

Academic Center Partnership with Health Department and Church to Rapidly Deploy COVID-19 Vaccine POD Reaching Underserved Populations

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Abstract

The COVID-19 pandemic has disproportionately impacted people of color, underscoring the importance of equity in the public health response. The Duquesne University Center for Integrative Health (DUCIH) is a university-wide center focused on training future practitioners and improving health equity in the Pittsburgh region. DUCIH's initial pandemic response included a virtual adaptation of community health programs and supporting partners' testing and vaccination efforts. In March 2021, the Allegheny County Health Department (ACHD) asked DUCIH to establish a vaccine Point of Dispensing (POD) at Central Baptist Church in Pittsburgh's Hill District, to reach underrepresented populations. DUCIH engaged the Schools of Health Sciences, Nursing, and Pharmacy and multiple university offices to recruit an interprofessional team of 263 volunteers. From March to June 2021, the POD administered 5,652 vaccines in an underserved neighborhood, with a majority of doses administered to people of color, meeting the POD's aim. This university-church partnership has continued with vaccine clinics and health screenings. This case study shares lessons for rapid response to public health emergencies

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through university-wide collaboration with community partners. Universities with health science schools should cultivate relationships with local health departments to promote awareness of these capabilities.

Keywords: COVID-19, vaccine equity, vaccine point of dispensing (POD), community engagement, community-academic partnership, academic health department, interprofessional education

Introduction: The Challenge and Potential Consequences

The 2019 coronavirus pandemic has had a disproportionate impact on people of color. Rates of laboratory-confirmed COVID-19-associated hospitalizations within the Centers for Disease Control and Prevention's (CDC) COVID-19-Associated Hospitalization Surveillance Network (COVID-NET) 14-state catchment area, adjusted for age differences between populations, were more than 2.5 times higher among Non-Hispanic American Indian or Alaska Native, Non-Hispanic Black, and Hispanic or Latino people than among Non-Hispanic White or Non-Hispanic Asian or Pacific Islander people between March 1, 2020, and September 18, 2021 (CDC, 2021b). CDC National Center for Health Statistics (NCHS) data also show disparities in age-adjusted COVID-19 death rates between racial and ethnic groups. Hispanic people make up 35.30% of COVID-19 deaths despite comprising only 19.40% of the U.S. population, Non-Hispanic Black people 22.60% of deaths but only 12.70% of the population, Non-Hispanic American Indian or Alaska Native people 2.60% of deaths but 0.70% of the population, and Non-Hispanic Native Hawaiian or Other Pacific Islander people 0.70% of deaths but 0.20% of the population (CDC, 2020b).

Consequently, equity in COVID-19 vaccine distribution has been an articulated priority of the CDC (CDC, 2021a). Specifically, the CDC identified activities to “build community capacity to reach disproportionately impacted populations with effective culturally and linguistically tailored programs and practices...” and “support capacity building for COVID-19 vaccine distribution and administration by establishing partnerships with organizations including federal, state, local, tribal and territorial agencies, national non-governmental, private sector partners, and community-based organizations” as important steps toward reaching this priority (CDC, 2020a).

Simultaneously, COVID-19 has posed disruptions to the functioning of communities due to mitigation measures (CDC, 2020c). Among these disruptions, health professions learners' participation in clinical rotations and community-engaged health programs was restricted

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throughout the United States in 2020 due to governmental stay-at-home orders, healthcare organization and community partner policies, and university policies (Fuller et al., 2020; Rose, 2020). Experiential learning is an integral component of health professions students' development of clinical competence and kinesthetic skills. The degree of the pandemic's disruption of clinical training varied among disciplines and the clinical sites students were assigned to.

For example, physician assistant and nursing students assigned to emergency departments were not permitted in these high-volume environments early in the pandemic, in some cases delaying graduations because students could not complete the required numbers of hours or patient encounters. Similarly, inpatient facilities with lower-acuity patients had lower censuses, often resulting in less capacity for students. From Spring to Summer 2020, many hospitals canceled elective surgical procedures, further limiting learning opportunities. Collectively, these situations had the potential to negatively impact student progression through their educational programs and the depth of the learning experience.

Duquesne University Center for Integrative Health

The Duquesne University Center for Integrative Health (DUCIH) is a university-wide, interdisciplinary center whose mission “is to train the next generation of practitioners who will address rural and urban health care disparities and thereby improve health equity in the Pittsburgh region and beyond” (“Center for Integrative Health,” 2021). DUCIH was established in January 2020 to foster collaboration toward this mission among the Schools of Health Sciences, Nursing, and Pharmacy and the proposed College of Osteopathic Medicine. The Center was built upon a history of work that had been taking place between the university and multi-sector partners “to address problems that have a high cost, high burden, and significant racial disparity” (“Center for Integrative Health,” 2021). Within the DUCIH is the School of Pharmacy's Center for Pharmacy Care (CPC), which is a pharmacist-provider of employee and student health programs, including robust immunization and travel health programs. DUCIH's Community Health Initiatives arm includes interdisciplinary school-based asthma clinics, a pharmacist-led community-clinical linkages program including chronic disease and social determinants of health screenings and care coordination, community-based chronic disease prevention programs (smoking cessation, CDC's Diabetes Prevention Program, etc.), and community-based vaccine clinics (Elliott et al., 2021). Through these programs, strong partnerships have been built over time with the Allegheny County Health Department (ACHD), school districts, churches, federally qualified health centers (FQHCs), the Housing Authority of the City of Pittsburgh, and community-based organizations, among others.

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The university’s programs affiliated with ACHD were undertaken with the explicit goals of both educating health professions students and improving public health. This pre-existing, established relationship demonstrates the key components of an Academic Health Department (AHD), including a formal partnership between an academic institution and a governmental agency (in this case, the local health department), a mutually beneficial agreement, and shared resources (Erwin & Keck, 2014). The AHD model is designed to enhance teaching, research, and service. Before the pandemic, various schools at the university partnered with ACHD on projects related to Head Start, screening, vaccination, and health education. This includes a five-year project, The Allegheny County Racial and Ethnic Approaches to Community Health (REACH) Project, to implement screenings for chronic disease and social determinants of health using community-based pharmacists (Elliott et al., 2021).

