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American College of Clinical Pharmacy Global Health Practice and Research Network's opinion paper: Pillars for global health engagement and key engagement strategies for pharmacists

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Abstract

The scope of pharmacy practice in global health has expanded over the past decade creating additional education and training opportunities for students, residents and pharmacists. There has also been a shift from short-term educational and clinical experiences to more sustainable bidirectional partnerships between high-income countries (HICs) and low- to middle-income countries (LMICs). As more institutional and individual partnerships between HICs and LMICs begin to form, it is clear that there is a lack of guidance for pharmacists on how to build meaningful, sustainable, and mutually beneficial programs. The aim of this paper is to provide guidance for pharmacists in HICs to make informed decisions on global health partnerships and identify opportunities for engagement in LMICs that yield mutually beneficial collaborations. This paper uses the foundations of global health principles to identify five pillars of global health engagement when developing partnerships: (a) sustainability, (b) shared leadership, (c) mutually beneficial partnerships, (d) local needs-based care and (e) host-driven experiential and didactic education. Finally, this paper highlights ways pharmacists can use the pillars as a framework to engage and support health care systems, collaborate with academic institutions, conduct research, and interface with governments to improve health policy.

KEYWORDS

ethics, global health, health systems strengthening, medically underserved area, developing country, pharmacy education

1 | INTRODUCTION

In the past decade, there has been a steady rise in pharmacist participation in global health experiences. The literature particularly highlights the growth within schools and colleges of pharmacy offering more opportunities to students around the world through formal and informal partnerships.[1] In addition, pharmacy residencies and fellowships are following similar trends with increasing global experiences being offered as part of the training. Global health is a newer engagement opportunity for pharmacy programs, and the profession in general. However, it has been a long-standing experience within medicine. There is much to be learned from medicine, which has been slowly transitioning from short-term mission experiences toward reciprocal partnerships with international institutions.[2-3] As high-income country (HIC) institutions and individual practitioners continue to advance collaboration with partners from low- and middle-income countries (LMICs), key engagement strategies can facilitate mutually beneficial partnerships that benefit institutions and the populations they serve.

The aim of this paper is to guide pharmacists from HICs in building sustainable, mutually beneficial collaborations with LMICs. To achieve this aim, we define global health and health equity, propose five pillars of global health engagement, and detail best practices in engaging health systems, academic institutions, research, and government and health policy organizations. The paper is intended for

institutions, pharmacists and students with global health interest or already participating in global health partnerships.

To our knowledge, this is the first paper describing a holistic view of pharmacist participation in global health focused on the entirety of the engagement process. This paper aims to fill that gap and represents the opinion of the Global Health Practice and Research Network (PRN) of the American College of Clinical Pharmacy (ACCP), which was established in 2015 with a mission to promote the clinical pharmacist's role in global health and to ultimately improve health worldwide. It does not necessarily represent an official ACCP commentary, guideline, or statement of policy or position.

2 | DEFINITION OF GLOBAL HEALTH AND HEALTH EQUITY

Before discussing best practices for engagement, it is necessary to define global health as it pertains to relationships between HIC and LMICs. The first articulated definition of global health, proposed by Koplan and colleagues in 2009, attempted to distinguish it from other areas of health, including international health and public health.[4] In response to the dialogue generated by the Koplan definition, Beaglehole and Bonita published a concise definition of global health in 2010 that emphasizes collaboration and action. They defined global health as: "collaborative trans-national research and action for

promoting health for all."[5] For the purpose of this paper, we are adopting the Beaglehole and Bonita definition of global health as it pertains to working in LMIC settings. Important aspects of these definitions include the building and promotion of health equity.

Health inequity is present in many countries around the world but is particularly prevalent in LMICs.[6] Equity, as defined by the World Health Organization (WHO), is "the absence of avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically".[7] Health inequities occur due to factors such as lack of political, social, and economic power. When pharmacists design global health programs or interventions, they should construct them with a focus on reducing these inequities in ways that are culturally appropriate, effective and sustainable.

While well-intentioned, many global health partnerships between HICs and LMICs can experience challenges in power dynamics, which shifts the focus away from equity and justice. One of the documented power differences is neo-colonialism, which has been discussed in the literature since the mid-20th century.[8] Neo-colonialism in global health can highlight issues of dependency and exploitation present between partners, where HIC partners, established in a position of power and resources, often put their own agenda, goals, and cultural assumptions first leading to diminished returns on capacity building for the LMIC setting.[9] Negative consequences of neo-colonialism

have been described when partners from HIC and LMIC settings overlook key infrastructure differences and have misaligned agendas, resulting in the exploitation of the LMIC population for HIC partner gains.[10] To help avoid these challenges and promote positive power dynamics, this paper proposes five key pillars for engagement between HICs and LMICs. An understanding of the pillars for implementation and engagement will also aid in the mobilization of the Beaglehole and Bonita definition of global health. The pillars, drawing from this definition, support positive global health engagement within pharmacy practice.

