COMMUNITY HEALTH WORKERS PRACTICE FROM RECRUITMENT TO INTEGRATION

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COMMUNITY HEALTH WORKERS PRACTICE FROM RECRUITMENT TO INTEGRATION

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EDITORIAL
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Editorial: Community Health Workers Practice From Recruitment to Integration

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Editorial on the Research Topic

Community Health Workers Practice From Recruitment to Integration

At no time like the present has the role of Community Health Workers (CHWs) received so much attention given their direct capacity to address community-centered health. The COVID-19 pandemic and the unprecedented attention to the gaps in health equity, especially racial and social justice issues, has highlighted CHWs' contributions to improve overall population health outcomes (1). However, this spotlight on CHWs as a solution to challenges has occurred previously. For example, CHWs were actively involved in reducing U.S. infant mortality through initiatives like Healthy Start in the early 1990s; further, CHWs actively assisted communities through disasters like Hurricane Katrina in 2005. Additionally, the Patient Protection and Affordable Care Act (2010) identified CHWs in several provisions, including in the Public Health and Prevention Fund and the National Health Care Workforce Commission. A growing number of state Medicaid programs are working on integration of CHWs into their reimbursable services to address social determinants of health. States continue to pass policies that support CHWs—including optional and required certification programs. On the surface, CHWs appear involved and integrated but is that the case? Are CHWs fully engaged in equitable ways in CHW recruitment, training, and integration?

Today CHWs and their allies participate in meetings with other members of the public health and healthcare fields talking about this novel CHW intervention, yet CHWs are often not even identified as part of inter-professional teams. Numerous organizations, let alone some community members, do not understand the presence, roles, and power of CHWs on the frontlines of public health domestically and internationally. In light of the U.S.'s current substantial investment in CHWs during the COVID-19 pandemic, we must ask if CHWs programs will be the first to be downsized as funds dissipate. Despite significant investments, CHW jobs are often part-time, without benefits, and without sufficient workspaces and equipment (such as desks and computers). We underinvest in CHWs and even isolate them so that they are not fully integrated into the fabric of our health and human services systems. Yet, CHWs can weave us into whole cloth and fill many gaps.

As an editorial team, we call for supporting the development of CHW peer reviewers, which will require time and management of hierarchies intended to support an academic expert practice perspective. We further acknowledge the need for Institutional Review Board reviewed research but also encourage more publication of the documentation and evaluation of daily practice of field-based CHW public health programming.

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In this e-book special issue, we called for CHW models focused on recruitment, training, and integration strategies. We invited CHWs as peer reviewers of abstract proposals ultimately featured in this issue.

RECRUITMENT

Successful CHW-integrated programs begin with the right CHW recruitment.

The literature and as well as this special issue lack attention to recruitment. One of fourteen articles specifically addressed CHW recruitment. McCarthy et al. outline a recruitment and selection process for a *navegante* training program. St. John et al. discuss CHW psychosocial determinants, which could/should potentially influence CHW recruitment. This issue further demonstrates the need for the right/proper recruitment, which became more evident throughout the COVID-19 pandemic. The National Association of Community Health Workers (NACHW) policy platform calls on "Public and Private Institutions to Respect, Protect, and Partner with Community Health Workers to Ensure Equity During the Pandemic and Beyond" (n.d.).

TRAINING

This issue provides a wide array of CHW training program models. For example, George et al. describe a conceptual approach for CHW curriculum development focused on clinical settings while Lee et al. discuss training methods and deliveries to strengthen CHW workforce readiness capacities in clinical and practice settings. Rajabiun et al. highlight a CHW training program (HIV/chronic disease focused) that engages the National CHW Core Consensus (C3) project framework (2). Elkugia et al. describe strengths of a scalable CHW-led home visit training program: community based participatory approach, continuous engagement, RE-AIM evaluation framework, and continuous adaption through integrating lessons learned—Byrd-Williams et al. summarize key findings from a CHW survey during COVID-19 and conclude with recommendations related to training needs for responding to and serving during public health emergencies. St. John et al. report on CHW psychosocial determinants and implications of findings for CHW training and interventions. Lastly, Zheng et al. summarize findings from an online CHW training program for high school students—emphasizing instructional design processes. More recently—as evident in a number of articles in this issue—thanks to the work of the C3 project, NACHW, APHA (American Public Health Association), and a number of state-level efforts, there has been growing consensus on core standards and best practices for CHW trainings evident in this issue: proper evaluation, consent, and CHW inclusion. Yet, training programs still vary in scope and implementation of core training standards—highlighting an ongoing gap in CHW training and implementation.

INTEGRATION

Several CHW integration models appear in the literature—ranging from community outreach and engagement to CHWs integration into complex, multidisciplinary clinical teams. This collection provides additional integration models and recommendations. The case study by Paulson et al. summarize findings from an evaluation of the integration of community health advocates (CHAs) into the care team, concluding with integration best practices and barriers. Sabo, O'Meara et al. provide recommendations for strengthening the Community Health Representative (CHR) workforce and increasing integration of CHRs within teams; similarly, Aminawung et al. recap integration strategies of formerly incarcerated CHWs into primary care teams. Sabo, Wexler et al. share findings from an assessment of organizational capacity for system change and CHW integration, while Barbero et al. utilize their conceptual model to evaluate implementation of statewide CHW workforce development opportunities. While building this literature on CHW integration through lessons learned on organizational readiness to fully and equitably integrate CHWs, we observed that gaps in integration methods persist.

In short, these 14 articles further provide evidence of CHW recruitment, training, and integration best practices and point to future areas of need. As manuscripts were submitted and reviewed, we identified areas for further exploration and publication. Within the CHW recruitment area, we should expand the availability of published research focused on effective strategies to recruit and retain CHWs from the communities served. Articles on CHW recruitment readiness would particularly assist the numerous agencies looking to hire CHWs for the first time. Implementing and documenting effective strategies to develop and sustain accessible CHW core and continual training available to CHWs in all states will benefit the future of the CHW field given that access to CHW core and ongoing training impacts the effectiveness and sustainability of the CHW workforce. Equitable CHW integration into health, public health, community wellness, and health equity teams need additional exploration and more data and publications that examine CHW integration on macro and micro levels to assist in guiding continued efforts to integrate CHWs as valued and respected members across all health and public health teams.

As stated previously, there is unprecedented attention and investment in CHWs, and the future of the field depends upon ensuring the elevation of CHWs through evaluation and research related to CHWs' roles in assisting the U.S. to achieve health equity through addressing social determinants of health; disparities; responding to past, current, and future pandemics; and other health and environmental disasters. While COVID-19 brought death and despair, the pandemic also exposed persistent disparities and inequities in the U.S. Similar to the HIV pandemic, COVID-19 provided an opportunity for CHWs to further demonstrate our value and effectiveness in addressing disparities and inequities. The pandemic and social justice movement has led to unprecedented investments in CHWs and supporting CHWs' roles in addressing social determinants of health, increasing access to accurate information and health education, and in expanding access to care.

Our editorial team included one long-serving CHW and three long-time CHW allies, all with decades of experience serving diverse communities across the U.S. Our team assembled in the

spirit of CHW self-determination and the mantra of "nothing about us, without us." We engaged CHWs and CHWs allies in every aspect—from developing the call for abstracts and manuscripts to the review processes. Putting the "peer" in "peer review" journal and publishing manuscripts that included CHWs as part of the author teams were two of the aims of our editorial team; we encouraged author teams to include CHWs and happily report that a number of manuscripts achieved this goal.

This e-book sheds light on strategies related to effective CHW recruitment, training, and integration. Our editorial team recognizes these foundational components of CHW workforce development need continuous support and exploration due to the impact and implications of these components for sustainability of the field. We hope findings shared in these articles inform your work and inspire CHWs and allies alike to help to fill the gaps revealed by these talented practitioners and researchers.

AUTHOR CONTRIBUTIONS

JS, DF, ER, and LL all contributed to the writing and review of this editorial. All authors contributed to the article and approved the submitted version.

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COMMUNITY CASE STUDY
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Recruitment, Training, and Roles of the Bilingual, Bicultural *Navegantes*: Developing a Specialized Workforce of Community Health Workers to Serve a Low-Income, Spanish-Speaking Population in Rhode Island

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Clínica Esperanza/Hope Clinic (CEHC) employs *Navegantes*, who are specially-trained bilingual Community Health Workers (CHW), as key team members who improve the ability of the clinic to provide care for and improve the health status of a large population of uninsured Spanish-speaking patients in Providence, Rhode Island. Given the growing demand for CHWs at the clinic and in the broader healthcare sector in the state, CEHC developed the Advanced *Navegante* Training Program (ANTP). The ANTP prepares community members to become certified CHWs who are equipped to provide patient navigation and lifestyle coaching as well as professional medical interpretation services. The ANTP is developed and taught by CEHC *Navegantes* who themselves are bilingual and bicultural peers of trainees as well as the population that CEHC serves. Upon graduation, ANTP trainees have been able to attain higher-paying and fulfilling careers in a range of healthcare and other community settings. The ANTP offers a low-cost, community-based model for training CHWs who are uniquely prepared to promote health and well-being among medically underserved patients.

Keywords: community health worker, community-based job training, health promotion, patient navigation, medical interpretation, Spanish-speaking communities of the US, public health workforce

INTRODUCTION

Community health workers (CHW) are in high demand in the healthcare and non-profit industries. The US Department of Labor recently projected that health educator and community health jobs will increase by 16% from 2016 to 2026 (1). In Rhode Island, growth in this job sector is currently driven by state-level efforts to improve access to healthcare and health information in underserved communities. Engagement of CHWs is also viewed as a means of reducing healthcare costs by teaching people healthy behaviors and connecting them to healthcare services, which may help to reduce health disparities (2).

Bilingual CHWs are particularly sought after to serve as healthcare navigators, patient advocates and medical interpreters in settings where there is a substantial Spanish-speaking patient population. In this capacity, bilingual and bicultural CHWs can serve as a linguistic and cultural bridge between clinicians and their patients, assisting with medical interpretation, patient education, adherence monitoring, and connections to social services (3).

A recent assessment of the CHW employment sector in Rhode Island reported that Community Health Workers work in a diverse set of medical settings including Federally Qualified Health Centers, hospitals, health systems, clinics and insurance companies. Many CHWs also work in community-based organizations that combine social and health services, such as Community Action Programs (CAPs), education systems, and local Health Equity Zones (4).

CONTEXT

Clínica Esperanza/Hope Clinic (CEHC) is a free healthcare clinic in West Providence, Rhode Island that serves a population of over 3,000 uninsured, low-income Spanish-speaking immigrants. Recognizing that patients would benefit from the guidance of bilingual and bicultural healthcare navigators and community health workers, CEHC instituted this role at the time of its founding in 2007. At that time, the clinic was entirely run by volunteers and operated out of a church basement. Community members who took on the role of *Navegantes* were trained to help with measuring blood pressure, checking basic laboratories such as blood sugar and cholesterol, and connected the clinic volunteers to members of communities that were hard hit during the 2008 recession.

The *Navegantes* continued to play a major role in the operation of CEHC as its services grew and it moved to a new, permanent location in 2010. Their participation in local health fairs attracted new uninsured patients to the clinic, as *Navegantes* helped foster trust and visibility of CEHC services in the community. Over the past 10 years, the *Navegantes* have engaged in a wide variety of health-promoting activities in the community, such as conducting community health needs assessments and door-to-door Census education, participating in active outreach and special health education programs at local community centers, and representing CEHC at city, state, and regional meetings.

The *Navegantes* also continue to fulfill multiple roles in the daily clinical operations of CEHC. CEHC is staffed with a team of *Navegantes* (typically 3–4) during all operating clinical hours to provide patient navigation, social service referrals, and peer-to-peer healthy lifestyle education. One *Navegante* each day is assigned to provide medical interpretation services. The *Navegantes* are also responsible for providing group session on healthy lifestyles including the CEHC's own Vida Sana lifestyle program and the Diabetes Prevention Program (DPP), funded by the Rhode Island Department of Health (RI DOH) (5, 6).

In 2012, as opportunities for bilingual and bicultural CHWs in RI continued to expand, CEHC recognized the opportunity to formally train and hire new *Navegantes* and developed the Advanced *Navegante* Training Program (ANTP). The goal of the program is to expand the number of formally trained and certified bilingual and bicultural CHWs that are particularly well-equipped to care for the Spanish-speaking immigrant populations. From the advent of this program, the curricular and logistical planning has been spearheaded by staff *Navegantes*, with the support of project managers and administrators at CEHC.

In addition to developing a workforce to meeting critical community health needs, the ANTP is also designed to empower individuals with the skills needed to attain rewarding and higher paying jobs. The ANTP has been organized and taught by current *Navegantes* who know best how to serve this community. The goal of the ANTP is to build a workforce that will empower CHW to become advocates for improving access to healthcare for their community. Here, we describe practical components and lessons learned from developing and offering a community-based CHW training program at a volunteer-run free clinic.

KEY PROGRAMMATIC ELEMENTS

Recruitment

CEHC recruits and trains one to two cohorts of 12–15 participants in the ANTP per year. Each year before the ANTP begins, information is distributed to community members through partner organizations and social media posts. In collaboration with community partners, CEHC acts as the central recruitment agency and identifies potential participants through a variety of methods, including emailing listservs connected to healthcare job seekers, posting flyers at job fairs and outreach events, sponsoring ads on Facebook, and notifying our patient population about the training opportunity.

Participants are also recruited by word of mouth through prior *Navegante* graduates who spread awareness about the opportunity within their social networks. Many of these individuals have obtained jobs in local healthcare offices and community-based organizations, so they have made connections with other individuals who are interested in advancing their careers. Since the focus of the ANTP is to train members of the community who can provide culturally appropriate care to patients with similar life experiences, using local networks to recruit participants has proven to be an effective method of recruitment.

Selection Processes

Individuals interested in the training are asked to send a resume and a letter of interest that describes their reason for wishing to participate in the course. Applicants to the ANTP are screened by the CEHC *Navegantes* and offered an interview if they meet the following criteria: (1) can commit to the time that is required to complete the course, (2) are bilingual in English and another language (Spanish or Portuguese have historically been prioritized given CEHC's patient population, but participants who speak other languages such as Creole, North African, or Middle Eastern languages spoken by refugees have enrolled), and (3) have at least a high school diploma or GED, classroom experience and/or several years of work experience.

TABLE 1 | ANTP curricular components.

Certifiable Health Care Navigator Training (using CDC workbooks)
• Sessions on case management, role of CHWs
• Basic Clinical Practice, including HIPAA training and medical ethics
• On-site one practicum, one evening per week for 10 weeks
Chronic disease short course
• Diabetes, hypertension, Cardiovascular Disease (visiting lectures)
• Instructors include: CEHC providers, including MD, PA, RNP, medical students
Case management training
First AID/CPR training
Formal medical interpreter training course
• Open to former ANTP graduates and other CHW training program graduates
Additional health topics/sessions
• Domestic violence
• Cancer prevention and screening
• Women's health
• Sexual health/gender identity
• COVID-19 and vaccination
Lifestyle change classes
• Vida Sana
• Diabetes Prevention Program (two 8-hr sessions provided by RI DOH)
Human subjects research studies certification
• Provided by CEHC with online modules from the Collaborative Institutional Training Initiative

We aim to include participants in the program who are interested in seeking employment in (or currently employed in) a healthcare setting, but do not currently have the knowledge and/or skills to carry out their desired roles. Usually there are more interested candidates than space in the program allows, resulting in a waiting list almost as long as the number enrolled. In these cases, the selection process is based on the applicant's interest in and dedication to the training, their relevant qualities skills (i.e., language skills, inclination for collaborative teamwork, etc.) and their demonstrated ability to perform well in an intensive classroom setting.

Training Components

The Advanced Navegante Training program (ANTP) is an intensive 10-weeks didactic program followed by an experiential learning internship. Classes are held during evenings and on weekends to accommodate participants' work schedules. Classroom learning takes place during 1–2-h sessions on weeknights, and 3–4-h sessions on the weekends. It is supplemented by at least 80 h of clinic-based experiential learning, where ANTP trainees can work with their mentors (the current *Navegantes*), assisting patients and interpreting for clinicians. A list of the topics and skills covered in the ANTP is provided in **Table 1**.

A key aspect of the ANTP is that it is peer-taught by current CEHC *Navegantes*, who create a comfortable and supportive environment. The experienced *Navegantes* are familiar with the personal backgrounds and experiences of the participants, improving the pedagogical efficacy and practical implementation of the program for both trainers and trainees.

The ANTP uses CDC-approved, evidence-based course materials as the backbone of the Health Care Navigator training course. Specifically, the clinic uses "A Community Health Worker Training Resource for Preventing Heart Disease and Stroke," which is an online manual available on the CDC website (7). The downloadable resource is printed for each of the participants in the course. Written in plain English, the CDC resource has 15 chapters on topics such heart disease, stroke, high blood pressure and cholesterol, diabetes, depression and stress, medication adherence, and other lifestyle risk factors.

During the classroom-based learning portion of the program, the CDC CHW curriculum is supplemented with other resources and guest speakers, which allows ANTP participants to gain knowledge in a wide variety of extra topics, such as chronic disease prevention and management, case management, and professional boundaries. This also ensures that the ANTP curriculum covers the key domains of knowledge outlined by the RI DOH (8). *Navegante* course leaders invite CEHC staff, volunteers, and guest speakers from the community to share their expertise on these topics. Visiting medical and nursing faculty from Brown University and University of Rhode Island come to instruct sessions on specific topics that are required for CHW certification, and honoraria for these speakers are included in the ANTP budget.

The trainees benefit from hearing the real-life context that the *Navegantes* and expert guest speakers offer related to the course subject matter as it provides them information about a wide range of healthcare settings. In addition, by telling stories about their own experiences, these speakers enable CHW-trainees to learn first-hand about what future employment opportunities they might be interested in pursuing.

Medical Interpretation

The Medical Interpreting course is provided over 8 weeks of intensive classroom training (6 h per weekend) by a certified medical interpretation educator. Participants learn about the health care interpreting profession and receive formal training in language and communication, professional ethics, health care systems, culture, medical interpreting protocols, message conversion, modes of interpretation, cultural brokering, mental health, HIPAA, job readiness (resume, cover letter, reference, and job searching strategies), professionalism, and customer service. The course also reviews basic medical conditions and medical terminology that interpreters may encounter on the job.

Lifestyle Class Leadership Training

A major role for CHWs is to provide health coaching and lead classes on healthy lifestyles. ANTP participants receive training in two types of lifestyle classes. The first is the Vida Sana/Healthy Life program, which is a unique social group-based course that was created and implemented by CEHC staff (5, 9). Vida Sana is structured as an interactive 8-weeks course that teaches participants basics about nutrition, making healthy choices, and self-management of chronic diseases for individuals with low health literacy. As part of ANTP, trainees are required to learn to lead Vida Sana classes by way of a "see one, do one, teach one" model. As part of the classroom component of the training, they take a Vida Sana class as participants, then help to teach one under the mentorship of experienced staff CEHC

Navegantes. In this way, the *Navegantes* can experience the impact of healthy lifestyle training themselves, helping them learn the techniques to be effective at teaching it to others. In addition, the material covered in Vida Sana reinforces information presented to trainees during the didactic portion of the program. This iterative training process prepares participants to successfully conduct health coaching and facilitate the Vida Sana class to future cohorts. Upon graduation, participants receive a certificate of completion to facilitate the Vida Sana/Healthy Life program as a Lifestyle Coach at CEHC.

The Diabetes Prevention Program (DPP) is an evidence-based lifestyle change program through the CDC. The DPP Lifestyle Coach training is provided to ANTP participants by the RI DOH. In the DPP, trained lifestyle coaches lead group classes to help participants at risk for diabetes to improve their food choices, increase physical activity, and learn coping skills to maintain weight loss and healthy lifestyle changes to prevent the development of diabetes (6).

Upon completion of ANTP, participants receive a certification to facilitate both the DPP and Vida Sana as a *Navegante*, qualifying these individuals for employment opportunities at local clinics and hospitals, and in programs such as the Health Equity Zone programs funded by the RI DOH.

Additional Components

In addition to the CHW certification they earn, participants in ANTP graduate with other marketable skills that serve the needs of the employers who are in need of highly trained patient advocates. These include First Aid/CPR Certification and Human Subjects Research Training through the Collaborative Institutional Training Initiative website.

Evaluation

Participants in the ANTP are required to complete and regular exams in order to progress through the course. The CHW training component includes four quizzes and one final exam, while the medical interpreter training includes a pre-test, midterm, and final exam. Other components, including Vida Sana, include quizzes to assess participant understanding and readiness to continue.

Experiential Learning Component

As part of ANTP, participants are required to complete an additional 80 h of on-site training at CEHC, for which participants receive a stipend (funded through the RI Department of Labor and Training). Since the majority of the participants either work full-time or work more than one job, these hours are very flexible (nights, weekends), and they have an entire year after graduation from the didactic phase to complete the additional 80 h.

During this experiential learning component, ANTP trainees shadow the staff *Navegante*s, who have a unique and broad set of duties and roles at CEHC. *Navegante* duties include administrative/clerical work, social service and healthcare navigation, medical interpreting, facilitating lifestyle classes, and more. If the ANTP trainees are also certified Medical Assistants (as many are), they can also perform Medical Assistant duties during CEHC clinics, such as taking vitals, administering point of care testing, urinalysis, vaccines, etc.

In some cases, ANTP trainees are offered employment at organizations outside CEHC before completing the experiential component of their training. In these cases, trainees are able to receive state CHW certification after completing the requisite number of hours at their new job.

Graduation and CHW Certification

Upon completing each of the requirements and passing each of the assessments, the participants are eligible to receive official certifications as a RI DOH Community Health Worker, a Professional Medical Interpreter, a DPP and Vida Sana Lifestyle Coach, and a First Aid/CPR provider.

In Rhode Island, participants can receive formal CHW certification upon successful completion of both the classroom portion of ANTP, as well as 1,000 h and/or 6 months of work as a CHW (8). Trainees also have the opportunity to become certified professional Medical Interpreters (predicated on their completion of the Medical Interpreter oral and written exam).

Costs and Funding

The ANTP is provided free of cost to participants. For the first several years, ANTP was entirely supported by grant funding from local philanthropic organizations, including the Textron Foundation. In 2019, CEHC provided a partnership with the RI Department of Labor and Training (DLT) which established a renewable mechanism for funding for ANTP. DLT funding has allowed CEHC to expand the program from one to two cohorts per year (graduating about 30 participants annually) as well as providing additional funding for direct participant stipends.

The total cost to train each participant is about $7,500, which includes the cost of the RI CHW certificate ($125), the National Medical Interpreter Exam ($450), medical equipment ($125), and CPR certification ($75), and a stipend for the experiential learning component ($500). In addition to these direct costs that are covered for participants, they receive one-on-one mentoring with a senior *Navegante* during their internship, assistance with career placement, and networking opportunities. The cost per participant also includes operational expenses associated with running the program like honoraria for presenters from The Warren Alpert Medical School of Brown University and local hospital systems including Lifespan and Care New England, as well as salaries for the *Navegante* leaders.

Strategic Partners

ANTP is based on a strong community collaboration of organizations that provide various components of the training, spread the word for recruitment, facilitate job placement after graduation, and more. These organizations span many different industries, from small non-profits, social service agencies, universities, state agencies, to large healthcare systems.

DISCUSSION

ANTP is offered on site at a free clinic that serves uninsured patients, many of whom are Spanish-speaking immigrants. In

TABLE 2 | ANTP outcomes by year.

Year	# ANTP graduates	# Employed at CEHC
2015	12	4
2016	10	2
2017	15	1
2018	16	2
2019*	31	4
2020*†	25	2

*Starting in 2019, we received funding to conduct 2 cohorts per year.
† All 2020 cohorts participated in the virtual ANTP format due to the COVID-19 pandemic. This table provides information on the number graduates from the didactic portion of ANTP. A small number go directly into full-time employment following graduation, while most complete the experiential learning internship (80-h internship at CEHC).

addition to providing valuable job training and improving employment outcomes for participants, the ANTP responds to the critical need for culturally competent and linguistically appropriate health care for medically underserved members of the Rhode Island community.

Outcomes

Since 2012, CEHC has trained over 100 bilingual and bicultural community members in the ANTP (**Table 2**). Of ANTP graduates who sought employment following the program, many have found rewarding and high-paying jobs in a variety of fields. Through CEHC's established partnership network with many institutions that employ CHWs or medical interpreters, ANTP graduates have been hired to work in health clinics, community-based organizations, and hospitals. For example, several graduates are working as full-time healthcare interpreters in hospital settings and emergency rooms. Others have supplemented their family incomes by becoming part time medical interpreters during evening hours. Other graduates have secured jobs with benefits as outreach workers in local health systems and social service agencies such as Providence Community Health Centers, Family Services RI and Neighborhood Health Plan. CEHC is also able to hire several new *Navegantes* from each of the graduating classes to work at CEHC depending on funding and staffing needs.

Through this training, low- to moderate-income level participants gain access to more rewarding and higher paying jobs in the growing sector of employers hiring CHWs and patient advocates in the healthcare industry. On average, CHWs earn $21.91 per hour in Rhode Island, more than the minimum wage in Rhode Island ($11.50 per hour) (10). With this extensive training, participants can advance their careers and become future leaders in the field of community health, often moving into higher-level management positions in many social service and healthcare agencies.

Most graduates are now certified CHWs and engaging in fulfilling, higher-paying employment at CEHC and other community-based organizations and healthcare systems. These cohorts of ANTP graduates have been empowered and equipped with the tools to help community members overcome the many cultural and linguistic barriers that arise within our healthcare system, leading to long lasting, positive effects on the health of all members of the community in Rhode Island.

Testimonials

During the ANTP graduation, participants often share powerful testimonials of their experience with this program and their gratitude for the opportunity. Some excerpts can be found in **Table 3**. Most were offered in Spanish, but the translated version is provided here.

Strengths of the Program

A key to success for this program has been ANTP's peer-led model. The advantages of this model are two-fold: (1) the *Navegantes* are peers of the current trainees and have shared personal and professional experiences, improving the pedagogical and practical efficacy of the program, and (2) in providing the training themselves, the *Navegantes* receive ongoing education in critical topics, becoming more experienced and skilled CHWs in the process. They create an environment for the training that is welcoming and supportive while ensuring that participants acquire skills that they believe to be essential to be successful as CHW.

In addition, the ANTP curriculum is designed to be multifaceted so that each participant involved gains the maximum benefits and are prepared for a variety of employment settings. ANTP training provides a number of tangible skills and certifications, from health coaching and case management to medical interpretation. The diverse set of skills they obtain make ANTP graduates marketable to a wide variety of future employment settings.

CONCEPTUAL AND METHODOLOGICAL LIMITATIONS

Challenges and Lessons Learned

An important focus of ANTP is that its trainees come from the same economically and medically underserved population that they intend to serve. This is important because it provides opportunities for people with limited educational background to seek higher paying, fulfilling jobs as CHWs and community advocates. However, during early cohorts of ANTP, we found that some participants faced significant barriers to completing the standardized assessments that are required to gain the formal certifications as CHWs or medical interpreters. As the demand for the program increased significantly, more careful screening procedures were instituted during recruitment which have helped to identify applicants who may require additional support to succeed during those parts of the program. Individuals who are not selected upon their first application to the ANTP are offered opportunities to volunteer at CEHC or other resources for job training that may prepare them for the program in the future.

Another significant challenge has been finding a steady source of comprehensive funding. During the early years of this program, CEHC only had a limited budget to fund the operational costs of the program. For some ANTP trainees,

TABLE 3 | Testimonials from ANTP graduates.

"Not only I was able to learn about community resources and what makes a good community health worker; I was able to learn from each and every one of my classmates, presenters, and *Navegantes*. I treasure the time spent with them and the contributions they have made to my life."
"This course has opened up my eyes to a vital, often overlooked need in the healthcare system. I have always been someone who naturally wants to help. Being a proud resident of Providence, born and raised, it feels amazing to know that this knowledge gained will allow me to be part of empowering my community and provide support in many aspects. Thank you to all the presenters who took time out of their busy days to come teach our tired minds. It was appreciated how you all kept the information interesting and engaging. For all the silly games that kept our blood rushing and all the laughs. For answering all of our questions and providing visuals of how much sugar was in many of our favorite drinks. And for all the amazing life hacks/tips/tricks that I will utilize in my personal life as well as professionally. I am forever grateful."
"Many of us, our parents or grandparents, arrived in this country as immigrants; some maybe fleeing from violence, wars, poverty in our countries. While they taught us how to help people, families and the community in many of the social and socioeconomic problems we face, we also learned how to prevent diseases, and have a healthy lifestyle through the Healthy Life program, and we learned a third language as Medical Interpreters, that is Medical Terminology to also be able to help people who need a translator in their medical appointments."

Most of these testimonials were offered in Spanish, and the translated version is provided here.

the costs of certification (for the state medical interpreter or CHW certification) and the unfunded requirement for additional on-site training was a significant barrier to success. However, CEHC's recent partnership with the RI DLT has allowed for a significantly larger budget for these additional components of the training, covering both these certification costs and stipends for the experiential learning components as well as providing continuity in funding for CEHC as the parent organization.

Online Adaptation and COVID-19

In early spring 2020, the ANTP was moved to a virtual format due to the COVID-19 pandemic. There have been some significant challenges associated with transferring this program online. For example, some trainees lacked the necessary technology (such as a computer and reliable WiFi connection) to participate in the online classes, but CEHC staff were able to work with trainees to find other options (e.g., phones, tablets) to ensure their ability to participate. In addition, the nature of the ANTP typically lends itself to a very dynamic classroom atmosphere with interactive activities and discussions. The comradery among trainees that naturally develops among the trainees in the classroom has also been more difficult to achieve in a virtual format. The *Navegante* course leaders have also noted that it is also more difficult to recreate this atmosphere and keep the attention of the participants in a virtual format. However, the online format did allow for two cohorts of ANTP trainees to successfully graduate despite the COVID-19 pandemic. It also allowed more flexibility for those who may not have otherwise been able to participate, including trainees who worked in evening hours and those with children.

Implementation Strategies and Next Steps

One central implementation strategy to the ANTP is its integration within the greater parent organization of CEHC. Designing this program under the umbrella of CEHC's work as a free clinic provides the opportunity to leverage the existing infrastructure and staffing, which helps to minimize overhead and operational costs. Importantly, one of the major roles of full-time CHWs at CEHC is to coordinate and lead the entire ANTP with the support of the clinic's existing resources. It also allows graduates to benefit from the existing partnership network of CEHC for job placement. An additional advantage of this model is that CEHC is able to fulfill staffing needs by hiring several new ANTP participants for part- or full-time positions upon graduation.

Another important aspect of the ANTP is making the work of CHWs at the center of all components of the program. The peer-led model enhances the warm social atmosphere and community among participants that is developed throughout the program. In this way, the program remains true to its core values of bridging the cultural and language gap that often exists within our healthcare and social service systems.

An important next step of this program is to scale up and adapt the program for other community organizations within Rhode Island and beyond. Given the flexibility of its design, the ANTP is thought to be highly adaptable to other settings and could be recreated in many places around the country.

CONCLUSIONS

CHWs are in high demand in healthcare and non-profit industries. ANTP is a relatively low-cost, sustainable and community-based job training model that uniquely prepares graduates to work in a variety of settings. By providing them with the tools they need to become CHWs, participants have access to higher-paying and fulfilling jobs, as we also build a growing team of knowledgeable, passionate advocates who promote community health for the medically underserved.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

MM and KB wrote the first draft of the manuscript. CE, BV, and DR were involved in the initial development and implementation of the ANTP, provided the logistical

information, and details that were used to write the manuscript. ML and ADG oversaw the program's implementation and wrote sections of the manuscript. All authors helped to revise, read, and approved the submitted version of the manuscript.

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CURRICULUM, INSTRUCTION, AND PEDAGOGY
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The Development of a Novel, Standards-Based Core Curriculum for Community Facing, Clinic-Based Community Health Workers

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Introduction: Historically, CHW trainings have been developed to support community-based CHWs. When CHWs have been trained to engage with patients, typically such trainings have been for short term grant funded projects, focusing on a specific health intervention and not for long term, ongoing engagement of CHWs employed in clinical settings. To the best of our knowledge, this is the first such effort to describe the development of a standards-based training curriculum for clinic-based CHWs using a novel conceptual framework.

Methods: Our conceptual approach for curricular development has several innovative features including: (1) a foundational consultation process with CHW national experts to inform curricular development approach, process and content; (2) utilization of the CHW Consensus Project (C3 Project) to provide curricular standards and guide learning objectives; (3) integration of three key stakeholder group perspectives (patients, healthcare teams, and healthcare systems); (4) use of popular education principles, aiming to foster a collaborative learning process; (5) integration of adult learning principles which build on learners' experiences, culminating in a modified apprenticeship model and (6) collaboration with clinical partners throughout planning and development of the curriculum.

Results: The resulting standards-based curriculum is comprised of 10 modules, which span three areas of focus: (1) Establishing a professional CHW identity and competencies; (2) Outlining the context, processes and key actors in health care settings with whom CHWs will engage; and (3) Identifying the main forces that shape health and health care outcomes of patients/families and communities.

Discussion: We highlight four lessons from our curriculum development process that may help other such efforts. First, curricular development should utilize CHW standards, existing training materials, and community-focused principles to inform curricular content and learning outcomes. Second, curricula should support training delivery using experience-based, participatory approaches, consistent with adult education and popular education principles. Third, training development for clinical settings should also

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draw from clinical CHW experiences and input. Fourth, curricula should support training for key stakeholders and champions in clinical organizations to improve organizational readiness for integrating CHWs into healthcare teams and health systems. Our results contribute to growing research on effective CHW training methods for clinical settings.

Keywords: community health workers, training for community health workers, standards-based curriculum for community health workers, community health workers in clinical settings, CHW Consensus Project (C3 Project)

INTRODUCTION: BACKGROUND AND RATIONALE FOR THE EDUCATIONAL ACTIVITY INNOVATION

Community health workers (CHWs) can be integral components of clinical care teams, having a long history of functioning as frontline public health staff who conduct outreach and build trust with vulnerable populations in federally qualified health centers (FQHCs), hospitals, public health agencies, and through community-based organizations. They have played an increasingly important role in health interventions/programs, often bridging the gap between clinic and community by facilitating care coordination (1, 2), health promotion (3), and communication between clinicians and patients/program participants (4) in a manner that is generally assumed to be more acceptable to the care recipients and ultimately improving health outcomes (5–7). CHW interventions have been identified as an essential strategy to address health disparities for patient-centered medical home (PCMH) (8–10) by the NHLBI (11) and the Centers for Disease Control and applauded for their contributions to the Institute for Healthcare Improvement's Triple Aim objectives (2, 12–14).