DUCIH Community Health Initiatives’ Response to the Pandemic

Given the existing infrastructure of community-based health programs and established partnerships, DUCIH was able to quickly respond to the pandemic locally. Table 1 summarizes various partners’ pandemic-response initiatives supported by DUCIH and lessons learned. Volunteer training and orientation for these activities generally were conducted on-site by the partners.

Table 1. DUCIH support of partners’ pandemic response

Start of Initiative	Volunteer Pool	Recruitment Mechanism	Volunteer Roles	Lessons Learned to Inform Future Initiatives
Summer 2020: Testing at partner FQHCs	<ul style="list-style-type: none"> • DUCIH staff • School of Pharmacy faculty and staff 	E-mail distribution list, with sign-up via Google Sheets	<ul style="list-style-type: none"> • “Crowd-control” (directing patients through the testing site) • Data intake • Providing self-swab instructions 	A variety of volunteer roles allowed the engagement of both clinician and non-clinician volunteers.
Dec 2020: Support for Community Pharmacy and Health System Vaccine Clinics	<ul style="list-style-type: none"> • School of Pharmacy students and faculty 	Announcements in “School of Pharmacy Pandemic Immunization Response” Blackboard	<ul style="list-style-type: none"> • Varied by partner and clinic 	Central communication mechanism through learning management system facilitated sharing specific nature of

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	community with links to sign-ups		volunteer needs, site-specific requirements, and sign-up mechanisms efficiently, with flexibility for partner needs
<p>Jan 2021: COVID-19 vaccines at partner FQHCs</p> <ul style="list-style-type: none"> • DUCIH pharmacist staff and rotation students • School of Pharmacy pharmacist faculty and students 	<p>E-mails to Pharmacy Practice faculty; Blackboard community announcements; Google Sheets transitioning to SignUpGenius</p>	<ul style="list-style-type: none"> • Vaccine administration (pharmacists only, due to FQHC credentialing process) • Intake and vaccine documentation (students) 	<p>DUCIH non-clinician staff member served as a liaison to FQHCs for pharmacist vaccinator credentialing and volunteer scheduling.</p> <p>Online volunteer management software (SignUpGenius) offered benefits over manual scheduling: allowed volunteers to customize availability week-to-week by signing up for available shifts easily, provided updates to the coordinator of any schedule changes, and sent automated shift reminders or notices of shift modifications.</p>

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Jan 2021: ACHD healthcare professional COVID-19 vaccine clinics on Duquesne campus	<ul style="list-style-type: none"> • DUCIH staff and rotation students • School of Pharmacy faculty, staff, and students 	E-mail list (faculty and staff) and Blackboard community announcements (students), with sign up via Google Sheets	<ul style="list-style-type: none"> • Registration • Guiding patients through workflow • Vaccine preparation • Vaccine administration/ documentation • Post-vaccination monitoring/ Check-out 	Roles for non-vaccinators (e.g., registration, guiding patients through clinic workflow) increased volunteer pool
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While the hands-on experience with mass vaccination to meet an urgent public health need was impactful for all health professions, the opportunity to be involved in vaccine administration was particularly impactful for student pharmacists since this was the first time they were permitted to immunize in Pennsylvania. While legislation from 2015 authorized pharmacy interns to immunize under pharmacist supervision, Pennsylvania Board of Pharmacy regulations implementing interns’ immunization authority had not been finalized by December 2020 (PA Act 8, 2015). Recognizing the potential of student pharmacists to assist in the COVID-19 vaccination effort, on December 8, 2020, Pennsylvania’s governor issued an emergency waiver permitting trained pharmacy interns to immunize after notifying the Board of their intent (P.A. Department of State, 2020a). While this waiver is subject to expiration, a permanent application process was instituted for the “Authorization to Administer Injectables for Pharmacy Intern” in March 2021.

DUCIH worked with the School of Pharmacy’s immunization training coordinator to establish a “School of Pharmacy Pandemic Immunization Response” community website in the university’s learning management system (Blackboard). This website was populated with all immunization-trained student pharmacists, faculty, and staff. It communicated vaccination opportunities, whether with DUCIH, local health systems, or community pharmacies. The site also served as a repository for clinical resources related to each COVID-19 vaccine and vaccine administration. “Assignments” were created in the site, which prompted students to upload training certificates and proof of Board of Pharmacy notification. School of Pharmacy faculty and staff could then verify requirements were met.

DUCIH’s support of early vaccination efforts at partner FQHCs (details in Table 1) emphasized the need for a flexible, nimble approach. Because vaccine supply was limited, and the FQHCs’ vaccine allocations from the Pennsylvania Department of Health varied week-to-week, weekly communication between each volunteer pharmacist and the nursing coordinators at the FQHC

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sites was essential to determine the actual need for volunteers. These pharmacists then updated student pharmacists who were scheduled to work with them.

DUCIH and the CPC also partnered with ACHD in January 2021 to vaccinate health professionals. Recognizing the role of health professions students and faculty in the local healthcare system (placing them in the initial phase [1a] of vaccine eligibility), on-campus clinics were organized to vaccinate this population, both from Duquesne University and a local community college. DUCIH staff worked with university facilities and events staff to arrange the use of large ballroom space and partnered with ACHD staff to design a clinic workflow to promote social distancing and logical movement of patients through registration, a waiting area, vaccination stations, and post-vaccination observation.

ACHD contributed a staff member serving as clinic manager, the vaccine supply, and use of their documentation system (PrepMod). Vaccine-eligible individuals used this system to schedule appointments online and complete the required pre-vaccination screening questions. The system was also used on-site to register patients into the clinic and record vaccination details for reporting to the state immunization registry (PA-SIIS). This system sent automated e-mail reminders for patients to schedule their second dose of the vaccine series when due.