3 | DEFINING THE PILLARS OF GLOBAL HEALTH ENGAGEMENT

The ACCP Global Health PRN proposes the following global health engagement pillars: sustainability, shared leadership, mutually beneficial partnership, local needs-based care, and host-driven experiential and didactic education. The pillars were developed through research, discussion, and debate amongst PRN members experienced in global health. These pillars are designed to be used by universities, health institutions, non-governmental organizations, and private entities when developing partnerships between HICs and LMICs. Figure 1 outlines the pillars as well as their foundation in culturally appropriate
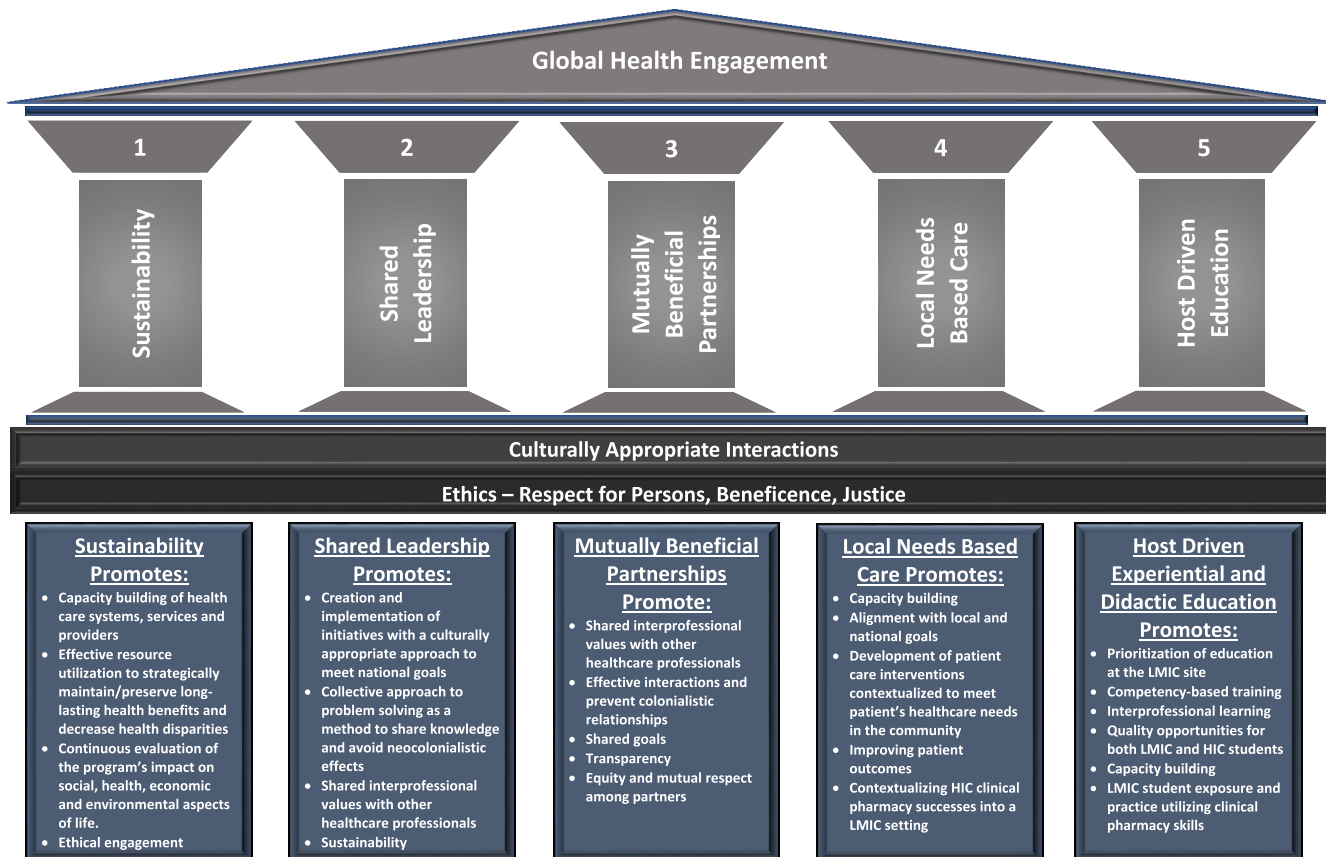

FIGURE 1 Global health pillars of engagement

interactions and on the ethical principles of respect for persons, beneficence, and justice. These principles were first promulgated in the Belmont Report [11] and were codified in the International Pharmaceutical Federation Statement of Professional Standards: Codes of Ethics for Pharmacists.[12]

Sustainability, by definition is "the ability to maintain a program and its benefits over time."[13] Sustainability in global health refers primarily to the maintenance of projects and programs that improve health within the low-resource setting, and contains within it the elements of beneficence and justice. If a global health practice is a one-time effort that has no supporting in-country partners, these principles can easily be derailed. The principles of beneficence and justice indicate that an LMIC group should receive benefits in proportion to the burden of hosting HIC partners. For example, if an LMIC partner serves to educate HIC health care students but does not receive the benefits of a more educated LMIC workforce or a sustainable health care facility to which patients can consistently receive care, then the practice could be considered an injustice.

Shared leadership involves respect for persons. As experts in their own communities and cultures, LMIC partners' knowledge and community trust should be recognized and they should be treated autonomously with the shared leadership and decision-making that a partner deserves. Shared leadership between HIC and LMIC partners assures a higher degree of cultural appropriateness, promotes shared equity when financial power is often in the hands of the HIC, and helps avoid situations in which beneficence or justice could be imperiled. Having shared leadership also empowers the LMIC host to voice concerns about feeling overburdened, having inadequate or inappropriate services or developing redundant projects.[14]

A *mutually beneficial partnership* incorporates all three ethical principles of respect for persons, beneficence, and justice. Collaborations that are rewarding for all partners help guard against colonialistic relationships of power imbalance.[2] Transparency is also of utmost importance in developing a partnership.[15] Additionally, awareness of costs and benefits to the LMIC partner is an important part of maintaining a mutually beneficial partnership.[16] Approaching programs with a holistic culturally sensitive view, and expanding programs beyond clinicians to include other professionals such as anthropology, public health, business, and law may help strengthen mutual benefit.[16]

Local needs-based care involves respect for persons and beneficence. The LMIC partner should identify their own priorities rather than having the HIC partner define their needs. When LMIC health care providers and the local community articulate their care needs, HIC partner contributions are more likely to help meet those needs.[17] This provides an obvious benefit to the LMIC partner, and increases the likelihood of project success. Successful sustainable projects ultimately lead to potential teaching and scholarship opportunities for all involved.

Host-driven experiential and didactic education involves respect for persons and beneficence. Adams et al suggest that equitable global health partnerships prioritize the education of trainees from the LMIC over HIC trainee education.[2] Without a host-focused and culturally sensitive educational outlook, there is a risk of a gap between the LMIC training needs and the training provided by HIC partners.[18] Some workforce training initiatives have also been criticized as narrow, donor-driven, short-term, knowledge-based, in-classroom only programs with high overhead costs.[18] Cancedda et al. have suggested that training should be competency-based and interprofessional to include clinicians, faculty, managers, and implementers.[18]

The global health engagement pillars embody the best practices for engagement and have been used to guide the selected engagement strategies subsequently discussed and programs described in the tables.