In healthcare settings, CHWs are intermediaries between patients and healthcare institutions and can help improve health outcomes. Because CHWs are often embedded in the community and are uniquely able to bridge the gap between healthcare organizations and the safety net patients in the community, CHWs are in a great position to address the potential obstacles to patient-centered care. With the onset of COVID-19, on March 19, 2020, the Department of Homeland Security's Cybersecurity and Infrastructure Security Agency issued a memorandum which included CHWs in the list of "essential critical infrastructure workers who are imperative during the response to the COVID-19 emergency for both public health and safety as well as community well-being" (15). Sen. Kirsten Gillibrand (D-NY) and Sen. Michael Bennet (D-CO) have proposed creating a national Health Force, inspired by the Depression-era Works Progress Administration, to recruit, train, and employ "hundreds of thousands" of CHWs to perform contact tracing and testing and provide a range of services (16). From much of the existing literature, including our own recent systematic review of patient feedback on CHWs' care provision (17), it is evident that CHWs are well-positioned to build trust surrounding clinical directives, provide credible health care information, and address barriers related to the social determinants of health. If CHWs are trained appropriately and integrated into clinical settings, such a patient-engagement and community outreach strategy addressing social determinants of health within a public health framework with the CHW at the center can provide a sustainable, new paradigm for meeting not only COVID-19 testing needs but also for engaging patients in accessing COVID-19 vaccinations and other emergent health care challenges.

Historically, CHW trainings have often been developed to support community-based CHWs. When CHWs have been trained to engage with patients, typically such trainings have historically been for short term grant funded projects, focusing on a specific health intervention and not geared toward a long term, ongoing engagement of CHWs employed in clinical settings but this is beginning to change. However, the lack of national consensus and the wide spectrum of CHW practice has contributed to a variety of CHW trainings that vary in scope of practice and are often limited to disease interventions or specific patient populations (18). The research on CHWs also tends to not address the topic of training with O'Brien et al. finding that only 41% of articles addressing this topic in their 2009 review (19). Despite their potential vitality to health care teams and their wide scope of practice, CHW training is not standardized. For example, there are no formal training or certification requirements for CHWs in California (20). Nationwide, the work of CHWs is just as varied since educational and training requirements of CHWs vary from state to state (21).

Part of the challenge is the disagreement about whether it is necessary to standardize CHW work and training. Standardizing CHW training with curriculum in academic settings raises concerns as to whether CHWs will be able to maintain their community identity that is so crucial to their practice and the effect it would have on the existing workforce (18, 22). Despite concerns about standardization, there have been several local and national efforts to identify standard roles and competencies for CHWs. One of the first groundbreaking efforts to develop CHW competencies came in 1998 with the report from the National Community Health Advisor Study (23). Another effort came in the form of a strategic initiative of the California Endowment's Building Healthy Communities partnering with the organization *Visíon y Compromiso*, which resulted in a framing paper highlighting roles and 10 defining characteristics and values that make a successful *promotora de salud* (24). This effort emphasized the importance of CHW qualities of having similar life experiences as the community being served, being trusted members of the community, and communicating community needs to organizations and compassion-based service, describing it as "*servicio de corazón*" (service from the heart) (24). A more recent research initiative attempted to establish a validated, standardized set of 27 core CHW competencies and

a linked workforce framework, delineating three categories of CHWs based upon training, workplace, and scope of practice (25). However, this effort has been critiqued by the National Association of Community Health Workers (NACHW) because it ".. relied on a small sample of primarily clinically based CHWs, (which) resulted in an overly medicalized model of core competencies that is inadequately aligned with CHW workforce history, current practice, and well-regarded research" (26). The most comprehensive and widely accepted set of CHW standards to date was proposed by The CHW Core Consensus Project (The C3 Project), a nationally-based collaborative effort between working CHWs, CHW curriculum developers and other allies (27). The C3 project proposed a recommended list of 10 roles and 11 skills and endorsed existing knowledge about CHW qualities that may be used as a reference for working CHWs or those working with CHWs. The concept of "qualities" allows for capturing what is already known about who makes a good CHW, as prominently defined in the *American Public Health Association* CHW Section's definition of a CHW. One of the fundamental qualities in this definition is "[being] a trusted member of and/or [having] an unusually close understanding of the community served" (28). Such a close connection to the community served can facilitate not only trust with patients, but also the CHWs' ability to better communicate with patients as well as serve as bridges of communications between clinical health care teams and such patients.

While CHW roles and competencies have been proposed, there are no formalized frameworks or standards-based curricula reported in the literature for training clinical CHWs in the United States. In our estimation, a remaining gap in the literature is a published account of a framework and description of applying proposed standards and competencies to develop a comprehensive training for CHWs in clinical settings. To the best of our knowledge, this is the first such effort to do so. While we are familiar with the existence of other well-regarded training programs for clinical CHWs such as Loma Linda University's San Manuel Gateway College Promotores Academy and University of Pennsylvania's Penn Center for Community Health Workers, we do not know of any publications on the development of such a training curriculum for clinically based CHWs. The Charles R. Drew University (CDU) CHW Academy is committed to addressing these gaps in the training and placement of CHWs from diverse backgrounds into clinical settings using an innovative approach to developing such curricula. In line with the C3 project, we see a distinction in how CHWs function when they are based in the community vs. in the clinic. Furthermore, they may have a different emphasis depending on their location and the primary context of their work. This can take several forms along a spectrum that includes either community-based or clinic-based CHWs who could be community-facing or clinic-facing. For our curriculum, we are focusing on CHWs who are clinic-based and community facing. But a strong element of our curriculum is that we have adhered to the C3 skills and competencies that are common to all CHWs. Below we discuss: (a) the conceptual approach to our curricular development and its innovative features; (b) the learning environment, objectives and format of our curriculum; (c) results to date, including our core curricular modules and evaluation plans; (d) practical implications and lessons learned; and (e) some historical, environmental, and material constraints that have shaped and limited our planned development.

CONCEPTUAL APPROACH

The conceptual approach for our curricular development included several innovative features outlined in **Figure 1**. Below we identify six key features that grounded our curriculum development approach. *First,* we began this process with a literature review and a foundational consultation process with CHW national experts to inform our curricular development approach, process and content. This group included nationally recognized CHWs and CHW allies with a track record of expertise in research, policy, and advocacy on behalf of CHWs. Using reflections sent by our expert panel on a set of questions to guide our initial conceptualization of the curriculum, we held a 2 day in person retreat with the expert panel at CDU, where they advised us on our overall approach, the processes of development and implementation as well as insights on the planned content of the curriculum. *Second,* based on our review of the literature and input from the national experts, we used the CHW Consensus Project (C3 Project) to provide curricular standards and guide the identification of content areas and learning objectives for the 10 modules of our curriculum. The C3 project includes a list of 10 CHW roles/functions and 11 associated skills, with multiple skills and CHW qualities necessary to support each role (29). The 10 CHW roles proposed by the C3 project refer to key CHW functions related to (1) cultural mediation, (2) culturally-appropriate health education, (3) care coordination and navigation, (4) coaching/social support, (5) advocacy, (6) capacity building, (7) direct services (8) individual/community assessment, (9) outreach, (10) evaluation and research (29). The grassroots history of CHWs, their ability to catalyze community growth, and the necessity and dynamics of their communication skills are reflected in the list of the ten roles and eleven skills proposed by the C3 project (9). *Third*, we identified three key stakeholders—patients, health care teams, and health care systems—who would be affected by CHWs in the clinical setting. Thus, with each module, we integrated and incorporated the perspectives of each of these stakeholders throughout the curriculum. *Fourth*, our approach utilized popular education principles, which aim to foster a collaborative learning process. For example, we used participatory approaches that focus on problem solving and role playing, including hands-on laboratory sessions to practice skills. *Fifth,* in place of a pedagogy, we have used an andragogical approach that recognizes that our learners come with their own lived experiences. We integrated adult learning principles throughout our curriculum (e.g., more problem centered than content oriented), in how we conduct our assessments of the learners and in a culminating apprenticeship model of learning. *Sixth,* we incorporated hands on collaboration with our clinical partners throughout the stages of the planning and development of our curriculum. Two practicing CHWs and co-authors (IR and ML) working

with our clinical partners reviewed each module and other aspects of our curriculum as we developed them and these CHWs provided feedback and input through track changed comments and participating in weekly discussion meetings on the curriculum. Furthermore, regular meetings over the past 2 years (quarterly or more often depending on the need) with our health care organization partners, who are also co-authors of this paper (JT, JJ, JM, RS), helped assure clinical relevance of our curriculum.

LEARNING ENVIRONMENT, OBJECTIVES, AND FORMAT

Our curriculum was planned in the context of a partnership between the *CDU CHW Academy* and a regional healthcare organization, *Providence*, with the intention of training CHWs to be placed in regional clinics and hospitals. We have recruited our cohorts of students from community settings surrounding the clinics across Los Angeles County where we intend to place the trained CHWs. Our CDU CHW Academy Instructors, coming from the same communities as our students, are also the curriculum developers under the direction of the two Academy directors. They are supported by five student interns at various stages of their health professional trainings. The learning objectives for each module was developed by our team based on guidance provided by C3 standards as well as use of the CHW Foundations textbook as a resource (30). Our pedagogical approach, or rather our andragogical approach, is outlined in **Figure 2**. The figure illustrates the multiple formats we use to present our curricular content for both in person and online implementation. First, learners are provided a student handbook with fillable exercise pages and course materials that match the instructor's more extensive textbook. Second, course materials are presented using both PowerPoint slides and Articulate 360, a web-based course authoring software that allows for dynamic and interactive presentation of materials and engaging assessment of learners' comprehension through knowledge check and poll questions. Finally, in keeping with the application of popular education and andragogical principles, our curriculum emphasizes several interactive methods to engage the learners. For example, most didactic sessions last about 4 h, including lecture presentation, individual reflections, group chat discussions, poll questions, and small group work. Fifty percent of each day is spent in a Hands-on Lab to practice the roles and skills discussed in the module of focus. Daily skill labs will also last 4 h with interactive activities including role play, reflective journaling, process simulations, individual and group assessments, and independent work. Interspersed into these sessions will be panel discussions with professionals in health care, academia, and public health. Students will be given the opportunity to attend online conferences and webinars related to CHW training. Finally, we plan to implement a modified apprenticeship program through virtual visits with healthcare professionals and experienced CHWs, given the limitations of the current pandemic.

RESULTS-CURRICULAR MODULES AND EVALUATION PLANS

The resulting innovative standards-based curriculum is comprised of 10 modules, which span three key areas of focus as outlined in **Figure 3**. Each of the 10 modules include two didactic sessions and associated lab sessions that allow learners to engage and practice and further explore new competencies introduced in each module. Each session will include the following structure: (1) Introduction and review of learning objectives, (2) content presentation, (3) teach back and summary, (4) skills review and chapter check, and (5) closing and answering remaining student questions. Furthermore, in **Supplementary Material 1**, we list the specific C3 standards that have been addressed through the content and learning objectives for each of the 10 modules of our curriculum.

As outlined in **Figure 3**, the first area of focus in these modules is related to *"Establishing a professional CHW Identity"* which consists of modules one and two. We assume that most of the students will have no previous experience or knowledge about CHWs. Consequently, in the first module, we begin with an introduction to CHWs, their legacy and impact in the community and health care settings. We also introduce the learners to the C3 roles and competencies. Finally, we make them aware of the different CHW professional organizations and networks that exist to increase awareness and advocacy for the profession. In the second module, we focus on the importance of CHWs practicing self-awareness and cultural humility. For CHWs who are front line providers, it is especially important to be aware of signs of stress in themselves and develop an action plan to address such stress. We also introduce them to the concept of culture, the importance of cultural identities and culturally-based health beliefs, and the impact of cultural diversity among patients and co-workers on CHW work interactions and practices. As they reflect on their own cultural identities and associated health beliefs, we discuss the principles of cultural humility and how to apply these principles in their professional interactions.

The second area of focus is related to "*Outlining the context, processes and key actors in health care settings with whom CHWs will engage,*" which consists of modules three to seven. In the third module, we introduce the students to the U.S. health care systems in a comparative global context as well as in the context of the triple aims of improving the experience of care, improving the health of populations, and reducing per capita costs of health care. We do this by identifying four key players (patients, providers, payors, and policymakers), the differences between private and public insurance programs and different types of hospital systems (private, public, and non-profit). We also discuss the navigation of the health care system from the perspective of patients receiving different types of patient care (primary care, specialty care, and emergency care), the typical barriers patients may encounter when accessing health care services and the many ways that CHWs can facilitate such access and support navigation for patients. In the fourth module, we focus on interprofessional workplace interactions. We begin this module with a description of the health care team approach, the various types and roles of health care professionals on such health care teams, and the traits

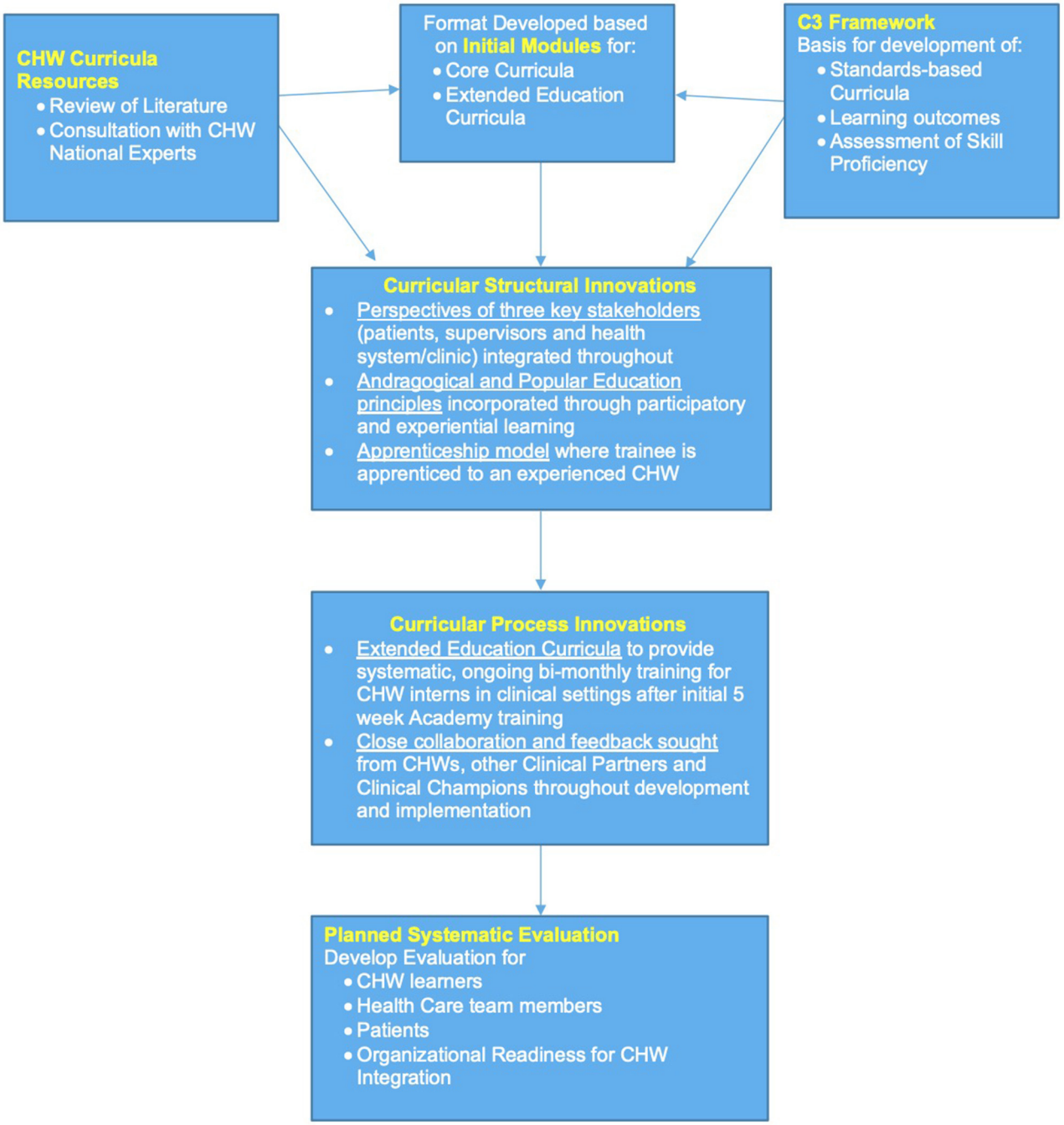

FIGURE 1 | CDU CHW academy curriculum development framework.

of successful multiprofessional health care teams. We focus on the role of CHWs on such teams as navigators, advocates, care coordinators, health promoters, etc. We also identify common barriers of interprofessional teamwork and discuss how they impact CHWs and how they may be addressed through conflict resolution principles to help CHWs be more effective members of health care teams. In the fifth module, we introduce learners to the field of public health, its emphasis on population, prevention, and social justice and its three main functions of assessment, policy development, and assurance. We describe how the three levels of public health departments at the federal, state, and local levels can work in tandem with the field of medicine, and the

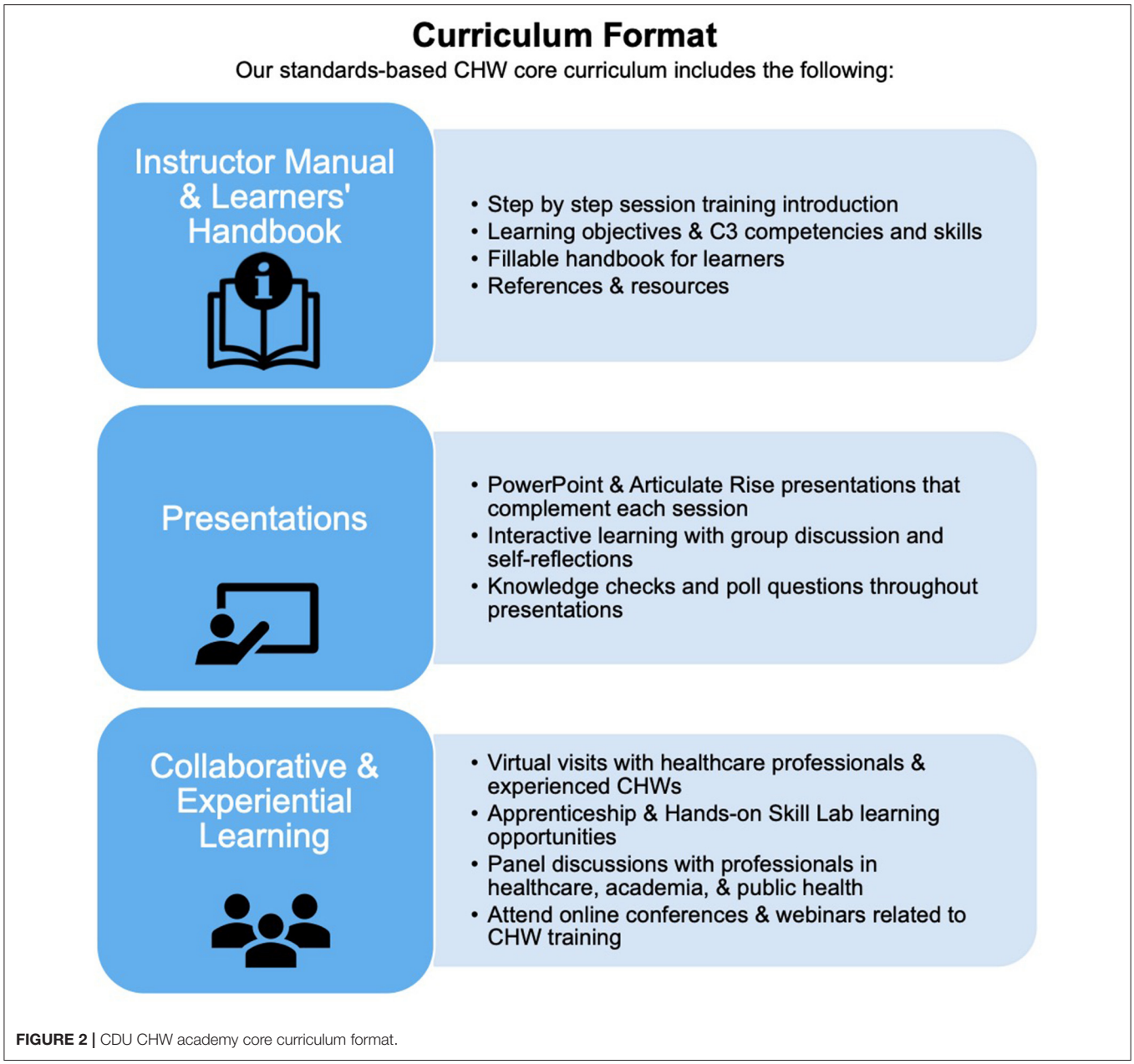

FIGURE 2 | CDU CHW academy core curriculum format.

roles that CHWs can play in prevention initiatives, using the COVID 19 pandemic and contact tracing as examples. We also discuss how public health is a multidisciplinary field, rooted in epidemiology and community health, using the ecological model to illustrate a public health approach to addressing population health. In the sixth module, we address the existing, new, and expanding uses of technology in health care. We first introduce students to the types of technology used in health care and how they are used by providers and patients. We describe some of the benefits and challenges of telehealth-based health care provision and discuss ways to protect privacy and confidentiality when using online applications. We consider how CHWs may build trust with patients in virtual settings and illustrate this through examples of how to build trusting relations with patients, families, and community members. In the seventh module, we focus on the vital importance of communication skills as well as ethical and legal regulations for CHW professional interactions. First, we Identify methods to communicate with patients and health care teams effectively, using verbal, non-verbal, and written communication skills. We analyze the value of and strategies for both providing and receiving constructive feedback in employment settings. We define code switching and potential challenges as well as discuss strategies for how and when to switch codes while retaining one's personal identity. We end this module by introducing legal regulations that operate in clinical settings, such as The Health Insurance Portability and Accountability

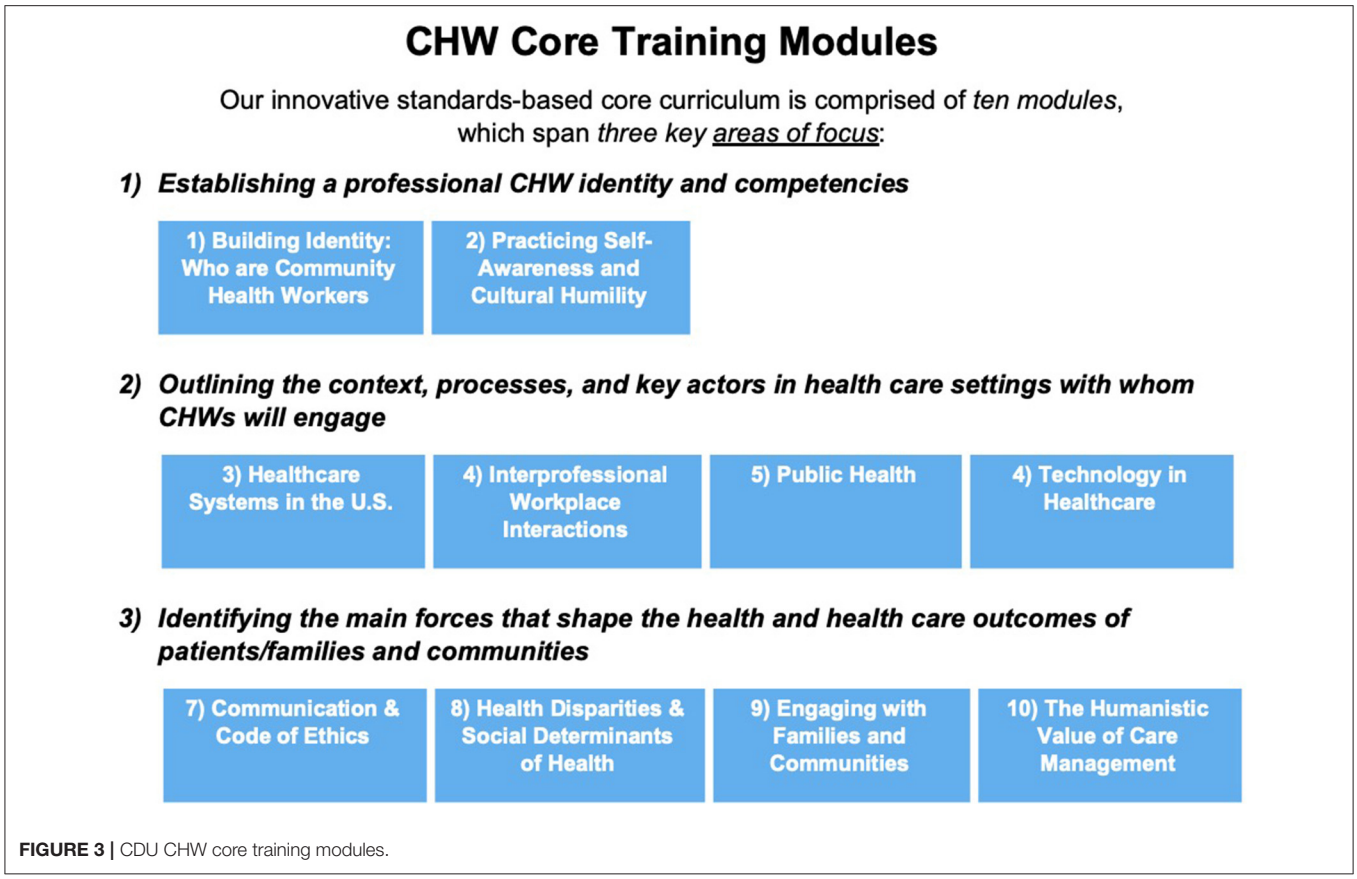

FIGURE 3 | CDU CHW core training modules.

Act (HIPPA) and the need for informed consent vs. ethics as guiding principles for CHWs and how they are different from laws. We discuss the Framework for Ethical Decision Making and key articles from the CHW Code of Ethics. While we provide examples of applying such codes as ethical guidelines relating to informed consent and confidentiality, we also highlight limits on confidentiality, given the CHW role as a mandated reporter.

The third area of focus is related to "*Identifying the main forces that shape the health and health care outcomes of patients/families and communities,*" consisting of modules eight to ten. In the eighth module, we introduce students to health disparities and social determinants of health. We specifically address health disparities related to race/ethnicity, gender/sex, and socioeconomic status, resulting in inequity in access to care as well as, affordability and quality of care. We list and discuss the nine social determinants of health described by the World Health Organization, their influence on health outcomes and measurement tools commonly used by CHWs to assess social determinants of health. Finally, we outline the difference between health equality and health equity and discuss the goals of federal health policy agenda *Healthy People 2020* to promote health equity as well as how CHWs can play a role in helping address health disparities and the social determinants of health. In the ninth module, we examine social support resources to engage with families and communities. We begin with a discussion of the diverse range of families that CHWs are likely to encounter and ways in which CHWs may stay actively engaged with the patient's family members, while being mindful of the patient's particular culture (e.g., *familismo*) and family structure (e.g., extended families living together), using health promotion and treatment frameworks that incorporate the family. We focus on the "home visit," a key tool for CHWs in engaging patients and provide examples and case studies of why and how they are conducted. Extending from the family to community, we discuss community engagement, organizing and advocacy and the CHW's potential role in the community capacity building. We introduce students to various models of community engagement such as Community Based Participatory Research (CBPR) and Community Action Model (CAM). In addition, we introduce them to key social services and how they might support patients in accessing and enrolling in such services. Finally in the 10 module, we conclude with a reflection on how all the CHW's roles and competencies culminate in the higher goal of ensuring humanistic values in care management. We begin by defining and illustrating humanistic values in health care through examples in health care settings. Reflecting on the potential challenges of a patient, who may have low health literacy and possible history of mistrust, and challenges navigating the health care system, we consider how a CHW might bring humanistic values to such a patient's experience of health care. We also focus on the CHW's role of care coordination, first considering varying definitions of care coordination and providing illustrations through examples

FIGURE 4 | CDU CHW academy training overview.

of how CHWs engage with patients and collaborate with health care teams to coordinate care. We explore three key tools in the CHW care coordination toolkit of (1) identifying the social determinants of health at play in the patient's health situation, (2) using empowerment approaches to manage care, and (3) applying the various functions of the CHW role to manage the patient's care.

We have also planned a systematic evaluation of the curriculum implementation process. We will assess the learning outcomes of CHW students with pre- and post-written and oral rubric-based assessments that match the learning outcomes for each module. Additionally, we will employ both individual and group interactive self and peer assessments throughout the 5 weeks of curriculum implementation, keeping in line with popular education and andragogical principles. We hope to eventually expand our evaluation to the health care team members and health systems where our CHWs are placed as well as patients in the health system who receive care from CHWs. Our goal is to use this information to develop an organizational readiness program to better prepare our clinical internship host partners to best support the integration of CHWs into their health care teams and health systems.

DISCUSSION ON THE PRACTICAL IMPLICATIONS AND LESSONS LEARNED

We highlight four lessons from our curriculum development process that may help other such efforts. *First,* we have learned that it is important to review and build on (a) existing knowledge in the literature, (b) previous efforts in the development of CHW training curricula, and (c) the values of the community who are going to be the end users and beneficiaries of such an effort. We began with an extensive review of the literature which helped us frame our preliminary framework and questions. We sought the input of trusted nationally recognized experts in the field with many decades of work with CHWs, including some CHWs and CHW allies, clinical, and academic partners whose wisdom was invaluable to our process. With their guidance, we did not have to "reinvent the wheel," but were directed to existing

resources, some of which we used and adapted to develop our curriculum. Thus, we were able to sift through available materials to identify the C3 CHW standards as the basis on which to establish our curricular content. We also found the exemplary CHW Foundations textbook (30) to be extremely helpful and we have selected some of their materials, and adapted others to fit the clinical setting. All through this process, we remained aware of the community-focused principles of this field that were developed over many decades to inform our curricular content and learning outcomes.

Second, we have learned that curricula should support training delivery using experience-based, participatory approaches, consistent with adult education and popular education principles. Given our own previous experiences in curricular development and education as well as our work with CHWs, we understand the importance of meeting students where they are, especially adult learners with multiple competing demands on their attention. Furthermore, many of these adult learners come with rich lived experiences that can be leveraged to engage them and make the educational process more relevant for them. Finally, some of these students may come with lower literacy levels, learning disabilities and other challenges where interactive, participatory approaches are important in both the provision and assessment of curricular materials. In the spirit of experiential learning, our approach includes an internship opportunity for CHW students, as outlined in **Figure 4**. Thus, our students will not only have the 5 weeks of core training with us but will also participate in a 21 week fully paid internship in clinical settings where they will receive oversight and additional training as part of a modified apprenticeship program.

Third, we have learned that CHW training development for clinical settings should be built on a strong academic-clinical partnership, especially drawing on clinical CHWs and other clinical partner experiences. We were able to get input from our clinical partner administrators, and CHWs working in our partner health system all along the way in the development of our curricular plan and on each of the modules of our curriculum. In return, we have provided feedback on the internship plan and recruitment process of the student cohorts that is being managed by our clinical partners. Such a strong and reciprocal engagement and feedback from both academic and clinical partners, particularly CHWs, was invaluable to developing CHW training materials that are relevant to the clinical setting.

Fourth, we have learned that the curricular approach should ideally support training for key stakeholders and champions in clinical organizations to improve organizational readiness for integrating CHWs into healthcare teams and health systems. We have learned the importance of organizational readiness from the work done by our clinical partners in readying other care organizations in taking on our CHW students as interns in their settings. One of our clinical partner team members dedicated a considerable portion of her effort in cultivating the idea of CHWs as members of health care teams with our internship host sites. She identified clinical providers who could be champions of CHWs in these settings and is engaging them in regular meetings to support the integration and supervision of CHWs in health care teams. We also planned a series of meetings, including a "kickoff" meeting with the health care organizations' leadership, to introduce them to the development and implementation of this curriculum and the internship process.

CONCLUSION

We hope that our results contribute to the growing research on effective CHW training methods and provide guidance to CHW training development for clinical settings. This was an especially difficult year in which to develop and plan for implementation of this curriculum, given the global COVID 19 pandemic and given that we were developing training for frontline healthcare workers. Thus, there are some COVID related limitations to our planned process. For example, while we hoped to implement a full-fledged apprenticeship model partnering CHW learners with experienced clinical CHWs, we had to modify the apprenticeship to limited engagement with clinical CHWs, given the unprecedented challenges faced by all clinical providers. Similarly, we had to adapt the curriculum content to be delivered exclusively online as a necessary adjustment to a pandemic environment. As we move past the pandemic, we hope that we will be able to implement a more comprehensive apprenticeship model and continuing education as a standardized part of our training approach and be able to provide an in person or hybrid approach to curriculum delivery. In order to address concerns raised by how standardizing CHW training can affect the emphasis on maintaining CHW community identity so crucial to their practice, in our training, we have focused on the related concepts of an ecological approach, the social determinants of health, cultural identity and health beliefs, and community engagement. All throughout our curriculum, we have emphasized and illustrated through examples how paying attention to the patients' broader socioeconomic and cultural context at the community level is vitally important not only to patient health outcomes, but also to bringing the full impact of the CHW role into clinical settings. We also recognize that the model we use of first recruiting and then training CHWs is not the traditional model of CHW workforce recruitment. Rather than engaging organically existing community health workers from the community, we are identifying individuals who may not have had previous experience in bridging the gap between clinical settings and the communities they live in and training them to do this work. It may be important to evaluate this non-traditional aspect of our approach in the future. We have yet to fully implement and evaluate our curriculum. We hope that our implementation and evaluation experiences will feed into the development of a formal organizational readiness component. Such an additional component, we hope, can be used to better prepare our clinical partners to engage and integrate CHWs fully into their healthcare teams and settings and to better fulfill the CHWs' potential to be bridges between patients, communities, healthcare providers, healthcare teams, and health systems.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/**Supplementary Material**, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

SG and HB devised the main conceptual ideas of the project with substantial feedback from our clinical partners, JT, JJ, and JM. LS developed and worked out almost all of the technical details related to the curriculum with the support of RS and feedback from ML and IR. TV, and SN supported the development of background and literature review for the paper. SG drafted the initial manuscript. All authors reviewed and approved the final manuscript.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpubh.2021.663492/full#supplementary-material

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Organizational Readiness for Community Health Worker Workforce Integration Among Medicaid Contracted Health Plans and Provider Networks: An Arizona Case Study

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Understanding and building organizational capacity for system change and the integration of the Community Health Worker (CHW) workforce within the health scare sector requires a supportive organizational culture among sector leaders and providers. The aim of this mixed-methods study was to assess organizational readiness for CHW workforce integration into Arizona Medicaid health systems and care teams. This collaborative effort was in direct response to emergent state and national CHW workforce policy opportunities, and the shifting health care landscape in Arizona – which merged behavior and physical health. Specifically, and in collaboration with a broad-based, statewide CHW workforce coalition, led by the CHW professional association, we assessed 245 licensed health care professionals with experience working with CHWs and 16 Medicaid-contracted health plan leadership. Our goal was to generate a baseline understanding of the knowledge, attitudes and beliefs these stakeholders held about the integration of CHWs into systems and teams. Our findings demonstrate a high level of organizational readiness and action toward integration of CHWs within the Arizona health care system and care teams. CHWs have emerged as a health care workforce able to enhance the patient experience of care, improve population health, reduce cost of care, and improve the experience of providing care among clinicians and staff.