The School of Nursing was also involved with testing and vaccination efforts as soon as both became available. Nursing students and faculty worked at vaccine clinics run by ACHD, including established clinics, as well as operations that went to temporary clinic sites to reach a specific population. Several faculty members were also involved with vaccination efforts with local hospital systems. A faculty member who helped organize mass clinics with these partners would later lead a DUCIH team tasked with designing clinic workflow and logistics. Another of the school's clinical faculty members who took students in the early stages of vaccine distribution would be recruited as a Site Lead. Early participation in community efforts provided valuable insight into design and implementation for DUCIH's clinic.

Point of Dispensing (POD) in the Hill District Neighborhood of Pittsburgh

ACHD's initial approach to vaccinating the larger community focused on using large, regionally-situated COVID-19 vaccine Points of Dispensing (PODs), allowing efficient vaccination of large numbers of patients to meet the initially-high demand for vaccines. In March 2021, ACHD sought to open a POD "to target specific communities and populations who have not yet been reached through traditional means" (Allegheny County Health Department, 2021). The location

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selected for this POD was Central Baptist Church (CBC), a longstanding community institution in the Hill District, one of Pittsburgh's historic predominantly Black neighborhoods.

Recognizing Duquesne University's history of community-engaged work in the Hill District and DUCIH's success with working with community partners to implement health equity initiatives, ACHD approached DUCIH on March 2, 2021, with an ask to coordinate operations at this POD. In this descriptive case study, the authors undertake to share strategies utilized and lessons learned in rapidly deploying this public health response through university-wide collaboration with community partners. Descriptive statistics of vaccine recipient demographics are presented, based on aggregate reports generated from the POD's clinical documentation systems, to assess the POD's impact on reaching underrepresented groups, including people of color.

The Community and Partner: Hill District and Central Baptist Church

The Health Resources and Services Administration (HRSA) has designated the Hill District as a Low Income Medically Underserved Population Health Professional Shortage Area ("MUA Find," n.d.). Census data for the church's tract indicate that 35.3% of people live below the poverty line; 84% of the population identify as Black, 13% White, 2% two or more races, and 1% Asian (U.S. Census Bureau, 2019). CBC is a centrally-located, well-known institution within this neighborhood and is also along two bus routes, facilitating access by those from other neighborhoods who rely on public transportation.

Inasmuch as the African American community has been facing serious health disparities, CBC felt it was the church's mission to maintain levels of community engagement from an ethnographic framing that limited COVID-19 disparities from widening. CBC's public health initiatives have been a part of the church's mission for more than twenty years. To this end, the dispensing of the COVID-19 vaccine became a part of the public health, healthy living, and personal fitness mission.

POD Planning

Contributions of ACHD, CBC, and DUCIH to planning for the POD are summarized in Table 2. In addition to conceptualizing the model and procuring the site, ACHD provided vaccine supply for the POD, information technology, and financial support for supplies, marketing, and a full-time Site Lead. Given the limited financial resources of ACHD, though, a model was created in which all other POD operations were supported by university faculty, staff and student volunteers, and CBC staff/volunteers.

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In addition to providing the space for the POD, CBC provided staffing support, as indicated in Table 2. Volunteers were enlisted to assist in mobilizing those who came for vaccination, primarily by appeals to the church congregation. These volunteers were mostly retirees who had a strong interest in public health and public service. However, eighteen hires were given part-time positions at minimum wage compensation to maintain the day-to-day operations. A detailed schedule was created for each week, and hospitality and COVID protocol training was implemented. Training in administrative procedures for COVID vaccination registration was also a part of the implementation process.

The church's leadership and congregation also assumed a lead role in promoting the importance of vaccination—and addressing hesitancy—among their community through pulpit announcements, word-of-mouth, personal calls, e-blasts, social media, and local television media interviews with the pastor and volunteers. CBC engaged in outreach to senior living facilities and churches and held a press conference collaborating with the Black Political Empowerment Project (B-PEP), Urban League, NFL Hall-of-Famers Mel Blount and Franco Harris, and the CBC pastor.

The Director of DUCIH worked with university administrators to obtain approval to support a campus-wide response quickly. The Hill District POD opened at CBC in less than three weeks, on March 19, 2021. The DUCIH Director identified individuals within select schools and offices to serve on the POD's coordination team (as noted in Table 2), provided leadership for this team, and worked closely with the ACHD, CBC, and university administrators to execute the necessary contracts and oversee all aspects of implementation.

The overarching Duquesne team met weekly beginning two weeks before the scheduled opening of the POD and provided planning and oversight of operations. The relatively large team was divided into four smaller teams, each with a designated lead and specific charges: Site Logistics, Vaccinator Training and Coordination, Coordination Logistics, and Promotion, as noted in Table 2. These teams began meeting, planning, and procuring resources upon receiving their charge to ensure processes and resources were in place prior to the POD opening. Importantly, representation from the Office of Civic Engagement and External Relations and the Office of Diversity and Inclusion on the coordination team provided perspective regarding cultural responsiveness in the team's planning.

Table 2. POD contributions and coordination

Partner Organization or DUCIH Team	Representation	Charge
ACHD	ACHD Staff and Volunteers	<ul style="list-style-type: none"> • Conceptualization of model • Selection/procurement of CBC site • Input on workflow • Vaccine supply (and ancillary immunization supply kits) from state allocation • Provision of vaccine scheduling and documentation platforms (PrepMod, Clinic Portal) and information technology • Staff member and intern on-site • Volunteer vaccinators to fill in gaps (e.g., during finals week) • Financial support for DUCIH to purchase additional supplies, design/distribute marketing material, and hire one full-time site Lead • Promotion of POD through county channels (e.g., Allegheny Alerts)
CBC	Pastor, Administrative Team, Volunteers, and Paid Staff	<ul style="list-style-type: none"> • Facilities (ADA accessible): <ul style="list-style-type: none"> ○ 4,200 square foot fellowship hall ○ Two meeting spaces adjacent to the fellowship hall ○ ADA-accessible restrooms ○ Two parking lots totaling approximately seventy spaces. • Part-time positions: <ul style="list-style-type: none"> ○ Two managers to oversee and implement the organizational and operational plans ○ Two parking attendants for traffic control ○ Two greeters to welcome and direct people to registration ○ Site monitors that managed the intake and outtake flows, including ensuring patients waited for the appropriate observation time as indicated by the vaccinator ○ Janitorial cleaning service for sanitizing and disinfecting church daily ○ One payroll attendant ○ Custodial service for daily cleanup.