4 | ENGAGEMENT STRATEGIES

When working in global health and creating partnerships, there are a number of potential areas for engagement, which include the health system, academic institutions, research, and government and local leadership.

4.1 | Engaging with health systems

The WHO describes an effective health system as one that "is built on well-trained and motivated health workers, a well-maintained infrastructure and a reliable supply of medicines and technologies, backed by aid funding, strong health plans, and evidence-based policies."[19] Working to bring about lasting improvements in health system functioning forms the basis of health systems strengthening (HSS).[20] There is a great need for HSS in LMIC settings, where malfunctioning health systems inhibit progress in addressing health care challenges that lead to higher mortality rates.[19]

Pharmacists can drive HSS through effective interactions with LMIC health care systems. Successful pharmacist collaboration in HSS must be built on the pillars of sustainability, shared leadership, mutually beneficial partnerships, and local needs-based care to increase capacity and improve the health of individual patients and the community as a whole.[18,21] Developing long-lasting partnerships is essential for understanding health care barriers, articulating strategies to sustainably address these barriers, and to ultimately meet community health care needs. Effective engagement will lead to better coordination of activities best suited to local practice that meets local care needs.[21] Several examples of HSS in LMICs are outlined in Table 1.

The significant impact pharmacists have made on patient outcomes, especially in both communicable and noncommunicable diseases, is well-documented in HICs.[22] Pharmacists can learn from the successes in HICs and contextualize solutions to fit LMIC health care needs when possible. Specific areas of need where pharmacists can be of value include addressing clinical care and service delivery, human resources for health (HRH) and access to essential medicines. With proper utilization of the pillars, it is reasonable to expect pharmacist influence on patient outcomes in LMICs may be even greater than what has been seen in HICs.

TABLE 1 Health care systems strengthening publications highlighting successes in LMICs in clinical care and service delivery, human resources for health and the supply chain

	Health care systems strengthening publications	
	Citation	**Description**
Clinical Care and Service Delivery	Mekonnen et al[95]	This was a prospective study that examined the impact of having a pharmacist perform medication reconciliation in an emergency department of a teaching hospital in Ethiopia. The pharmacist participation significantly decreased discrepancies in medication lists and significantly decreased discrepancies that had potentially severe consequences.
	Pastakia et al[96]	This was a prospective study of the Bridging Income Generation with Group Integrated Care (BIGPIC) model in Kenya. It involved hypertension and diabetes screening, followed by linking patients to health care/microfinancing groups, where they were provided education and treatment, along with opportunities to use microfinancing loans for personal use. The model had a high rate of patients with diabetes and/or hypertension linked to care (70.3%) and a significant blood pressure decrease.
	Brink et al[97]	This was a prospective study highlighting the impact of pharmacists on antimicrobial stewardship in multiple hospitals in South Africa. A statistically significant reduction in antibiotic use was found in the study.
	Manji et al[98]	This was a retrospective chart review of warfarin management in an anticoagulation clinic in Kenya. Patients had an acceptable mean time in therapeutic range (64.6%) and low thromboembolism (5%) and major bleeding (1.25%) events overall. This demonstrated that the LMIC anticoagulation clinic was not inferior to anticoagulation clinics in HIC settings.
	Paulós et al[99]	This study highlighted the impact of a community pharmacy intervention in patients living with dyslipidemia in Chile. The study's control group received counseling, and the intervention group received a detailed treatment plan with regular follow-up. The intervention group participants showed a statistically significant decrease in cholesterol levels.
Human Resources for Health	Avong et al[100]	This was a pilot study, conducted in Abuja, Nigeria, that examined task-shifting HIV care for stable patients on 1st line antiretroviral treatment regimens to community pharmacies for medication dispensing and maintenance of therapy. The study results demonstrated a high prescription refill rate and care retention for patients managed by community pharmacies.
	Nelissen et al[101]	This was a pilot study, conducted in Lagos, Nigeria, that shifted hypertension management from physicians to community pharmacies using an mHealth tool. Five community pharmacies were selected to provide regular blood pressure measurements and lifestyle counseling. Pharmacists communicated with cardiologists using and mHealth tool. Study results demonstrated a decrease in systolic blood pressure and an increase in blood pressures within the target range.
	Pastakia et al[57]	This was a publication describing a partnership between Purdue University School of Pharmacy and University of Nairobi in Kenya where pharmacy students from each university are paired (or twinned) together in a mutually beneficial way, allowing the twinned students to learn from each other and provide clinical pharmacy services in a sustainable way. A later publication demonstrated the clinical impact of the twinned American and Kenyan pharmacy students (Pastakia et al[54]).
Supply Chain	Molemodile et al[102]	This was a pilot intervention conducted in Kano, Nigeria that streamlined the vaccine supply system from 4 steps to 3 steps overall. Within the Kano state, areas with adequate supply of vaccines was 98% at the end of a 10-month period. The adequate supply of vaccines was only 21% prior to the pilot program.
	Manji et al[103]	This was a pilot study of three revolving fund pharmacies (RFPs) in western Kenya demonstrated increased medication availability in all three sites (Site 1 increased from 40% to 90%; Site 2 increased from 36% to 94%; site 3 increased from <10% to 91 The RFPs were set up alongside government pharmacies and provided medications when the government pharmacy was out of stock.
	Barrington et al[104]	This was a pilot study of the Short Message Service (SMS) for Life malaria medication access project in 3 remote districts of Tanzania. The project used SMS messaging to assess the weekly stock of anti-malarials in the 3 districts. The project resulted in a lower stock-out percentage (from 78% to 26%).