Keywords: Community Health Workers, integration, health systems, recruitment, retention

INTRODUCTION

The national expansion of health plans and health-plan contracted provider groups that promote the use of the Community Health Worker (CHW) workforce within clinical care has increased in the last decade. More markedly with the proliferation of the Quadruple Aim framework, which acknowledges the critical role of the health care team in healthcare transformation (1), CHWs

have emerged as a health care workforce able to enhance the patient experience of care, improve population health, reduce cost of care, and improve the experience of providing care among clinicians and staff (2, 3). The inclusion of CHWs in multidisciplinary care teams contributes to the efficacy of Patient-Centered Medical Homes (PCMH), Accountable Care Organizations (ACO) and Community Health Teams (4–6). In addition to coordinated care, both ACOs and PCMHs are required to provide routine preventive care and patient education. CHWs are documented to be well-positioned to support these entities and effectively meet health reform mandates for prevention, education and coordination of care (4, 5). Movement toward Medicaid financing for value-based purchasing, or health plan reimbursement for patient population outcomes rather than per capita health services, offers yet another opportunity for the integration of CHWs into health systems and as members of the care team.

Medicaid health plans have also begun to act on opportunities presented by population-driven, value-based provider contracting to expand and promote CHW activities. Several state Medicaid programs, including Alaska, Minnesota (7) and Oregon, have specifically named CHWs as core participants in health care delivery reform. Oregon's Medicaid administered Coordinated Care Organization (CCO) payer-provider partnerships require the integration of CHWs in the healthcare team and train several 100 CHWs to support its CCOs (8). These actions come after the monumental 2014 decision by the Centers for Medicaid and Medicare (CMS) to issue guidance to allow states to reimburse for preventive services offered by non-licensed professionals such as CHWs (9). Yet, few states have taken advantage of policy opportunities to establish permanent financing systems to integrate CHWs formally into the health care delivery system.

Understanding and building organizational capacity for systems change and integration of CHWs within the health care sector requires attention to the organizational culture of the health care sector and the actors operating within in it (10). Organizational culture is most often defined by the collective behaviors, values, beliefs, attitudes and norms of the system and its actors (10). Often, leadership is at the core of organizational cultural. Here, in response to this special research topic on integration of CHWs within systems and teams, we aim to address the topic of organizational readiness to ensure successful integration of CHWs into health care systems and teams.

Arizona Context

Arizona's Medicaid health care delivery system has a growing interest in the potential for the CHW workforce to impact health outcomes and costs, motivated at least in part by considerable policy shifts in the delivery of health care. In October 2018, Arizona's Medicaid system, known as Arizona Health Care Cost Containment System or AHCCCS, implemented the Arizona Complete Care (ACC). ACC requires Medicaid-contracted health plans to integrate behavioral and physical health services within one delivery mode, affecting ∼1.5 million or ∼80% of Medicaid members in Arizona (11). In the same year, Arizona's CHW workforce gained a substantial policy win through the passage of HB2324, providing the pathway and infrastructure for CHW voluntary certification and mandating CHW-driven workforce standards in training, supervision and career progression (12). While the current policy environment in Arizona is conducive to the integration of CHWs into health systems and clinical care teams, individual and systems-level barriers may hinder the potential for CHW integration to positively impact health outcomes (13–15).

In direct response to emergent state and national CHW workforce policy opportunities, and the shifting health care landscape in Arizona, we aimed to engage the Medicaid-focused health care sector of Arizona. Specifically, we assessed health care sector actors critical to organizational readiness and systems change: licensed health care professionals with experience working with CHWs and Medicaid-contracted health plan leadership. Our goal was to generate a baseline understanding of the knowledge, attitudes and beliefs these stakeholders held about the integration of CHWs into systems and teams.

MATERIALS AND METHODS

This study was guided by members of the Arizona Community Health Worker Coalition inclusive of more than 100 CHW stakeholders, including the Arizona Community Health Worker Association, CHW employers, the Arizona Department Health Services, Universities and health policy experts among many others. As a partnership, we have been engaged in several CHW workforce assessments with a focus on systems and environmental change that benefit the workforce as a whole. Between 2015 and 2019, we implemented a mixed-methods study with multiple aims: assessing organizational readiness, onboarding processes and integration of CHWs into Arizona Medicaid health systems and teams, as well as the perceived impact of CHW integration on health outcomes and cost of care among licensed providers in the state. This collaborative study took place during a period of a fast-moving CHW workforce policy landscape in the state.

Health Provider Survey

In 2015, to assess organizational readiness for system change and actual integration of CHWs, we implemented a cross-sectional, on-line survey with Arizona licensed health providers **Table 1**. Our aim was to engage Arizona licensed providers to assess their knowledge, beliefs, attitudes and professional experience with the CHW workforce, the perceived influence of CHWs on patient outcomes and the quality and cost of care, and the mechanisms for CHW integration within the health care team. Our brief survey was adapted from and developed in collaboration with national CHW workforce policy experts with experience in surveying health care providers and systems leaders in Massachusetts, Texas and Wisconsin. Our survey was piloted with local, busy primary care providers employed in Federally Qualified Community Health Centers (FQHC) and adjusted to take no more than 5 min. We disseminated the survey by email and face-to-face to the universe of licensed providers in Arizona serving the Medicaid population and or employed within health systems that commonly employ CHWs in Arizona. This universe

TABLE 1 | Health plan interview domain and licensed provider survey questions.

Instrument	Topic areas
Health plan leadership interview guide (*N* = 16) Semi-structured, qualitative small group phone interviews with 2-3 members of the health plan leadership team.	I. Familiarity and involvement with CHWs II. Utilization of CHWs in the Health Plan and contracted provider network 1. Roles for CHWs 2. Motivation for using CHWs 3. Qualifications/Identification/Recruitment 4. Training CHWs 5. Length of time using CHWs 6. Challenges in hiring and/or integrating CHWs into Health Plan workforce III. Determining the value of CHWs in care management 1. Importance of CHWs in improving *quality* of care 2. Importance of CHWs in improving *cost* of care 3. Most valuable contribution of CHWs to health plan/networks 4. Evaluation of cost savings or quality of care improvement 5. Timeframe for demonstrating impact of CHWs 6. CHW influence in designation of High Value/Center of Excellence IV. Payment models to support CHWs 1. Financing/How health plans pay to use CHWs as part of health care team 2. How provider networks are using CHWs to achieve value-based incentives 3. Interest in and financing of CHWs in community-based positions V. Current Arizona law/policies relating to CHWs 1. Value of CHW Voluntary Certification (HB2324) to health plans 2. Impact of AHCCCS Complete Care (ACC) on use of CHWs
Licensed health provider survey (*N* = 364) Cross-sectional online survey 5-point Likert scale ranging from strongly agree to strongly disagree	I. Familiarity and involvement with CHWs II. As a result of working with CHWs, patients are more likely to: 1. Follow my recommendations 2. Show up for scheduled appointments 3. Maintain regular care 4. Better manage their chronic disease 5. Have good birth outcomes 6. Have more effective communication during office visits 7. Have better access to care III. In my experience, CHWs have contributed to: 1. Reduction in the cost of care for high risk or high-cost patients 2. Reduction in the cost of care for NON-high risk or high-cost patients 3. Improved health outcomes for high risk or high-cost patients 4. Improved health outcomes for NON-high risk or high-cost patients 5. Prevention of high risk or high-cost health conditions IV. In my experience, CHWs have saved me time: 1. Arranging clinical referrals and follow-up for patients 2. Arranging social service referrals for patients 3. Educating patients on disease management 4. Educating patients on health promotion (i.e., nutrition and physical activity) 5. Educating patients on healthy childbirth V. Overall, how do CHWs in your organization work with the primary care team: 1. Meeting regularly with primary care staff 2. Regularly receiving patient referrals or assignments from primary care staff (for needed education sessions or home visits) 3. Providing interpreting services VI. What would make you more likely to utilize CHWs as part of the health care team: 1. More evidence that CHWs improve health outcomes 2. If CHWs services were reimbursed (i.e., By Center for Medicare and Medicaid Services (CMS), AHCCCS, third party payers)

Authors' description of survey and interview guide domains.

of providers included all 22 FQHCs, the three Indian Health Service (IHS) Areas of Arizona and all tribal health centers and clinics, as well as various behavioral health centers, local and state health provider professional associations and networks (i.e. family medicine, nursing, social work, pharmacists). Survey questions are detailed in **Table 1** and followed a 5-point Likert scale ranging from strongly agree to strongly disagree. Variables were collapsed into three categories: Agree, Unsure and Disagree. Due to very low percentages within the Disagree category, data is presented as Agree and the remaining proportions are Unsure. Analysis was performed using Stata Statistical Software. Descriptive statistics were generated to characterize patient demographics and stratify by provider practice type, including (1) Federally Qualified Community Health Center, (2) Indian Health Service/638 Clinic/Hospital, (3) Health Practice and (4) Other Health Practice (inclusive providers employed in solo practice, group practice, managed care organization, and or hospital-based practice.

Health Plan Leadership Interviews

In 2018, we assessed organizational readiness for system change and actual integration of CHWs, including the recruitment, training and onboarding process among Medicaid-contracted health plans. We collaborated with health policy experts from the Arizona Association of Health Plans (AAHP), an alliance of Arizona Medicaid-contracted health plans that represents the policy interests of these plans, and the Arizona Department Health Services **Table 1**. Together we engaged leadership of all six Medicaid-contracted health plans through 60–75-min, semi-structured qualitative interviews. Through purposive sampling of health plan leadership teams, which often included the chief medical officer (CMO), chief operating officer (COO) and the chief financial officer (CFO), we explored current and projected utilization, recruitment, training, and financing of the CHW workforce among other topics described in **Table 1**. Purposive sampling and inclusion of various leadership team members in the single interview was recommended by our

health policy expert partners to ensure comprehensive responses to the domains of the interview guide that may or may not have been known by any one individual leader. Questions were piloted with one health plan leadership team, inclusive of a team of CMO, CEO and CFO, and adjusted to strengthen interview flow and timing, reflect key areas of focus and adapt for changes in Arizona health policy affecting CHWs and health plans. Recruitment occurred through the AAHP partner, who explained the project to health plan leadership during regularly scheduled meetings. Leaders were provided the interview guide and asked to identify members of their team with adequate knowledge to answer the questions. Researchers worked directly with designated health plan liaisons to schedule the interviews, which were facilitated by the same primary interviewer trained in qualitative research methods. Interviews were audio recorded and transcribed verbatim. A team of two research staff, inclusive of the primary interviewer and the primary study lead, used a collaborative analysis approach to first, discuss and identify common themes for the major domains of the interview guide and then to develop a code book, later confirmed by study partners (16). The Community Health Worker Core Consensus (C3) Project's 10 CHW core competencies definitions were used to code for CHW core competencies. Using Atlasti eight qualitative research software, the primary interviewer coded the interviews using the agreed upon codebook. Through a process of consensus, the two researchers met face to face over a series of meetings to interpret the findings, address discrepancies in coding and prepare coding memos which were shared with study partners for final interpretation of results (16, 17). Triangulation of the complementary data sources (survey and interviews) occurred in two phases: (1) first, we created a comprehensive description of the characteristics and other emergent themes found in the provider survey results and the health plan leadership interviews; and then we (2) compared and contrasted the relationships and identified commonalities and differences in knowledge, beliefs, attitudes and professional experience with the CHW workforce, the perceived influence of CHWs on patient outcomes and the quality and cost of care, and the mechanisms for CHW integration within the health care team. These interpretations were again shared back with research partners for interpretation recommendations.

RESULTS

Results will be presented by selected survey and interview guide topics outlined in **Table 1**. A total of 364 Arizona licensed providers completed the survey in its entirety. Given our focus on licensed providers with experience with CHWs, our analysis includes only the 245 (70%) providers who reported direct or indirect involvement with a CHW. Among these providers, 91% ($N = 223$) were somewhat to extremely familiar with CHWs. Physicians, Physicians' Assistants and Nurse Practitioners accounted for 65% ($N = 160$) of the sample. Approximately 56% ($N = 137$) of the sample were currently employed in a clinical setting designated as a patient center medical home model (PCMH). Participants represented the breadth of health care contexts: 39% ($N = 88$) of participants were employed in a FQHC, 29% ($N = 66$) in Indian Health Service/638 Clinic/Hospital, and 32% ($N = 74$) in a group, solo practice, managed care, or hospital-based practice. We coupled this survey with interviews with 16 ($N = 16$) individuals representing leadership roles within six AHCCCS Complete Care (ACC) contracted health plans, as of October 1, 2018. Participants held positions of chief management, medical, financial and quality assurance officers. Over half of health plan leaders interviewed were employed with the health plan for at least 5 years. Approximately 90% of health plan leaders interviewed were moderately to extremely familiar with CHWs; those with less familiarity with CHWs were those in financial management roles.

Integration Within Systems and Teams

Among licensed providers, we assessed ways in which they believed CHWs were integrated into the clinical care team **Table 2**. Respectively, 48, 68, and 52% of providers surveyed reported CHW integration, taking one or more of the following forms: CHWs receive ongoing referrals or assignments by provider staff ($N = 166$); CHWs have regular meetings with clinical care team staff ($N = 107$); and or CHWs provide translational or language interpretation services for patients ($N = 126$). We assessed CHW integration within health plans by first asking participants to describe the known roles CHWs play within their organization and within their contracted provider networks. Health plan leaders interviewed described nearly all of the 10 CHW core competencies in their descriptions of CHW integration **Table 3**. Most often, leaders described CHW integration within health plan systems and within care teams as connecting members to community resources, providing health behavior education, assisting in health system navigation, and conducting outreach to hard-to-reach health plan members. Health plan leaders emphasized the importance of CHWs' ability to address social determinants of health by connecting members to community and health resources. In one instance, leaders from Health Plan A described expanding the role of the CHWs from a limited, telephone-based, patient navigation role — to a broader role focused on the social determinants of health within the home and clinic. According to leadership, CHWs are now employed as part of an interdisciplinary care team that works with high-need members. CHWs on this team are highly integrated into the health care team and have a variety of roles including connecting members to community resources to address social determinants of health and provide health behavior support and education. Leaders described in detail:

> *"They [CHWs] do a lot of resource finding [. . .] a lot of the social determinants they are focused on, but also chronic disease support and management, goal setting, SMART goal setting with patients around their medication adherence, their disease management, their wellness and making sure they make their appointments, making sure they know how to use the medical system, they might accompany people to a medical or behavioral health appointment and then they support the other roles of the team. They are the support system for the nurse practitioner, the clinical pharmacist, the behavioral health specialist and the nurse. . . "*

TABLE 2 | Forms of CHW integration and licensed health care provider attitudes and beliefs about the impact of CHW integration patient health outcomes, provider time and cost of care.

	Agree/Strongly agree				
	Total	**FQHC/Clinic**	**Health practice[a]**	**IHS/Tribal clinic**	**Other[b]**
Forms of CHW integration with clinical care team					
Meeting regularly with primary care staff	44 (107/245)	53 (49)	56 (35)	21 (14)	43 (9)
Regularly receiving patient referrals or assignments from primary care staff[c]	68 (166/245)	75 (70)	71 (45)	56 (38)	62 (13)
Provide interpreting services	52 (126/243)	50 (46)	60 (37)	46 (31)	57 (12)
As a result of working with a CHW, CHWs have contributed to:					
Good birth outcomes	52 (123/237)	50 (43)	55 (33)	49 (34)	59 (13)
Prevention of high risk or high-cost health conditions	65 (160/247)	73 (68)	65 (41)	54 (37)	64 (14)
Improved health outcomes for high risk or high-cost patients	69 (170/247)	75 (70)	67 (42)	64 (44)	64 (14)
Improved health outcomes for NON-high risk or high-cost patients[c]	61 (151/247)	73 (68)	54 (34)	56 (39)	45 (10)
Reduction in the cost of care of high risk or high-cost patients	55 (135/247)	60 (56)	59 (37)	43 (30)	55 (12)
Reduction in the cost of care of NON-high risk or high-cost patientsz[c]	47 (115/247)	57 (53)	46 (29)	33 (23)	45 (10)
CHWs have saved provider time in:					
Arranging clinical referrals and follow-up for patients	65 (161/247)	69 (64)	73 (46)	55 (38)	59 (13)
Arranging social service referrals for patients [c]	69 (171/247)	71 (66)	81 (51)	52 (36)	82 (18)
Educating patients on disease management	70 (174/247)	70 (65)	67 (42)	74 (51)	73 (16)
Educating patients on health promotion	77 (190/247)	80 (74)	70 (44)	80 (55)	77 (17)
Educating patients on healthy childbirth [c]	52 (122/236)	55 (48)	53 (32)	42 (28)	64 (14)
As a result of working with a CHW, patients are more likely to:					
Follow my recommendations	76 (186/246)	78 (72)	76 (48)	71 (49)	77 (17)
Show up for scheduled appointments	74 (184/247)	73 (68)	75 (47)	74 (51)	82 (18)
Maintain regular care	76 (187/247)	80 (74)	76 (48)	70 (48)	77 (17)
Better manage their chronic disease	72 (178/246)	78 (72)	68 (43)	68 (47)	73 (16)
Have more effective communication during office visits	64 (158/246)	73 (68)	61 (38)	55 (38)	64 (14)
Have better access to care	80 (196/246)	85 (79)	73 (45)	77 (53)	86 (19)

[a] *Health Practice include solo practice, group practice, managed care organization and behavioral health.*
[b] *Other includes items were sites that did not fit into any other pre-defined category.*
[c] *Statistically significant at the 0.05 level.*

TABLE 3 | Community health worker core competencies and roles utilized within arizona medicaid-contracted health plans.

Roles[a]	**Health Plan A**	**Health Plan B**	**Health Plan C**	**Health Plan D**	**Health Plan E[b]**	**Health Plan F**
Cultural Mediation among individuals, Communities, and Health and Social Service Systems	✓	✓	✓	✓		✓
Providing Culturally Appropriate Health Education and Information	✓	✓	✓	✓		✓
Care Coordination, Case Management, and System Navigation	✓	✓	✓			✓
Providing Coaching and Social Support	✓		✓	✓		✓
Advocating for Individuals and Communities	✓	✓				✓
Building Individual and Community Capacity	✓	✓		✓		✓
Providing Direct Service	✓	✓	✓	✓		✓
Implementing Individual and Community Assessments						✓
Conducting Outreach	✓	✓	✓	✓		✓
Participating in Evaluation and Research						

Community Health Worker Core Consensus (C3) Project: 2016. Recommendations on CHW Roles, Skills, and Qualities. Access at http://bit.ly/2wzz2oe; Authors' analysis of data from the Integration and Financing of Community Health Worker. Workforce in AHCCCS Health Plans interviews, 2018.
[a] *The Community Health Worker Core Consensus (C3) Project: A report on the C3 Project Phase 1 and 2. Together Leaning Toward the Sky; 2019. https://www.c3project.org/.*
[b] *Health Plan utilizes peer support workers only.*
A ✓ indicates that the given role (identified as a core CHW role by the C3 Project) is performed by CHWs employed by the health plan.

Participating leaders from Health Plan B further described how they employ CHWs in a variety of roles including patient navigation, patient advocacy, health education, as members of the interdisciplinary health care team, and in conducting outreach. Much of their work involves in-person interactions with members, connecting them with community and health resources to address social barriers to health. In Health Plan F, CHWs were described to act as integrated members of their care management and member engagement teams and support addressing social determinants of health including transportation, housing, food insecurity, and employment. It is notable that only one health plan leader described the CHW core competency of implementing individual and community assessments. This core competency could help plans identify and address population level determinants of health.

CHW Identification, Recruitment and Training

Health plan leaders described in detail the ways in which they identify and recruit CHW team members. Recruitment was generally described as occurring through referrals from current employees and from partner organizations or training programs. The most commonly required qualifications included a health-related degree or certification, computer skills, communication skills, experience in a health care setting, and familiarity with community resources. Health Plan A leadership identified a variety of skills they look for in a CHW, including customer care experience, computer skills, basic familiarity with medical records, communication skills, and being both bilingual and bicultural. In terms of recruitment, the plan specifically mentioned FQHCs that often identify outstanding existing employees and provide them with the training to become CHWs. Health Plan F leaders also identified several key skill areas they look for in CHWs, including a degree or certification related to health or social services (e.g., CNA, or BA in social work), some experience in the health care setting, familiarity with the culture and resources of the community served, and knowledge of or desire to learn about both motivational interviewing and trauma informed approaches. The recruitment process for CHWs started with internal job postings, as well as external sites connected to the health plan, and taking referrals from current CHWs. Health Plan B sought CHW applicants who had lived experience in the areas of health care navigation, care giving, or community services. The plan preferred to hire CHWs with CHW certification (12), and emphasized their willingness to support an employee to become certified. Recruitment primarily happened through community partners, word of mouth, and certification programs that used their plan as a practicum site.

Leaders at Health Plan E, which at the time did not employ CHWs, described the basic qualifications for Peer Support Specialists (PSS), a type of CHW workforce currently recognized by the Arizona Department of Behavioral Health Services (DBHS) and whose services are reimbursable by Arizona Medicaid. They described the qualifications for PSS as having "lived experience," meaning personal experience – as opposed to formal training – with the criminal justice system, with alcohol or substance use and or history of mental illness; being over the age of 21; and having a fingerprint clearance card. Similarly, Health Plan C leaders spoke specifically about PSS, and required these same qualifications, in addition to good computer and communication skills. They identified potential PSS mainly through current PSS or case managers. FQHCs in Health Plan C provide network identifies CHWs by their active role in the community. The health plan also described their recent contractual relationship with a third-party agency that hires, trains, and pays for CHWs serving members in one of their service areas. Health Plan D, which also does not currently utilize CHWs but planned to do so in the future, stated that they would look to a community partner that specializes in CHWs, such as the Arizona CHW professional association, to take the lead on determining the specific qualifications for CHWs. In addition, they would prefer for all CHWs to have certification, for liability reasons.

Training requirements and opportunities for CHW integration varied widely among health plans. Several plans preferred to hire CHWs with formal certification, however it was not required at the time of the interview. While one plan provided extensive internal training for CHWs, others described a more basic training (or retraining for current employees) on health plan systems and community resources. Health Plan F required extensive internal training for CHWs, using evidence-based curricula developed by their national team. CHWs took part in a 2-week training specifically on the roles of a CHW, followed by a 3-week preceptor ship. Each month the CHWs participated in grand rounds with the health plan's national medical director and received training on a specific topic such as depression. CHWs received extensive workforce safety training and trainings related to disease management, health behavior, and community resources. The health plan also used "field-based ride-alongs" to train new CHWs through direct observation of experienced CHWs – an opportunity also available to health plan leaders and management. Health Plan A leaders described that within some of their contracted FQHCs existing employees are often recruited and re-trained to become CHWs. At the time, Health Plan E only employed PSS, who were required to go through a state approved Peer Support Employment Training Program, one of which was offered internally at the health plan (Since 2012, the state has required that all PSS pass the state-approved training in order to have their services billed through Medicaid). Once credentialed, PSS went through basic employee trainings in areas such as HIPAA. Leaders from Health Plan C, which only employed PSS at the time of the interview, discussed their efforts around creating future CHW positions that would require CHW certification as well as training on electronic health record systems. They described working with several Arizona community colleges to develop and improve their curriculum for CHW certification to include behavioral and mental health components. In addition, the health plan had financed the training of more than 50 people to attend the CHW programs at these community colleges.

CHW Integration Contributions to Quality of Care

We assessed how CHW integration contributed to the quality and cost of care among providers and health plan leaders **Table 2**. Among licensed health care providers surveyed, ∼87% (N = 214) believed CHWs have a positive impact on patient care. In terms of quality and continuity of care, respondents reported that patients who have CHW contact were more likely to follow their recommendations (76%, N = 186), show up for scheduled appointments (74%, N = 184), maintain regular care (76%, N = 187), and better self-manage chronic disease (72%, N = 178). Respondents perceived CHWs to increase patient access to care (80%, N = 197) and enhance the efficacy of patient-provider communication (64%, N = 158) **Table 2**. Providers surveyed believed CHWs saved them time specifically through arranging clinical (65%, N = 161) and social referrals for patients (69%, N = 171), as well as educating patients on disease management (70%, N = 174) and health promotion (77%, N = 190). These attitudes and beliefs were consistent across all health care contexts.

Among health plan leaders, CHW integration was believed to impact the quality of care in two main areas: medical and social. In the first area, several health plan leaders described the positive impact CHWs have on member outreach and engagement, as well as on the utilization of preventative and primary care. The reduction of emergency services was also cited as a major benefit of CHW involvement. CHW impact on housing and justice involvement was also described. Health plan leaders emphasized that the value of CHWs was difficult to measure by standard metrics and that their value was in part due to their unique understanding of the community served.

Health Plan a noted two main areas of value in terms of CHW integration: "member outreach" and the completion of "certain preventative services." However, they emphasized that the positive impact that CHWs have on the quality of patient care often did not align within the "metrics that CMS or other large agencies have come up with." Health Plan B had found that CHWs had a significant impact on improving quality of care for members, particularly in the area of preventative services. They measured CHW integration impact on quality of care by focusing on what happened when certain social barriers (e.g., unemployment, lack of transportation, housing insecurity) were removed as a result of a CHWs efforts. Health Plan C leaders explained how CHW integration helped to "normalize" the utilization of health care among populations that traditionally are reluctant to seek medical services. Health Plan D described observing positive impacts in lowering emergency department admissions, reducing involvement in the justice system, and increasing housing for homeless plan members. Health Plan E, D and F leaders believed CHW lived experience made them extremely effective advocates for their clients within the health system and the community.

CHW Integration Contributions to Cost of Care

Approximately two-thirds of licensed health care providers surveyed believed that CHW integration contributed to the prevention of high risk or high-cost health conditions (65%, N = 160), improved health outcomes for high risk and high-cost patients (69%, N = 170) and saved them time with their patients (66% across all provider categories). **Table 2**. Health plan leaders concurred with this belief and described a significant reduction in member costs due to increased utilization of primary and preventative services and reduced utilization of emergency and inpatient services. In addition, CHWs were believed to provide high value, low-cost services as part of the health care team.

> *"As the price goes up then the value equation gets a little more challenged, because in some ways you're just trying to replace a higher cost, you don't need an RN or an LPN or someone with a given license to do the work, it might be done more effectively by a CHW, but part of that value equation is that they are a lower cost staff member."*

Health Plan B found cost savings through the use of CHWs in large part because CHW activities tend to reduce utilization of expensive and sometimes unnecessary services such as emergency room visits, hospital inpatient admissions, and rapid readmissions. Leaders from Health Plan D had not formally evaluated cost savings of CHWs, largely because their reasoning behind CHW integration was focused on improving quality of care rather than cost. With that said, Health Plan C, D and E had observed a general reduction in cost around emergency department utilization, treatment adherence and hospital inpatient admissions, as members working with CHWs were more likely to seek primary care and preventative services. For Health Plan C, members involved with Peer Support Services were shown to have fewer inpatient events, less justice involvement, and reduced use of emergency services. Health Plan E leaders described these impacts as a result of CHWs preemptively reaching out to high needs members and connecting them with preventative health care services and addressing social barriers before a crisis occurs.

Financing CHW Integration

Finally, we assessed how health plans financed CHW integration within systems and teams. Health plans described four models used to finance CHW integration; administrative or operations budget/dollars, grant funding, value-based payment arrangements and Arizona Medicaid billing codes (PSS only). Health plan leaders indicated that their plan and provider networks often used more than one of these finance models depending on the CHW's role and position in the health care team. Several plans utilized administrative funds to directly employ CHWs, noting however that this was not a particularly sustainable model and would not be cost-effective for providers. Administrative funds were used occasionally to pilot programs, with the goal of ultimately moving toward value-based purchasing. In Health Plans B and F, CHWs were employees paid through operations or administrative budgets, while at the provider network level, CHWs were paid through value-based contracts. Leaders at Health Plans D and C described providers in their networks had funded CHW positions through grant funding, which one leader explained was often restrictive and

resulted in CHW positions that were short-term and frequently narrow in scope. Many health plan leaders described the utility of value-based purchasing to allow contracted providers to achieve high quality outcomes through creative means, such as hiring non-clinical team members like CHWs. One plan leader explained their perspective on value-based purchasing, which is focused on achieving health outcomes rather than services provided:

> *"I think value-based arrangements allow for the use of CHWs because we're just giving a chunk of money and we don't dictate how you use it as long as you're achieving good outcomes. As opposed to the current system where you have to be a professional that can bill for a given unit of service, which is this fee service system. [. . .] the reality of value based is about achieving value at high quality outcomes so it's not dictating the process by which you do that."*

Health plans employing PSS are able to fund those positions through Medicaid billing codes for services, in addition to some administrative or grant funding for specific community-based projects. Several plans cited the lack of a similar dedicated Arizona Medicaid billing code for CHWs as a challenge to creating sustainable CHW integration systems that utilize the full CHW scope of practice. One leader explained the benefits of a CHW billing code this way:

> *". . . if they (Arizona Medicaid and the Legislature) got CMS's approval to have a specific code that could only be billed by community health workers then yeah, you would see a flood of CHWs across the state. . . . but again, if that doesn't happen then really the only recourse is to come along side and shore it up as a health plan with different focused grants. . . and that's the thing about those grants, you really have to figure out what are you wanting to accomplish and what a community health worker is. . . sometimes you lose a little bit of what a community health worker is when you have it run through grants that are very focused on very specific populations... Not to say it's a bad thing but I guess it's my longwinded way of saying I support CMS or AHCCCS getting that code, otherwise you get like CHW lite."*

All health plan leaders noted that it would be "very beneficial to see CHWs to have their own billing code," to support development of future positions.

Challenges to Integration Within Systems and Team

Among both Licensed health providers surveyed and health plan leaders interviewed, all discussed several challenges around hiring and integrating CHWs into the health care systems and teams **Table 4**. They highlighted the lack of "consistent understanding" at the plan and provider network level of CHW competencies, roles and training needs, which impacts the training, placement and supervision of potential CHWs. The CMO of one plan described requiring the members of the care team to "review the roles, the functions [of CHWs] and how they would integrate and work together." Leaders emphasized the lack of recognition by the state Medicaid system and billing codes as the major barrier for uptake and scale of CHWs. Health plan leaders often emphasized the challenges in assessing CHW integration impact through existing standard metrics set forth by CMS (18).

DISCUSSION

Provider surveys and health plan leadership interviews demonstrate that Medicaid-contracted health plans and their provider networks are rapidly incorporating CHWs into the health systems and clinical care teams. Both sets of health care sector actors were knowledgeable of and highly valued CHW expertise and activities as encompassed under the CHW core competencies. Among health plan leaders, all understood and prioritized the cultural, linguistic and lived experience characteristic of the CHW workforce and made efforts to actively recruit, train and integrate CHWs into clinical and community-based teams to benefit health plan members. CHWs were considered to add value to patients care by conducting effective and culturally salient health plan member outreach. For both providers surveyed and health plan leaders interviewed, such culturally informed outreach and education activities conducted in the home, over the phone and in the clinic have resulted in both anecdotal and empirical evidence of improved access to health care, use of prevention screenings, appropriate use of the health care system, including avoidance of emergency room and hospitalization among members. CHW integration was considered essential to increasing access to primary care, self-management activities and behavioral health support for highly vulnerable health plan members. Such perspectives are critical as decisions about CHW integration is increasingly influenced by internal calculations and demonstration projects, even in the absence of rigorously designed peer-reviewed research (19).

Consistent with the literature, health care providers consider CHWs to be valuable members of health teams who play a vital role in addressing medical and social determinants of health among underserved populations. Health plan leaders were motivated to integrate CHWs in part by reforms in health care financing in the United States which are incentivizing the shift toward a value-based reimbursement structure that reward evidence of favorable medical and social outcomes (20). We found health care sector actors to be supportive of the notion that by utilizing their unique position within their community, coupled with core competency and disease specific training, CHWs can play a significant role in improving patient outcomes and reducing system costs of health care (4, 7, 21). Also consistent with the existing evidence, CHWs embedded within the health care team were described to facilitate patient care coordination between social supports, primary care, and collaboration with public health and social service agencies to improve community outreach, wellness education, and chronic disease management (6, 22). Health Plan leaders and providers surveyed perceived CHW interventions to improve several clinical indicators, (23–25) lower risk factors for chronic disease and mental health (26, 27) and increase medication adherence (25, 28). For many leaders, CHW interventions were thought to contribute to a reduction in emergency department visits,

TABLE 4 | Health plan leaders attitudes, beliefs, and values regarding CHW health care systems change and integration.