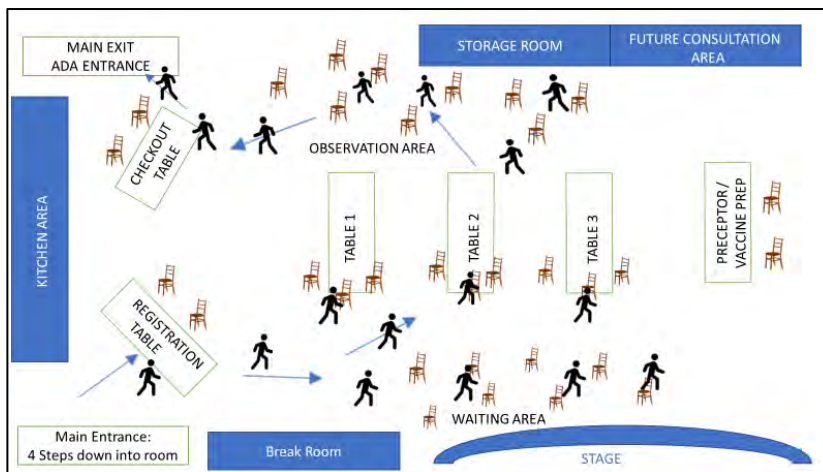
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<p>Duquesne Site Logistics Team</p>	<p>School of Nursing DUCIH</p>	<ul style="list-style-type: none"> • Designing preliminary workflow of POD, including physical layout and patient movement from arrival in the parking lot to departure to promote: <ul style="list-style-type: none"> ○ Social distancing of patients ○ Efficiency and safety ○ Compliance with regulatory requirements (e.g., 15–30-minute observation period, provision of required documents) • Coordinating provision of I.T. needs with ACHD (e.g., computer and wireless network access) • Establishing vaccine ancillary supply procurement process from ACHD or DUCIH • Establishing process for volunteer access to ACHD’s documentation system (partnership with Coordination Logistics team)
<p>Duquesne Vaccinator Training and Coordination Team</p>	<p>School of Nursing School of Health Sciences School of Pharmacy DUCIH</p>	<ul style="list-style-type: none"> • Establishing a process for recruiting volunteer Nursing, Physician Assistant, and Pharmacy student vaccinators and faculty preceptors to fill the POD schedule • Establishing process for vaccinator and preceptor volunteer communication and training: <ul style="list-style-type: none"> ○ Required advance training ○ On-site daily briefing by preceptor
<p>Duquesne Coordination Logistics Team</p>	<p>Office of Civic Engagement and External Relations Online Learning and Strategy Office of Diversity and Inclusion (ODI) DUCIH School of Nursing</p>	<ul style="list-style-type: none"> • Creating a “community site” in the university’s learning management system (Blackboard) for volunteer information and communication <ul style="list-style-type: none"> ○ Required trainings ○ Job descriptions ○ Transportation logistics • Creating and managing a master schedule for all university POD roles/shifts • Recruitment of non-vaccinator volunteers (e.g., registration, workflow management)
<p>Duquesne Promotion Team</p>	<p>Marketing and Communication ODI DUCIH</p>	<ul style="list-style-type: none"> • Creating clinic signage and branded clinic documents (e.g., cards for end of observation time, vaccine cardholders) • Designing/procuring patient giveaways • Designing/procuring volunteer shirts and nametags • Procuring water for patients and volunteers

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The team conducted an initial visit to the church vaccination site on March 18, 2021, one day prior to the POD’s soft launch, to explore the space and meet with representatives of CBC and ACHD. DUCIH’s previous experience with the ACHD on-campus vaccine clinics provided an initial workflow, adapted by the Site Logistics team to fit the available space in the fellowship hall and ACHD’s goal volume of 150-200 vaccinations per five-hour day (Figure 1). The same core areas were maintained: registration stations (two with a volunteer at each), patient waiting area, vaccination tables (three stations, each with one vaccinator and one scribe [asked screening questions and completed the required documentation]), post-vaccine monitoring area, patient checkout table, vaccine preparation area, and supply storage. During this visit, videos were taken of the clinic space and proposed layout to post for future volunteer review.

Figure 1. POD workflow



Note. Adapted from volunteer orientation materials (not to scale).

Soft Opening and Initial Learning

The POD opened with a soft launch on Friday, March 19, 2021, with a limited schedule of 20 patient appointments and shorter clinic hours of 2-4 PM to pilot workflow. Appointments were scheduled in advance using ACHD’s existing process of announcing clinics through the county’s community notification system (Allegheny Alerts) and having patients schedule online or by calling the PA 211 community resource line. Members of the coordinating team, DUCIH staff and rotation students, ACHD staff members and interns, and volunteers from the church covered

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the schedule for this launch while university volunteer recruitment procedures were still being developed.

Appointments were increased to 50 percent of goal (approximately 75 appointments) the following week, Monday through Friday, from 1-4 PM. This gradual opening allowed the team to evaluate workflows and volunteer needs before opening the full schedule the following week. Based on the church supplying staffing support daily to assist patients in moving from the parking lot through the clinic, the anticipated need for non-vaccinator University volunteers was reduced to assisting with the registration process. Simultaneously, the coordination team observed that the registration process was more time-intensive than anticipated and created a bottleneck in the workflow. Consequently, a third registration volunteer was requested. Having two staff members present from ACHD allowed flexibility to provide additional registration support, in addition to their primary roles concerning monitoring vaccine supply, the clinic's virtual workflow, and providing technical/procedural guidance.

Additionally, the coordination team observed that the schedule was not always full but that patients were requesting vaccines on a walk-in basis. While walk-ins were not initially planned for, given the goal of the POD to promote accessibility and the need to avoid vaccine waste, the decision was made to accept walk-ins. However, all ten doses from each vaccine vial (Moderna mRNA) had to be administered or discarded within six hours of puncture. Thus, in the final two hours of the clinic, walk-in appointments could only be accommodated when there were extra doses anticipated from the vials needed for remaining appointments unless a full ten walk-ins were received. Some challenges were encountered in communicating this nuance of when walk-ins could be accommodated.