4.1.1 | Addressing clinical care and service delivery

With the shortage of health care workers, the rising prevalence of NCDs in LMICs, and the higher likelihood of premature death in LMIC settings, pharmacists should utilize their expertise in creating successful alternative care programs to address these needs in LMICs.[23-25] However, there are a number of challenges faced when attempting to duplicate HIC outcomes in LMIC settings. First, pharmacy education and practice in LMICs are primarily product focused and prioritizes supply chain management over the use of clinical pharmacy skills.[25] Second, pharmacists lack recognition by other health care professionals as clinical practitioners capable of impacting patient outcomes.[26] Last, insufficient health care infrastructure and limited access to drug information resources can also pose difficulties for pharmacists in LMICs, especially when needed to fulfill the role of ensuring the safe administration of medicines, monitoring of adverse effects, and prescribing errors and the quality of medications administered to patients.[26-28]

In order to ultimately contextualize the successful interventions from HICs to LMICs, pharmacists must utilize tools and approaches from implementation science, which is the translation of evidence-based health care interventions into actual practice.[29] LMIC health care delivery needs can be determined by working collaboratively with local leaders and using a combination of locally relevant research and evidence-based medicine. For example, rational medicine use, or using the five rights (right drug, right dose, right patient, at the appropriate time, and using the correct route of administration) enhances patient access to appropriate efficacious, safe, and affordable care.[30] Because communicable diseases remain a prevalent cause of mortality[31] and antimicrobial resistance is on the rise in LMIC settings,[32] a specific area for initial focus could be rational antibiotic usage, which may translate into cost savings and improved outcomes.[32-34] An estimated 60% of antibiotics are sold over-the-counter without written prescriptions globally, making pharmacists in LMIC community settings vital for educating patients on the proper use of medications, encouraging patient adherence, and promoting evidence-based therapy selections.[33] Infectious diseases is an area of expertise in HIC as evidenced by infectious diseases pharmacist implementation of antimicrobial stewardship programs, residencies and integration into all levels of the health system.[34] Through the HIC partner's knowledge of implementation and monitoring and evaluation of stewardship programs, these pharmacists can provide guidance and collaborate with LMIC clinicians and other key stakeholders to develop solutions with appropriate use of available resources. The unique medication expertise of pharmacists, whether in an inpatient, outpatient or community setting, make them a valuable resource for optimizing medication use as active participants on multidisciplinary health care teams.[35-36] Examples of the impact of pharmacist inclusion in-patient care in LMIC settings are outlined in Table 1.

When designing an implementation intervention for health care delivery, pharmacists can utilize a variety of tools to evaluate or enhance the process. Pharmacists can employ the Care Delivery Value Chain tool to identify and contextualize the problem, understand the shared infrastructure associated with the disease state of interest or the service delivery issue, and then determine the best intervention to implement based on the value as perceived by the patient, clinician, and government.[37] Technological advances, or informatics to support real users, represent another tool for advancing health care delivery in LMIC settings. For example, clinical decision support tools and point-of care diagnostics have an important role in improving clinical care in LMICs. Informatics systems that can assist with public health surveillance and epidemiologic research allow for gathering of data that could be used to make LMIC specific decisions and recommendations. Were and colleagues outlined several different types of informatics systems as well as ideal characteristics of each.[38] Although technology can be useful in improving care, it only represents part of the solution for addressing barriers to global health delivery and increases the responsibility of both HIC and LMIC partners to fully understand the health care environment where technological advances are deployed. Regardless of implementation site, disease state or community, health care delivery by HIC partners must be conducted with shared local leadership based on local needs with the consideration of sustainability at the forefront.

4.1.2 | Addressing HRH

The WHO estimates that shortages of all health care workers, including pharmacists and pharmacy personnel, will reach 12.9 million by 2035.[23] Disparities in the number of pharmacists exist in LMICs when compared to HICs and the gap is increasing despite LMICs bearing a higher disease burden.[39,40] Pharmacist migration—or "brain drain"—contributes to the slow growth of pharmacists in LMICs because of higher earning potential in HICs as well as the ability to apply higher-level skills that are infrequently supported by LMIC health systems. Even though developing the health workforce is one of the six crucial system building blocks within the WHO health system framework, inadequate HRH and inefficient utilization of HRH both contribute to the current health workforce crisis.[41-43] Both obstacles handicap LMIC health systems in maintaining adequate medication supply chains and appropriate infrastructure. Pharmacists engaging in capacity building and HSS in LMICs should support workforce expansion of all pharmacy cadres, expansion of clinical services through the use of evidence-based medicine and access to drugs and infrastructure development.

One key strategy for optimizing the current pharmaceutical workforce is task-shifting, which involves training lower-skilled workers to perform technical tasks allowing higher-skilled workers to focus on activities more in-line with their training.[44] However, strategies must be in place to ensure that all health care workers have adequate training and supervision to effectively achieve their goals to improve public health. Strategies for increasing the positive impact of task-shifting include: (a) identifying areas of work that can be clearly operationalized compared to those requiring analysis, (b) providing education and training to assure that lower level workers have the required knowledge and skill set, and

(c) advocating for policies that empower pharmacy technicians and assistants to take on technical roles, including dispensing and supply chain management.[44]

Twinning, or pairing health care professionals and academic faculty in LMICs with those from HICs for the purpose of skill transfer, is another potential strategy for addressing the health care workforce crisis. This concept is built upon the development of mutually beneficial partnerships between organizations in differing settings, whose success can be improved with heightened cultural awareness. Twinning involves developing a close relationship between the twinned individuals with specific objectives, while being flexible enough to also allow for unscripted development.[45] There are a number of examples in the literature of using this concept in health care, specifically relating to medicine, nursing and, midwifery programs.[45] Examples of programs utilizing task-shifting or twinning can be found in Table 1.

4.1.3 | Addressing the supply chain and access to essential medicines

A major component of effective care delivery is access to medicines. The WHO Model List of Essential Medicines is a biennially updated list of safe and effective medicines required to address priority health needs.[46] In LMICs, essential medicines continue to be inconsistently available. Additionally, it is important to assure that all available medications are used appropriately. Unfortunately, the WHO estimates that nearly 50% of prescriptions are unnecessary, incorrect, or taken improperly.[46,47] The cost of essential medicines also accounts for a substantial personal expenditure. Although data is limited, less than 36% of essential NCD drugs are considered both available and affordable in the public sector of LMICs.[48] Additionally, the median availability of lowest-priced generics in health facilities in LMICs fall well below the 80% WHO target.[49] Medication quality is also an important element of medication access, as the rates of falsified and substandard medicines (FSM) are estimated at 13.6% and 28.5% in recent reviews.[50,51] Poor medication quality has detrimental effects on death and disability and results in significant economic loss.[51-54]

Ensuring access, quality, and affordability to all essential medicines requires that barriers and implementation gaps at all health system levels be adequately addressed. Opportunities for pharmacists to address these challenges are numerous, and recommendations are highlighted in a thorough report provided by the Lancet Commission on Essential Medicines.[30] Pharmacists can champion global collaborative monitoring and reporting of access to essential medicines, which currently occurs infrequently.[30,49] This type of reporting is important to continuously apprise health care professionals, researchers, and policy makers of current levels of access, persisting gaps, and opportunities for improvement. In addition, national, regional, and global professional associations could advocate for necessary policy and implementation efforts needed to expand access to quality essential medicines. Last, the unique

demand-side and supply-side contextual challenges that exist in different global settings may require pharmacists to collaborate in implementation science research to have an informed response to address these challenges.