Theme	Thematic summary	Direct participant quotes
CHW integration contributions to quality of care	**Medical needs** -Meaningful outreach and engagement -Increase utilization of primary care -Increase utilization of preventative care -Decrease utilization of emergency services -Improve treatment adherence -Supportive in meeting Healthcare Effectiveness Data and Information Set (HEDIS) **Social determinants of health needs** -Trusting relationship with health plan member -Normalize health care experience -Decrease involvement with justice system -Housing support -Health plan member advocacy -Identify and remove social barriers to care -Save member lives -Encourage behavior change	*"We have all of these health outcomes that we hold our providers to as far as how many of your members end up going to jail, how many of your members end up in the ER regularly, that sort of thing and our providers know they can greatly reduce all of those additional costs with a team of appropriately staffed peer or community health workers."* *"We have found that for every social barrier that is removed through a community health worker and tracked through the community impact model, we save $450 in reduced emergency room visits, reduced length of stay in a hospital and reduced rapid readmissions. At the same time, not only is there a cost savings but we have found that there is a significant lift in quality scores when those same social barriers are removed. Members are 1½ - 2½ times more likely to schedule and complete their primary care physician visits, they are nearly 7 times more likely to have a better adult BMI score, they remain more compliant with their diabetes treatment and so on. We have each measure documented on what the list is by removing a social barrier, which is one of the key roles that we ask the community health workers to play."* *"They are saving the lives of the people that they are working with in one way or another. They either help them find a purpose like a job and they feel alive and they want to be alive, reducing suicides, reducing overdoses, letting people know that they are not alone that they too can make it through this, so I would say the most valuable contribution is the lives of our members."* *"I think the idea that someone that is a little bit more of a lay person, a little bit more of a peer from the community that is field based that actually sees people face to face offers such a tremendous additional opportunity to the rest of the care team and I say the rest I mean the nurses and the physicians which are more office and less field based. You can't account enough for the value that comes from the direct intervention and seeing and meeting with people in their environment and in their home or at their work to try to get a better handle on the needs that they may have and to get a better understanding of what they are going through relative to the healthcare that we are trying to deliver to them."*
CHW integration contributions to cost of care	-CHWs are of high value at a low cost -Improve adherence to treatment -Reduce use of emergency services -Reduce hospital inpatient admissions -Enhance early identification of high-cost members	*"As the price goes up then the value equation gets a little more challenged, because in some ways you're just trying to replace a higher cost, you don't need an RN or an LPN or someone with a given license to do the work, it might be done more effectively by a CHW, but part of that value equation is that they are a lower cost staff member."* *"So reaching out to them instead of waiting for them to come to us and so when I think about cost, identifying people that are higher cost and those are the folks that these teams are often times trying to identify and work with earlier rather than later. That's how they help reduce costs […] If they can positively influence and impact those individuals in the ways we talked about earlier we can hopefully reduce that cycling through those very high cost settings which are not the best or the most appropriate places of care."* *"It [CHW integration] definitely reduces cost for a number of reasons, number one because it improves adherence and people tend to stay in treatment and follow through with their treatment more, so that reduces relapse, that reduces maybe the utilization of the ED [emergency department services]."*
Financing CHW integration via value-based contracts	-Flexible model that allows provider contractors to achieve high quality outcomes through creative means -Payments to providers tied to patient health outcomes, cost of care, and quality of care (not fee-for-service). -Health Plans support (but do not mandate) CHW integration through value-based agreements with provider. -More sustainable than grant funding.	*"Generally speaking most value-based contracting going forward is going to be tied to outcomes rather than processes. … most health plans are moving away from funding specific processes and dictating what those look like and more funding outcomes. But I can see again agencies having better outcomes with CHWs that will be able to take advantage of value-based payment arrangements because of that, because they are making certain outcomes that they are looking for."* *"We have value-based payment models that are in place with a number of large groups that are total-cost-to-care based, so if they have an impact on any aspect of cost to an individual, they can potentially net benefit from that as part of those value-based payment models. […] sometimes they'll [the provider] say that CHWs are part of their planned approach and if they don't raise that, we usually raise that as a potential best practice that they should be considering. If they do earn shared savings, we don't typically dictate how they can spend those savings but we encourage them to consider the use of some of those savings that they earn and reinvest it back into their program and CHWs are one of those areas we make recommendations that they consider."* *"I think value-based arrangements allow for the use of CHWs because we're just giving a chunk of money and we don't dictate how you use it as long as you're achieving good outcomes. As opposed to the current system where you have to be a professional that can bill for a given unit of service, which is this fee service system.*

(Continued)

TABLE 4 | Continued

Theme	Thematic summary	Direct participant quotes
		[…] the reality of value based is about achieving value at high quality outcomes so it's not dictating the process by which you do that." *"So I would not say we're going to have value based payments and you should be hiring community health workers, that's not the point of value based. We're doing value-based payments and this [value-based payments] allows you all to get creative with using whatever you need to get those best outcomes. "*
Challenges in CHW integration	-Lack of understanding among providers of CHW competencies and training needs -Reliable transportation among CHWs -Needing to recraft CHW positions to accommodate non-traditional candidates -Lack of Medicaid billing codes -Lack of understanding CHW competencies and roles among health care team -Locating individuals with the right combination of CHW competency and confidence to integrate into health care team	*"Community health workers aren't currently recognized in the state and so that honestly causes a lot of challenges for us internally to really develop programs."* *"I wouldn't call them challenges, just things that we process through and we hire individuals that represent the consumers that we provide services to. We have had to recraft the position so that some of those positions are part time and many of the individuals that we hire are non-traditional so we've had to adjust our employment practices to be able to accommodate special needs in a much more highly specialized fashion."*

Authors' analysis of data from the Integration and Financing of Community Health Worker Workforce in AHCCCS. Health Plans interviews, 2018.

(29–33) while CHW integration into the health care team was consistently considered associated with reductions in health care cost (29, 34–37), and for some health plans, either anecdotal or measured, provided a return on investment per dollar invested in CHW interventions (25, 29, 35, 36). Yet, and very consistent with existing literature, inherent challenges exist within the health care system to optimize CHW integration and financing (7).

Implications for Health Care Policy and Research

In Arizona, the integration of physical and behavioral health services Mandated by the AHCCCS Complete Care (ACC) contract provides a policy window of opportunity to advance and sustain the CHW workforce in contracted health plans (38). Health plan leadership expect that the ACC will fundamentally expand the need for CHWs and their core services, as plans take on an expanded role in meeting membership medical and non-medical needs. ACC contracted health plans with experience in the delivery of behavioral health care through peer supports can provide technical expertise and knowledge transfer related to the process of developing state Medicaid billing codes for non-clinical staff (39, 40). In this same time frame, and partially in response to heightened interest in the documented impacts of the CHW workforce on the U.S. health care system, CHW stakeholders have also converged to more clearly define CHWs' core competencies and roles (41). To adjust provider misunderstanding of CHW roles and competencies and ensure the full range of patient outcomes associated with CHWs, mechanisms to ensure the integrity of the workforce should be cultivated and maintained, including organizational culture and leadership promotive of these values and norms.

The Arizona Legislature recently passed HB2324, which authorized the voluntary certification of community health workers and mandated standardized training of the CHW workforce (12). Arizona Department of Health has established a 9-person advisory council made up of at least 50% CHWs which will be responsible for establishing CHW core competencies, training standards, continuing education requirements and other details related to CHW certification in the state. The Association of Health Plans was strongly in favor of the legislation and the organization's support was pivotal in gaining legislative support in a state that is largely anti-regulation. Arizona health plans expressed the benefit of the HB2324 legislative efforts for voluntary certification, specifically in the opportunity to recruit and retain highly qualified CHW to meet member medical and non-medical needs. Voluntary certification may facilitate reimbursement mechanisms for CHWs, and thus may be an important consideration for financing in other states. In Arizona, certification was the avenue for workforce standardization. Several statewide strategies exist to support the health system's capacity to integrate CHWs into systems of care and clinical care teams, including; (1) Extend Arizona AHCCCS (Medicaid) billing codes to reimburse for CHW services as in the case of Peer Supports; (2) Designate CHWs as a provider and enable CHWs to bill for the full array of CHW core competency services; (3) Monitor CHW innovations emerging from AHCCCS Complete Care (ACC) contracts and CHW voluntary certification legislation; (4) Promote standardized CHW training among health plans and contracted provider networks; (5) Share CHW innovations in training, supervision, hiring, financing and integration within health care teams.

Nationally, Medicaid administrators should leverage existing channels of communication with CMS officials to advance the development metrics that more accurately capture the CHW process and outcomes participants. Health plan leaders in this study identified a clear need for CMS policy change, to be inclusive of metrics related to the social determinants of health, appropriate methodology for measuring CHW integration within systems and teams. The National CHW Common Indicator Project could support with identification of CHW

centered process and outcomes measures (42, 43). Without a doubt, the attitudes, beliefs and values of the participants in this research express a resounding call for action on the creation of CHW-specific billing codes across the CMS system. In the paraphrased words of the Institute of Medicine Report, CHWs are effective, and "*If these were the results of a clinical trial for a drug, we would likely see pressure for fast tracking through the FDA; if it was a medical device or a new technology, there would be intense jockeying from a range of start-ups to bring it to market*" (44). This research adds to the mounting evidence of the need for a national strategy toward the development of CHW covered services, billing codes and metrics for CHW integration within systems and teams within the health care sector and beyond.

Limitations

Our study has several strengths and limitations. The strength of this study lies in the broad based CHW and CHW ally stakeholder engagement to both conceptualize the study and carry out the entirety of the research process. Through our partnerships, we were able to interview the universe of Medicaid health plans in the state. Our limitation includes a non-representative convenience sample of licensed health care providers. Although we engaged in an exhaustive sampling methodology representative of major health care employers of CHWs and several professional associations of licensed providers, our sample was not randomized nor representative of all licensed providers of Arizona. We therefore may be underreporting the experiences of licensed providers with experience with CHWs.

CONCLUSIONS

Our findings demonstrate a high level of organizational readiness and capacity within the Arizona Medicaid system to integrate CHWs in system and teams. Licensed health care providers and health plan leaders demonstrated attitudes, beliefs and values that align with tremendous organizational culture and capacity to transform and innovate the systems and processes for CHW integration and financing. As states move toward standardized CHW certification and the demand for CHWs increases with the transition to coordinated systems of care, health plans and providers will benefit from sharing of best practices, challenges and solutions.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by University of Arizona Human Subject Review Board. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

SS co-conceptualized the study and lead the writing of the manuscript. MI, FR, and JG co-conceptualized the study. LO'M and HD facilitated data collection and analysis and interperation of results. NW and HC provided health policy expertise and supported writing and editing. All authors contributed to the article and approved the submitted version.

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Workforce Readiness Training: A Comprehensive Training Model That Equips Community Health Workers to Work at the Top of Their Practice and Profession

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Background: Recent reports have recognized that only 20 percent of health outcomes are attributed to clinical care. Environmental conditions, behaviors, and social determinants of health account for 80 percent of overall health outcomes. With shortages of clinical providers stressing an already burdened healthcare system, Community Health Workers (CHWs) can bridge healthcare gaps by addressing these nonmedical factors influencing health. This paper details *how* a comprehensive training model equips CHWs for workforce readiness so they can perform at the top of their practice and profession and deliver well-coordinated client/patient-centered care.

Methods: Literature reviews and studies revealed that training CHWs alone is not sufficient for successful workforce readiness, rather CHW integration within the workforce is needed. Consequently, this comprehensive training model is developed for CHWs with varying skill levels and work settings, and supervisors to support organizational readiness and CHW integration efforts. A systematic training program development approach along with detailed implementation methods are presented. Continuing education sessions to support CHW practice and Organizational Readiness Training for supervisors, leadership and team members directly engaged with CHWs in the workplace are also discussed. CHWs were involved in all phases of the research, development, implementation, and actively serve in evaluations and curriculum review committees.

Results: Components of the comprehensive training model are presented with an emphasis on the core CHW training. Two CHW training tracks are offered using three delivery modalities. Process measures with student learning objectives, outcome measures developed using the Kirkpatrick model to capture attitude, perceptions, knowledge acquisition, confidence, behavior, and overall experience, and impact stories by two CHWs are presented. Lessons learned from the implementation of the training program are discussed in three categories: Practice-driven curricula, student-centered training implementation, and adaptations in response to COVID-19 pandemic.

Conclusion: This comprehensive training model recognizes that training CHWs in a robust training program is key as the demand for well-rounded CHWs increases. Furthermore, a comprehensive training program must include training for supervisors, leadership, and team members working directly with CHWs. Such efforts strengthen the CHW practice and profession to support the delivery of well-coordinated and holistic client/patient-centered care.

Keywords: training, competency, skills, workforce readiness, capacity building, organizational readiness, model

INTRODUCTION

Recent reports have recognized that environmental conditions, behaviors, and social determinants of health account for 80 percent of overall health outcomes while 20 percent are attributed to clinical care (1). The demands from these nonmedical factors have put a strain to an already burdened healthcare system calling for innovative approaches. In California, value-based care approaches have received increased support with improved health care processes and outcomes that led to expanded access for the uninsured. These efforts have made way for non-traditional services for patients with complex health and social needs (2). More work is ahead, nonetheless, as public health care systems focus on vulnerable populations such as those who experience homelessness, behavioral health issues, and other conditions stemming from the social determinants of health. Community Health Workers (CHWs)—and these include promotores, community health representatives, and individuals with many other titles delivering CHW scope of work—are ideal for addressing the needs of the high-risk, high-touch patient populations by increasing patient knowledge, activation, and adherence, while making an impact on patient health, health equity, and health care savings (3). Because CHWs often share ethnicity, socio-economic status, health conditions, and other barriers as well as assets with marginalized communities, CHWs have a unique understanding of their community. CHWs' ability to communicate and connect with people in a compassionate, caring, and culturally sensitive manner, and their expertise in health and social systems navigation make them ideal candidates to help individuals, families, and communities take full advantage of system resources. Particularly for patients with complex chronic conditions who need more intensive services, CHWs can serve as critical members of the healthcare delivery team and facilitate physical and behavioral health services along with community services and resource support (4).

Despite decades of studies on CHW efficacy and workforce development, and even classification in the U.S. Bureau of Labor, there are no national standards, curricula, or educational/career paths for preparing CHWs for workforce integration. Growing interest in CHWs and implementation of CHW programs are also drawing more attention to the need to train CHW supervisors and health system leaders who are unfamiliar with CHW selection criteria, training, scope of practice, roles and responsibilities, workload, reimbursement, and outcome measures (5, 6). A recent policy statement by the National Association of Community Health Workers (NACHW) further describes the value in building capacities of CHWs and the members of their team to achieve equity and social justice:

> "*When the roles and leadership capabilities of community health workers are actualized and their organizing infrastructure is cultivated, CHWs can join with other professions to co-create and implement programs, practices, and policies that achieve health, racial equity, and social justice.*" (7).

In a statewide stakeholder engaged effort, the California Health Workforce Alliance (8) recognized the importance of establishing: "a competency-based framework" for CHW training that clarifies the *full range* of competencies, skill development for working in community-based primary and preventive care, and CHWs as a link between public health and health care. A more recent work further validated a set of measurable competencies linking to a workforce framework as a model for advancing the CHW profession (9). The California Health Care Foundation also continues to convene CHWs and CHW allies to further discuss the future of CHWs in the state (10, 11).

Currently in California, there is no legislation for CHW certification or credentialing (5, 12). As a result, there are a wide array of trainings to meet the needs of the CHWs scope of work. These trainings generally fall along the spectrum of grassroots/community trainings, in-house/on the job trainings, issue or topic specific trainings, and structured/more academic trainings (some granting college credits). The training described in this paper shows a model that utilizes a comprehensive set of competencies to strengthen CHW workforce readiness. The training helps to actualize CHW potentials to deliver a wide array and full range of roles and responsibilities as health care team members. The model also includes continuing education (CE) for CHWs, and Organizational Readiness Trainings (ORTs) for supervisors, team members, and leadership to maximize CHW potentials and integration efforts. The comprehensive training program was designed and has been implemented since 2016 by the Community Health Workers/Promotores Academy (hereinafter the Academy) at San Manuel Gateway College, Loma Linda University, in California.

Since 2016, the Academy has trained 11 cohorts under this training model. Diverse cohorts included mostly female adult students (8:2 female to male ratio) with high school degrees or GED with no experience to 20 plus years of experience from all ethnic and racial backgrounds (predominantly Hispanic, then African American, Asian, and Native American). Students who successfully complete

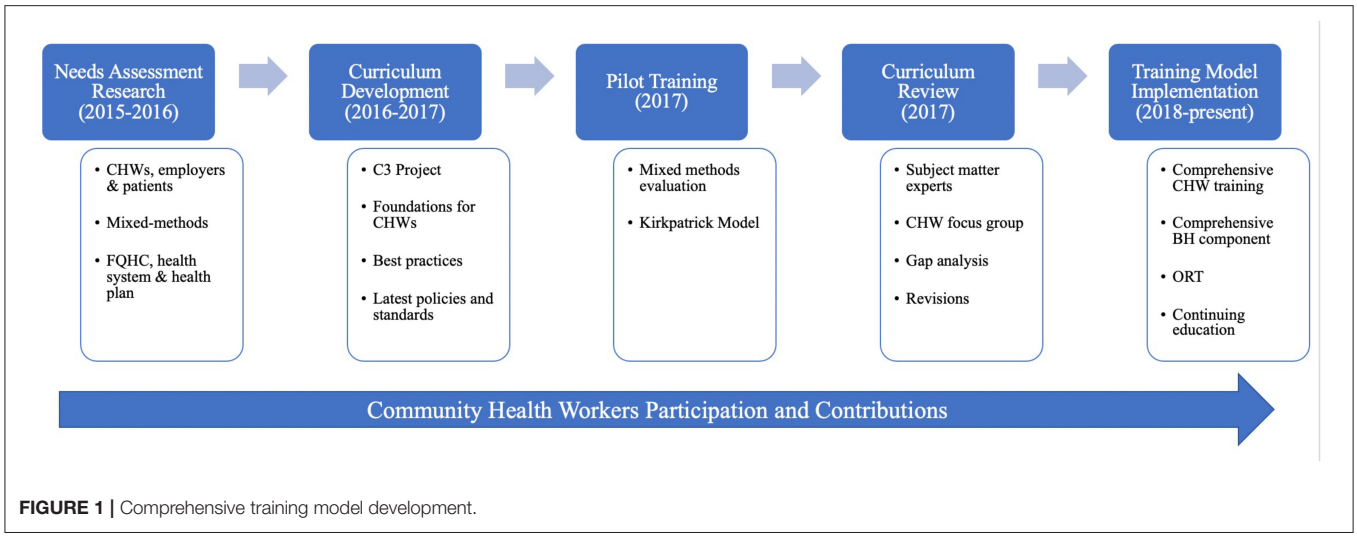

FIGURE 1 | Comprehensive training model development.

the training program receive a certificate from Loma Linda University. Graduates have been hired in over 40 different organizations (community, school district and mostly health care settings) across three counties (Los Angeles, Riverside, and San Bernardino).

PEDAGOGICAL FRAMEWORK, PRINCIPLES, AND STANDARDS

The Academy's training model strengthens the CHW capacities for workforce readiness by offering a comprehensive breadth of competencies (knowledge, skills, abilities) to perform various roles and to deliver a broad scope of services alongside clinical care teams in various complex service delivery settings. The training model promotes workforce readiness capacities so graduates can perform at the top of their practice and profession regardless of the workplace setting.

Training content and materials were developed and informed by a systematic approach, including: findings from triangulated stakeholder-engaged mixed methods training needs assessment research (6, 13); curriculum development referencing work published by CHW experts, best practice guidelines, and policies; pilot testing and evaluation using mixed methods approach; curriculum review with subject matter experts to perform gap analyses; then the implementation of the comprehensive training model (see **Figure 1**).

All trainings are delivered with a practice-driven approach to strengthen the CHW workforce. Competency-based curricula are delivered using popular education approaches and adult learning andragogy that encourage adult students to actively contribute to their learning with their "shared lived" personal and work experiences. Special attention is given to application of *CHW-engaged strategies* through case-based scenarios, which have been developed to promote higher level critical thinking for real-life application and practice.

The comprehensive training program includes: *Core CHW trainings* (offered in two different tracks through three different delivery modalities, in two languages, and training hours ranging from 200 to 400 hours), *Continuing Education (CE)* for CHWs, and *Organizational Readiness Trainings (ORTs)* for supervisors, leadership, and teams (see **Figure 2**).

The *core CHW trainings* contain four pillars to support workforce readiness: didactic instruction, skills lab with competency assessments, practicum application, and professional development capacity building. *Continuing education* and other specialty trainings are designed to support competencies needed for more specific areas of focus. Case-based learning and applications are central to the CE sessions. *Organizational Readiness Trainings* are unique to this training model as the need for a more systematic training for supervisors and leadership was identified through the needs assessment research (6, 13). A series of ORT sessions are intended for supervisors but are also offered to leadership and members of the team directly working with CHWs. The ORTs are customized to meet the needs of the organization, whether new or experienced, in delivering CHW-engaged programs as well as supporting the organizational training needs to prepare supervisors for their roles, to understand the wide array of CHW duties and responsibilities, addressing role clarity and communication among health care team members working with CHWs, and offering opportunities for supervisors across organizations to share lessons learned and best practices.

Competency-based curricula are updated and adapted regularly based on a rigorous evaluation design, stakeholder feedback, curriculum reviews, and gap analyses (see **Figure 1** and **Tables 1**, **2**). These processes involve CHWs from various settings as active contributors and are closely aligned with latest policies and guidelines to ensure the program meets best practice standards. The Academy's access to health sciences faculty at Loma Linda University offers an additional layer of internal expertise that is regularly called upon for curriculum developments, reviews, and training implementation.

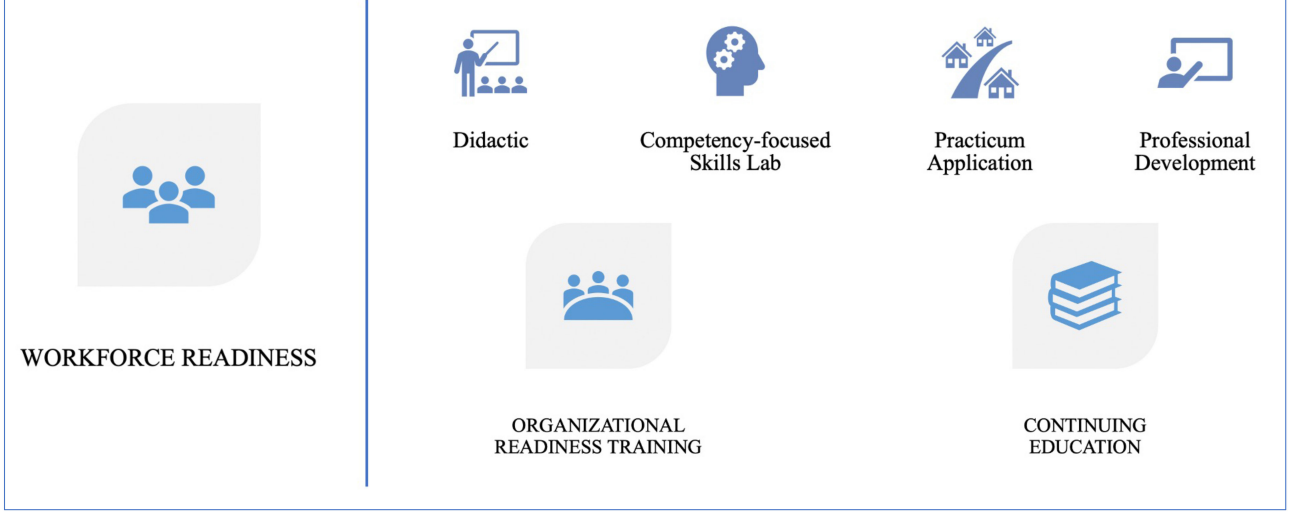

FIGURE 2 | CHW Workforce readiness framework: A comprehensive training program.

TABLE 1 | The academy's core competencies and main training topics.

Community Health Workers/Promotores Academy Core Competencies:		
Communication skills: Listening, reading, speaking, and writing		
Interpersonal skills: Teamwork, leadership, inter-professionalism		
Problem solving		
Critical thinking		
Professionalism and workforce capacity building		
Foundations of CHW Practice	**CHW and Behavioral Health**	**Clinic-based CHW Practice**
• Individual and community capacity building • Behavior change • Access to preventive health care • Direct services • Culturally humility and mediation • Health education, coaching and promotion • Informal counseling and social support • Advocacy and outreach	• CHWs and behavioral health basics • Principles of behavioral health practice • Prevalent mental health disorders • Skills for behavioral health care and service delivery • Cultural considerations in behavioral health care and service delivery • Risk assessment tools • Community Resiliency Model (CRM) • Mental Health First Aid (MHFA)	• Clinical-community networking principles and practice • Patient safety practices • Disease management practices • Care transition management • Clinical and community interventions and tools • Health coaching and support services

TABLE 2 | Training program evaluation and Kirkpatrick model matrix.

Evaluation	**Indicators and Instruments**	**Implementation**	**Kirkpatrick model**
Process	Student Learning Outcome (SLO) Learning domain assessments	During training	Reaction and Learning
Outcome	Pre-post assessment Instructor evaluation survey Practicum evaluations survey End of program survey	Before and after training End of training End of training End of training	Learning and Behavior
Impact	Graduate survey and focus group Employer survey and interview	6–12 months post training	Behavior and Results

LEARNING ENVIRONMENT AND PEDAGOGICAL FORMAT

For the purpose of this paper, the pedagogical format description will focus on the *comprehensive core CHW trainings*. CEs and ORTs utilize similar format and delivery methods. Discussions on the ORTs will be described in more detail in another paper.

Training Tracks and Modalities. The Academy offers traditional and intensive track training programs delivered in-person (in traditional classroom settings), hybrid (in-person and virtual) setting, or fully virtual/online. All training programs are available in English and Spanish. Hybrid and fully online training modalities use synchronous (live, real time engagement) and asynchronous (independent) instructions. Students have independent work to complete in Canvas (an online Learning Management System), as well as synchronous live online class times with the instructors and classmates via Zoom video conference application. Other software and online applications are utilized as applicable to facilitate instruction and communication. Under months of physical distancing regulations due to the Covid-19 pandemic, all training programs transitioned from in-person and hybrid to fully virtual. Because use of technology and computer skills are part of the core training to build professional development capacities, the transition to online learning was met with minimal barriers.

Multidisciplinary Team. Trainings are taught by a team of instructors with subject matter expertise from various disciplines, including experienced CHWs, masters and doctors in public health, licensed clinical social workers, marriage and family therapists, psychologists, nurses, and medical doctors. Additional experts and faculty in specific health issues (e.g., substance use), Community Resiliency Model (CRM) and Mental Health First Aid (MHFA) fields engage throughout the training program depending on needs and scope.

Curricula Organization. The training materials are organized in three main components: didactic instruction, competency-focused skills lab, and practicum application. Professional development is embedded in each of these three components. Units and modules contain student learning objectives based on the Blooms Taxonomy with the application of the three learning domains: cognitive (thinking), affective (emotions or feeling) and psychomotor (physical or kinesthetic) (14). Core Competencies and topics covered in the Clinic-based CHW Intensive Training Program are shown in **Table 1**.

Didactic Instruction

Didactic instruction is delivered through interactive, participatory methods, using popular education principles to build upon students *shared lived* experiences and built expertise. Student learning assessments are embedded throughout as part of process evaluation to capture student learning progress. **Table 1** presents the Academy's core competencies for the Clinic-based CHW intensive Training Program. The school-based and other specialty training programs are not included in this paper.

Competency-Focused Skills Lab

Skills labs focus on competencies using case-based scenarios to bridge gaps between the didactic training and practice. These competencies focus on CHW-engaged strategies that straddle the health care system interventions and community-clinical links domains described in a recent report by the Centers for Disease Control and Prevention (3). Through case scenarios, CHWs work on demonstrating various skills necessary to implement *CHW-engaged strategies*, including motivational interviewing for behavior change planning and harm reduction, patient navigation through transitions of care, home visitation (tele/virtual visitation), medication review, accompaniment, and more.

The content design and teaching approaches for the skills lab training and competency testing are unique to the Academy's training model. As scholars agree, adult learning requires an intentional *learning transfer* approach that scaffolds around "meaningful social interaction and the development of transfer skills" (15). The Academy's competency-focused skills labs are built upon four premises that promote *learning transfer*: (1) Building up of a new CHW self-image; (2) Identifying and emphasizing critical gaps; (3) Building on prior knowledge; and (4) Chronological thinking.

Building up of a new CHW self-image is based on the premise that working as a CHW is not a job, it's a vocation. Instilling a pathway to support CHWs' passion, belonging, and a strong sense of identity is the first step in training a CHW to be successful (15). Within the framework of a popular education teaching environment, all are encouraged to view themselves as active contributors to the teaching rather than being recipients of knowledge taught by "experts" alone. Throughout the course, multiple opportunities are created for team-learning, where students collaborate in small group projects leveraging their strengths and extra-curricular skills and experiences as complimentary learning opportunities. The goal is to support students as they identify their endogenous and unique strengths that they may not have believed or perceived to exist within them and contribute to the betterment of the healthcare system.

Identifying and emphasizing critical gaps focuses on the role of CHWs in filling these gaps within the current healthcare system, and how this process helps CHWs recognize their position as contributors to the team and the organization. Students are guided through exercises that help identify gaps in the current healthcare system and provider services, such as the "great divides" in literacy, income, culture, and others that contribute to high healthcare cost. The training also emphasizes the process of identifying gaps in CHWs' own learning (16) by approaching each individual from a holistic perspective, aiming to ensure that every need particularly in the areas of social determinants of health is addressed with a patient/person-centered approach.

Building on prior knowledge is based on the premise that learning is more deliberately transferred when there is mindful abstraction of prior knowledge in new relevant contexts (16, 17). Because CHWs vary widely in personalities and skills as well as educational, experiential, socio-economic, cultural, and professional backgrounds, instructors encourage logical thinking to connect life experiences and previously acquired knowledge to conclusions (15). Thus, they learn by association. Other strategies and tools such as color-coding, easy-to-remember mnemonics, life stories and life principles, and pattern identification are used to further build knowledge connections. As CHWs develop more confidence and become more comfortable with their roles, CHWs can build upon these learning processes to apply to specific circumstances. Another part of the process of building connections includes helping students identify their learning style, providing them with opportunities to adapt the material to their own style and asking those with similar interests/learning styles to share the newly learned concepts with each other (18). This process of conceptualizing, creating logical ways to retain information and associating new content to previous knowledge serves to reduce the burden of learning, increase long-term retention, and allow students to make more informed decisions in the future.

Chronological thinking is based on the premise that practice crosses over different contexts and contents over time, improving adaptability and preparedness. As implied in the previous section, activities in this training are mostly described as combinations of strategies and tools which lead to the creation of several protocols, all of which are written within the frame of a timeline (before, during, and after). Once the didactic units are covered, CHWs are then asked to adapt appropriate strategies and tools to a variety of circumstances in the setting of skills labs. These skills labs place the knowledge

acquired into real life scenarios in which students must think of practical ways to apply what they've learned in the context of their community or work setting. As much as is feasible, the skills lab environment is created to simulate reality and allows for role playing episodes and interactive activities with "patients/clients/members." Competencies exam stretches the students' abilities to apply their newly acquired learned skills with unpredictable patients/clients. It also helps them interact better within the setting of a team. Offering multiple opportunities to apply their knowledge to real life applications is *reinforcing the learning transfer process* (15); it ensures that all students become more confident and better prepared to face the workforce demands.

Practicum Application

Practicum is a vital portion of the core comprehensive CHW training program, giving students real-life opportunities to further develop, practice, and refine the application of competencies covered in the didactic and skills labs. Students are required to complete a series of assignments based on Logic Model principles (19) that lead to a final Community Engagement Project (CEP) or Community Diagnosis Project (CDP). Both the CEP and CDP provide students the opportunity to look deeper into the communities they serve, identifying current health or social issues. The research tools for these projects include windshield surveys, key informant interviews and/or focus groups, research on best practices and strategies, and findings from patients' success stories. With systematic tools and methods to survey communities, and their expertise, students have an opportunity to critically reflect and process potential solutions to create a practical and innovative program action plan. Depending on the program track and practicum settings, students often can implement the proposed program plan. The practicum experience concludes with an oral presentation where students highlight their findings reflecting community perspectives on social and/or health issues, spotlighting best practices, recommendations, and providing activities that involve *CHW-engaged strategies* to address issues/barriers shared by the community. Practicum projects and scope of work may vary by site, track, and training modalities; therefore, projects reflect unique approaches to specific assigned responsibilities and priorities of the practicum site. Students also have the opportunity to network with other health and social service professionals and form alliances with members of the community. Using an adult learner knowledge transfer perspective, this practicum application allows students to actively incorporate new knowledge and skills in a relevant context by telling the "story" from the community perspective. Scholars refer to this learning application as *organizational mirroring and owning the learning*, which is a "lever" of change that influences learning transfer (15, 16).

RESULTS, PROCESSES, AND TOOLS

Parallel to the development of the CHW training curricula was the creation of a robust evaluation plan to assess process and outcome measures of student learning and program effectiveness. Like the student learning assessments, programmatic outcomes are captured using evaluation instruments created based on the Kirkpatrick's Model (20). Program evaluation captured three measures on training methods, eight on "on-the-job application" of competencies, and one open-ended question on the positive effects or outcomes CHWs might have experienced as a result of applying what they learned back on the job. Although not within the scope of this paper, evaluation reports using the aforementioned measures have been produced and presented to training partners and stakeholders. To further capture training impact, graduate and employer evaluations are administered 6–12 months post training. In addition to evaluation tools, groups of subject matter and assessments experts, post-training CHW focus groups, and curricula review further guided and continue to guide improvement plans to ensure program and curriculum efficacy in strengthening the CHW workforce readiness capacities (see **Table 2**).

The Academy has trained 308 culturally diverse CHWs since its inception in 2012, of which 196 were trained under this robust and comprehensive training model: one pilot cohort ($N = 14$), seven cohorts ($N = 158$) in the intensive track Clinic-based CHW training and three cohorts ($N = 24$) in the traditional track Foundations and Behavioral Health training programs. End of program evaluations report 98% retention rates and 99% job placement rate within 6–9 months of the training, where 90% of students are employed in clinical, community and school-based settings. CHWs from the intensive clinic-based CHW training program were hired in 39 different healthcare organizations across three counties in Southern California; traditional track CHWs were hired by two Community-Based Organizations to work in local communities and school districts. During time of enrollment, about 10% of students reported having previously pursued higher education and attained degrees in social work or public health or were enrolled in graduate programs. Reported attrition was due to health issues and/or personal/family obligations. Pre-post assessments show an average 34% increase in knowledge acquisition, and instructor evaluations averaged 4.5 ratings in an eight-item Likert-scale, where 1 = poor and 5 = excellent. More than 85% of all CHWs agreed or strongly agreed that the competency trainings prepared them with knowledge, skills, and abilities to perform and deliver patient-centered care services. Through the open-ended responses, the following themes emerged that describe CHWs' learning experiences: CHWs felt better equipped with necessary tools for practice; CHWs expressed increased capacity to have more meaningful patient engagement and experience; and CHWs felt they are able to make better contributions to their health care organizations, community and patients. These sentiments are described directly by a few CHWs' open ended responses:

> "You will truly learn a lot about yourself while learning how to give to others."
> "This training is invaluable."
> "Take advantage of your time at the Academy and apply your skills immediately. Put it into practice."