To further reduce waste, a volunteer from the church started to maintain a "standby list" of interested individuals if vaccine doses were remaining at the end of the clinic and assisted in calling these people in the order that they had expressed interest. The church also had a volunteer who could work with the county to pre-register individuals who did not have access to the internet or were not able to register on their own for any reason.

The desire to avoid wasting doses while vaccine supply was initially limited resulted in clinic staff staying longer than anticipated the first week. Patients were called in for remaining doses (transportation was sometimes a challenge), received their vaccines, and then completed observation. For transparency of the volunteer time commitment, the end of the shift was communicated as an hour after the last appointment to account for this process. As vaccine supply increased and demand decreased, beginning in May with a decline in first-doses at the POD, guidance from public health authorities shifted from a "no dose wasted" to a "no

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opportunity missed” approach, resulting in greater flexibility to accept walk-ins, even if wasted doses would result. This shift allowed the POD to further promote accessibility, particularly to those with scheduling or transportation limitations. This shift also decreased the importance of having a “standby list.”

POD Site Lead and Student Intern Positions

To provide continuity and on-site leadership for the POD, a nurse practitioner was hired by DUCIH, funded by ACHD, to serve as the Site Lead at the POD. The Site Lead supervised the overall day-to-day operations at the POD, including supervising immunizing faculty and student volunteers to ensure patient safety, compliance, and efficiency. Sometimes reallocation and retraining of volunteers for alternate roles was necessary based on the clinic’s daily needs. The lead also fulfilled an administrative role in the POD documentation system to manage volunteer access and ensure the completion of documentation. The Site Lead was also tasked with monitoring the inventory of vaccine doses administered in this system, compared with remaining doses and appointments to prevent waste. Additionally, the Site Lead assisted in other roles throughout the clinic.

Two student interns were eventually hired to provide administrative support to the Site Lead. One on-site intern was charged with monitoring clinic supply inventory and assisting where needed in workflow. The other intern worked primarily remotely and was responsible for communicating POD volunteer reminders and training information to faculty and students across campus.

Faculty and Student Volunteer Recruitment, Training and Oversight

Based on the clinic’s staffing hours of weekdays 12 - 6:30 PM (vaccine appointments from 12:30 – 5:15 PM) and Saturday 8 AM – 2:30 PM (appointments 8:30 AM – 1:15 PM), the volunteer coordinators split the clinic into two overlapping 3.5-hour shifts to allow a shorter time commitment. However, a single volunteer could fill the two overlapping shifts for a given role when their availability allowed.

A master schedule of all university POD volunteer shifts (vaccinator and non-vaccinator) was created in a spreadsheet (Microsoft Excel) and uploaded to a secure University drive (Microsoft OneDrive). This helped identify any vacant slots to be filled by individuals from other disciplines. Particularly, regular check-ins between the School of Health Sciences, Nursing, and Pharmacy coordinators allowed them to arrange vaccinator coverage as needed during

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challenging periods for a particular school (e.g., the first week of rotations for pharmacy students, exam-heavy weeks, etc.). The master schedule spreadsheet also served as the mechanism for providing volunteer names and contact information for the POD Site Lead and student interns to arrange documentation system access and send reminders in advance of each shift.

Volunteer roles and recruitment strategies are described in Table 3. Student vaccinators and faculty preceptors were recruited from the School of Health Sciences Department of Physician Assistant (P.A.) Studies, School of Nursing, and School of Pharmacy. Non-vaccinator volunteers were recruited from a broader pool across the university.

Table 3. University volunteer roles and recruitment

Volunteer Type (# per shift)	Role	Recruitment Mechanism
Faculty Preceptor (1)	<ul style="list-style-type: none"> • Provided support and oversight for student immunizers • Conducted a start-of-shift huddle with vaccinator volunteers to review pertinent vaccine information (e.g., contraindications/ precautions to vaccination, intramuscular injection technique, etc.) and orient them to the clinic workflow and safety procedures. • Monitored students' interactions with patients throughout the clinic, provided feedback, answered questions • Evaluated special patient circumstances identified during the screening that might affect eligibility for vaccination. • Assisted in preparing vaccine doses and monitoring for, and 	<p>Assigned to one of the three health professions schools according to the day of the week, with all three schools rotating Saturdays.</p> <p>Each of the schools adopted a different approach to filling this role based on the availability of clinical faculty, whether assigning one person for a particular day of the week or coordinating a volunteer schedule for their school's day(s).</p>

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responding to, any adverse events.

<p>Physician Assistant Student Vaccinators (2)</p>	<ul style="list-style-type: none"> • Administering vaccines • Asking screening questions, documenting, providing counseling • Set-up and tear-down of vaccine stations 	<p>Identified students in the final year of the program and assigned them to the POD. Several of the students were suspended from originally-scheduled rotations due to the pandemic. Other students were assigned to the POD to supplement their primary care or internal medicine rotations during low patient censuses. Students in the didactic phase of their P.A. training were asked to volunteer for the Saturday shifts.</p>
<p>Nursing Student Vaccinators (2)</p>	<ul style="list-style-type: none"> • Administering vaccines • Asking screening questions, documenting, providing counseling • Set-up and tear-down of vaccine stations 	<p>Recruited students to participate as part of their required Population Health course. These were 8-hour shifts, as expected with other clinical placement sites. Students had already been working at various other hospital- and community-based vaccine clinics within the county. The SON simulation lab faculty developed an online education module (via Nearpod) and provided open lab hours for students to practice their vaccination skills. Nursing student volunteers were primarily third-year undergraduates and second-degree students who had already completed coursework and clinical experiences that included intramuscular injection training. The response from nursing students was strong, and as such, students were initially limited to one shift in the clinic to ensure all those interested would have the opportunity.</p>
<p>Pharmacy Student Vaccinators (2)</p>	<ul style="list-style-type: none"> • Administering vaccines • Asking screening questions, documenting, providing counseling • Set-up and tear-down of vaccine stations 	<p>Pharmacy Practice faculty members were asked by the coordinator, with the support of the Division Head and Dean, to occasionally release their final-year clinical rotation students to volunteer at the POD. Because these students were routinely expected to be at their site for an eight-hour day, they were generally asked to fill the entire 12 – 6:30 PM shift at the POD to minimize volunteer shift changes and the number of shifts to cover.</p>

Initially, the school’s coordinator attempted to compile a list of student availability, by day of the week, from each faculty member via a survey (GoogleForms) and then assemble a school-wide

schedule. Based on feedback that the survey was unclear and that students' availability might vary week-to-week based on rotation activities, the coordinator began using SignUpGenius to post the individual volunteer shifts and distributed this to the faculty.