Many opportunities for pharmacists from HIC settings to engage in HSS, specifically through efforts to improve HRH through training and the transfer of skills, as well as working to improve patient care delivery through innovation and improved access to medicine. Engaging with academic institutions from different countries is another common and long-standing approach for partnerships in global health.[54,55]

4.2 | Engaging with academic institutions

Academic partnerships provide diverse engagement opportunities in service, research, and didactic and experiential education for faculty, students, and practicing pharmacists. Engagement allows for bilateral learning, improved sustainability, and building workforce capacity.[55] An example of this on a large scale is the US-Thai Consortium that has partnered US and Thai pharmacy schools since the mid-1990s to share resources and collaborate on shared goals (education, research, and engagement/service).[56] Another example is the Purdue Kenya Partnership, which has partnered with a single institution within Kenya since the early 2000s to achieve its tripartite mission of health equity and sustainability through care, teaching, and research.[57] The continued growth of interest in global health by pharmacists and HIC pharmacy schools will likely parallel a rise in partnerships with academic institutions. These partnerships, facilitate collaboration amongst students, practicing pharmacists, and academicians. Successful engagement with academic institutions should be built on all five pillars.

Several unique challenges when partnering with academic institutions in LMICs, including inadequate representation of each partner's voice, potential language barriers, insufficient resource use, poor harmonization, and misguided assumptions.[18,58] Anecdotal evidence from experience working with or developing academic collaborations in LMICs, highlights additional challenges, including a lack of pharmacy schools or pharmacy faculty partners, shortage of faculty, lack of funding, and control of funding, accreditation standards that do not align with current practices, large patient and education burden with fewer resources, poor access to teaching and laboratory space, shortage or lack of research training and infrastructure, and different teaching styles (didactic focused vs experiential/practical focused).[3,18,59,60] Table 2 highlights example partnerships documented within the literature that have addressed some of these challenges and engaged using the pillars as a guiding focus.

4.2.1 | Building academic partnerships

When beginning a collaboration with an LMIC institution, each partner should thoroughly evaluate the other to ensure mutual benefit and avoid early pitfalls. Partnership evaluation tools have been published that aim to address broad institutional factors and ensure a

TABLE 2 Academic publications highlighting partnerships, experiential training opportunities, curricular needs pre- and post-international experience training for HIC learners and post-doctoral training programs

	Academic publications	
	Citation	**Description**
Academic partnerships	Schellhase et al[60]	The authors highlighted two different tools used to evaluate international partnerships. The two partnership assessment tools offer a starting place for beginning conversations and identifying strengths and areas of possible disconnect or concern. The authors pointed out that each partner needs to be evaluated and assessed individually even with the use of the tools.
	Alsharif et al[1]	This was a review article discussing current practice guidelines for how to build and maintain global health APPEs based on literature and consensus gathering.
	Anderson et al[105]	This report highlighted the similarities and differences in pharmacy education around the globe.
	Anderson et al[106]	This article highlighted the start of the FIP UNESCO-UNITWIN program which aimed to partner academics from around the globe to enhance pharmacy education in LMICs and specifically within Africa. It outlined ways to use connection and sharing to aid in program development.
	Anderson[107]	This report highlighted some of the challenges and opportunities for increasing academic capacity for pharmacy schools and the profession at large globally. It pointed out the need to continue aligning educational content that aligns with the practice environment within the stated country.
Curricular additions/ considerations	Bhagavathula et al[108]	This was a cross-sectional study that aimed to identify pharmacy students' perception of research in India, Pakistan and Malaysia. The study surveyed 348 students and identified the majority had no research experience but were interested in pursuing a research project. They concluded that students would like to participate in research to advance their writing skills and contribute to the scientific literature and that it should be incorporated into their education.
	Gelayee et al[109]	For this study, pharmacy students in Ethiopia were surveyed to investigate pharmacy students' provision of health promotion counseling during their community pharmacy rotation. The survey results highlighted the experiential training coupled with intentional inclusion of health promotions activities/practice within the curriculum are a good combo for learning. It also highlighted the need for having practice opportunities within the curriculum before experiential training to help the students gain confidence and skills before working with real patients.
	Elnaem et al[110]	This study utilized a survey to assess pharmacy students in Malaysian pharmacy schools' views and perceptions toward cardiology practice due to the high rate of cardiology disease within the country. The students had positive views of incorporating cardiology as a stand-alone topic/module. Authors also provided a conclusion that Malaysian pharmacy schools should offer clinical learning with a focus on topics/ailments that align with the public health needs of the country.
	Law et al[111]	This study surveyed pharmacy students from Namibia, Zambia and Zimbabwe to gain insight into their attitude and interest in public health activities. The majority of students had interest in pursuing public health activities and felt they needed additional focus on these skills within the curriculum.
	Banneheke et al[112]	This was a descriptive study of managers/supervisors working in Malaysia aimed at identifying characteristics of health professional students that prepare them for clinical practice. Pharmacy supervisors comprised 48% of the sample. Study personnel showcased professionalism and willingness to learn were the most important characteristics and suggested these should be further emphasized in curricula.
	Tomlin et al[113]	For this study, authors surveyed students returning from an 8-week global health APPE in Kenya. The majority of respondents experienced signs and symptoms of reverse culture shock. They also noted that even though they had support systems in place, they would have liked additional resources to help them with the re-entry process.
Experiential education	Childs-Kean et al[114]	This article highlighted the international experiential options offered by the University of Florida. It highlighted how both short and longer-term international experiences can be used to meet curricular learning objectives while offering students the opportunity for first-hand international experience.
	Bhagavathula et al[115]	This was a prospective survey aimed identifying pharmacy students from India's experience on clinical rotations and the mentoring they received. This study