DISCUSSION

Lessons Learned

Designing, developing, and implementing a comprehensive training program requires commitment to serve and build equity in the community, a process that should involve the investment of strengthening the CHW workforce (a group of professionals ideal to make an impact). Over the course of 4 years, 11 cohorts, and series of rigorous evaluations, several lessons learned merit attention. The lessons learned are presented in three categories: Practice-driven curricula, student-centered training implementation, and adaptations in response to COVID-19 pandemic.

Practice-Driven Curricula. (1) The practicum projects provided real-life application within a real workplace environment. Students found research methods such as windshield surveys, key informant interviews, focus group highly valuable as it allowed them to see and understand in depth their communities' needs and existing resources. Creating a safe space and time for students to share their experiences and present highlights of their practicum are recommended; they promote reflections on their CHW practice, networking, professional growth, and comradery much needed among CHWs whether from similar or different geographical regions; (2) Competency-focused skills labs were highly rated by students. Logistics for competency exams should be organized with detailed time breakdown, rotation cycles, rubric, and supporting materials. Guides should be made for both the instructors and students, distributed in advance for transparency and preparation.

Student-Centered Training Implementation. (1) The comprehensive nature of the training offers large amount of content that may be challenging to organize and retain. Study guides, review sessions, instructors/staff availability for one-on-one office hours, and study skills building workshops helped supplement the learning gaps and support learning and retention; (2) The interdisciplinary team-teaching approach offered students opportunities to grow confidence and gain a clearer understanding of their role as they worked through case scenarios with other professionals during the training. Perspectives were gathered using mixed methods assessment of the value of a multidisciplinary training approach and presented at the 2019 American Public Health Association Annual Conference. One CHW describes this experience:

> *"First of all, I had no experience working in a clinic setting. So, I felt very lost, even some of the terminology was a little scary. However, having all these clinicians helped me understand the different roles and services that CHW's can offer. I had no idea that as a CCHW* [clinic-based CHW] *we would be able to offer informal counseling, disease management or even mental health aid. Having all of our clinicians here was distinctly helpful."* (CHW – Intensive Clinic-based CHW Training Program, Cohort 2)

(3) Teaching and promoting self-care and peer support throughout the training was deemed highly important and beneficial. Because CHWs share lived experiences, CHWs may experience vicarious trauma and be at higher risk of burnout. The behavioral health portion of the training not only provided CHWs with tools to assist others in areas of behavioral/mental health, but they were key fundamental skills that CHWs applied to their own mental health self-care practices.

Adaptations in Response to COVID-19 Pandemic. (1) Training materials and delivery methods required adaptations to facilitate online learning. A 2-week break at the onset of the "shelter in place" orders allowed CHWs and their organizations to make work accommodations, and for the Academy to transition to online platforms and conduct in-services to train staff on maximizing the use of technological applications; (2) Utilizing Canvas provided students with full access of all the materials. Zoom application and its features allowed for live, synchronous learning sessions with creative adaptations to activities to promote participation. The Remind application along with Canvas announcements directly delivering messages to email inboxes and phones facilitated continuous communications; (3) Evaluation and assessments were adapted to utilize Zoom features and Qualtrics. The number of assignments and assessments to measure student learning outcomes (SLOs) were adjusted to include shorter and more frequent quizzes to provide self-assessments and progress; (4) Participation in a fully online training requires devices and dependable internet. Thanks to gracious donors, the Academy was able to offer desktops and iPad loaners. Additional trainings on utilizing smartphones and other personal devices further supported the transition process.

Practical Implications

Real life impact and practical implications of the comprehensive training program can be depicted by real life testimonies of graduates of the program. These testimonies represent the Academy's efforts to center CHWs experiences in the training and draw upon lessons learned to engage in active efforts for the betterment of the training. The following two CHW stories depict how "a typical CHW is [as] anything but typical" (5) and how this comprehensive training impacted their personal and professional lives.

Silvia's Story. It has been over a decade since I was called to do this work, overcoming personal health challenges and life altering events. When I was first introduced to community health profession, I quickly realized that I had *already* been engaging in these community and health-strengthening activities. I felt the need to formalize my calling and explore available trainings to serve my community in a more profound way. That is when I decided to attend the Community Health Workers/Promotores Academy Foundations of CHW Practice training.

The training solidified for me that I was born to do this work. The training was extremely valuable, specifically because it was the first time my lived experiences were drawn upon as sources of knowledge and guidance for others. I was trained to deliver and perform CHW competencies and skills in a culturally appropriate manner. I enjoyed the popular education activities and learning about the social ecological model. I was able to learn about potential health outcomes of those that live within the spectrum of the community framework. For example, drawing upon my own lived experiences and leveraging cultural humility, I was able to support pregnant women with their maternal health, although I had never been pregnant myself. My confidence flourished as

a result of this training, and I found the courage to run and win a campaign for school board office. The training impacted my community actions as a school board leader who stood for change and advocated using public policy.

My training continued when I was given the opportunity to return to the Academy and participate in the first Community Health Worker clinic-based training. This training was profound personally, as my father was diagnosed with a life-threating disease during this same time. Instinctively, I became my father's CHW and experienced first-hand the need for comprehensive care. The clinical training allowed me to understand that physical health must be comprehensive and include emotional and spiritual health. Through the clinic-based training, I was able to acquire a valuable CHW lens and learn more about the root issues impacting community health. I saw the opportunity to learn more about behavioral health, and that is when I joined the committee to pioneer the behavioral health training at the Academy, incorporating the CRM model. The popular education approach highlighted the notion that individuals and communities can heal together and go from being trauma-informed to trauma-transformed. Now, after years of implementation, I serve on the behavioral health curriculum review committee where I work toward enhancing the training like I did before. The Academy has given me an incredible opportunity to come full circle as a student, graduate, and now instructor, where I can share with students what I have learned over the years.

Carlos' Story. Trust, by definition, implies that someone has confidence in you and believes in you, your character and strength. Working as a registrar, I was recognized for being compassionate, sincere, and resourceful. My ability to connect with diverse patients, building trust and comfort-level, was noticed by my supervisors. My responsibilities grew, and I was tasked with navigating and linking Transgender-identified individuals to care. This catapulted me in my upcoming career as a CHW. I was identified as someone who would be a perfect candidate to receive the training at the Academy at Loma Linda University San Manuel College and become a certified clinic-based Community Health Worker (CCHW). This opportunity has changed my career path completely. I quickly understood the need for this valuable role in this population and understood how my upbringing and intuitive sense of connection is valuable.

The Skills Lab training helped me prepare for situations like home visits and accompaniments. In one case, I was able to identify the cause of poor blood sugar management and coordinated the delivery of a new glucometer to the patient's home. After assessing the patient's living situation and eating habits, I provided education on cultural food choices and made recommendations to avoid dangerously low blood sugar levels. Working with patients in their home allowed me to recognize opportunities for improved mental health using informal counseling, demonstrating grounding and breathing techniques from the training. Learning about the CRM has allowed me to keep patients in a resilient zone and to identify the root causes of their stress. Motivational interviewing is another tool I utilize frequently to positively reinforce and celebrate small health improvements and commitment to thrive. I have learned through my training and experience that when you set SMART goals with your patients, they must be achievable and realistic to keep your patients on track and accountable.

During my time at the Academy, I had an opportunity to present on Health Disparities within the Transgender Community, which led to an expanded role to join the Diversity and Transgender Committees. After the training, I was given an opportunity of a lifetime as a trained CHW to influence and help various communities as a Linkage to Care Specialist, Transgender Navigator, Early Intervention Specialist and Housing Case Manager. I feel accomplished and blessed.

The ability to connect with people and being trusted is a powerful tool. Being a CHW has elevated that quality to all my job descriptions. The accomplishment came into a full circle when I was invited back to the Academy to speak on a panel about my experiences as a CHW. At that point I became a mentor and felt responsible to continue my journey into expanding my career as a CHW and participate in any possible CE training. I know this will lead me into an amazing future and am truly grateful that I am part of something grand.

CONCLUSION

More than ever before, CHWs are being recognized as the critical workforce to address environmental conditions, behaviors and social determinants of health. Yet no standards have been established to assess and ensure quality training for CHWs nor to prepare organizations that employ them to integrate them into their teams. The Academy's comprehensive training model addresses both. The comprehensive core CHW training programs enable CHWs to perform at the top of their practice and profession in a variety of settings, promoting high standards of professionalism, a culture of critical thinking, as well as learning, innovation, and creativity. Just as importantly, the ORTs provide organizations hiring and overseeing CHWs with the opportunity to create a nurturing environment that facilitates CHW integration and long-term success. The key is not *who* trains the CHWs, but *how* they are trained and equipped for workforce readiness and for scaling-up the workforce to narrow the gaps in our nation's healthcare system.

DATA AVAILABILITY STATEMENT

The data supporting this article can be made available by the authors without reservation.

ETHICS STATEMENT

Ethical review and approval was not required on human participants in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in quality improvement evaluations of the program. Written informed consent was obtained from individual(s) for the publication of identifiable data included in this article.

AUTHOR CONTRIBUTIONS

LL conceived and developed the framework. ER facilitated data analysis. ER, PF, and MJ-C contributed to the design of the implementation of the trainings. LL led the writing process. All authors contributed equally to the writing and editing.

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Training Needs of Community Health Workers Facing the COVID-19 Pandemic in Texas: A Cross-Sectional Study

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The COVID-19 pandemic has required the professional healthcare workforce not only to adjust methods of delivering care safely but also act as a trusted sources of information during a time of uncertainty and rapid research and discovery. The Community Health Worker COVID-19 Impact Survey is a cross-sectional study developed to better understand the impact of COVID-19 on this sector of the healthcare workforce, including training needs of those working through the pandemic. The survey was distributed in Texas, New Mexico, and Arizona. This study focuses on Texas, and the data presented ($n = 693$) is a sub-set of qualitative data from the larger survey. Results of the content analysis described in this paper are intended to inform current COVID-19-related CHW training curriculum, in addition to future infectious disease prevention and preparedness response trainings.

Keywords: community health worker, workforce training needs, Infectious disease preparedness, COVID-19 pandemic response, education

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INTRODUCTION

The Community Health Worker (CHW) workforce is an integral part of the healthcare system in the U.S. CHWs effectively improve the health of communities through the implementation of community-based public health interventions, especially among underserved populations and communities (1). The COVID-19 pandemic has disproportionately affected communities of color and those who are economically vulnerable (2–4). CHWs may be uniquely placed to help reduce the burden of COVID-19 infections, illness, and death, because they act as a bridge from the communities they serve and the U.S. healthcare system. During the COVID-19 pandemic, there has been a call to prioritize the role of CHWs to help fight the pandemic at the international (5), national (6, 7) and state (8) levels.

In Texas, CHWs can play a pivotal role in combatting the pandemic. Texas is a state with an established CHW workforce (9), and part of the Texas administrative code defines a CHW as "a trusted member, and has a close understanding of, the ethnicity, language, socio-economic status, and life experiences of the community served" (10). Texas CHWs can work as paid employees or volunteers, and according to legislation enacted in 2001, the certification is "mandatory for

promotores (as) who are financially compensated for the services that they provide" and "voluntary for promotores (as) who do not receive compensation for their services (11). Texas has a large CHW workforce, consisting of ∼4,000 community health workers certified by the Texas Department of State Health Services and an unknown number who are not certified (12, 13).

In order to best equip Texas CHWs in the battle against COVID-19, understanding their training and capacity-building needs related to COVID-19 is critical. To learn about Texas CHWs' training needs, the Maternal and Child Health (MCH) Training Program at UTHealth, a program which provides CEU trainings for CHWs, collaborated with the CHW Core Consensus (C3) Project, a national project that has worked to build consensus to better support the capacity of the CHW workforce to serve individuals and communities (14, 15).

MATERIALS AND METHODS

Study Design

The participants included in the sample for this content analysis were part of a larger cross-sectional survey of CHWs. In the summer of 2020, an interprofessional team of CHWs, CHW instructors, CHW researchers, and maternal and child health researchers developed an online survey to understand the perspectives and experiences of CHWs during the COVID-19 pandemic in Texas, New Mexico, and Arizona. This analysis focuses specifically on a convenience sample of CHWs in Texas. The study was deemed exempt by the Committee for the Protection of Human Subjects (CPHS) at the University of Texas Health Science Center at Houston (HSC-SPH-20-0592). When preparing this manuscript to ensure transparency in reporting the research, the COREQ and STROBE checklists for qualitative and cross-sectional studies, respectively, were used as a guide, where applicable (16, 17).

Survey Instrument

The questions discussed in this paper are part of the larger survey that aimed to: (1) understand changes in the CHW workforce, (2) identify training opportunities, and (3) describe priority needs of CHWs and their communities. Respondents eligible to participate were people who (1) self-identify as a CHW according to the APHA definition, (2) live in Texas, New Mexico, or Arizona, and (3) have been working as a CHW during and prior to the arrival of COVID-19 in their community. The APHA CHW section defines a CHW as "a frontline public health worker who is a trusted member of and/or has an unusually close understanding of the community served (18)." The survey ended for those who did not meet the inclusion criteria.

Questions used in this analysis were part of a 37-item survey instrument, available in English and Spanish, collecting both qualitative and quantitative responses. First, respondents were asked, "How likely are you to take a free, self-paced online COVID-19 training, specific to CHWs?" Response options were a five-point Likert scale ranging from "very unlikely" to "very likely." Second, respondents who answered "likely" or "very likely," received a follow-up question to elicit training topics of interest in a free-text answer box: "What topics related to COVID-19 would be most helpful to you as a CHW?"

Data collection utilized Qualtrics XM online survey software. All survey instructions, questions, and answers were available to respondents in Spanish or English. The first set of instructions, prior to the screening questions, included guidance on how to toggle between Spanish and English at any point in the survey. The survey content went through three translation phases: (1) the "translate survey" feature in Qualtrics, (2) feedback and edits from survey team members fluent in Spanish, and (3) an additional round of feedback and edits from Spanish-speaking team members. To ensure optimal user-experience, functionality, readability, and survey length, the survey content was piloted by English- and Spanish-speaking students at UTHealth School of Public Health.

Survey Distribution

Local and state-level CHW associations and organizations collaborated with the survey team to distribute the survey link. Survey distribution occurred via email with the access link—avoiding social media platforms to decrease risk of fraudulent responses (19). To maximize the survey's reach, the survey team engaged 15 community partners at local and state-level CHW organizations and associations in the months leading up to data collection.

Distribution collaborators received an optional email template for convenient marketing of the survey, that included the survey hyperlink and the survey URL. Additionally, the survey link was distributed via professional contacts of the survey team. The exact number of people who received the survey is indeterminable due to the phone-tree style of distribution and the potential of a single CHW receiving the survey link from multiple distributing sources. At the end of the survey, respondents were given the opportunity to provide their email address to be included in a give-away of ten $100 e-gift cards to a large retail chain with over 500 stores in Texas.

Data Collection

Data collection occurred July 13 to August 3, 2020, with the original completion date of July 27, 2020. A one-week extension attempted to reach additional CHWs. Distributing collaborators received marketing materials in June of 2020, on the survey go-live date, and about 2 weeks after the go-live date with information of the 1-week extension. Documentation of the actual dates that distribution collaborators completed outreach to their listservs was not collected. After data collection, the research team prepared and shared a report with stakeholders, including survey respondents and organizations that collaborated in distributing the survey (20). The secure network at UT Health School of Public Health houses the data.

Data Analysis

First, descriptive frequencies were conducted in SPSS for demographic data and the question of how likely respondents would be to take "a free, self-paced online COVID-19 training, specific to CHWs." Second, respondents who indicated they were they were "likely" or "very likely" to take a training were asked,

"What topics related to COVID-19 would be most helpful to you as a CHW?," and a content analysis was conducted to categorize the open-ended, de-identified survey responses from the free text entry question (21).

To systematically sort, synthesize, and summarize the free text responses into training topic categories, two researchers (ME & SS) conducted an inductive-dominant content analysis (22), with a third reviewer who resolved discrepancies (CBW). There were no a priori categories, and categories emerged from the data. In an iterative process, the researchers created and refined the categories and sub-categories of training topics and created a codebook to help ensure an accurate and objective categorization process. Inclusion criteria for each category and sub-category were identified utilizing words and phrases, which were taken verbatim from survey respondent's answers. Some respondents provided more than one training topic, and each response was classified into as many categories as needed. After several iterations of data reduction and category creation, a last review was conducted using the finalized codebook. No new category or sub-category was identified during the final analysis.

RESULTS

Demographics and Training Interest

Demographic characteristics of the respondents included in this content analysis ($n = 693$) are presented in **Table 1**. Nearly 90% of survey respondents are female, 65% of Hispanic, Latino, or Spanish origin, 18% Black or African American, 64% White, 94% are certified in Texas as CHWs, and 16% completed the survey in Spanish, and their average age is 47 years (SD = 10.8). After the survey screening questions, 885 respondents agreed to the consent. Of the 885 eligible respondents from Texas, 801 answered the question about how likely they would be to take a self-paced, online, COVID-related training. Of those, 747 (93%) responded that they would be "likely" or "very likely" to take a training.

TABLE 1 | Demographic characteristics of Community Health Worker (CHWs) respondents who indicated that they were "Very Likely" or "Likely" to take a free, self-paced online COVID-19 training specific to CHWs and provided a response to the following question: "What topics related to COVID-19 would be most helpful to you as a CHW?" ($n = 693$).

Characteristics	*n*(%)
Age in years [Mean (SD)], ($n = 687$)	47.67 (10.82)
Number of years working as CHW [Mean (SD)], ($n = 682$)	7.22 (5.85)
Percentage who completed survey in Spanish ($n = 693$)	108 (15.58)
Percentage certified as CHW in Texas	652 (94)
Sex ($n = 692$)	
• Male	70 (10.12%)
• Female	618 (89.31%)
• Other	1 (0.14%)
• Prefer not to say	3 (0.43%)
Ethnicity ($n = 692$)	
• Hispanic or Latino	454 (65.61%)
• Not Hispanic or Latino	232 (33.53%)
• Prefer not to say	6 (0.87%)
Race ($n = 681$)	
• White	438 (64.32%)
• Black or African American	129 (18.94%)
• American Indian or Alaska Native	5 (0.73%)
• Asian	22 (3.23%)
• Other	63 (9.25%)
• Multiracial	24 (3.52%)
Likelihood to take a free, self-paced online COVID-19 training specific to CHWs ($n = 693$)	
• Very Likely	584 (84.26%)
• Likely	109 (15.73%)

Categorization of Training Topics

Of the 747 respondents that expressed interest in training, 93% ($n = 693$) provided training topics of interest in the free text answer box. Respondents provided from one ($n = 483$) to five topics ($n = 3$) for a total of 970 topics from 693 respondents, with a median of one topic per respondent. Many gave broad responses wanting "any" information on COVID-19, while others provided more specific and detailed topics. Categories and sub-categories along with example text are presented in **Table 2** and described below. A total of seven categories and 22 sub-categories were identified. An exhaustive list of key words used to categorize the categories and sub-categories and select quotes from CHW respondents are included in **Appendix 1**. The seven major topics and related sub-categories are described below.

Prevention

This topic category was the most frequently reported and more than a third of respondents requested a training topic related to the prevention of COVID-19. This category included the four sub-categories of "General prevention," "Masks/personal protective equipment (PPE) social distancing," "Vaccines," and "Health/wellness promotion".

The sub-category of "General prevention" was the most frequently reported and included responses such as "prevention," "disinfecting," and "hygiene, safety." Less frequently reported were the sub-categories of "Masks/PPE/Social Distancing," "Vaccines," and "Health/wellness promotion."

The "Masks/PPE/Social Distancing" sub-category was created, because respondents frequently grouped them, e.g., "the importance of social distancing and use of facial masks" and "social distancing, importance of the mask." The respondents discussed PPE for the community, "where to get free PPE for the community" and "PPE needs for the public," but not specifically in a clinical setting.

The sub-categories of "Vaccine," "Health/wellness promotion," and "Contact tracing" had fewer than 25 responses. "Vaccine" included straightforward responses, e.g., "vaccine," "vaccines that are discovered." The sub-category of "Health/wellness promotion" had responses that included the "importance of diet and exercise" and the "promotion of regular healthcare." The "Contact Tracing" sub-category included straightforward responses such as "contact tracing," "tracking cases," and "tracing."

TABLE 2 | Categories & sub-categories of training topics related to COVID-19 requested by Community Health Workers (CHWs).

Category (*n*) • Sub-category	**Example text** (examples text from CHW responses for each training topic category and sub-category)
Prevention (*n* = 289)	
• COVID-19 Prevention (General)	Hygiene, cleaning/disinfection, quarantine, isolation after exposure, transmission
• Masks/PPE/Social Distancing	Facial coverings, personal protective equipment, social distancing
• Vaccine	Vaccination, immunization, vaccine
• Of illness through Health/Wellness	Promoting health/wellness and regular health care, importance of diet & exercise
• Contact Tracing	Contact tracing, tracking cases, tracking, tracing
Clinical course of COVID-19 (*n* = 188)	
• Treatment	Treatment, managing symptoms, curing COVID-19
• Symptoms	What COVID-19 does to the body, signs and symptoms, asymptomatic
• Testing	Tests, where to get tests, testing sites, accuracy of tests, testing costs
• Post-COVID Impact and Care	After effects, after care, antibodies, reinfection
Community resources and engagement (*n* = 103)	
• General resources	Resources, community services
• Specific resources	Transportation, medicine, rental assistance, food assistance, evictions, financial help
• Communication	Engaging clients, how to talk to the community, outreach, how to provide info effectively
• How to work remotely as a CHW	Delivering information virtually, helping clients remotely
Vulnerable populations (*n* = 102)	
• People at increased risk[a]	Older adults, "co-morbidities," diabetes, immunocompromised/HIV-positive
• Others who need extra precautions[b]	Rural communities, people with disabilities, breastfeeding parents, refugee populations
• Children/kids	Children/kids, schools, effects of COVID-19 on children
Mental Health (*n* = 79)	
• General	Coping, depression, anxiety, stress/stress management
• Of health care providers	CHW self-care, compassion fatigue, mental and emotional health for health workers
• Due to isolation	Isolation, loneliness, how to treat anxiety generated by confinement
• Due to dealing with illness	Coping if client for family member has the virus, how to deal with loss of a loved one
General COVID-related information (*n* = 118)	
• General COVID-related information	All/anything and everything, myths, education and information
Other/unclear (*n* = 91)	
• Other	Appeared ≤ 3 times in the responses, e.g., motivational interviewing, hurricanes
• Unclear	Text was unclear, i.e., not clear to any of the researchers or interpreted differently

[a] *Groups at increased risk for severe illness of COVID-19 (https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/index.html).*
[b] *Those who might need to take extra precautions against COVID-19 (https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/other-at-risk-populations.html).*

Clinical Course of COVID-19

This category includes all sub-categories related to the clinical course of COVID-19, including "Symptoms," "Testing," "Treatment," and "Post-COVID impact and care".

Among these sub-categories, the sub-category of "Treatment" was the most frequently reported (n = 58) and included responses such as "treating symptoms," "how to manage symptoms at home, and "curing COVID-19." "Symptoms" and "Testing" were the next most frequently reported in this category, with 54 and 49 responses, respectively. "Symptoms" included many straightforward responses such as "symptoms" and "signs and symptoms", but also responses such as "what COVID-19 does to the body" and "pathophysiology of COVID-19." The "Testing" sub-category included responses that indicated CHWs would like more information about "accuracy of tests" and "how often to get tested," and information about testing resources, such as "where to get tested," "promoting testing," and "testing costs."

The "Post-COVID Impact and Care" sub-category (n = 27) was created because respondents often reported a desire to know more about the "after-effects of COVID-19" or the impact of "COVID-19 antibodies" on reinfection and treatment of the disease.

Community Resources and Engagement

About 50 respondents indicated that they would like a training on "Community Resources," which was divided into two sub-categories, i.e., general and specific. Some respondents broadly requested a training on "resources" or "community services." Other respondents requested education on more specific community resources, e.g., "food, medication, utilities, etc." and "assistance with rent." Another 50 respondents requested

training in "Community Engagement," which was divided into two sub-categories, i.e., "Communication" and "Working remotely as a CHW." The sub-category 'Communication' included responses such as "community engagement" and "how to talk to the community about COVID." The sub-category "Working remotely as a CHW" included responses such as "how to reach goals serving families while working from home."

Vulnerable Populations

Over 100 respondents included responses related to "Vulnerable Populations," or the specific community or populations they serve. The three sub-categories that make up this category include "People at Increased Risk," "Other People Who Need Special Precautions," and "Children/Kids." The titles and definitions of these sub-categories reflect the CDC guidance around people who are known to be at increased risk for severe illness due to COVID-19 or those who may be at increased risk and need special precautions (CDC).

The "People at Increased Risk" sub-category ($n = 46$) includes groups such as "older adults," "those with co-morbidities," "those who are pregnant," and "immunocompromised/HIV-positive individuals." The "Other People Who Need Special Precautions" sub-category ($n = 31$) includes groups who *may* be at increased risk, such as "refugee populations", "people experiencing homelessness," and "racial & ethnic minority groups." Responses related to "Children/Kids" made up about one-quarter of this category's responses ($n = 25$), and included responses such as "how to care for children with COVID-19," "schools," "child care settings," and the "effects of COVID-19 on children."

Mental Health

Similar to "Community resources," about 80 respondents indicated they would like a training on "Mental health," which was divided into sub-categories, i.e., "General mental health," "Mental health of healthcare providers," "Mental health due to isolation," and "Mental health due to dealing with personal/family illness."

General COVID-19-Related Information

Over 10% of respondents gave a very broad response indicating they would like a COVID-19-related training on "anything" and "everything" or about "COVID facts" and "myths." Respondents who reported they would like a training about "education" or "information" were also sorted into this category.

Other/Unclear

Seven responses fell into the "Other" category, which was comprised of topics that appeared <5 times, including "employee rights" ($n = 3$), "intimate partner violence" ($n = 2$), "motivational interviewing certification" ($n = 1$), and "COVID during hurricanes" ($n = 1$). Over 80 responses were unclear to the researchers conducting the content analysis, meaning that the responses were too vague or confusing to develop COVID-19-related training/learning objectives. Unclear responses included text such as "what is really going on?" and "cancer prevention."

DISCUSSION

This study describes priority training needs and interests during the COVID-19 pandemic reported by CHWs in Texas. While some studies have compiled guidelines and resources for CHWs during COVID- 19 (23), this is the first study to our knowledge that provides recommendations for training topics requested by CHWs in Texas. Recognizing the professional changes and training needs of CHWs creates the opportunity to support this sector of the healthcare workforce during the current pandemic and to prepare for future public health emergencies. The categories identified by the respondents that could be helpful in developing CHW trainings included how to prevent COVID-19 ("Prevention"); the diagnosis, treatment, and effects of the illness ("Clinical Course of COVID-19"); the effects of COVID-19 on specific populations who are vulnerable to the disease ("Vulnerable Populations"); the effects of COVID-19 on mental health ("Mental Health"); and how to engage and provide resources to the community ("Community Resources and Engagement").

The categories and sub-categories presented from this study can serve as a starting point for those developing trainings. To ensure training relevance, the research team recommends collaborating closely with CHWs themselves to identify specific learning objectives and co-create training content. This tailoring is especially important given the fluctuating nature of the pandemic and our response. As infection rates and state/local restrictions change, so will training needs.

In addition to the categories discussed above, a "General COVID-related information" category emerged from the data. This category is not intended to provide guidance on training content, but it does provide some insight. Given that over 10% of respondents indicated that they were interested in "any" or "all" topics related to COVID-19 demonstrates, it appears that there is a need and hunger for COVID-related trainings among CHWs. However, at this point in the pandemic CHWs may have more specific questions and training needs. An important consideration for any of the training topics presented in this paper is the rapidly changing rates of COVID-19 infections, hospitalizations, and deaths during the time of data collection and the publishing of this article.

The list of training categories that emerged from the data in this study is most certainly not an exhaustive list of COVID-19-related training topics. Of the 970 topics provided by respondents, only seven were categorized into the "Other" category, meaning the topic was mentioned by fewer than three respondents and not easily incorporated into an existing category. The unassigned topics included (1) motivational interviewing, (2) intimate partner violence, (3) COVID-19 and hurricanes, and (4) employee rights and employer responsibility during COVID-19. Though these topics were not frequently requested, they are relevant. For example, studies have shown that CHWs are effective at using motivational interviewing (MI) to elicit behavior change (24), and MI could be used to help clients practice safe pandemic behaviors. Second, some studies suggest an increase in intimate partner violence (IPV) as a consequence of COVID-19 related lock-down

restrictions, sheltering-at-home, isolation, and quarantine (25), and as frontline workers working with families, CHWs are well-positioned to help prevent IPV (26). Third, as the pandemic continues, it is important to consider COVID-19 recommendations in disaster preparedness plans, such as those for hurricanes, to mitigate negative health outcomes if these challenges were to converge (27). Finally, several CHWs requested training topics related to employee rights and employer responsibilities during the pandemic, i.e., sick days and protective equipment. Future studies should examine whether CHWs felt protected or whether they felt their employee rights were violated while working during the pandemic.

The most frequently requested training category was "Prevention." Some responses were broad and requested training topics on how to "prevent COVID" or "stop the spread," while others responses fell into more specific sub-categories. One sub-category was "Masks/PPE/Social Distancing," and CHWs, who are trusted in the community, could provide information to people on the ever evolving COVID-19-related information and recommendations from the CDC. "Vaccines" were another sub-category of training topics that was identified, and at the time of data collection, no COVID-19 vaccines had been authorized for emergency use in the U.S. by the Food and Drug Administration. At the time of publishing, at least three vaccines have been authorized for emergency use (28), so the training requests related to vaccines may have changed. Other prevention related topics were related to "Health and Wellness," such as encouraging regular health care, presumably because people have been delaying regular health care, such as cancer screening exams, during the pandemic (29).

CHWs requested trainings to help their communities by improving access to community resources and increasing community engagement. Specific community resources that were requested aligned with the social determinants of health, including food availability, employment, housing, and access to healthcare. The COVID-19 pandemic has increased the number of households experiencing food insecurity (30), impacting vulnerable populations (31). Given their foothold in vulnerable communities and their resourcefulness, CHWs could provide the link between community members and the resources they need. CHWs also requested trainings on how to engage the community, specifically while working remotely. A recent study that conducted focus groups with CHWs about their experiences during the pandemic identified a similar theme of technology and the need and opportunity to develop skills (32).

Recommendations for Those Who Develop Trainings or Training Courses

The training topics identified in this study are intended to serve as guidance. Categories and sub-categories were developed through the lens of training development opportunities and which categories and sub-categories could be used to develop learning objectives. Topics identified through this survey cross a wide range. We see several topics as having an enduring value to sustained training opportunities and competency development for CHWs related to public health preparedness overall. Notably, the topic of prevention, most commonly cited by participants, matches the recommendations of the C3 Project for core skill competency area that falls within the Project's core competency Knowledge-base area (https://www.c3project.org/resources). The Knowledge-base area has expanded significantly over the 20 years since the original release of core CHW roles and competency recommendations in the National Community Health Advisor Study in 1998 (33).

Training and Capacity Building for CHW Preparedness

The COVID-19 pandemic has created a learning laboratory for CHWs and other community-centered health care workers as they have become essential partners in many regional efforts to do contact tracing and promote healthy behaviors to combat the spread of virus (34). Long-range training and capacity–building plans for CHWs moving forward from COVID-19 should emphasize prevention within a preparedness framework. A national project carried out by the Association of Schools of Public Health (ASPH) at the request of the Centers for Disease Control and Prevention (CDC) in response to the Pandemic and All-Hazards Preparedness Act of December 2006 (35) led to the development of preparedness public health core competencies. Four core areas of the competency map are: Model Leadership, Communicate and Management of Information; Plan for Improved Practice; and Protect Worker Health and Safety. Areas that emerged from our data include some of these core elements. Future exploration of overlap and divergence is recommended.

Training Characteristics to Promote Capacity-Building

In the pandemic, it is clear that online training has now been normalized and it must be considered along with all other training modalities. Based on previous interviews with CHWs, there is a preference for short, self-paced, online courses, especially for continuing education units (CEUs) needed to maintain certification. While this type of training is often more accessible, it is not as effective at meeting learning objectives as higher intensity trainings (1). While some CHWs may prefer brief, self-paced, online courses, other CHWs will prefer synchronous and interactive trainings offered via an online videoconferencing platform or in-person, though these have not been a norm during the COVID-19 pandemic. Additionally, online courses may not be accessible to the ∼1-third of rural Texans that have limited access to high-speed internet and communities along the US/Mexico border that rank among the nation's "worst-connected" cities (36).

In addition to approaches to training, it is also vital to consider language access when planning trainings for and with CHWs. In this study, 16% of survey respondents answered in Spanish. Over a third of Texans over the age of five speak a language other than English at home (37). After Spanish, the most frequently spoken languages are Vietnamese and Chinese with more than 300,000 people speaking those languages (37).

CHWs as Trainers- Building Capacity of the CHW Field From Within

It is important to consider whose expertise is emphasized when trainings are developed. As recommended by the CHW National Education Collaborative, when considering how to approach CHW training, CHWs should play a prominent role in facilitating educational sessions (38). One example of CHW-led training during the COVID-19 response efforts comes from the Arizona Community Health Worker Association (AzCHOW).

The CHW leadership team of AzCHOW has been offering virtual sessions in Spanish for other CHWs to both offer social support and to promote skill development so CHWs may better provide needed support to their communities (39). Most recently, the online sessions have focused on vaccine hesitancy and access to vaccines for both CHWs and their communities. We observe that CHW–led training by and for CHWs during the pandemic exemplifies the CHW–skill building learning laboratory created by the pandemic noted earlier.

Limitations

It is important to note several limitations of this study. First, the timing of the study may limit the generalizability. As discussed previously, the changing nature of the pandemic could impact the training topics that are requested. Data represent responses reported earlier on in the pandemic (July-August 2020), and responses may not reflect current CHWs' needs and opinions now a year into the pandemic. Additionally, there were at least three other surveys of CHWs circulating around the time of data collection for this study, which could have increased survey fatigue among CHWs and lowered the response rate for this study. Also, the survey asked CHWs to provide topics for a free, self-paced, online training, because that is the type of training the MCH Training Program has previously developed for CHW CEUs. The survey did not ask about other training formats or modalities that respondents may be interested in and, as such, the results from this study may not be generalizable to other types of trainings. Lastly, the survey did not include questions about how applicable the trainings would be to certification or the maintenance of certification, which would provide insight into CHWs motivations for completing trainings. Future research should explore the motivations of both certified and non-certified CHWs to inform the development of trainings.