The majority of weekday shifts were filled through this method; any remaining shifts, including Saturdays, were distributed via the "School of Pharmacy Pandemic Immunization Response" Blackboard community. The coordinator also used this site to verify that student pharmacist volunteers had completed all training and Board-notification requirements before placing them on the schedule as vaccinators.

Non-vaccinator
volunteers (2-3)

- Patient registration

Recruited from the university faculty, staff, and students through purposeful recruitment tactics.

The initial ask for volunteers was centered around vaccinated individuals who had experience in allied health settings. This was the initial strategy to ensure that the non-vaccinator volunteers could assist in various roles at the site, despite not being able to vaccinate patients themselves. It became apparent that volunteers versed in healthcare terminology were of greater assistance in the registration role as they could assist individuals in completing the screening questions and answering questions about the vaccine and vaccination process itself. However, as the academic calendar came to a close, recruiting in this manner became more challenging due to student and employee availability during finals week. Therefore, larger open calls for volunteers were made via email through messaging on the institution's event management system (CampusLink). By opening the call to attract a broader audience, faculty, staff, and students from all nine schools of study were able to volunteer to support the POD.

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The Vaccinator Training and Coordination team prepared training for students. This training included completing the CDC COVID-19 vaccine training modules for the specific vaccine products used at the POD (initially Moderna, and later Pfizer, mRNA vaccines) and reviewing a description of the vaccinator role, clinic workflow, and safety procedures. These training requirements were included in the reminder e-mail by the POD student intern prior to scheduled shifts, along with the shift date, time, address, parking information and map, dress expectations, and the POD Site Lead's contact information in the event of questions or inability to fulfill a shift. Volunteers were also advised that they would receive an e-mail to create an account in the documentation system before their shift.

Faculty preceptors were sent the same information directly (and carbon-copied on the student e-mails for their shifts) along with information about their role as preceptors in partnership with the Site Lead. This included a list of topics to review with students during the start-of-clinic huddle, including highlights from the CDC training modules. Preceptors were also asked to observe and coach students' injection technique at the start of the shift due to the students' varied experience and comfort levels. Non-vaccinator volunteers received a reminder e-mail the day of their shift, a map to the site, and training was provided on-site.

Educational Considerations: Interprofessional, Culturally-Competent Care

In addition to addressing a critical public health and health equity need in the community, the POD provided a unique interprofessional education opportunity for participating students. Health professions students worked alongside non-vaccinator volunteers from schools and departments across the university, as well as vaccinator volunteers from each of the three schools. While student vaccinators tended to gravitate toward working at a vaccine table with a student from the same discipline, sometimes uneven volunteer numbers from the schools resulted in organic interprofessional pairings. Even when this did not occur, the various health professions students had the opportunity to participate in the daily huddle, collaboratively problem solve throughout the day, and participate in informal conversations with students from the other professions. Additionally, due to the rotating preceptor schedule, students worked under the supervision of preceptors from other professions. This arrangement provided exposure to the different professions' clinical decision-making processes and expertise. While students engage in interprofessional experiences routinely during their didactic and experiential training, the aspect of being permitted to vaccinate under the supervision of a health professional from a different discipline was novel since this was permitted by state-specific pandemic emergency waivers (P.A. Department of State, 2020b, 2021).

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Providing care at the POD also required student vaccinators to demonstrate culturally competent care, including mindfulness of the church site as a house of worship, respectfully listening and honestly responding to patients' questions and concerns about the vaccine, considering transportation availability for the timing of second doses, and working effectively with interpreters for patients who spoke languages other than English. Interpreter services were available telephonically at the POD, but patients were sometimes accompanied by a family member or friend who translated. Students were coached through these considerations by the preceptors.

Adaptations to POD Workflow

While the POD planned to open the full 200 appointments per day beginning March 29, 2021, ACHD transitioned to a new clinic documentation software (Clinic Portal) that week. To allow POD staff and volunteers time to learn the new software, 50 percent capacity was maintained for that week. This software allowed patients to schedule their second-dose appointment before leaving the clinic, reducing the possibility of scheduling barriers interrupting the two-dose vaccine series. Two checkout stations were routinely needed instead of one to integrate this feature. These were generally staffed utilizing a POD intern and staff member from ACHD. Early in the POD operation, it was identified that, while the open room layout was convenient for efficiency, it offered little privacy for patients requiring removal of clothing or who were anxious about the vaccination and benefited from additional privacy. A mobile, three-paneled privacy screen was delivered to the clinic to provide a suitable level of privacy for people who required it. The screen could also be positioned around church pews along the sides of the room to allow patients with a history of post-injection dizziness or syncopal episodes to lie down while receiving the vaccine.

Aware that the spring semester ended in May but that vaccination needs would extend into the summer, DUCIH received additional funding from ACHD to hire ten student vaccinator summer interns to ensure the POD would be appropriately staffed as the majority of the student body returned home or resumed summer jobs. The volunteer coordinator from each health profession school promoted these opportunities to their students and collected interest using a simple online questionnaire (Qualtrics) asking about their availability, relevant experience, and the reason for their interest in the role. The coordinators reviewed the interested candidates in collaboration with the DUCIH Director and selected interns with the goals of maximizing availability and including students from multiple health professions when their program structure permitted. The employment of interns began in May 2021, with each working an estimated 30 hours per week. As they were oriented to their position, the student volunteer positions were phased out.