TABLE 2 (Continued)

	Academic publications	
	Citation	Description
		highlighted a continued need for clinical mentors to demonstrate clinical practice and patient-centered activities within an experiential environment.
	Mendonca et al[116]	Authors in this study utilized an autoethnographic qualitative study approach to evaluate Brazilian pharmacy students' and preceptors' perceptions of clinical competencies needed for delivering comprehensive medication therapy management. This study also highlighted the use of experiential training as a teaching opportunity for students to manage real patients.
	Peterson et al[117]	This study highlighted the benefits provided to pharmacy students when they participate in an international internship. The authors highlighted nine distinct themes identified from this study which included: cultural awareness, collaboration, communication, clinical skills, knowledge, adaptability, compassion, confidence, and personal growth.
	Dornblaser et al[69]	This review was conducted to identify current practices for identification of qualified preceptors and interested students for international/global APPEs. It also provided recommendations based on current practice to aid in preceptor selection and development to ensure the highest quality experience for learners.
	Wietholter et al[118]	This article highlighted the first three years of an international APPE offered in partnership between West Virginia University School of Pharmacy (WVUSOP) and Nelson Mandela Metropolitan University in South Africa. The authors concluded that this experience offered value to the WVUSOP curriculum and provided student participants a unique opportunity to enhance their direct patient care skills and cultural competence.
	Arif et al[119]	This was a review article that identified barriers encountered by schools and colleges of pharmacy that provide international APPEs. There is also discussion about the different APPE formats utilized. The authors identified the large and private institutions may have more barriers to overcome when creating sustainable partnerships.
	Chargualaf et al[120]	This article highlighted the impact of layered learning (clinical pharmacist, PGY-2 oncology resident, APPE students) on pharmacy practice at a hospital in Ethiopia.
HIC Pre-departure education	Covvey et al[121]	This article utilized a delphi process to identify a core set of learning objectives that can be used for global health courses across universities. They can also be used to unify course content and align pharmacy education around the topic of global health.
	Poirier et al[122]	This article highlighted the development and implementation of an online global health course. The course was able to assist in enhancing student perceptions about their global health knowledge.
	Bailey et al[54]	This article documented available global health offerings in accredited US schools of pharmacy as of 2016. This included programs with global health courses, global health degrees and also global health APPEs and mission trip experiences.
	Addo-Atuah[123]	This article highlighted the development and implementation of a global health care elective course offered to Doctor of Pharmacy students, with a course goal of preparing participants to work in global health environments.
Training programs	Miller et al[124]	This article highlighted the creation of a global health residency program based in Eldoret, Kenya. This residency program was developed through an academic partnership and employed US and Kenyan trained residents. The outcomes from this training program included development of new patient care services and employment opportunities.

sustainable, lasting partnership.[60] In addition to utilizing partnership evaluation tools, the International Pharmaceutical Federation (FIP) has published the Pharmaceutical Workforce Development Goals (WDGs), which aim to build the pharmacy workforce around the world and can be used to provide an additional framework to identify areas for specific collaborative efforts.[61] Several WDGs support academic engagement partnerships between HICs and LMICs, such as: the concept of helping train others to work across difference, academic capacity, foundation training, advanced and specialist development, competency development, continuing professional development strategies, service provision and workforce education and training, and workforce intelligence.[62] As partnerships are developed, it would be advantageous to map efforts and activities to the WDGs.

4.2.2 | Teaching

Within educational partnerships, there are opportunities for engaging learners from both HICs and LMICs. To this end, training and education is needed within both settings.[63]

Teaching LMIC trainees

One way HIC partners engage and address challenges is through assistance with either didactic or experiential teaching.[54,62,64] Education activities can be focused within a college of pharmacy but may also exist with other health professions, the community or pharmacy extenders like technicians.[44,45] With the differences in health-systems mentioned above, educational content should match local standards of care and include discussions and examples using medications readily available within the setting and international- or country-specific disease state guidelines and treatment algorithms when available. Incorporating innovative strategies used in HIC that transition education from didactic instruction to more active and practical learning will allow pharmacists to improve, increase and retain their skills.

Another way HIC partners can work with an LMIC partner is to support their curricular shift from a product-focused profession to a patient-centered service while respecting the local educational model, manpower needs (eg, need for industrial pharmacists), and job opportunities for clinical pharmacists. FIP recommends "each country take steps to prepare their pharmacists and healthcare systems for collaborative pharmacy practice" at the earliest opportunity.[64,65] This includes new training programs, but also includes elevating pharmacy practice through continuous professional development activities that are relevant to the setting and recognized by the appropriate regulatory bodies.[18,64,65] Importantly, pharmacy training programs in LMICs cannot be modeled only from HICs, because limited access to medicines and diagnostics as well as health care worker shortages may require pharmacists to take on greater roles than traditionally seen in HICs.[66,67] No matter the type of training program created, all five pillars can be employed to create training programs that are contextualized to local needs both for education and care.[62,65] See Table 2 for additional examples.