Recommendations for Researchers

Survey respondents yielded a large volume of qualitative data when given the opportunity to complete free text answers. Future researchers studying the CHW population are encouraged to consider (1) free text response as an effective method of eliciting data and (2) plan for bandwidth and expertise available during the qualitative data analysis phase. To elicit more specific training needs and avoid misinterpretation in future survey instruments, researchers recommend providing general training topics, such as the themes identified in this paper, for respondents to select prior to then providing an open text answer for respondents to identify specific training needs.

In reflecting on the survey process undertaken, we add that working directly with significant CHW input in the design, delivery, and interpretation of research tools such as surveys is best practice (40). This team included a key CHW member but haste due to COVID-19 impacted our further pursuit of greater input. Future work in this arena on an upcoming follow-up survey will include direct input from CHWs through several mechanism including town hall and an all-CHW advisory group.

CONCLUSIONS

Community Health Workers role in preparedness has not been well-defined, though it has been examined in other public health emergencies (41). The COVID-19 pandemic has brought new attention the field of public health's role in preparedness overall and with it, new attention to public health's frontline team members, CHWs, who are increasingly identified as essential to address the pandemic and health equity and access issues overall. This paper examines preparing CHWs for their emerging preparedness role in the wake of the COVID-19 Pandemic. We ask, what might this enhanced role of CHWs in preparedness mean for CHWs going forward? We call for future investigation grounded in a community–based participatory research framework to help move this dialogue forward while fully engaging CHW leadership nationally and internationally. Through this engaged action research approach, CHWs can work to define their terms for any preparedness roles they will play in the future and any related capacity building they will require to fulfill those roles in the face of inevitable global challenges ahead.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Committee for the Protection of Human Subjects (CPHS) at the University of Texas Health Science Center at Houston (HSC-SPH-20-0592). The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

All authors contributed to the conception of the study design, the acquisition and interpretation of the data, and manuscript drafting. SS, ME, and CB-W conducted the data analysis. All authors approved the final version and agree to be accountable for all aspects of the work. A report from this survey, which did not

include this content analysis, is available online at: https://sph.uth.edu/research/centers/dell/resources/the%20final%20report%20of%20the%20community%20health%20worker.pdf.

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SUPPLEMENTARY MATERIAL

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COMMUNITY CASE STUDY
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The Community Health Worker (CHW) Common Indicators Project: Engaging CHWs in Measurement to Sustain the Profession

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Despite progress in documenting the outcomes of Community Health Worker interventions, the lack of standardized measures to assess CHW practice has made it difficult for programs to conduct reliable evaluations, and impossible to aggregate data across programs and regions, impeding commitment to sustainable, long-term financing of CHW programs. In addition, while CHWs have sometimes been involved as data collectors, they have seldom been engaged as full partners in all stages of evaluation and research. This manuscript details the current work being done by the CI Project, demonstrating how CHWs are able to contribute to the integrity, sustainability, and viability of CHW programs through the collaborative development and adoption of a set of common process and outcome constructs and indicators for CHW practice and CHW program implementation.

Keywords: community health workers, measurement, popular education, participatory evaluation, community based participatory research

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INTRODUCTION

Measurement is inherently political. Who has the power and money to measure; what is measured and who chooses; how measurement occurs and who decides; whether or not measurement is a requirement for funding; how and by whom data are collected, collated, analyzed, interpreted and presented—all of these questions reflect ideologies and relationships to power. As scholars in the movement to decolonize research and practitioners of various strands of participatory research have made clear (1, 2), what were previously thought of (by those in power) as value-free, objective decisions, are anything but.

This is particularly true in the case of measurement and evaluation in the Community Health Worker (CHW) profession. CHWs are trusted community members who work with others in their community and use a range of approaches to improve health and equity (3). As predominantly members of marginalized communities where health inequities are greatest, CHWs (who use titles including Community Health Representatives in Native/American Indian communities and Promotores/as in Latinx communities) experience the same oppression and denial of power experienced by their broader communities. Historically and still today, this has included the denial of power to identify research and evaluation questions, and design, conduct, and disseminate research and evaluation studies.

While CHWs have sometimes been involved as data collectors, they have seldom been engaged as full partners in all stages of evaluation and research, from conceptualization to analysis to publication. A recent systematic review of CHW research found that only 23 articles out of 130 included CHW participation in five or more intervention research phases. Across the phases of research, 98.5% of studies employed CHWs to implement the health intervention. CHWs were frequently involved in participant eligibility screening and/or recruitment (57.6%) and data collection (49.2%). CHWs were much less frequently involved in identifying the research question (10.8%), data analysis (2.3%), and research dissemination/action (10.8%) (4).

Based on the authors' collective experience, because of CHWs' strong connections with community members, the data they collect are often more accurate and extensive than data collected by non-CHWs. In the context of the pandemic, for example, CHWs have been able to learn more about possible sources of transmission than epidemiologists who lack the same levels of trust and connection.

Consequences of alienation from the knowledge production process for CHWs have mirrored consequences for people in other marginalized communities and include characterization through a white/academic/bureaucratic/colonizer/medical gaze (1, 2). Additionally, CHW studies and evaluations have often lacked the crucial perspectives of those closest to and most informed about the work, which has led in turn to the use of process measures that do not adequately capture the contributions of CHWs, and outcome measures that do not emphasize the outcomes CHW are uniquely able to achieve (5).

Another outcome of CHWs' and their communities' social location is chronic underfunding, including underfunding of research and evaluation. One of the consequences of underfunding has been an inability to use common measures to conduct longitudinal studies such as those which have been conducted in fields like nursing (6). Despite progress in documenting the outcomes of interventions led by CHWs (7–12), a lack of standardized measures to evaluate CHW programs and policies has made it impossible to aggregate data across programs and regions, impeding commitment to sustainable, long-term financing of CHW programs and positions. Aggregated data could also facilitate inferences about which aspects of CHW practice and program inputs lead to improved outcomes. Lack of comprehensive and easy-to-use indicators hampers the ability of many community-based programs to reliably report outcomes to funders. Lack of attention to the processes by which CHWs achieve outcomes has made it difficult to conclusively demonstrate the importance and effectiveness of particular CHW roles, skills, and qualities, and identify the kinds of support that programs need to provide to CHWs (5).

To address these issues, building on work conducted by the Michigan CHW Alliance, in 2015 CHWs and non-CHW researcher collaborators from five states formed the national CHW Common Indicators (CI) Project. The purpose of the CI Project is to contribute to the integrity, sustainability, and viability of CHW programs through the collaborative development and adoption of a set of common process and outcome constructs and indicators for CHW practice. Since its organizing Summit in 2015, CHWs have been at the forefront of the CI Project. Five of 16 attendees at the organizing Summit were CHWs, three of whom co-facilitated the Summit. CHWs have been actively involved in presenting about the project, participating on the project Leadership Team and Advisory Group, and publishing blogs and peer-reviewed journal articles about the project (13–15).

Between 2015 and 2019, the CI Project achieved several important goals, including engaging more than 100 CHWs, researchers and others from around the country who are committed to identifying and implementing common indicators through a participatory process (13), and compiling a robust set of 20 process and outcome constructs (see **Table 1**). Based partly on a strong track record of accomplishments, in 2019 the CI Project received an initial year of funding from the Centers for Disease Control and Prevention (CDC) via the National Association of Chronic Disease Directors (NACDD)[1].

The purpose of the CDC-funded 2019-2020 scope of work was the collaborative selection of 10 priority constructs (from the list of 20 in **Table 1**) and development of associated indicators for evaluation of programs, systems, and investments involving CHWs. If adopted, these indicators will illuminate (1) the processes by which CHWs achieve positive outcomes at multiple levels (individual, community, and system), (2) the outcomes themselves, and (3) the key kinds of support that CHWs need to be successful, across programs and diseases or conditions. In addition, there are currently few specific indicators available to measure process and outcome constructs across CDC CHW programs and initiatives. The CI Project's 2019–2020 work addressed this gap, thus strengthening the evidence regarding CHW contributions to improving health and reducing inequities. The project did not require IRB approval as it did not include research participants.

This article describes how Project leaders were able to enhance the engagement of CHWs and achieve project objectives during the first year of CDC funding and in the midst of the COVID-19 pandemic through a series of activities that were based in popular education methodology. The article then discusses findings and lessons learned. After exploring conceptual and methodological constraints of the project, the manuscript concludes with a summary of next steps and some persistent questions posed by a project of this type.

CONTEXT

The setting for the CI Project is the CHW field in the United States. Organizational settings include community health centers; community-based organizations; academic health centers; universities; health plans; state, local, and national CHW associations; and a range of other organizations that are led by and employ CHWs. Principal actors (the population) are CHWs, who by definition are members of the communities they serve. Other stakeholders and constituents include university-

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TABLE 1 | Full list of recommended constructs with definitions.

Process constructs	Definitions
CHWs' job satisfaction	The extent to which CHWs are satisfied with their overall job conditions.
CHWs' compensation, benefits and promotion	The salary paid to CHWs in relation to their FTE and local cost of living, in addition to the presence or absence of health insurance, retirement, disability, and paid leave within their benefit package. Opportunities for advancement/promotion are also part of this construct.
Acceptance/Value of CHWs to the organization	The extent to which CHW work is considered a regular and valuable component of the employing organization's services.
Supportive and reflective CHW supervision	The extent to which CHWs feel they receive supervision from clinical and non-clinical supervisors that is supportive, reflective, and trauma-informed, not disciplinary and paternalistic.
CHW enactment of the 10 core roles	How often (in the past week, month, or year) individual CHWs or a group of CHWs within a program or organization enacted or engaged in each of the 10 core roles defined by the CHW Core Consensus (C3) project.
Participants' trust/satisfaction with CHW relationship	The extent to which participants feel they can trust the CHW(s) with whom they work, including trusting that a CHW will keep their private information confidential, and that a CHW is genuinely dedicated to their care and well-being. Also, the extent to which participants are satisfied with their relationship with their CHW(s), in terms of feeling genuinely respected and understood by their CHW(s).
CHW-facilitated referrals	Completed referrals facilitated by the CHW, through which the participant successfully receives attention, care, and/or resources from a clinic, other healthcare or social service agency or public service. CHWs will not be held responsible when necessary services are not available.
CHWs' involvement in policy making	The extent to which a CHW is able to be involved in policy making both within their own organization and in the larger community on work time and/or as part of their volunteer commitment.
CHW integration onto teams	The extent to which CHWs are members of a collaborative and communicative "team" with other providers within a clinic, school, social service agency, etc.
Use of popular/people's education in CHW training	The extent to which CHW training is informed by popular/people's education, which values, draws out and builds on what CHWs know through life experience.
Outcome constructs	**Definitions**
Participant self-reported health status	A participant's own assessment of their physical, mental, and emotional health.
Participant quality of life	A participant's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns (WHO).
Participant health and social needs	Health and social needs currently experienced by the participant, e.g., food, transportation, water, and housing insecurity.
Participant knowledge, attitudes and behaviors	A participant's knowledge, attitudes and behaviors related to specific health conditions.
Participant social support	The level of support (i.e., assistance/help) that participants perceive from others to deal with regular and emergent life challenges, including economic, social, health, and emotional challenges.
Participant empowerment	A composite measure assessing both actual and perceived empowerment. Includes the following domains: self-efficacy, sense of community, perceived control at the community level, decision-making ability, education/knowledge/skills, critical consciousness, optimism, inner peace, communication, resources.
Participant cost of care	The total cost of a participant's health care in a given period of time, with a focus on high cost emergency services.
Participant utilization of health services	A participant's use of health services in a given period of time, for example, use of emergency vs. routine primary care services.
Participant health outcomes	A participant's physical, mental and/or emotional health status, as assessed by a clinician.
Policy and system change	Policies and system changes that address CHW workforce development and sustainability as well as policies that promote population health and address inequities (i.e., many different policies at multiple levels of government, business, etc.).

and community-based researchers and evaluators; CHWs' colleagues in their places of work; program administrators; CHW supervisors; and those involved in making policy regarding CHWs at the state and national levels.

The phase of the CI Project covered by this manuscript occurred in the midst of at least four cataclysmic events which strongly influenced the project. These included the emergence of the COVID-19 pandemic; the uprising for racial justice that followed the police killings of George Floyd, Breanna Taylor, and Tony McDade; the largest economic crisis since the Great Depression; and an upsurge in white supremacist violence. As a project committed to health justice, the CI Project sought to respond to these crises in a variety of ways, some of which are detailed below.

At the beginning of the period described in this manuscript, there was one CHW on the five-person Leadership Team,

and multiple CHWs in the Advisory Group. At the end of this period, the Leadership Team comprised three CHWs and three non-CHW collaborators, and a CHW Council consisting of four CHW leaders had been formed through a national recruitment process.

The CI Project uses popular education as a theoretical framework, an organizing philosophy, and an educational methodology. Also referred to as "people's education," popular education creates settings in which people most affected by inequities can share what they know, learn from others in their community, and use their knowledge to create a more just and equitable society (16). Popular education and the CHW model grew out of many of the same historical roots and share key principles, such as the ideas that people most affected by inequity are the experts about their own lives, and that experiential knowledge is just as important as (and sometimes more important than) academic knowledge (17).

Collaboration With the CDC

This project benefited from the close collaboration of the CHW Work Group at CDC (the Work Group). The Work Group first convened in 2011 as an informal multidisciplinary group, composed of volunteers from CDC's National Center for Chronic Disease Prevention and Health Promotion. Since then, the Work Group has expanded to include representatives from across CDC. The mission of the Work Group is to facilitate, support, and advance CHW initiatives and policies to help accomplish public health goals.

The 2019–2020 CI work plan was created jointly by the CI Project Leadership Team and colleagues at CDC and NACDD. CDC and NACDD colleagues provided input into two major aspects of the Project: the choice of priority indicators and the development of indicator profiles. CDC colleagues prioritized development of indicators for policy and systems change at the program and state levels, since they had identified this as a gap in previous work and it is central to CDC's CHW Sustainability Strategy (18). The other constructs prioritized by CDC colleagues included: *Participant Health and Social Needs*; *Participant Self-Reported Health Status*; *CHW-Facilitated Referrals*; and *CHW Integration into Teams*.

The CI Leadership Team prioritized five constructs that had been highlighted by stakeholders: *CHW Compensation, Benefits, and Promotion*; *CHW Enactment of the 10 Core Roles* (as identified in the CHW Core Consensus or C3 Project) (19); *CHW Involvement in Policy Making*; *Participant Empowerment*; and *Participant Social Support*.

CDC colleagues were involved in the development of profiles (detailed documents including a definition of the construct, purpose and rationale of the indicator, a description of the indicator, recommendations for how to operationalize it, and other information) for the 10 priority constructs. CDC and NACDD colleagues also helped to develop criteria to identify and select key stakeholders who would provide feedback for the content and operationalization of the indicators. They participated actively in bi-monthly Advisory Group meetings and the 2020 Summit (see below) and met with the Leadership Team to discuss the dissemination plan.

KEY PROGRAMMATIC ELEMENTS

The collaborative methods used in this project included a review of peer-reviewed and non-peer reviewed literature, and comprehensive stakeholder engagement culminating in a 1.5-day online Summit held in 2020. Findings from all methods were triangulated to produce results and identify lessons learned. Both the findings of this project and popular education suggest that equitable engagement of marginalized individuals and communities including CHWs depends on thoughtful and diligent work before, during and after engagement opportunities. For this reason, the processes used and how they were influenced by popular education are described in some detail.

Literature Review

A review of peer-reviewed and non-peer reviewed literature about measurement of the 10 priority constructs was conducted to identify existing measurement approaches and promising paths forward for indicator development and validation. The Leadership Team divided the 10 priority constructs among four members of the team (including one CHW), and each member undertook the literature reviews for their respective constructs, consulting each other as needed.

It was difficult to conduct a truly systematic literature review across all 10 priority indicators. Leadership Team members were tasked with reviewing literature for a total of 10 constructs, some of which have been studied for decades. In some cases, Leadership Team members were able to build on literature reviews they had begun as much as 20 years earlier, for constructs that have been well-defined (e.g., empowerment and social support). In these cases, they used academic databases such as EBSCO host to update searches in other databases including Academic Search Complete, Academic Search Premier, E-Journals, Health Source: Nursing/Academic Edition, *Fuente Académica*, MasterFILE Premier, MedicLatina, Medline, and Psychology and Behavioral Sciences Index.

For the self-reported health status construct, an initial search on general health-related quality of life revealed two widely accepted measures: the SF-12 (20) and the CDC Healthy Days measure. Once these measures had been identified, a search was conducted in PubMed, filtering for publications in the U.S. from 2010 to 2020. For other well-defined constructs (i.e., teamness, a construct contained within *CHW Integration into Teams*), research reviews exist and were consulted.

In other cases (notably *CHW Enactment of the 10 Core Roles*, *Policy and Systems Change*, and *CHW Compensation, Benefits, and Advancement*), reviewers were unable to identify peer-reviewed literature. Leadership Team members used their networks and general abilities to search for various kinds of literature to conduct what they felt were sufficiently thorough reviews of both peer-reviewed and non-peer-reviewed literature. They consulted CDC documents, reports, presentations, and parallel literature in other fields and/or current practice in the CHW field.

Some indicators (e.g., *Participant Health and Social Needs*), while not well-defined as constructs, are frequently measured in the CHW field, and Leadership Team members were able to

base indicators on existing, widely used measures. This was also the case with *CHW-Facilitated Referrals*, where activity tracking forms and individual patient self-management assessments from programs in Oregon and Michigan were used. Reference lists from journal articles were also searched. The most useful tools were derived from other organizations and measurement efforts.

While most of the literature review occurred before the formal stakeholder engagement described in the next section, stakeholders including CHWs have been engaged in choosing and defining constructs and identifying potential indicators since the CI Project began. Stakeholders provided input into the project at multiple times and venues, including the organizing Summit in 2015; 2016 and 2019 pre-conference workshops at the Annual Meeting of the American Public Health Association (APHA); multiple interactive workshops at state and local conferences; and bi-monthly Advisory Group calls. Since 2015, a substantial portion of several Advisory Group calls has been dedicated to specific constructs, eliciting how Advisory Group members have defined and measured the construct in their own programs and settings.

Stakeholder Engagement

A formal process of stakeholder engagement, emphasizing engagement of CHWs, was the centerpiece of the 2019–2020 scope of work. Input was sought from stakeholders at various times, in various venues, and on various questions about both overarching issues and specific constructs and indicators.

APHA Pre-conference Workshop, November 2019

In November 2019, the Leadership Team held a 2.5 h by-invitation workshop at the APHA Annual Meeting. Invitees included all current members of the Advisory Group as well as key partners from CDC and the National Association of Community Health Workers (NACHW). The primary goal of the workshop was to invite feedback on: (1) the tentative list of 10 priority constructs, (2) the stakeholders who would help guide indicator development for these constructs, and (3) the methods for engaging these stakeholders. The Leadership Team also aimed to develop community through face-to-face interaction. Eighteen people participated in the workshop, including CHWs, supervisors, researchers/evaluators, program directors, and others.

After a welcome and opening dinámica, facilitators reviewed objectives and action steps for the 2019–2020 work plan. They then divided participants into cooperative learning groups and elicited feedback on the criteria for choosing stakeholders, the initial list of stakeholders, and the proposed list of priority constructs. The workshop concluded with a large group report back, a brainstorm of next steps, and a group evaluation of the meeting.

Regular Meetings of the Project Advisory Group

Since the organizing Summit in 2015, the Advisory Group has met monthly or bi-monthly. The Advisory Group distribution list has grown from 16 to 170+ individuals from 30 states and the District of Columbia. Much of this growth occurred during 2019-2020, thanks at least in part to funding from the CDC. Many regular Advisory Group participants are active members of their state's or region's CHW association or network. Multiple researchers and CHW program evaluators also regularly attend. Attendance at meetings has climbed steadily from ∼10 to more than 50 attendees.

Advisory Group meetings use popular education methodology and building community is the first objective of every meeting. When participant numbers allowed, facilitators set aside time at the beginning of every meeting for all participants to introduce themselves. Recently, facilitators have begun meetings with short breakout groups to further relationship building. Meetings always include an update from the Leadership Team members, who rotate facilitation responsibilities. In addition to focused discussion on specific indicators or topics, facilitators ensure time for participants to provide meaningful feedback on the information shared.

Individual Interviews and Focus Groups

Before the COVID-19 pandemic, the Leadership Team developed a plan for obtaining stakeholder feedback on the priority indicators that relied heavily on volunteers from the Advisory Group conducting in-person focus groups with CHWs and other stakeholders in their area. The Leadership Team developed a detailed lesson plan, PowerPoint, note-taking template and indicator grid (**Table 2**), and provided guidance to volunteers on how to use the materials. However, due to the pandemic, only two in-person focus groups took place. As the breadth of the pandemic became clear, the Leadership Team adapted the plan to rely on remote, web-based focus groups and one-on-one interviews. Ultimately, five focus groups were conducted with CHWs and other staff representing a state CHW association, a community-based organization, a state health department, the CI Advisory Group, and the research and outcomes arm of an urban health institute.

Leadership Team members also conducted seven individual interviews, as well as several informal conversations using an interview guide (see **Figure 1**). Combining focus groups and one-on-one interviews, 46 people were reached. While the Leadership Team had hoped to reach more people, they were able to reach most major stakeholder groups. By the end of the process, based on iterative analysis after each interview and conversation, Leadership Team members felt they had reached saturation on several questions and concepts, providing confidence in the findings.

Early in the development of the Stakeholder Engagement Plan, the Leadership Team developed a system for analyzing the feedback received. This plan consisted of at least one Leadership Team member (and sometimes two) doing a line-by-line analysis of the transcript and/or notes taken by the facilitators and interviewers. (Some interviews and focus groups were audio recorded; during others, facilitators took careful notes.) Subsequently, summaries of the feedback on each indicator were created and a list of cross-cutting themes (identified in the Results section below) was compiled and added to the previously developed indicator grid (**Table 2**). This allowed the Leadership Team member responsible for developing each indicator to quickly see the individual feedback as well as the cross-cutting

TABLE 2 | Indicator grid.

Construct	Definition	Rationale for measuring	How to operationalize
#1 CHWs' level of compensation, benefits, and promotion (PROCESS)	The salary paid to CHWs in relation to their FTE and local cost of living, in addition to the presence or absence of various benefits, as well as opportunities for promotion	*Justice*: Insufficient payment is exploitative and unfair. (2) *Effectiveness/performance*: Sufficient compensation allows CHWs to dedicate their full time and attention to community health work because it provides for all their material needs. (3) *Addressing poverty and lack of good jobs within communities*: Sufficient compensation for CHWs can facilitate a pathway out of poverty over the long-term. Living wage CHW jobs provide job development in communities.	Method 1: CHW surveys Method 2: CHW employer surveys
#2 CHW enactment of the 10 core roles (PROCESS)	How often individual CHWs or a group of CHWs within a program, organization, state, or region enacts each of the 10 core roles defined by the CHW Core Consensus (C3) project.	Collecting these data is critical to evaluating the unique contributions of CHWs and the outcomes they achieve. Research suggests that CHWs are better able to contribute to improving health and decreasing health inequities when they are supported to play a full range of roles. In addition, clarity about CHW roles can foster CHW integration into teams and will also allow training to be geared to meet CHWs' needs, and/or to emphasize the necessity of playing a full range of roles.	CHW Encounter Forms or other forms used to track CHW interactions with individuals and groups.
#3 CHW-facilitated referrals (PROCESS)	Completed referrals facilitated by the CHW, through which the participant successfully receives attention, care, and/or resources from a clinic, other healthcare or social service agency or public service.	Making and facilitating referrals for community members to needed and appropriate health or social services is directly connected to at least 7 of the 10 core roles of a CHW as defined by the C3 project. This key component of CHW work is currently being measured at the individual programmatic level, and although there are various models and survey questions used within the domestic and international setting, there is no recommended standard instrument that can be used to generate national data sets for this activity.	CHW Encounter Forms or other forms used to track CHW interactions with individuals and groups (paper or digital).
#4 CHWs' involvement in decision- and policy-making (PROCESS)	The extent to which a CHW is able to be involved in policy making both within their own organization and in the larger community on work time and/or as part of their volunteer commitment.	Policy making is one of the three core functions of public health. CHWs' ability to address the social determinants of health and eliminate health inequities depends on their ability to create and influence health-promoting policy, both within and outside their employing agency. Being able to influence policy depends on knowing who to work with, being trusted by other policy actors, and being supported to engage in policy making on work time.	CHW surveys
#5 Extent to which CHWs are integrated into teams (for example, health care teams) (PROCESS)	The extent to which CHWs are members of a collaborative and communicative "team" with other providers (i.e., nurses, doctors, social workers, health educators, pharmacists, etc.) within a clinic, school, social service agency, etc.	Well-functioning, transdisciplinary teams have been recognized by the Institute of Medicine as key to the safety and quality of care across multiple settings. Integration of CHWs into transdisciplinary healthcare and social service teams is widely recognized as key to the effectiveness, cultural appropriateness, and quality of care. Despite wide recognition of its importance, integration of CHWs into care teams and its impact on team functioning are rarely measured. Also, while care teams more frequently include CHWs, this often may not yet represent their meaningful integration as full participants in care teams.	CHW surveys
#6 Participant self-reported physical, mental, and emotional health (OUTCOME)	The self-reported assessment of perceived physical, mental and emotional health and quality of life.	An indicator of self-reported health is important for monitoring and assessing the perceived general and functional health and quality of life of individuals and populations. It is widely used in the U.S. and worldwide, relatively easy to measure, and generally correlates well with clinically measured health status, use of health services and health care costs. Self-reported health "incorporates the voices of individuals" and provides "a more holistic view of overall health."	Participant surveys
#7 Participant health care and social needs (OUTCOME)	Health care and social needs currently experienced by the participant.	A key proven outcome of CHW action is more secure access among participants (and their households) to primary care and various social services that may be needed (e.g., food banks, housing support, legal support, etc.). More secure access to primary health care and social services, in turn, is crucial to the well-being of marginalized households and communities.	Participant surveys or assessments
#8 Participant social support (OUTCOME)	The level of support (i.e., assistance/help) that participants perceive from others to deal with regular and emergent life challenges, including economic, social, health, and emotional challenges.	The presence of social support has been associated with faster recovery from illness, responsiveness to treatment in stress-related illnesses and fewer pregnancy complications, and decreased levels of depression, greater life satisfaction, and better well-being. Lack of support is strongly associated with increased morbidity and mortality. CHWs provide social support both directly, by accompanying community members, and indirectly, by linking them to existing groups and starting new ones.	Participant surveys

(Continued)

TABLE 2 | Continued

Construct	Definition	Rationale for measuring	How to operationalize
#9 Participant empowerment (OUTCOME)	A composite measure assessing both actual and perceived empowerment. Includes the following domains: self-efficacy, sense of community, perceived control at the community level, decision-making ability, education/knowledge/skills, critical consciousness, optimism, inner peace, communication, resources.	Empowerment is "recognized by the World Health Organization and health agencies around the world as a core concept in health promotion and integral to the achievement of social equity." Empowerment independently predicts self-reported health status and depression, and is in the pathway to improved health, making it a good intermediate measure of health status. Increasing empowerment is seen as a critical CHW function; it has also been hypothesized that CHWs are unique among other health and social service professionals in their ability to support participants to increase their empowerment.	Participant surveys
#10 Policy and system change: program/employer level (OUTCOME)	Policies and system changes that address CHW workforce development and sustainability. For our 2019–2020 work, we focused on policies related to CHW workforce development (training, payment, etc.).	The CHW workforce is best respected and stabilized through policies that support their sustainability, including a recognized definition and scope of practice/roles, core-competency-based training, voluntary certification mechanisms, appropriate supervision, and payment mechanisms that support sustained employment, e.g., general funds and insurance company payment. CHW employers and programs can institute these policies at the CHW employer/program level.	CHW program/employer surveys
#11 Policy and system change: state level (OUTCOME)	(see above)	The CHW workforce is best respected and stabilized through policies that support its sustainability and integrity, including a recognized definition and scope of practice/roles, core-competency-based training, voluntary certification mechanisms, appropriate supervision, and payment mechanisms that support sustained employment, e.g., general funds and insurance company payment (CDC, May 2019). State governments can facilitate policy and systems changes that support CHW programs, employers and the CHW workforce.	Surveys of a state government's policies and practices

The indicators proposed below rest on the following set of assumptions:

1. *CHWs[2] will be responsible for (i.e., involved in) collecting the data for many of these indicators. This is true, for example, of indicators that are included in pre-post surveys/assessments with participants.*
2. *When they are fully disseminated for use to programs, the indicators will be accompanied by a manual that will include further explanation of the meaning and intent of each indicator, so that those who collect the data are able to interpret them in culturally-centered ways.*
3. *We are proposing quantitative indicators because they are easiest to implement in a consistent and reliable way. We recommend that these indicators be used along with qualitative methods that are specific to the culture/community and setting.*
4. *Whenever possible, we recommend that indicators be operationalized in existing data collection and/or case management tools, to reduce the burden on CHWs and data management staff.*
5. *When we recommend an indicator be collected on a CHW Encounter Form, that can occur either on paper or via an online case management database like RedCap, CareScope, ETO, SMART Sheets, etc.*
6. *Assessing CHWs' contributions to improving population health (e.g., with community-level indicators) is crucial. However, it is beyond the scope of most or all CHW programs to do that on their own; for this reason, among others, we are not recommending community-level indicators. We are, however, recommending collection of a participant general health indicator (Indicator #6, below).*
7. *Many things are beyond the immediate control of the CI Project, such as the multiple titles used for CHWs. However, if we collect these data systematically, some things should become more consistent, such as CHW job descriptions that are based on the APHA definition and the 10 core roles as identified in the C3 Project.*
8. *For collecting initial assessment data, some CHW programs use Intake Forms, some use a pre-assessment, and some use both. Any of the participant outcome indicators that we recommend for inclusion in a pre-assessment could also be included in an Intake Form, as long as that same indicator is repeated at regular intervals to assess change.*
9. *Along with assessment and assurance, **policy development** is one of the three core functions of public health (https://www.cdc.gov/nceh/ehs/10-essential-services/resources.html). As essential public health professionals, Community Health Workers also engage with their communities in developing policies that promote health, prevent disease, and ameliorate existing health inequities.*
10. *We acknowledge the importance of health care utilization and cost measures; however, it is impossible to create or identify one utilization measure that will work in all cases, especially because not all CHW programs have access to this data.*

[2]Please note that in the CHW Common Indicators Project, the term "Community Health Workers" (CHWs) is inclusive of Promotores/as de Salud and Community Health Representatives.

1. Do you have any general questions about the CI project or this phase of the work before we get started?

2. Having looked at the indicator grid, do you have any general feedback about the way we are approaching the task of identifying specific process and outcome indicators for CHW practice?

3. Are there indicators that are of particular interest to you on which you'd like to give specific feedback? (Once those are established, ask these questions about each one):
    a. Does your CHW program or state or research program already measure this indicator/collect these data?
    b. If your program or state or research program does not already collect these data, how easy or difficult would be to collect these data according to the approach we have suggested? Could your systems be changed to collect these data? Would you be interested in doing so?
    c. Can you think of other ways to measure the same construct (i.e. other data sources and/or indicators)? What would that look like? (Feel free to suggest other *existing* approaches or your own ideas.)
    d. Is there anything else you would like to say about this indicator?

4. From your perspective as an [x], how compelling would these indicators be for your organization?

5. Is there anything else you would like to tell us about the CI Project generally?

FIGURE 1 | Individual interview guide.

themes, which were identified through a process that combined both inductive and deductive coding (21, 22). Leadership Team members used these materials to discuss and make changes to the indicators and resulting grid.

Online Summit, May 2020

The second CI Summit was the major culminating stakeholder engagement activity to solidify the indicators and identify next steps for the Project. The Leadership Team began planning in January of 2020 and moved toward inviting participants to a 2-day Summit in Portland, Oregon. As the severity of the COVID-19 pandemic became increasingly clear, the Leadership Team made iterative shifts in the planning, moving first to the idea of a hybrid Summit, and then, by March 20, deciding to conduct the Summit entirely online. The Summit took place on May 14-15, 2020.

The Leadership Team sought to invite a diverse group of ∼20 CHWs, researcher/evaluators, CHW program staff, health system staff, state and local health department staff, and colleagues from CDC and NACDD. Initial invitations were sent in early March, when an in-person gathering was still planned. This led to an overrepresentation of people from the West Coast, for whom travel costs would have been lower. Once organizers decided to make the Summit entirely virtual, they expanded the group to include more people from other parts of the country. A total of 39 people (including facilitators and staff from NACDD and CDC) participated in the Summit, of whom 16 identified as CHWs. Further information about planning for the Summit and how popular education was used in the online environment, as well as a final report from the Summit are available on the CI Project webpage (23).

A systematic approach was used to document the process and outcomes of the Summit. First, a 21-page document that included notes from all the plenary sessions at the Summit was prepared. In addition, 10 individual documents with notes on each indicator and three individual documents with notes on the piloting process were created. All these documents informed the Indicator Profiles. Finally, a checklist of important considerations for the piloting process was developed.

FINDINGS AND DISCUSSION

Literature Review

A primary finding from the literature review was that there was a great deal of literature about some constructs and a paucity of literature about other constructs. While some constructs had not been measured in CHW programs, they had been measured in other settings. For some of the indicators, it made sense to adopt and adapt published and validated scales, whereas for other indicators, there were no published, validated measurement approaches. Thus, indicators had to be developed "from the ground up," by proposing questions/items that have been used in CHW program evaluations but not necessarily published and validated, and/or by developing brand new questions/items that were suggested and endorsed by our stakeholders. Another general finding was that some construct names needed to be changed to align with what is used in peer-reviewed literature and in community health practice. This was the case with *Participant*

Health and Social Needs (which was originally titled, *Participant Access to Health and Social Services*).

Another important finding from the literature review was that a project with similar goals to the CHW Common Indicators Project—yet focused on low- and middle-income countries rather than the United States—had recently been conducted (24). The existence of this project, known as the Frontline Health Project and funded by the Bill and Melinda Gates Foundation, further confirmed the timeliness and potentially global significance of the CHW Common Indicators Project. There was a great deal of overlap between the two projects in overall measurement frameworks and in respective lists of recommended evaluation constructs. In this case, the literature review informed the stakeholder engagement by prompting the Leadership Team to engage leaders within the Frontline Health Project, who provided input on the CI Project indicators, shared resources, and joined the Advisory Group. One important distinction is that while the CI Project has focused on engaging CHWs as leaders in the work, publications by the Frontline Health Project do not provide evidence of such engagement. This likely leads to important differences between the projects in overall measurement frameworks and recommended constructs and indicators, a review of which is beyond the scope of this article.