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Two additional second-degree nursing students also completed a public health-directed study during the summer months, focused on vaccine education and marketing the clinic to the neighborhood. These students worked with the site administrators, community agency, and community volunteers to create and test messaging and distribution strategies.

Two part-time assistant coordinators were also hired to cover the clinic coordinator role on days the Site Lead was scheduled off. These assistant coordinator positions also allowed the POD to phase out the need for faculty preceptor volunteers over the summer. ACHD and CBC continued to supply previous staff and volunteer support levels through the summer.

In late May 2021, following the Emergency Use Authorization of the Pfizer mRNA COVID-19 vaccine for adolescents aged 12-15 years old, ACHD asked the POD to offer this vaccine in addition to the Moderna vaccine previously offered. While this expansion was a positive development in reaching an expanded population, it required a careful re-evaluation of the clinic workflow to prevent product-related confusion or medication errors. The Moderna vaccines were reserved for those who had received the first dose of that product and needed to complete the two-dose series. Any new patients presenting to the POD were administered the Pfizer vaccine, barring contraindications, to eventually phase out the Moderna product.

Beginning May 24, 2021, the clinic layout was revised to create two separate workflows for each vaccine product on opposite sides of the room, converging in a shared post-vaccine observation area in the middle. The church volunteer greeting patients as they entered the clinic asked which dose patients were arriving for and directed them to the registration station corresponding to that number. Station 1 (first doses) was set up to register patients to receive the Pfizer vaccine on that side of the room. Station 2 (second dose of Moderna series) was set up to register for the Moderna vaccine on the other side. While still social distancing, patients waited in separate areas according to vaccine product, and two vaccine administration tables, along with one vaccine preparation station, were set up on each side of the room for the respective products. Keeping administration and preparation separate for the vaccine products was implemented to prevent errors due to the different preparation instructions (e.g., Pfizer required dilution, whereas Moderna did not) and dosing (0.3 mL for Pfizer vs. 0.5 mL for Moderna) for each vaccine. It was also necessary to prevent anyone under the age of 18 from inadvertently receiving the Moderna vaccine, which was not authorized for this population. Color-coded bins and syringe labels were used to distinguish the products and provide an additional layer of patient safety and quality assurance. Expanding to the adolescent population resulted in necessary changes around emergency preparedness, including extra vigilance for syncopal reactions and ensuring the availability of pediatric dose epinephrine injectors.

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Remarkably, the demand for vaccines decreased at the end of May, as vaccine coverage increased. Seeing a decline in doses administered, ACHD adjusted the POD operation to two days only during the following week and then phased out with Friday clinics only for the next three weeks, concluding operations entirely on June 25, 2021. A timeline of operations milestones is presented in Table 4.

Table 4. Timeline of POD operations

Date (2021)	Event
March 2	ACHD asks DUCIH to operate Hill District POD
March 18	Initial team visit to CBC Site
March 19	Soft launch (20 appointments; 2-4 PM)
March 22-26	Ramp up to 50% of goal volume (75 appointments/day; 1-4 PM)
March 29	Transition from PrepMod to Clinic Portal documentation systems; hours increased to 12:30 – 5:15 PM Monday – Friday and 8:30 AM – 1:15 PM Saturday)
April 5	Increased to full goal volume (150-200 appointments/day)
Early May	Transition from student volunteers to paid summer interns
May 24	Addition of Pfizer mRNA vaccine
June 1	Beginning of POD phase-out (operated only two days this week, then next three Fridays)
June 25	Conclusion of POD operations

Outcomes

At the height of operations, the POD was staffed 6.5 hours per day, six days per week. Each shift, DUCIH POD staff, university volunteers, and ACHD staff/volunteers partnered to fill a goal of at least two registration positions, six vaccinator/scribe positions, a vaccinator oversight/precepting position, two checkout staffers, and a clinic coordinator (generally the Site Lead). The church provided staff daily to assist with patient movement into and through the POD workflow.

The DUCIH POD planning and oversight team included 19 individuals, including the Site Lead. DUCIH also employed three summer assistant coordinators, two student coordinator interns, and ten summer vaccine clinic interns through funding from ACHD.

The university volunteers included 160 student vaccinators, 25 faculty preceptors or vaccinators, two pharmacy residents, and 76 non-vaccinator volunteers. Coordinators attempted to fill vaccinator shifts evenly from the three health professions but collaborated to cover gaps. In addition to sending a staff member to the POD daily, ACHD provided an intern when available,

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and five health professional volunteers helped cover the schedule during finals week. CBC employed 18 individuals in part-time roles to assist with POD operations. From March 19 to June 25, 2021, 5,652 vaccine doses were administered at the POD. Patient demographics recorded for these vaccine doses are presented in Table 5. This data support that the POD achieved its aim to reach underrepresented groups, given that most doses were administered to people of color.

Table 5. Vaccine doses administered by recipient demographics

Age Group	Count	Percent
10-14	6	0.1%
15-19	177	3.1%
20-24	928	16.4%
25-29	716	12.7%
30-34	498	8.8%
35-39	355	6.3%
40-44	283	5.0%
45-49	301	5.3%
50-54	386	6.8%
55-59	540	9.6%
60-64	574	10.2%
65-69	317	5.6%
70-74	237	4.2%
75-79	89	1.6%
80-84	87	1.5%
85-89	38	0.7%
90-94	21	0.4%
95-99	6	0.1%
100-104	1	0.0%
Unavailable	92	1.6%
Total	5652	100%

Ethnicity	Count	Percent
Hispanic or Latinx	298	5.3%
Not Hispanic or Latinx	4970	87.9%
Unknown	384	6.8%
Total	5652	100%

Race	Count	Percent
Asian	555	9.8%

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Black	2576	45.6%
Native Hawaiian or Other Pacific Islander	6	0.1%
White	2087	36.9%
Other Race	330	5.8%
Unknown	69	1.2%
American Indian	29	0.5%
Total	5652	100%

In addition to the direct public health and educational impact of the POD, DUCIH’s partnership with Central Baptist Church has continued after the POD phase-out, with DUCIH continuing to hold weekly vaccine clinics utilizing their vaccine supply and free health screenings coinciding with the church’s soup kitchen hours.