Teaching HIC trainees

Outside of providing support for LMICs curricular needs, HIC academic partners benefit through the placement of Advanced Pharmacy Practice Experience (APPE) learners on global health experiences. These experiences provide documented benefits for participants including: enhanced knowledge of cultural sensitivity, disease state management, and social determinants of health; improved skills in professional adaptability, communication, problem solving, self-awareness and empathy; and better attitudes towards cultural appreciation, working with limited resources and overall confidence.[54] These knowledge, skills, and attitudes gained through a global health experience can be mapped back to the 2016 Accreditation Council on Pharmacy Education (ACPE) standards, specifically addressing Standard 4.[67]

As evidenced above, global health experiences allow for extensive benefits for HIC learners but may present an undue burden to the host country and institutions. Problems faced when global health experiences are administered poorly include the following: (a) Waste of human resources, specifically clinicians redirecting time from local teaching and care to HIC learners, (b) Potential harm to the community through learners practicing beyond their training, (c) Lack of knowledge of culturally appropriate health care practices and (d) Moral distress experienced by the learner.[68]

Fortunately, these experiences have led to the development of lessons learned to promote a productive experience for all. First, the establishment of a memorandum of understanding between institutions, in addition to other aspects, can clarify the responsibilities of each partner as it relates to HIC trainees, allowing preparation and possible mitigation of the use of in-country resources.[1] Examples of how HICs have helped address student placement assistance have been the employment of HIC funded faculty within the LMIC institution, HIC faculty traveling with their students during each visit and sustained support of a local host.[69] Second, given the practice and cultural differences, HIC learners will experience, pre-departure training is essential to ensure students are active participants within the learning environment.[1,69,70] In an article by Alsharif et al, various issues are reviewed to improve the preparedness of participants in global engagement experiences, such as, student expectations, travel logistics, housing and safety concerns, potential health-related issues, and host country considerations.[1] The Purdue Kenya Partnership has developed a global health preparatory course which aligns specifically with the variety of international APPE opportunities and it offers with the goal of reviewing the above-mentioned topics in addition to improving the knowledge of local disease states and cultural practices.[70] Last, common challenges students experience during global health opportunities include homesickness, poor performance, and illness (physical and mental).[69,71] HIC partners should have organized strategies to manage these concerns, which may include regular debriefing on clinical experiences, ethical issues, and cultural awareness and growth.[69,72] Strategically designed experiential opportunities coupled with mutually beneficial partnerships and shared goals can lead to a positive learning experience for trainees, which can be linked to a higher likelihood of pursuing careers advocating for underserved populations.[73]

Partnerships with academic institutions provide opportunities for pharmacists, students, and faculty to share ideas and enhance learning within both HIC and LMIC settings. Outside of the aforementioned curricular engagement, pharmacists and students can also work with either academic institutions or health care organizations to conduct and promote research to further enhance the learning and practice environments within LMICs.

4.3 | Engaging in research

Research in LMIC settings is needed to better understand population-specific outcomes, yet deficiencies in funding and capacity often lead to inequities in research partnerships between HICs and LMICs.[74-75] Engaging in research, whether with academic, government or health systems can improve local understanding of disease states and outcomes. It can also improve health systems and build capacity,

especially when supported by the pillars of sustainability, shared leadership and targeting local care needs.

4.3.1 | Challenges with research in LMIC settings

The international health research agenda is often led by large global health research entities and not driven by national or local needs with only about 50% of global health research conducted by individuals from LMICs.[76] More often large-scale funders who have an investment in how the research is conducted or publicized are responsible for study design and implementation.[77] These entities need to have an understanding of LMIC patients and their concerns and needs.[77] Community representatives should be engaged when determining the research agenda; it should be locally relevant, show commitment to good scientific practice, and consider appropriate language and culture.[76,78]

4.3.2 | Research capacity building

Research capacity building can aid in the development of a culturally appropriate, internal research agenda that is sustainable through the local clinicians, researchers, and government.[76,78] Training including Research Ethics Committees (RECs), the study process, and publication of results can make LMIC researchers more competitive for large scale funding.[76,79] The Canadian Coalition for Global Health Research's Partnership Assessment Tool was developed for partners to work through a formalized process to agree on research implementation from knowledge transfer and dissemination to capacity building.[80] Mentorship, but more importantly, partnership, can also provide good leadership to move research forward and promote a sense of fairness, trust, and judgment amongst researchers.[80]

4.3.3 | Research ethics committees and conducting research

When conducting global health research, one should consult with the RECs within each country to best understand the composition of the REC and the processes involved.[79,81] Timelines and necessary documentation may vary greatly between RECs. There is often a perception that LMICs do not meet international standards and they often rely on international guidelines rather than their own.[79,81] There may be limited communication between RECs in regards to priorities, study modifications, and which REC should be the lead; although most concur it should be the REC in which the research is occurring.[79,81] The researcher must be aware and be diligent about maintaining the research objectives and appropriate reporting.[77] Loss of study confidentiality can result in lost job opportunities and reduced professional credibility of researchers and social ostracism, and marginalization of participants.[82] Researchers can improve this by increasing data collection time or sites, discussing with study participants for a culturally acceptable solution, having a confidentiality agreement with

stakeholders, or rendering all data and sites anonymous.[77,82] Study design, analysis, and publication are often fraught with complexities due to competing organizations interest in positive results.[83] In addition, lack of training on appropriate use of reporting data without plagiarizing and assigning appropriate authorship are important issues that need to be addressed.[84] Researchers should also be mindful of the authorship with regards to including international partners and the role they serve.[85] Those engaged in research between the HIC and LMICs should learn about each other's REC process and communication expectations, identify capabilities and potential barriers, and harmonize the process when working with multiple RECs.

Many global health programs align funding and the determination of success through the measurement of research opportunities and outcomes. In this issue of the *Journal of the American College of Clinical Pharmacy*, is an example of a successful research program built upon a strong foundation of HSS activities and a commitment to teaching. Upholding the five pillars (Figure 1) when engaging in HSS activities globally will shift the measurement of the efficacy of global health programs towards improving target population clinical outcomes. Academic programs can then layer training and research opportunities around these collaborative and bilateral interventions, which will likely lead to richer experiential and research outcomes in the future.

4.4 | Engaging in government and health policy

Engagement in health systems, academia, and research are often united by their participation with or regulation by the government. For example, new strategies implemented in the health system to improve patient care or locally relevant research showing new findings can be used to inform government agencies to help drive national health policy and funding and determine local guidelines for disease states. In addition, many government sectors serve as an accreditation body for educational programs and regulate the health care workforce. Even though LMIC governments face numerous obstacles, engagement within the government can lead to opportunities to improve health systems, training, and contributions to human resources for health and policy development.