Stakeholder Engagement

The most important findings from the stakeholder engagement are reflected in **Table 2**. Specific findings from specific stakeholder engagement activities are highlighted below.

2019 APHA Pre-conference Workshop

Participants in the workshop endorsed the tentative list of 10 priority constructs and strongly endorsed selected constructs including *Participant Empowerment*, *CHW Integration into Teams*, and *CHW Compensation, Benefits, and Promotion*. In addition, they urged Leadership Team members to make important additions to the stakeholder list, including CHW employers, payers/health plans, FQHCs, and state health department representatives. They identified a need to clarify and further develop the *CHW-Facilitated Referrals* construct, so as not to make CHWs responsible for "failed" referrals (when, for example, services don't exist and/or are substandard, not culturally competent, inaccessible, etc.). Finally, they identified a need to acknowledge the importance of health care utilization and cost measures but make clear it is impossible to create one utilization/cost measure that will work in all settings.

Advisory Group Meetings

In the meeting evaluation, participants regularly provide useful corrective feedback, for example: "Sometimes we need a space to discuss things that aren't on the agenda, so we have some time to discuss and organize." They also frequently express appreciation for the way meetings are conducted, such as the following from the May 2020 meeting: "As usual, I appreciate the level of organization that gets us through a lot of stuff. I continue to be very excited about sitting on this group." The trust and community building processes inherent in the Advisory Group meetings and other CI Project activities have been essential to the broad consensus and growing, nationwide uptake of common indicators for evaluating CHW practice.

Focus Groups, Individual Interviews, and May 2020 Summit

Overall, this phase of the Project demonstrated the broad acceptability of the measurement framework developed within the CI Project. That framework centers CHWs' 10 core roles with an explicit goal to ensure that all 10 roles are understood and practiced within CHW programs. The framework also highlights key kinds of support that CHWs need to be successful in all 10 roles, and outcomes that CHWs are particularly capable of bringing about—not only at the level of individual participants in CHW programs (e.g., wellbeing and social support), but also at the level of policy and systems change to address structural determinants of health inequities. Notably, the framework defines and forefronts a multi-level indicator of empowerment, which both the literature and our experience suggest is among the most significant and emblematic outcomes of CHW work. This framework reflects the deep participation and leadership of CHWs within the Project, who aim to protect the integrity and advance the self-determination of the workforce. Non-CHW stakeholders generally affirmed the importance of these key features of the measurement framework, as well as the principle that CHWs must be deeply involved in evaluating their own profession.

Generally, stakeholders expressed enthusiasm and approval for the choice of indicators as well as the proposal to operationalize the indicators in existing tools such as encounter forms, CHW surveys, CHW employer surveys, participant surveys, and state performance reports. Stakeholders reinforced the importance of complementing quantitative indicators with qualitative, narrative, and ethnographic assessment methods. They pointed out that narrative methods and storytelling are uniquely powerful and effective ways to document how and why CHW practice is effective in various cultural settings, and to clarify the kinds of changes that are necessary to improve systems, provide adequate support to CHWs and their communities, and achieve health equity.

LESSONS LEARNED

An important lesson reaffirmed during this phase of the CI Project was that obtaining meaningful input from a diverse group of stakeholders about a project primarily concerned with measurement and evaluation in the midst of a pandemic is challenging and requires thoughtful planning, skillful use of popular education methodology, and a team that is aligned around common goals and principles.

During the early stakeholder focus groups, it was found that many stakeholders who were not trained as evaluators commented not on how to *measure* concepts like social support, but rather how to *increase* social support among program participants and what they need to be successful in their work. Making the distinction between *doing the work* and *measuring*

the work was challenging for volunteer focus group facilitators. This was partly because most CHW program staff are focused on doing, not measuring, their work and CHWs remain largely marginalized from evaluation and research processes.

Similarly, based on the summaries of indicator-specific input created after the Summit, it was clear that the way the indicators were explained by the small group facilitators affected the feedback group members provided on those indicators. As the CI Project moves to piloting, it will be important to assure that indicators are explained in a consistent way.

Interestingly, many stakeholders, including CHWs, resisted shortening the length of (i.e., reducing the number of items within) the indicators, even when the goal of keeping the indicators relatively quick and easy to use had been emphasized. This was generally because stakeholders felt that cutting proposed items would eliminate important aspects of CHW practice and participant outcomes. At the same time, stakeholders readily appreciated that program capacity must be developed to *measure the work*, so that measurement and evaluation help rather than hinder CHWs in *doing the work*. As we move forward with the piloting process, it will therefore be important to carefully communicate with CHWs and other stakeholders the pros and cons of shorter surveys, and the fact that funding is necessary to pay for CHWs' and others' time involved in new data collection and reporting. This is a reflection of how the goals of the CHW Common Indicators Project are intricately tied to the issue of securing sustained funding for CHW programs generally.

Other lessons learned included the importance of clearly communicating project assumptions at the outset of any engagement activities. Specifically, stakeholders expressed the importance of making it clear that:

- the indicators will be accompanied by a manual that will carefully explain the meaning and intent of each indicator;
- the Project will recommend that indicators be operationalized using existing data collection and/or case management tools, whenever possible, to reduce the burden on CHWs and other data management staff;
- quantitative indicators are proposed because they are easiest to implement in a consistent and reliable way, and not because they are of higher value than qualitative methods;
- health care utilization and cost measures are important but not included, because it is impossible to create one utilization or cost measure that will work in all cases and not all CHW programs have access to this data; and
- while the CI Project is unable to control the fact that CHWs are often given multiple different titles, the project's recommended indicators can help bring about more consistency in CHW job descriptions, given the indicators' built-in emphasis on the APHA definition of a CHW as well as the C3 Project's definition of the 10 core roles of CHWs (19).

Though it was enforced by the pandemic, heavier reliance on individual interviews was beneficial to the goal of collecting constructive feedback on the proposed and evolving indicators. The experience doing focus groups revealed that the kind of input needed was easier to obtain one-on-one.

FUTURE APPLICATIONS

With assistance from colleagues at CDC and NACDD and participants in the 2020 Summit, the Leadership Team has identified several next steps, in which the CI Project is currently engaged. The first step is piloting the indicators developed during 2019-2020 and developing a manual/toolkit with information crucial to piloting, including definitions, intent, background, and methods of calculation. A participatory and developmental evaluation for the pilot will also be conducted, with pilot sites actively involved in the on-going development of the evaluation plan. Other next steps include developing an indicator for reflective supervision, continuing to build project infrastructure, and strengthening the CI Project's CHW-led and community-based methodology. In pursuit of the final goal, following a national recruitment process, in August of 2020 the CI Leadership Team expanded and is now 50% CHW and 50% CHW ally. In addition, the team created a CHW Council composed of four CHWs with experience in research and evaluation. Finally, the Leadership Team chose and adapted a racial equity tool to guide future project decisions.

CONCEPTUAL OR METHODOLOGICAL STRENGTHS AND CONSTRAINTS

This phase of the CI Project had several strengths, including a well-developed network of 180+ individuals who possess a variety of skills, perspectives, and knowledge based on lived experience and are committed to improving measurement in CHW programs; and the Leadership Team's dedication to and capacity in using popular education methodology. This methodology allows the Leadership Team to operationalize our commitments to community-based participatory research; shared power; racial, social, and health justice; and a non-hierarchical approach. All members of the Leadership Team are deeply committed to the project, and possess a well-rounded set of skills as CHWs, researcher/evaluators, and program managers. An additional strength is our strong relationship with NACHW and various state CHW organizations. The CI Project benefited from the dedication and knowledge of the CDC CHW Work Group members and partners at NACDD. Also, using an online platform for the 2020 Summit facilitated inclusion of a larger and more diverse number of stakeholders.

The work discussed in this article had several constraints and limitations. A major limitation was the COVID-19 pandemic, which required project partners to be creative in how they collected stakeholder feedback and built community. Funding constraints and lack of full-time staff on the project limited the number of hours staff could dedicate to various project activities. Despite attempts to mitigate its effects, limited racial/ethnic diversity on the Leadership Team, the fact that all three members with doctoral degrees were white, and that only one member was a CHW unquestionably influenced power dynamics and meant that the Leadership Team lacked crucial perspectives. Recognizing this led to an intentional process of increasing both racial/ethnic diversity and CHW representation on the

Leadership Team and creating a CHW Council to provide additional CHW input into decision-making.

CONCLUSION

The CDC-funded 2019-2020 work plan was pivotal for the CI Project. Having funds to pay salary and stipends allowed Leadership Team members and Summit facilitators to set aside time to focus on this project, leading to substantial progress on the overall development of the CI Project. With the participation of multiple stakeholders, particularly CHWs, 11 profiles were developed for 10 priority constructs. The profiles include information about why the indicators are important, why they should be measured in particular ways, and how data should be calculated. In addition, largely based on the success of the Summit, the CI Project substantially expanded the constituency committed to the Project. In 2020–2021, Leadership Team members look forward to piloting the indicators, developing materials and methods to support the piloting, strengthening the work through the application of an explicit racial equity lens, and continuing to expand CHW involvement and capacity as the researchers and evaluators for and about their field.

Some persistent and important questions remain. The CI Project is premised partly on the idea that policy makers and funders require additional data about CHW outcomes before they will agree to sustainably finance CHW programs. Yet the same does not seem to be true of professions and programs staffed by more privileged people. They do not have to produce data about their value, at least not in the same way. The CI Project will continue to problematize that fundamental issue while continuing to develop indicators, based on the conviction that if CHWs and dedicated allies do not do so, someone else will, with potentially dangerous consequences for CHW autonomy and self-determination.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

KR and NW contributed equally to the work plan and writing of this manuscript. KM contributed to the work plan and writing of this manuscript. TC-D contributed to the work plan and reviewing of this manuscript. VA, PJ, and SM-J contributed to the review of this manuscript. All authors contributed to the article and approved the submitted version.

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BRIEF RESEARCH REPORT
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Processes for Implementing Community Health Worker Workforce Development Initiatives

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Introduction: The objective of this observational, cross-sectional study was to identify, document, and assess the progress made to date in implementing various processes involved in statewide community health worker (CHW) workforce development initiatives.

Methods: From September 2017 to December 2020, we developed and applied a conceptual model of processes involved in implementing statewide CHW initiatives. One or more outputs were identified for each model process and assessed across the 50 states, D.C., and Puerto Rico using peer-reviewed and gray literature available as of September 2020.

Results: Twelve statewide CHW workforce development processes were identified, and 21 outputs were assessed. We found an average of eight processes implemented per state, with seven states implementing all 12 processes. As of September 2020, 45 states had a multi-stakeholder CHW coalition and 31 states had a statewide CHW organization. In 20 states CHWs were included in Medicaid Managed Care Organizations or Health Plans. We found routine monitoring of statewide CHW employment in six states.

Discussion: Stakeholders have advanced statewide CHW workforce development initiatives using the processes reflected in our conceptual model. Our results could help to inform future CHW initiative design, measurement, monitoring, and evaluation efforts, especially at the state level.

Keywords: community health worker, workforce development, promotora, promotor, community health representative

INTRODUCTION

A community health worker (CHW) is a frontline public health worker who is a trusted member of and/or has a close understanding of the community served (1). Community health workers, including *promotor(a)s* and community health representatives (CHRs), build relationships and trust with people experiencing health inequities based on shared life

experiences. CHWs provide tailored support based on understanding people's experiences, needs, and preferences. Research has shown that interventions engaging CHWs have led to positive health, social, and economic outcomes for individuals (2–5) and communities (6).

The COVID-19 pandemic has presented many opportunities and challenges for the CHW workforce and their employers. Early in the pandemic, the National Association of Community Health Workers (NACHW) found that many CHWs were laid off or experienced reduced work hours or activities (7). However, many stakeholders, including federal and state public health agencies, healthcare payers, and private healthcare companies, have bolstered support for employment of this critical workforce during the pandemic (8, 9). This new interest in CHW employment, combined with ongoing challenges, such as sustainable financing for CHW positions and scaling their integration into health delivery systems, make CHW workforce development a salient contemporary public health issue (10–13).

Statewide CHW workforce development initiatives can include state level strategies and activities focused on enhancing capacity of CHWs and current or potential CHW employers. According to the National Academy for State Health Policy (NASHP), nearly every state reported activity to support the CHW workforce in 2017 (14). As of June 2016, nearly half of states including D.C. had enacted laws pertaining to the CHW workforce (15). Over the last decade, federal agencies, including the Centers for Disease Control and Prevention (CDC) and Centers for Medicare and Medicaid Services (CMS), have provided funding that state public health agencies and their partners have leveraged to implement statewide CHW workforce development initiatives (16, 17).

Process theory provides a useful framework for analyzing the implementation of complex interventions (18–20) and can be applied to statewide CHW workforce development initiatives. The objective of this observational, cross-sectional study was to identify, document, and assess the progress made to date in implementing the processes involved in statewide CHW workforce development initiatives. Results could help to inform future CHW initiative design, measurement, monitoring, and evaluation efforts, especially at the state level (21, 22).

METHODS

From September 2017 to December 2020, researchers at the CDC partnered with experts in CHW workforce development and related policies to: (1) engage stakeholders to develop and test a conceptual model of the processes involved in implementing statewide CHW workforce development initiatives and (2) apply the model to assess CHW workforce development initiative processes and outputs across the 50 states, D.C., and Puerto Rico. The Tulane University Social and Behavioral Institutional Review Board determined this project to be exempt.

Conceptual Model Development

Development of the conceptual model began with review of relevant literature and models (21, 22). Findings from this review were used to draft an initial model that was reviewed by nine stakeholders, including CHWs, healthcare and community employers, state public health agency staff, and CHW workforce training experts, during a virtual meeting in February 2018. The stakeholders were recruited through our professional networks and represented several regions of the U.S. Criteria for stakeholder selection included (1) a history of leading CHW workforce development initiatives and programs related to training, certification, and/or sustainable financing, and (2) being a CHW or having worked directly with CHWs. In this meeting we took notes as stakeholders suggested edits to the model, ordered the processes in a logical manner (although it was acknowledged that these initiatives are often not linear in practice), and discussed potential outputs.

Assessment of Model Processes for Three States

After the stakeholder meeting, we finalized the model (**Figure 1**) and selected three states for initial application. State selection criteria included: evidence of significant historical and current CHW activity; current or prior workforce development efforts led by the state public health agency and/or statewide CHW organization; and documentation of progress in studying the CHW workforce (e.g., strategic planning for workforce expansion and assuring appropriate CHW selection and training). In June 2018, we conducted group interviews with three key informants in each of three states ($n = 9$). Interviews included CHW initiative leaders from state health department, CHWs who were currently serving in a leadership role in a statewide CHW organization, and CHW employers. To encourage participants to speak openly, we promised that identifying information, including participants' state, would not be included in publications or presentations. One researcher from our team led the group interview in each state, using the conceptual model as a guide for the discussion, while a second team member took extensive notes. Afterwards, participants provided additional resources (e.g., state meeting minutes, grant applications, and training reports) to offer more information. We used the group interview notes and other sources to develop a technical report (unpublished) detailing the statewide CHW workforce development processes implemented in each of the three states.

Identification of Outputs and Assessment for 50 States, D.C., and Puerto Rico

After assessing the model processes present in three states based on interviews and extant documents, we developed a systematic peer-reviewed and gray literature collection and assessment procedure for application to all 50 states, D.C., and Puerto Rico ("states"). From May 2018 to September 2020, we conducted searches for literature for each state using: internet databases and search engines (PubMed, Google Scholar, and Google); references and citations from existing literature; and relevant funder (CDC, CMS, state health department, academic and research institution, and training and workforce development organization) and third sector (CHW organization and coalition) websites. State-specific search strings were created using the terminology from the

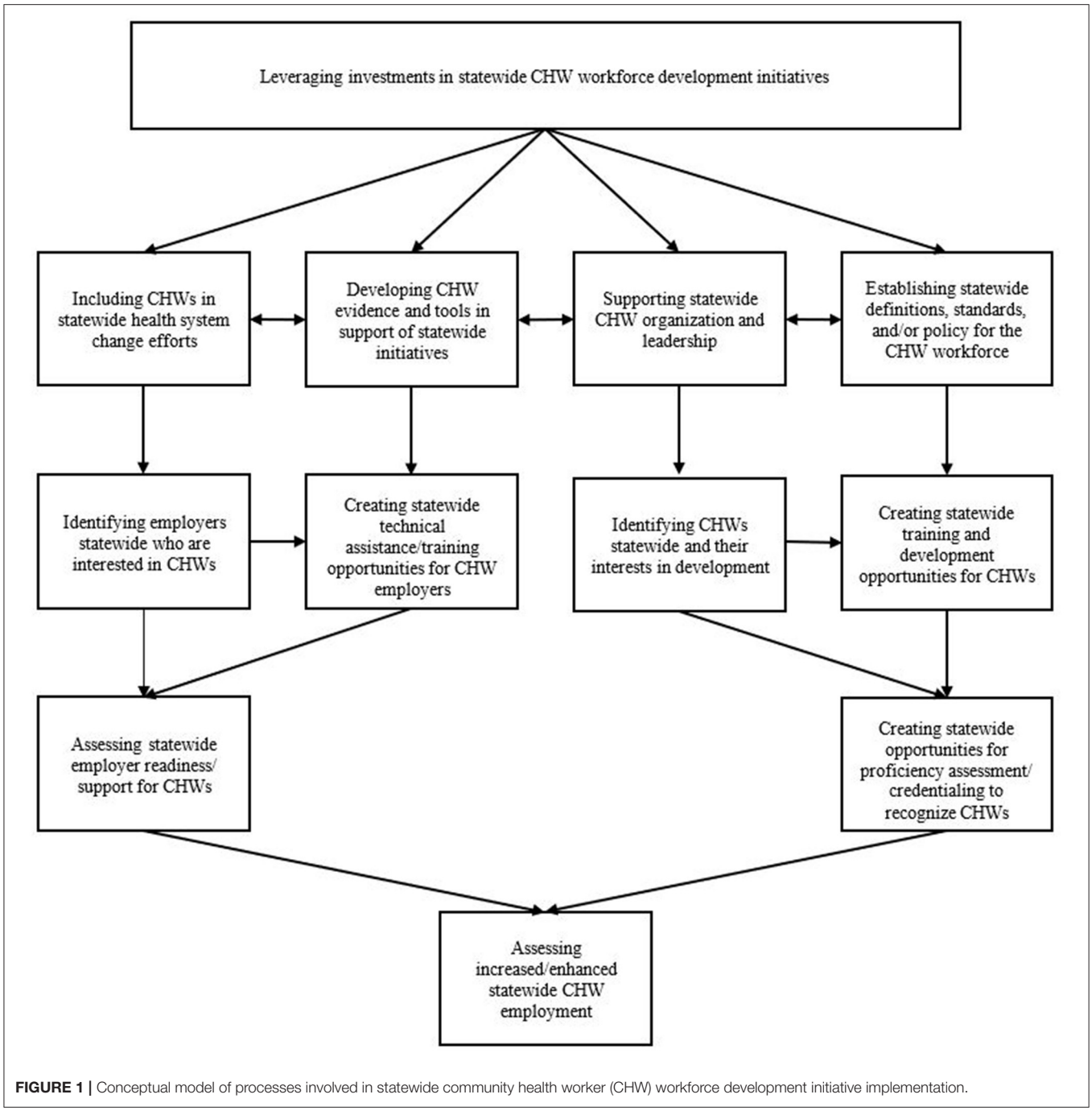

FIGURE 1 | Conceptual model of processes involved in statewide community health worker (CHW) workforce development initiative implementation.

boxes in the conceptual model. For example, one search string was: "[state name]" AND "community health worker" AND "training". National CHW resources (14–17) were also searched for relevance to individual states.

Next, we documented statewide CHW workforce development processes and outputs for each state. We compared findings from state documentation with the notes from our virtual stakeholder meeting and the technical report to develop a list of 21 process outputs, with at least one output identified for each model process (**Table 1**). Then we re-reviewed all sources to ensure that all 21 outputs were assessed for each state. Data quality was ensured by having at least two researchers independently review all the documents, processes, and outputs for each state and the research team review the aggregate findings. The full list of sources reviewed and the final assessment of outputs for each state are included in the **Supplementary File**.

TABLE 1 | Community health worker (CHW) workforce development initiative processes and outputs for the 50 states, D.C. and Puerto Rico as of September 2020[a].

Conceptual model process	# of states out of 52	Output(s) associated with this process	# of states out of 52
Leveraging investments in statewide CHW workforce development initiatives	48	Centers for Medicare and Medicaid Services State Innovation Model w/1 or more process	27
		Centers for Disease Control and Prevention 1305 or 1422 Program w/1 or more process	33
Including CHWs in statewide health system change efforts	46	Medicaid Managed Care Organizations or Health Plans include CHWs	20
		Patient-Centered Medical Homes/Health Homes include CHWs	11
		Medicaid 1115 Waiver includes CHWs	10
		Medicaid State Plan Amendment includes CHWs	10
		Community Health/Care Teams include CHWs	6
		Accountable Care Organizations include CHWs	4
		Accountable Communities of Health include CHWs	4
Supporting statewide CHW organization and leadership	41	Statewide CHW organization comprised mostly of CHWs	31
Establishing statewide definitions, standards, and/or policy for CHW workforce	47	Statewide multi-stakeholder CHW coalition or other entity focused on advancing the CHW workforce	45
		Stakeholders have adopted a statewide CHW definition	34
		Stakeholders have adopted statewide CHW core competencies or scope of practice	33
Developing evidence and tools in support of statewide CHW initiatives	42	State-level report on CHW workforce development	35
Identifying CHWs statewide and their interests in development	35	Statewide survey of the CHW workforce	26
Identifying employers statewide who are interested in CHWs	33	Statewide survey of CHW employers	22
Creating statewide training/technical assistance opportunities for CHW employers	37	Statewide training program for CHW employers	15
Creating statewide training and development opportunities for CHWs	46	Statewide CHW training program(s)/apprenticeship available	36
Creating statewide opportunities for proficiency assessment/credentialing to recognize CHWs	36	Statewide CHW certification process available (does not include certificate programs)	18
Assessing statewide employer readiness/support for CHWs	10	Conducting routine, statewide monitoring of CHW employer readiness	5
Assessing increased/enhanced statewide CHW employment	13	Conducting routine, statewide monitoring of CHW employment	6
Minimum, maximum # of processes addressed by a state	2, 12		
Average # of processes addressed by a state	8		

[a] *See* ***Supplementary File*** *for state-specific results.*

RESULTS

Conceptual Model

Our final conceptual model includes 12 logically ordered processes that can be involved in implementation of statewide CHW workforce development initiatives (**Figure 1**). The first process in the model involves stakeholders leveraging financial and other investments for the development and implementation of statewide initiatives, and the last process in the model involves efforts to assess increased and enhanced CHW employment statewide. The right side of the model includes processes focused on CHWs and the left side includes processes focused on employers.

Processes and Outputs Across States

As of September 2020, most states had implemented most of the processes from our model, with an average of eight out of 12 processes implemented per state, and seven states implementing all 12 processes (**Table 1**). Nine states had implemented less than half of the 12 processes, with a minimum of two processes implemented. Results of our assessment of the 21 process outputs across states are provided in the **Table 1**.

Outputs by Process

1. *Leveraging investments for statewide CHW workforce development initiatives*: We found that as of September 2020, nearly every state (48 states) had leveraged a financial investment for CHW workforce development initiative

implementation. For example, CMS and CDC funding were leveraged during 2013–2018 to address one or more of our model processes in 27 and 33 states respectively (16, 17).

2. *Including CHWs in statewide health system change efforts:* Most states (46 states) were also implementing this process, but since not every state chose the same approach, there were different outputs. The most common outputs across states were CHW inclusion in: State Innovation Models (27 states); Medicaid Managed Care Organizations and Health Plans (20 states); Patient-Centered Medical Homes or Health Homes (11 states); Medicaid Waivers (10 states); and Medicaid State Plan Amendments (10 states).
3. *Developing evidence and tools in support of statewide CHW initiatives*: Slightly fewer states (42 states) were working to develop an evidence base and tools in support of statewide CHW initiatives. For example, stakeholders in Minnesota developed a CHW employer toolkit (23), and the Pathways Community HUB model, which includes training for CHWs and data collection, has been implemented in 20 states so far (24). In 35 states, stakeholders have published a report about CHW workforce development in their state.
4. *Establishing statewide definitions, standards, and/or policy for CHW workforce:* Stakeholders in 47 states have been working to develop statewide infrastructure to support the CHW workforce, with a multi-stakeholder CHW coalition present in most of these states (45 states). Two common outputs of this process were a statewide CHW definition, often based on the American Public Health Association definition (1), and recognition of core competencies, often based on the national CHW Core Consensus (C3) Project (25), in 34 and 33 states respectively.
5. *Supporting statewide CHW organization and leadership*: In 41 states, stakeholders were supporting CHW workforce organization and leadership, with statewide CHW organizations formed in 31 states; in Nebraska, Utah, and Wisconsin, this included a CHW section of the state public health association.
6. *Identifying CHWs statewide and their interests in development:* In 35 states, stakeholders had made efforts to engage CHWs across the state to learn about their work and interests. A little over half of states (26 states) had conducted at least one statewide survey of CHWs.
7. *Creating statewide training and development opportunities for CHWs:* In 46 states, stakeholders were working on creating training opportunities for CHWs. In 36 states, a CHW training program had been made available to CHWs statewide (Alaska, Iowa, Pennsylvania, and Wisconsin offered CHW apprenticeships).
8. *Identifying employers statewide who are interested in CHWs:* Compared with efforts to identify CHWs, fewer states (33 states) were working to identify CHW employers across the state. Statewide CHW employer surveys were also less common (in 22 states); in most of the states with employer surveys (20 states), CHWs were also surveyed.
9. *Creating statewide training/technical assistance opportunities for CHW employers:* We found that stakeholders were providing technical assistance and training about CHWs to employers in 37 states. However, statewide training programs about CHWs for employers were also less common (in 15 states). Most of these trainings were created for CHW supervisors.
10. *Creating statewide opportunities for proficiency assessment/credentialing to recognize CHWs:* Stakeholders in 36 states were undertaking efforts to advance professional recognition for CHWs. These efforts included establishing CHW certification, offering certified CHW titling, and/or granting CHW certificates. As of September 2020, 18 of these states had made a statewide certification process available to CHWs.
11. *Assessing statewide employer readiness/support for CHWs:* Far fewer states (10 states) had efforts to assess employers across the state on their readiness for employing CHWs. Only five of these states had systems in place for routine monitoring of employer readiness. As one example, in Michigan, the statewide CHW alliance conducts biannual employer surveys, which gather information on employer support for the statewide CHW training program (26).
12. *Assessing increased/enhanced statewide CHW employment:* Similarly, only 13 states had efforts to advance assessment of statewide CHW employment, with only six states having routine monitoring systems, often supported by the statewide CHW organization or coalition.

DISCUSSION

This study describes the processes achieved in implementing statewide CHW workforce development initiatives as of September 2020. Findings are relevant to state level planning and evaluation frameworks (21, 22, 27). We found that states have largely implemented CHW workforce development initiatives using the processes reflected in our conceptual model. Repeated assessments using our model and outputs could provide important information to track improvements and gaps in practice.

Although we found that 47 states have made efforts to establish statewide definitions, standards, and policy for the CHW workforce, it is important to note that fewer states (41 states) had efforts dedicated to organizing the CHW workforce. Similarly, while 45 states had a multi-stakeholder CHW coalition in September 2020, 31 states had a statewide CHW organization comprised primarily of CHW members (**Table 1**). These two types of entities often have different purposes, with the CHW organization(s) typically serving as the "voice" for the CHW workforce in the state. The opportunity to partner with a statewide CHW organization may have a wide range of benefits, including enabling the successful execution of workforce studies and full participation of CHWs in the formation of policy (28). CHW organizations can also help to lead decision making about whether or not to pursue CHW certification or another form of professional recognition.

Our discovery that training programs and surveys were less common for CHW employers than they were for CHWs is also important because employer understanding of and

appreciation for the distinctive CHW role and core attributes of CHW candidates are vital for implementation of successful CHW programs (29). Regional approaches could support wider availability of employer training across states (30, 31), but nuances in local culture, availability of community resources, and local and state regulations that may affect the CHW workforce can also be considered. Furthermore, the impact of the statewide CHW employer technical assistance and training that we found in the 37 states will also be important to assess. However, as of September 2020, we found only a handful of states with systems in place to monitor statewide changes in employer readiness and CHW employment (**Table 1**). Repeated administrations of existing surveys were one way to advance statewide CHW workforce monitoring and evaluation. For example, surveys conducted in Michigan and Minnesota have been able to track improvements in CHW employment rates and job benefits, such as sick and personal leave, health insurance, mileage reimbursement, and vacation accrual (23, 26).

Securing sustainable financing for CHWs remains a key objective among stakeholders. We found the inclusion of CHWs in several different Medicaid financing mechanisms, with the most common being Managed Care Organizations (MCOs) and Health Plans (in 20 states) (**Table 1**). While this reflects progress, more examples and opportunities may exist; for example, in 2017, 39 states had at least one Medicaid MCO (32). Despite being widely promoted as a pathway to sustainability, we found the presence of a Medicaid State Plan Amendment or Section 1115 Waiver that explicitly included CHWs both in only about one-fifth of states (10 states each).

There are some limitations to this study. The assessment relied on publicly available information, which may become quickly outdated and fail to identify all applicable outputs. It is likely that we captured only the major, documented, centralized efforts, and in the future, the field would benefit from collecting more data on the many local and community level efforts that are contributing to the advancement of this versatile, diverse public health workforce. Another limitation is that some of the efforts we included in this assessment may not have been sustained, as comprehensive financing for statewide CHW workforce development initiatives remains an ongoing challenge.

Furthermore, we were not able to assess statewide CHW employment numbers as an output, due to many challenges in using available data, including the use of CHW definitions that overlap with definitions for other health care professionals. For this reason, we did not count reporting to the Bureau of Labor Statistics CHW occupational category (10) as routine monitoring of CHW employment. Additionally, we are aware that some CHW workforce members may not perceive themselves to be CHWs, and some community-based clinical health professionals may mistakenly identify as CHWs (33). This issue will need to be addressed if CHW counts are to be used for monitoring and evaluation.

While our study was able to assess the presence of a statewide CHW organization in each state, another next step for research could be to assess CHW organization co-leadership in statewide initiatives (34). Lastly, as data collection improves, it may be possible to estimate the impact of statewide CHW workforce development approaches on population health outcomes and health equity. While we found that statewide CHW certification is a common approach for workforce development implemented among states (**Table 1**), it remains only one option for advancing the professional recognition of CHWs. It will be crucial to assess for any unintended consequences of this policy on the CHW workforce. For example, depending on how it is designed, statewide CHW certification could pose a barrier to practice. Researchers might also consider how statewide CHW certification compares with alternative approaches chosen by stakeholders, such as increased support for CHW training, efforts to educate employers about CHW roles, and/or certifying employer or training programs instead of CHWs.

Overall, this article illustrates how CHW workforce development has been advanced across states. Many opportunities still exist to support statewide CHW organizations, scale statewide financing mechanisms, and improve employment data collection. Additional support for CHW workforce development could help to increase the engagement, reach, and impact of this critical workforce.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/**Supplementary Material**, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

CB, TM, CR, MS, AB, EF, NC, JF, and AW contributed to developing the conceptual model, conceptualization of the manuscript, and contributed to reviewing and editing the manuscript. CR and TM conducted the group interviews. MS and AW developed the technical report. CB, TM, CR, MS, AB, EF, and AW completed the state coding. All authors contributed to the article and approved the submitted version.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpubh.2021.659017/full#supplementary-material

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Development of an Asthma Home-Visit Training Program for Community Health Workers and Their Supervisors in Washington State

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The community health worker (CHW) asthma home-visiting model developed by Public Health-Seattle & King County (PHSKC) is an evidence-based approach proven to improve health outcomes and quality of life. In addition, it has been shown to be an effective and culturally appropriate approach to helping people with asthma understand the environmental and behavioral causes of uncontrolled asthma, while acquiring the skills they need to control their asthma. This paper describes the development and implementation of training curricula for CHWs and supervisors in the asthma home visiting program. To facilitate dissemination, this program took advantage of the current healthcare landscape in Washington State resulting from Centers for Medicare & Medicaid Services (CMS) approval of the 1115 Medicaid Waiver project. Key aspects of the training program development included: (1) Engagement: forming a Community Advisory Board with multiple stakeholders to help prioritize training content; (2) Curriculum Development: building the training on evidence-based home-visit protocols previously developed at PHSKC; (3) Implementation of the training program; (4) Evaluation of the training; and (5) Adaptation of the training based on lessons learned. We describe key factors in the training program's improvement including the use of a community-based participatory approach to engage stakeholders at multiple phases of the project and ensure regional adaption; combining in-person and online modules for delivery; and holding learning collaboratives for post-training and technical support. We also outline our training program evaluation plan and the planned evaluation of the home visit program which the trainees will deliver, both of which follow the RE-AIM framework. However, because the COVID-19

pandemic has curtailed training activities and prohibited the trainees from implementation of these CHW home visit practices, our evaluation is currently incomplete. Therefore, this case study provides insight into the adaptation of the training program, but not the delivery of the home visit program, the outcomes of which remain to be seen.

Keywords: community health worker, asthma, home visit, community based participatory research, health disparities, environmental assessment, implementation science, training

INTRODUCTION

Asthma is a chronic condition that impacts the lives of ∼1 in 12 Americans and over 24 million people in the United States (1). The rates of asthma are highest among Hispanics and non-Hispanic Black communities who have been historically underserved and underinsured in the United States (2, 3). In Washington State, an estimated 490,000 adults and nearly 110,000 children have asthma, and mirroring the rest of the nation, the condition disproportionately impacts low-income and minority populations (4–6). The high cost of medical care for asthma, the lost school and workdays, and reduced quality of life for individuals living with the disease make asthma a major health priority (7).