Reflection and Replication

The experience of DUCIH during the pandemic illustrates the importance of established relationships with community partners and infrastructure to support University-wide initiatives of this nature. While some of the Center’s established community health programs had to shift to a virtual platform during the pandemic, trusted and existing relationships with community partners allowed the Center to identify opportunities to assist in the community’s pandemic response on the ground, whether through testing, flu vaccines, or partners’ COVID-19 vaccination efforts. In each of these partnered responses, communication was essential—both with the partner to understand the specific need for support, as well as with DUCIH staff and volunteers to ensure their preparation to meet the need. DUCIH’s previous experience working with the county health department on community health programs to address health disparities, and the university’s history of community-engaged work in the Hill District, also resulted in ACHD identifying DUCIH as an academic partner to coordinate the neighborhood’s POD focused on reaching underserved populations.

DUCIH’s position as a university-wide, interdisciplinary center and existing collaborative relationships within the university facilitated the rapid team response to this request, bringing together the expertise, perspectives, and resources of multiple university offices and schools. Organizing these representatives into a central planning and oversight team, with four sub-teams focused on specific areas of planning and execution, proved to be an effective approach for rapidly preparing to launch the POD. Additionally, DUCIH’s previous experience working with ACHD at on-campus clinics provided a starting point for the POD workflow.

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The hub-and-spoke model used for vaccinator recruitment promoted standardized training and helped to ensure the schedule was filled across schools while allowing a customized approach within each of the schools, as each school's coordinator was aware of which subsets of students would be most available to assist based on the curriculum of each program. The school coordinators also relied on relationships with faculty colleagues to request flexibility for student volunteering and to recruit faculty preceptors. Finally, coordinators were aware of and could verify any requirements for students within their profession to be authorized to vaccinate. The availability of non-vaccinator roles expanded the pool of potential volunteers to assist in this large effort. Using technology in the volunteer recruitment process within individual volunteer pools, and then having a master schedule at the university level, helped to improve efficiency and streamline communication between volunteers, the coordinators, and the POD Site Lead. For health professions students impacted by limitations on clinical placements, patient care activities at the POD also filled a need. While limitations eased as vaccines became available, some remained when the POD was conducted. In these cases, shifts at the POD provided important clinical opportunities when students could not participate in their originally-scheduled placement. The unique nature of the learning experience was also important. Typically, public health topics such as disease outbreaks and disaster management are covered in theory only, and students rely on simulations to get experience. The health professions schools were committed to ensuring that students had the opportunity to meaningfully engage in the massive public health response and serve the community.

In launching the POD and throughout its operation, adaptability to changing needs and open lines of communication within the university team and with partners at CBC and ACHD was essential. The Site Lead sent frequent e-mails (daily initially and during periods of change) to volunteer coordinators and DUCIH and ACHD leadership. Meetings were conducted weekly to keep all team members informed, maintain accountability for individuals' roles, and brainstorm solutions to implementation challenges. The Site Lead interacted with representatives of CBC on-site daily, providing updates and serving as a consistent, familiar point of contact for any questions or concerns. This relationship was particularly important given the staffing model of rotating preceptors and volunteers. Providing updates and gathering feedback were crucial around planned changes in the workflow to share the rationale, obtain input, and ensure that church staff could effectively assist patients with navigating changes. This communication and collaborative work toward a shared goal laid the additional groundwork for future collaboration.

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Limitations

This POD was conducted in a single location. Due to the unique relationships between—and resources of—the partners, other organizations seeking to implement a similar public health partnership may need to adapt the general approach to their circumstances.

The volunteer coordinators initially intended to deploy a customized training program for the POD—including cultural competency training with readings, activities, and reflections—via a community page in the University learning management system. However, the urgent need for vaccine accessibility prompted a shift to on-site training—other than the Site Lead confirming vaccinators' completion of the existing CDC modules—to reduce barriers to participation and support the rapid launch. This adaptation may have been mitigated by incorporating cultural competency within program curricula and cultural diversity training programs accessible to the whole campus community. Nursing students participate in a series of diversity, equity, and inclusion workshops facilitated by the leadership of ODI and the Center for Community-Engaged Teaching and Research (CETR). Physician Assistant students take a course focusing on health disparities. Third-professional-year pharmacy students participate in a community-engaged learning course involving skill development, assessment, and reflection in cultural competency, building on foundations of cross-cultural communication earlier in the curriculum. Cultural competency modules are incorporated in courses within the Liberal Arts, and programs on diversity and cultural competency are offered during student orientation and throughout the academic year by ODI, the CETR, and the Division of Mission and Identity. Thus, students who volunteered to participate in the POD would likely have previously engaged with curricula focused on cross-cultural competency. This reflection highlights that having a university-wide cultural competency curriculum would ensure that any volunteers who could potentially engage with members of marginalized communities, such as during rapid responses to emergencies, are prepared to do so.

Finally, while systematically evaluating stakeholder perspectives would have provided valuable insight on the POD's impact, the rapid launch required focusing resources on operations.

Conclusions and Lessons Learned

Effective teamwork and communication within the university and community partners were critical in rapidly deploying this public health response. Frequent, open communication regarding needs and progress allowed the partners to adapt to new developments and address challenges nimbly. Within the University team, central leadership with an accountable delegation

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of specific tasks within individuals' areas of expertise helped to marshal resources and develop plans quickly. Using technology to efficiently organize volunteers (e.g., scheduling platforms) and share information (e.g., learning management systems, master schedule on University drive, templated e-mails, etc.) simplified coordinators' administrative workload.

Based on this experience, academic institutions with health science programs should consider the implications of their community health partnerships, not just for current programming, but to address future, possibly emergent, needs. Further, promoting awareness of community health programs, partnerships, and the populations served with local health departments may assist with the growth of those programs and result in greater recognition of the academic institution as a resource for responding to public health emergencies or other needs. Development and evaluation of these relationships can be informed by Erwin and Keck's (2014) Academic Health Department concept. The existence of a university-wide, interdisciplinary health-oriented Center or Institute, like DUCIH, to develop and maintain relationships with community partners and facilitate collaboration across the health professions is critical for academic institutions to respond to public health needs.

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