4.4.1 | Challenges with government institutions and health policy in LMIC settings

Within LMIC governmental health sectors, various challenges related to health policies continue to exist. They include, but are not limited to (a) health care financing, (b) supply chain management, (c) health regulations, and (d) monitoring and evaluation mechanisms. First, financing in pharmaceutical care and health care to ensure equitable access to affordable health care services and essential medicines for all patient populations is extremely crucial. However, despite ongoing efforts, suboptimal funding for health care financing is still evident, with low annual expenditure on health, coupled with other competing national priorities and increases in care service demands in many LMICs.[86] Better

governance and leadership development in this area is much needed to overcome barriers such as suboptimal health budget allocation, poor management of public health budgets, and inefficient use of resources.[87] Second, in regards to supply chain management, the existence of parallel pharmaceutical supply chain systems have led to medications being supplied only for specific disease states, instead of a comprehensive system that take into consideration an integrated approach to create effective and cost-effective solutions for the lack of essential medicines in LMICs.[88] Poor procurement and stock management practices have also contributed to a culture of limited transparency, governance, and resistance to change.[88] Third, a lack of robust physical infrastructures, in combination with weak regulations and regulatory bodies have led to the introduction of FSMs.[89-91] Currently, these low-quality medications plague LMICs and adversely affect patient populations. Better regulatory infrastructure is much needed to battle the above-mentioned FSM burden. Last but not least, adopting effective monitoring and evaluation (M&E) mechanisms to continuously assess progress in health care is of equal importance of implementing any health care interventions. It is commendable that many developing countries have adopted M&E systems, however, many of these systems are inconsistent in providing the right data at the right time to key stakeholders and policy makers. In the absence of effective monitoring, evaluation, documentation, and reporting, cases of mismanagement of health care resources can persist.[86,88]

4.4.2 | Engagement strategies in the government

Engaging with a government's health sector to affect policy and strengthen systems at a national or regional level is not an easy task with very few direct paths to attaining that goal. However, there are primary steps that each pharmacist can take. First, when engaging with governmental settings in LMICs, pharmacists will want to be educated on the structure of local, regional, and national government agencies and health systems. Becoming familiar with the setup will allow better understanding on local health care and how patients afford health care services. Various agencies may be the driving force behind policy, implementation, and management decisions for particular disease states (ie, tuberculosis, HIV, malaria, etc.). Experience with local needs-based care shapes pharmacist understanding of how the population interacts with the health care system and how private vs public health care structures are established. For example, pharmacists may need to interface with government systems to understand how to connect patients with appropriate care, especially when participating in short-term medical missions. All health systems and populations have unique challenges, which drives the need for contextualized global health engagement in governance and policy.

The second step to engaging with government health systems is through informed practice experiences, allowing practice to inform policy. By engaging in the health system, a pharmacist can gain valuable experience and an understanding on how to address various challenges. Pharmacists who want to develop formal training programs in LMIC settings may first need to develop key infrastructure and gather local stakeholders. With local partners, pharmacists can engage regulatory bodies to gain accreditation and understand local requirements which will add value to an educational program. In Rwanda, the Ministry of Health guided the Human Resources for Health Program in determining the educational needs of the health professional programs being developed, managed the funding for the program and helped to create a sustainability plan which included

FIGURE 2 Recommendations for global health engagement

public sector contracts for graduating health professionals.[92,93] In addition to integrating with universities and other training programs, many scientists may have unique skills or innovations that can help address the challenges faced by regulatory authorities. For example, with poor regulatory systems in LMICs, substandard or counterfeit medication detection is an ever-growing problem. In Kenya, scientists from the University of Notre Dame are working with the national pharmacy board to integrate a paper analytic device, which has been locally tested and validated, requires no electricity and minimal expertise, for qualitative testing of suspected poor-quality medicines.[94] Utilizing a memorandum of understanding can also help to ensure that all parties recognize their role for a mutually beneficial partnership. The local experience a pharmacist acquires identifying and addressing health challenges can be spread through advocacy and informing key political stakeholders.[95]

Creating a relationship with LMIC governing bodies through direct involvement in a HIC government institution through particular expertise or direct employment is another method of engagement. For example, in the United States, the United States Agency for International Development (USAID), the President's Emergency Plan for AIDS Relief (PEPFAR), the President's Malaria Initiative (PMI) and the Peace Corps are organizations within the U.S. government that provide global health opportunities, which often directly engage with LMIC Ministries of Health. Involvement or employment through international health organizations, such as the WHO, Global Fund or Gates Foundation is also an avenue into working directly with health policy and governance. Established and growing areas in global health governance include supply chain management, climate change science, and immunization efforts.

5 | CONCLUSION/FINAL THOUGHTS

LMIC health systems face many challenges, including severe shortages of health care workers, a product-focused pharmacy workforce, poor access to quality medicines, limited academic capacity to train pharmacists, and limited published literature from LMIC settings to inform practice. Pharmacists from HICs and LMICs, through collaboration, can confront many of these challenges and significantly impact health systems and patient outcomes around the world. However, these collaborations should follow best practices to provide benefit to all involved, rather than focusing primarily on the positive experience of the HIC partners. Effective engagement is built on a foundation of ethics and cultural sensitivity as well as the five pillars of sustainability, shared leadership, mutually beneficial partnership, local needs-based care and host-driven experiential, and didactic education. By contextualizing the successes of HIC pharmacy practice into LMIC settings, and with proper utilization of the pillars, it is reasonable to expect pharmacists influence on patient outcomes in LMICs to be even greater than what has been seen in HICs because of the challenges faced in LMIC settings. However, if not aligned with the pillars, programs can unintentionally cause harm to patients and health systems through unethical, culturally insensitive, and short-sighted practices. For this reason, the ACCP Global Health PRN supports implementing programs,

as outlined in Figure 2, that maximize the value of pharmacist engagement in global health, specifically in the areas of health systems, academic institutions, and government and local leadership. It is therefore prudent for current global health programs, whether short-term or continued longer-term engagement, to align s as closely to the pillars as possible. Newly developing global health programs should do the same. Although outside the scope of this paper, local/ global health, or focusing on health care for vulnerable populations regardless of their location, may provide additional and more sustainable opportunities to teach and practice global health skills that fit well with the pillars of engagement and should be considered as well.[75] In conclusion, the ACCP Global Health PRN desires to maximize the impact of pharmacists in global health, and supports the use of the pillars of engagement to guide global health program development and implementation.

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