Many of the drivers of asthma morbidity are factors related to low socioeconomic status, such as transportation, language, and financial barriers; poor access to primary health care services; and environmental exposures to allergens and irritants including second-hand smoke (3, 8–13). Many of these factors can be addressed by interventions conducted by community health workers (CHWs). Asthma CHWs are typically lay health workers who have been trained by medical or other health providers to deliver health education regarding asthma. They come from the communities in which they serve and have a familiarity with asthma and its impact on patients and families. Home visits bring CHWs into the settings where environmental exposures are active, allowing them to address asthma triggers and more directly promote health behavior change. To reinforce the behavior change, the CHW models trigger reduction strategies and provides the clients with supplies, such as mold cleaning kits, mattress encasements to reduce exposure to dust mites, and vacuums with high-efficiency particulate air (HEPA) filters. CHWs can also deliver education on medication use and self-management of asthma while connecting families to resources to overcome barriers to symptom management. In the best scenarios, CHWs then connect with the patient's primary care physician and their health plan to inform a longer-term care plan that maintains support for both home environment and medication adherence.

These multicomponent home visit interventions for asthma led by CHWs have been shown to reduce morbidity from asthma and result in cost savings to the overall health care system (14–16). Multicomponent home visits for asthma have also been recommended by the Task Force on Community Preventive Services to reduce asthma morbidity (17). However, a lack of consistent state or federal funding for these efforts has impeded a widespread scale-up of the model. In Washington State, the Medicaid waiver project, fueled by a $1.5 billion 1115 Medicaid Waiver, has created an opportunity for the scale-up of an evidence-based asthma home visit intervention through delivery of a training program for CHWs and CHW supervisors. This paper describes the CHW training program by outlining the five phases of our process: engagement, curriculum development, implementation, evaluation of the training, and adaptation. We then discuss challenges and lessons learned.

CONTEXT

Public Health-Seattle & King County (PHSKC), the health department of the most populous county in Washington State, has prioritized reduction of asthma health disparities using a CHW-led intervention model. The CHW program at PHSKC has many years of experience in development and implementation of CHW-led public health programs for asthma, including five research studies spanning from 2004 to 2015 (16, 18–21). Building on this experience, PHSKC, in collaboration with the University of Washington, conducted the Guidelines to Practice (G2P) study funded by the Patient-Centered Outcomes Research Institute (22). This randomized controlled trial conducted from 2015 to 2017 examined the effectiveness of CHW home visits including home environmental assessment for identification of asthma triggers, education on self-management plans and medication use. The trial also highlighted the benefits of collaboration between the CHWs and the patient's primary care provider and Medicaid managed care plan. Results from the G2P study showed that individuals who received home visits from a CHW experienced more days without asthma symptoms, fewer nights when they woke up because of asthma, and fewer missed work or school days compared to those who did not receive home visits (22).

This success motivated us to scale up the CHW asthma home visit model used by PHSKC to other communities throughout Washington State. Historically, there has been no sustainable funding source for such a project. However, the recent initiation of the $1.5 billion 1115 Medicaid Waiver project in Washington created an opportunity (23). The Waiver project is administrated through the Centers for Medicare & Medicaid Services (CMS) and allows states to waive certain federal funding rules and commit to demonstration projects which are cost-neutral or money-saving to the health care system, provided states reach certain health metrics. In Washington, the Waiver projects are chosen and implemented by regional organizations called Accountable Communities of Health (ACHs). For the current cycle of projects, several of the nine ACHs in Washington

selected community-based asthma management as a strategy to focus on chronic disease prevention and control. Our evidence-based CHW asthma home visiting program fit several ACH communities' goals, which opened the door for a collaboration ultimately including several ACHs.

The project described here is hosted by PHSKC with four primary implementation partners within western Washington: three ACHs (King County, Cascade-Pacific, and Southwest Washington) and one Federally Qualified Health Center (FQHC, SeaMar), a safety-net provider with clinics in nine counties in Western Washington (**Table 1**). These partners each serve as hubs or central organizing bodies for multiple clinic- and community-based organizations that employ CHWs to provide chronic disease and health behavior change programs.

We sought to train the CHWs connected to these regional hubs on the delivery of the evidence-based asthma home visiting program. However, we realized that our CHW program had 25 years of development and infrastructure that may contribute to positive results not easily replicable by other programs. In order to boost regional program effectiveness and sustainability, we decided to develop a program manager/supervisor training as well. This training would be built on the principles of best practices in creating supportive and sustainable CHW programs (24–26).

The development and implementation of our training program followed five phases: (1) Engagement: we establish our community advisory board, partnership, and infrastructure for decision-making to support throughout the project. (2) Curriculum Development: we develop our training curriculum. (3) Implementation: we host our first trainings. (4) Evaluation: we measure and assess how the trainings were received. (5) Adaptation: we iterate phases 2, 3, and 4 applying improvements based on learnings from the implementation and evaluation stages. This manuscript is intended to present the proposal, design, and development of a training program, following many years of research and development of the program. At the time of submitting this manuscript, we are between phases 4 and 5. Therefore, we present some initial (i.e., preliminary) outcomes and our plan for the Adaptation phase. This work was funded by the Patient-Centered Outcomes Research Institute (PCORI).

KEY PROGRAMMATIC ELEMENTS

Phase 1: Engagement

Our work approaches community, program development, and research based on the principals of community based participatory research (CBPR) (27). Using this approach, program and evaluation plans are generated by all stakeholders involved, including patients, clinicians, community groups, payors, academics, and researchers. Through the application of CBPR principles to our work, we ensure that resources, decision-making power, and ideas are collectively shared.

Our initial step was to convene a Community Advisory Board (CAB) consisting of key stakeholders who would provide guidance and increase local engagement. The CAB included representatives from our priority patient populations, CHW and supervisor teams, Washington State's Department of Health CHW program, local managed care organizations and Medicaid, a Federally Qualified Health Center, PHSKC, and three additional regional ACHs. Three CHWs from PHSKC served as lead educational consultants, and a University of Washington research group specializing in producing online, interactive medical training resources provided expertise. The CAB was representative of both new stakeholders as well as partners who were involved in our recent PCORI-funded randomized trial. This was intentional so that the diversity of experiences and expertise from our partners would enable adaptation within local contexts and provide a feedback loop regarding implementation challenges and opportunities. Authentic engagement, clear communication, and shared leadership with patients and other stakeholders in all project phases was considered critical to the project's success.

We held regular monthly CAB meetings during which we created working groups for different tasks, and encouraged active participation toward four primary goals: (1) improve the scope and design of the training program to meet the needs of the various project partners; (2) develop, tailor, and deliver the support structures needed by the CHWs, program supervisors and organizations implementing the model; (3) provide input on the design of the evaluation of the training program, and (4) engage stakeholder end-users and funders to determine opportunities for continued spread. Participation in CAB meetings ranged from 20 to 30 in attendance, beginning in March 2020 and continuing to the present.

Participation in the CAB was compensated with an annual stipend offered to our four project partner agencies through funds from our PCORI grant. The amount was calculated based on the anticipated staff time and resources, and use of the stipend was not restricted. In addition, we developed several additional entry points for engagement that were fully compensated. Each site was encouraged to identify at least one CHW, one program manager, and one person with asthma from their region to sit on the CAB. We also budgeted for interviewing program recipients in each region to provide feedback on the program aspects they experienced, compensating them for their time.

Phase 2: Curriculum Development

After assembling the CAB, we conducted an in-depth examination of the existing evidence-based CHW asthma educational and environmental protocols at PHSKC and resources on CHW supervision to create a comprehensive foundation on which to build the new curriculum. We strategized with the CAB to narrow down the protocols to those most relevant and useful, and to identify gaps in information. The resulting protocols were then modified into a format appropriate for an in-person 2-day training for CHWs. Selected content was converted into a multi-media interactive online tutorial for asthma-focused CHWs by our partners at the University of Washington.

In order to assist the integration of CHWs into their teams and to increase the sustainability of the project, we also designed a training specifically for CHW supervisors. We used the same strategy described above to develop a curriculum for a 2-day training for CHW supervisors.

TABLE 1 | Community characteristics.

Region	Estimated CHW FTE	Medicaid population	Medicaid asthma population	Estimated population with poorly controlled asthma	Estimated eligible and interested in home-visit program
HealthierHere: King county accountable community of health	34.0	432,633	26,598	3,300	1,650
Cascade-pacific action alliance	14.0	189,442	11,000	1,400	700
Southwest washington accountable community of health (SWATCH)	10.0	135,091	8,000	1,000	500
SeaMar Community health centers	7.0	206,698	12,951	1,600	800

CHW, community health worker; FTE, full-time effort.

During the monthly meetings of the CAB, we worked together on the above curriculum development tasks and solicited feedback on the materials developed. The CAB provided invaluable feedback regarding potential implementation challenges and opportunities for continued dissemination of this model. For example, one of our primary partners noted that their CHWs primarily work with asthma patients who also are experiencing homelessness. Based on that feedback we incorporated information in our trainings on how CHWs can be innovative when it comes to delivering the asthma intervention protocols in situations where traditional housing or indoor shelter is not an option.

Phase 3: Implementation

The application of a community-based collaborative approach paired with an adult learner-centered curriculum development process resulted in a training tailored to support CHWs focused on asthma and their supervisors. This process yielded a collection of online tutorials intended for independent, self-paced study (available at chw.uwimtr.org), to be followed by an in-person training, covering the topics listed in **Table 2**. The combination of online and in-person study was intended to reach participants of different learning styles and to engage non-native English speakers who preferred an in-person interactive training where interpretation was provided. By holding multiple trainings over the project years, our goal was to have some CHWs or program managers step forward in each region to serve as a regional Asthma Champion that can help observe and provide peer-support and make connections for future training.

Online Tutorials

The online tutorials covered the topics listed in **Table 1**, and take an estimated 2–3 hours to complete. The modules included interactive elements such as video demonstrations by CHWs, quiz questions, and visually rich graphics tailored to educate and engage participants. For example, a detailed picture showing differences between a normal lung and a lung affected by asthma were intended to help CHWs describe asthma and its symptoms. The CHWs registered for trainings were encouraged to complete these modules prior to attending the in-person training. Those completing the modules were presented certificates of completion at the in-person event.

In-person CHW Training

The in-person training curriculum topics (**Table 1**) were implemented by our support staff, CHW education specialists from PHSKC, a pediatrician specializing in asthma, and a motivational interviewing trainer. Training took place over two full days, with a total of 6.5 hours of instruction each day. Interpretation in Spanish was provided for non-English speaking CHWs. During the sessions, the PHSKC CHWs modeled how to use the protocols and conduct an asthma home visit, and the trainees were given the opportunity to practice with their peers during case studies and role play sessions.

A key component of the in-person training was the distribution of supplies which were intended for the CHWs to reuse for future trainings. We provided an environmental and educational protocol handbook, patient asthma education packets, safer cleaning kits with healthy cleaning methods, and placebo medication tools that allowed demonstrations of medication technique. The training and supplies were offered free of charge, funded by our grant.

In-person Supervisor Training

The CHW supervisor has an important role in the success of any CHW program. We hosted a request for proposals to solicit a curriculum developer with experience with a broad set of CHW programs nationally. This contractor focused on the specific elements that made the existing asthma home visit program at PHSKC most successful. The topics covered are detailed in **Table 1**. The training first focused on defining the role of CHWs in order to foster support, mentoring, and supervision. Elements of 360 supervision discussed included group supervision, 1-on-1 supportive supervision, direct observation, and patient feedback (28). The training also highlighted methods for promoting relationships to support CHWs and building multi-sector relationships with clinical and community efforts. In addition, the training discusses continuous professional development for the CHW, establishing formal connections

TABLE 2 | Training components.

Training format	Module topic	Content
Online tutorial for CHWs	Asthma: the basics	• Asthma definition • Triggers and allergens • Definition of asthma control • Controller vs. rescue medication • Importance of flu shots • CHW assessment, key messages, and actions
	Medication adherence and guidelines for using an asthma action plan	• Strategies to improve medication adherence • Asthma action plan • How to use an inhaler • When to use a spacer
	Respiratory distress: warning signs and responses	• Symptoms and warning signs in the individual patient • Warning signs and the asthma action plan • What to do during an acute asthma episode • When immediate medical care is necessary • Correlation between colds and asthma
	Home environmental check and cleaning techniques	• How to complete a Home Environmental Checklist • Contents of Safer Cleaning Kit • How to assess for cleaning issues • How to clean various rooms
	Dust control guidelines: vacuuming and doormats	• Importance of reducing dust exposure • Importance of using a door mat • How to vacuum • How to maintain a vacuum cleaner
	Dust mite guidelines	• Importance of reducing dust mite exposure • How to control dust mites
	Mold and moisture guidelines	• Common sources of moisture in the home • Importance of vapor barriers • How to clean mold • How cold homes affect people with asthma
	Roach and rodent guidelines	• What is integrated pest management, and why is it important • The cockroach elimination process • Cockroach management strategies • Rodent control strategies • Prevention of rodent problems
	Pets: management and HEPA filter use	• Which pets can be asthma triggers • Actions to reduce pets' effects on asthma • HEPA filters and how to clean them
	Environmental air exposure: indoor and outdoor	• How tobacco smoke affects asthmatics • Why children are more susceptible to smoke • How to reduce pollen exposure • How to be prepared for wildfire smoke
In-person CHW training	Trauma-informed care	• Definitions of trauma and trauma informed care • Adverse Childhood Experiences (ACEs) study and the ACEs quiz • Limitations of the ACEs studies • CHWs as frontline workers
	Self-care for CHWs	• Boundaries between CHWs and patients • Prioritizing self-care • Stress, secondary trauma, and resilience
	Motivational interviewing	• Working with chronic disease patients • How to ask open-ended questions • Engaging in reflective listening • How to use motivational interviewing with asthma patients
	Asthma medication tools	• Types of asthma medications • How to explain medications to patients • Practice with placebo tools • Challenges when working with patients using their medications
	Case studies and role play	• Small group review of case studies utilizing variety of protocols • Large group discussion of strategies used and concerns raised

(Continued)

TABLE 2 | Continued

Training format	Module topic	Content
In-person CHW supervisor training	CHWs' uniqueness	Understanding their roles, skills, strengths, and challenges
	Best practices for supervising CHWs	Individual vs. group supervision and shadowing
	Integration	Effectively integrating CHWs into organizations
	Building bridges	Building bridges between CHWs, members of organizations, and external partners

TABLE 3 | Evaluation plan.

RE-AIM metric	Training program	Home visit program
Reach	• Number, proportion, and characteristics of CHWs and supervisors who attended trainings	• Number, proportion, and representativeness of Medicaid patients (ages 5–65) in each ACH catchment area with severe, uncontrolled asthma visited by a CHW
Effectiveness	• Change in trainee confidence, comfort, and knowledge; ability to apply new skills and knowledge; and trainee opinion on clarity of information	• Patient-reported symptom-free days • Hospitalization and ED use • Rescue medication use • Missed days of work or school • Self-rated asthma control over the past 4 weeks
Adoption	• Components of content which were/were not used by trainees • Number and proportion of ACH member organizations that support CHWs attending the training program and making asthma-related home visits	• Number and proportion of CHWs who make their first home visit
Implementation	• Number of trainings conducted • Perceived facilitators, barriers, and adaptations of trainees when applying the skills or knowledge learned	• Program fidelity • Number of home visits • Number of new referral pathways established during the program • Facilitators, barriers, and adaptations to program delivery
Maintenance	• Number and proportion of ACH member organizations that support CHWs attending the training program and making asthma-related home visits at 6 months (or longer) post-training • Number of partners, resources, or referral pathways for asthma related services developed by an organization	• Number and proportion of CHWs who make their first home visit at 6 months (or longer) post-training

into the health care system, supporting community outreach, and compensation and workload management (24). Finally, the backbone of our CHW program is rooted in a philosophy of trauma-informed principles (29, 30), motivational interviewing, and self-care.

Monthly Learning Collaboratives and Ongoing Training Support

After implementing the trainings, we held monthly virtual meetings termed Learning Collaboratives for all past trainees in order to provide technical assistance and one-to-one support, create an environment for cross-learning among CHW peers, and provide ride-along or shadowing opportunities as requested. Other specific agenda topics have been largely driven by attendees. These Learning Collaboratives were also useful during our evaluation phase as a setting in which to conduct focus groups and solicit feedback on evaluation results. These meetings are intended to continue beyond the adaptation phase.

Phase 4: Evaluation

Our evaluation plan focuses on the impact of the training program, but eventually will also assess the public health impact of the home-visit program that is delivered by the trainees (**Table 3**). This evaluation plan was developed with the guidance of an implementation science expert and applies the RE-AIM framework, which provides a practical approach for evaluating programs within "real world" settings in the domains of Reach, Effectiveness, Adoption, Implementation, and Maintenance (31). The RE-AIM framework balances internal and external validity and addresses considerations relevant to dissemination, implementation, and scale-up. It is also compatible with socio-ecological models of health and useful for evaluating the public health impact of multilevel, multicomponent programs such as the PHSKC asthma home visit intervention.

The evaluation of the training program takes a mixed-methods approach including review of program records, surveys of all trainee participants, and interviews of a subset of trainees. Program records were reviewed to elucidate process

measures such as numbers of attendees and trainings delivered. Pre-post surveys were administered to CHW and supervisors to assess change in confidence, comfort and knowledge, ability to apply new skills and knowledge, and opinion on clarity of information. Finally, we also conducted interviews with a subset of CHWs and CHW supervisors who attended trainings. These interviews covered barriers to client behavior change, experience at the trainings, implementation of knowledge/tools gained, the impact of COVID-19 on their work, and desired future trainings.

Phase 5: Adaptation

Our initial qualitative interviews and survey data from the trainees will be utilized to iteratively evaluate our trainings and inform program improvements. The implementation team will compile results and present suggested next steps for revisions to the CAB for advice and approval. With their guidance, the implementation team will adapt, schedule, and deliver the revised trainings to each of the partner sites. New trainees will provide feedback for review allowing one final opportunity for revision.

PRELIMINARY RESULTS

Our training program commenced in January 2020. Shortly thereafter, the COVID-19 pandemic took hold in Washington State, which rapidly led to restrictions on in-person gatherings and shifting of heath department priorities toward the pandemic rather than chronic disease. Both in-person trainings and asthma home visits were suspended, which prevented new trainees from returning to their communities to apply what they had just learned. As a result, currently we have only partial results from our evaluation of the training program (presented below), but no data regarding the home visit intervention. The evaluation will continue when in-person asthma CHW activities are allowed to resume.

In January and February of 2020, we delivered two in-person CHW trainings and two in-person CHW supervisor trainings, rather than the planned four trainings for each group (one for each ACH region). Our initial plan to hold separate trainings in each ACH region was modified once we discovered established venues that were convenient to multiple regions, allowing us to consolidate to two locations. A total of 60 individuals attended a training. This initial cohort of trainees were representative of over 12 different organizations including health departments, local neighborhood groups, community-based organizations, and managed care organizations. The training was provided in Spanish and English as planned.

Initial results from surveys of training participants showed the following:

- 77% of CHWs (24 out of 31) were extremely clear about the takeaway points.
- 91% of supervisors (32 out of 35) were extremely clear about the takeaway points.
- 74% of CHWs (23 out of 31) thought the presentation of information was extremely clear.
- 89% of supervisors (32 out of 36) thought the presentation of information was extremely clear.
- 71% of CHWs (22 out of 31) were rated their confidence 8 or higher for their ability to apply what they learned at work (scale of 0 = not at all and 10 = extremely confident).
- 91% of supervisors (31 our 34) rated their confidence 8 or higher for their ability to apply what they learned at work (scale of 0 = not at all and 10 = extremely confident)

Interviews revealed that overall, there was a positive experience with major elements of the training such as food, environment, location, built confidence, facilitation, activities, interactivity and engagement, and room set-up and rotation. When speaking about the facilitation, one participant stated, "I think any time you have a training that's gonna be 16 hours over two days and there's a lot of material to cover, the facilitation makes or breaks the training. And they were just so personable and open, and asked pertinent questions and waited for the replies that needed to come out. I didn't feel pressured in any way to perform or not perform. I think the facilitators make or break any training, and they were exceptional."

CHWs especially felt that the motivational interviewing, visual aids/diagrams, role playing practice and the background was helpful. One CHW stated, "What will help me are the handouts that they gave us on 'What is asthma?' and 'How do we breathe?' [and] on why it's important to have controlled asthma and the importance of what the inhalers do. The actual visual diagrams I think will help clients understand 'Oh yes, this is important', since they'll be able to see how it affects them when they are having an asthma attack, what actually is happening inside their lungs."

Several areas for improvement of the training program were identified. For example, feedback from the CHW training showed the desire for a refresher course online, funding for supplies, instruction on topics beyond asthma, and avoiding repetition of the online module content. Supervisors suggested slowing the pace of the training, providing tools that can also be applied to other chronic conditions, and spending more time on best practices for supportive supervision. One supervisor also suggested including a half-day overlap with CHWs to share learnings.

DISCUSSION AND LIMITATIONS

This report has outlined the development of a training program to teach CHWs and CHW supervisors how to deliver an asthma home visit intervention built on an evidence-based, cost-effective model in Washington State. The scale-up of this approach took advantage of the state Medicaid Waiver program, which is likely to accelerate its integration into the health care system and improve its sustainability over time. Our use of a Community Advisory Board from the very early stages of the project enabled us to identify opportunities for adaptation of the proposed training to the settings in which it would be delivered, and offered invaluable feedback on what was and was not working. Following the trainings, the monthly Learning Collaboratives allowed ongoing engagement and review

of skills, which is also expected to improve effectiveness and sustainability. The iterative nature of the curriculum design allows for continual improvement of the program over time. While not all states are participants in a Medicaid Waiver project, the other community-based participatory methods described here may still be applicable for other organizations seeking to scale up CHW home visit models across different settings in their state.

Throughout the implementation of this project, we learned several lessons which will help to improve future iterations of the program. Firstly, changing conditions during the pandemic reinforced the importance of flexibility and willingness to adapt program implementation to the setting. Since the COVID-19 pandemic started in our region very shortly after our in-person trainings, many trainees were unable to go back to their communities in person and immediately apply their new asthma education skills. As the pandemic continues and some attention shifts back toward non-COVID-19 health concerns, we are encouraging our trainees to begin conducting virtual asthma visits as a way to resume providing this service. We are also developing ways for trainees to refresh these asthma skills remotely. Another invaluable lesson was the tremendous utility of soliciting feedback from both the community and CHW participants early on and frequently. This provided the insight we needed into the needs of each individual community, such as a focus on managing asthma during housing instability, or the importance of obtaining funding for program supplies. Recognizing the challenging and complex environments the trainees were working in was essential to adapting the training appropriately.

Our program has a number of limitations which are important to consider. Firstly, the training capitalized on the Washington Medicaid Waiver project. While any state can apply for permission to pursue similar projects through the Centers for Medicare and Medicaid Services, they do not currently exist in every state, which limits the generalizability of our program design. Additionally, our program is funded by an outside source (PCORI). In accordance with PCORI values, we have done our best to avoid direct compensation for program aspects that would require coverage by an employer or the health system to be sustainable. However, we have offered compensation for the CAB and the training program staff, and the training and materials are offered free of charge, which raises concerns for sustainability. The Learning Collaboratives are also dependent on this funding as it provides for program staff. Because of this, our team has been exploring avenues of more sustainable funding, including the potential for Medicaid reimbursement of material costs and CHW time, but this issue has not yet been resolved.

Despite these limitations, our case study has shown that a community-based approach to curriculum development and improvement can produce a training program that is adaptable, engaging, and valuable to participants and has the potential to produce CHWs competent to deliver high-quality, effective home visit interventions for asthma. The coronavirus pandemic has limited the ability of our trainees to implement their training, but our program is adapting with the creation of protocols for virtual visits. The next steps include evaluation of the effectiveness of our trainees' services, and further refinement of the training program design. Through this community-based, adaptive approach, we hope to harness the proven effectiveness of CHW-led home visits to address asthma in a way that is culturally acceptable and cost-effective, and addresses some of the root causes of asthma-related disparities.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by University of Washington Institutional Review Board. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

JS, BW, and CK contributed to the conception and design of the program and evaluation plan. NE, JS, KB, and CK implemented the program. NE wrote the first draft of the manuscript. NE, MC, KB, and CK wrote sections of the manuscript. All authors contributed to the article and approved the submitted version.

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Community Health Representative Workforce: Meeting the Moment in American Indian Health Equity

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In 2018, the Community Health Representative (CHR) workforce celebrated their 50th year and serve as the oldest and only federally funded Community Health Worker (CHW) workforce in the United States. CHRs are a highly trained, well-established standardized workforce serving the medical and social needs of American Indian communities. Nationally, the CHR workforce consists of ∼1,700 CHRs, representing 264 Tribes. Of the 22 Tribes of Arizona, 19 Tribes operate a CHR Program and employ ∼250 CHRs, equivalent to ∼30% of the total CHW workforce in the state. Since 2015, Tribal CHR Programs of Arizona have come together for annual CHR Policy Summits to dialogue and plan for the unique issues and opportunities facing CHR workforce sustainability and advancement. Overtime, the Policy Summits have resulted in the Arizona CHR Workforce Movement, which advocates for inclusion of CHRs in state and national level dialogue regarding workforce standardization, certification, training, supervision, and financing. This community case study describes the impetus, collaborative process, and selected results of a 2019–2020 multi-phase CHR workforce assessment. Specifically, we highlight CHR core roles and competencies, contributions to the social determinant of health and well-being and the level to which CHRs are integrated within systems and teams. We offer recommendations for strengthening the workforce, increasing awareness of CHR roles and competencies, integrating CHRs within teams and systems, and mechanism for sustainability.

Keywords: community health representative, community health worker, American Indian/Alaska native, health systems, scope of practice

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INTRODUCTION

In 1968, the Indian Health Service (IHS) funded the Community Health Representative (CHR) program through P.L. 100–713 as a component of healthcare services for American Indian and Alaskan Native (AI/AN) people (1). This policy established the first federally funded, community health worker (CHW) workforce, with origins in emerging anti-poverty and migrant health movements of the 1960s. In 1975, the Indian Self-Determination and Education Assistance Act, P.L.

93–638, facilitated Tribal authority to contract with the Federal government to operate programs and health systems serving their tribal members and other eligible AI/AN persons (2). Today, 95% of the 246 Tribal CHR programs (∼2000 CHRs nationally) are tribally governed. In Arizona, the focus of this community case study, 19 of the 22 Tribes operate a CHR program, employing

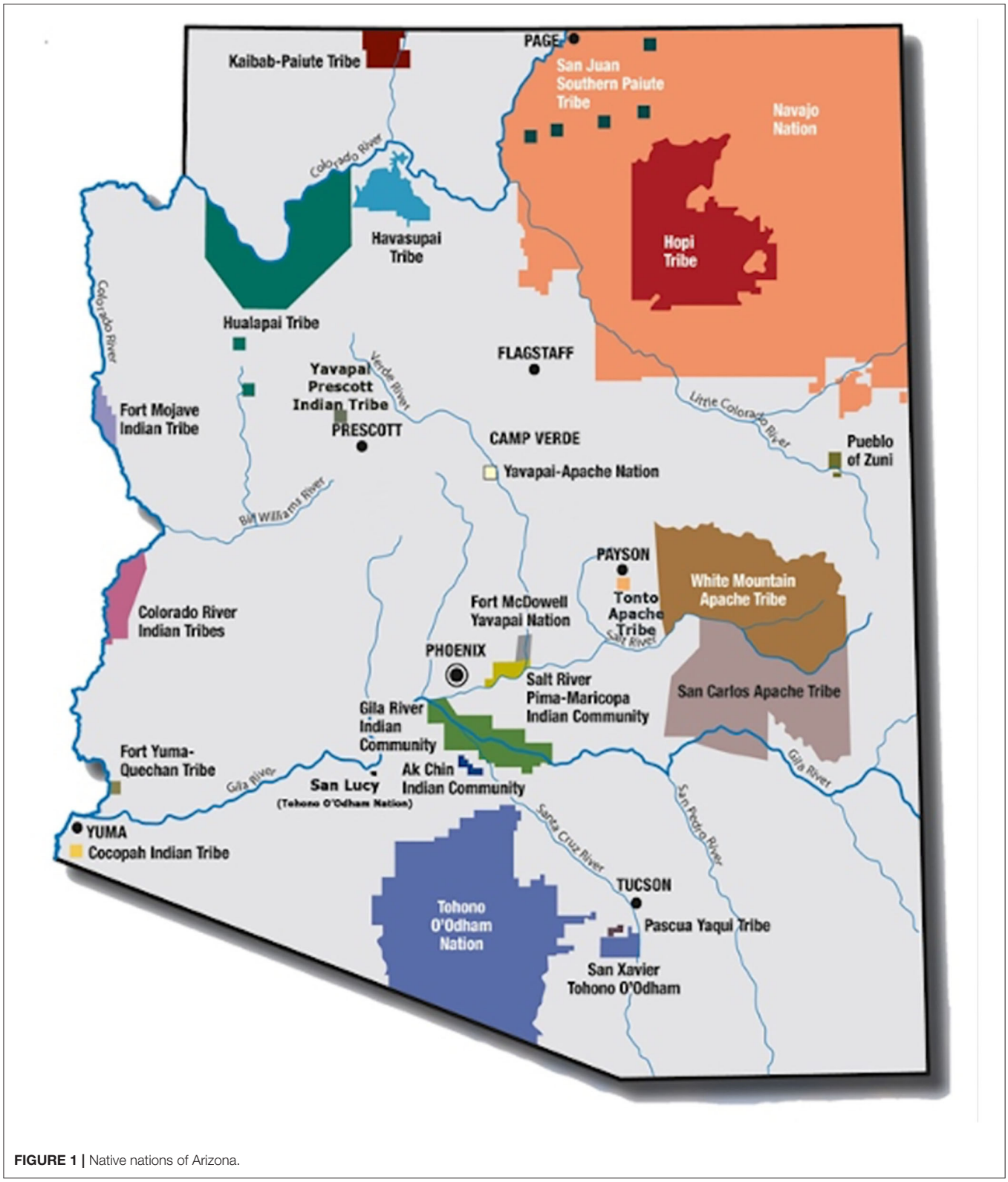

FIGURE 1 | Native nations of Arizona.

∼250 CHRs, equivalent to 30% of the total CHW workforce in Arizona [(3); **Figure 1**].

Since 2015, in direct response to statewide organizing efforts among the broader CHW workforce and allies, CHR programs of Arizona organized for annual CHR Policy Summits to dialogue and plan for the unique issues and opportunities facing CHR workforce sustainability and advancement (4–7). Over time, annual Summits resulted in an Arizona CHR Workforce Movement, which advocates for inclusion of CHRs in state and national level dialogue regarding workforce standardization, certification, training, supervision, and financing (8). Movement members include CHR Programs representing 19 Tribes, including CHR Program Directors, CHRs, health department directors, leading American Indian health and social policy entities, as well as state health department, Medicaid and university partners. Like many professional associations and conferences, annual CHR Summits and monthly CHR Movement meetings provide an interactive environment and mode of continuous communication among stakeholders in which policy initiatives and advocacy strategies unique to the CHR workforce can be discussed and deliberated.

Since 2015, the AACIHC has served as the backbone or convening agency for the Movement, with a larger mission to convene Tribal, state, and federal entities—including 22 representatives from each of the state's federally recognized American Indian Tribes—to advocate for increasing access to high quality healthcare programs for all AI/ANs in Arizona (6–8). CHR Movement members began to prioritize the need for CHR workforce assessments as an essential strategy to recruit, retain, and sustain a cadre of highly skilled, culturally and linguistically diverse CHRs. Moreover, CHR Movement leadership recognized the urgent need to better position the workforce in response to three important shifts in state and federal level workforce policy environments.

First and foremost, despite federal funding since 1968, CHR programs throughout the US are consistently called upon to demonstrate their effectiveness on health outcomes but have never in more than 50 years in operation had the resources to systematically collect the data necessary to demonstrate this level of impact. Such a challenge is in the light of overwhelming body of evidence of outcome and cost effectiveness of the broader CHW workforce across contexts and disease areas (9–12). Second, beginning in 2017 and culminating in fiscal year 2020, the Presidential Proposed Budget recommended phase out of the CHR Program and eliminating the health education programs funded in the IHS budget. Phase out was recommended in order to shift funds to extend the more medically focused Community Health Aide Program (CHAP) historically operating in villages of Alaska, to the lower 48 states (13). Third, after years of collaboration and collective advocacy, with critical advocacy efforts by CHR Programs and Tribes, Arizona CHW Voluntary Certification HB2324 legislation was signed into law on May 16, 2018 (14). Passing of this historic legislation, represented an essential opportunity to assure that the CHW/CHR workforce definitions were in alignment with all groups and that the scope of practice reflect CHW/CHR roles in both clinic and community-based settings (14). Thus, it was in this context that the first ever Arizona CHR workforce assessment was launched and serves to support current and future CHR professional development, training, supervision, career advancement, and financing of the CHR profession in Arizona (3).

Here we aim to highlight the collaborative process to engage the CHR workforce in identification of workforce development and sustainability priorities, and especially outline CHR core roles and competencies, contributions to social determinants of health and integration within systems and teams. Permissions have been obtained to reproduce some of the text published in our previous conference and assessment reports which are all located on the Arizona Advisory Council on Indian Health Care (AACIHC), website (https://bit.ly/306UscA).

CONTEXT

Throughout the US, CHR Programs are organized and convened based on IHS designated Service Areas. For example, the 22 Tribes of Arizona are grouped into three distinct IHS Service Areas, including; Tucson, Phoenix, and Navajo Areas (15). Novel to our collective approach, the CHR Movement and CHR Policy Summits convene across the three IHS Service Areas. Beginning in 2018, in an effort to better understand the CHR workforce as a whole, members of the CHR Movement designed a preliminary CHR workforce assessment to be administered during an annual CHR Policy Summit. This conference-based assessment of the CHR workforce was the first of its kind in Arizona, and documented important demographic, professional, and training characteristics of the workforce across Tribal programs. This particular policy summit convened nearly 25% ($N = 60$) of the total CHR workforce employed in the state. Through this first step, we learned that among CHRs who attended the conference and completed the brief survey, that the CHR workforce in Arizona were predominately female, averaging 47 years in age with 13 years of employment experience as a CHR. Approximately one quarter of CHR survey respondents reported a high school diploma or a GED equivalent as their highest level of education, while almost half (47%) reported having achieved some college education and 23% had received a college degree. One quarter of CHRs reported an annual salary of less than $25,000 and ∼53% of CHRs earned between $25,000 and $35,000 annually.

This conference assessment also illuminated CHR current and desired training. Standardized IHS CHR Basic and Advanced training requirements exist for the CHR workforce. Approximately 76% of CHRs reported having received Basic CHR Certification provided by the IHS CHR National Program. Approximately half of CHRs reported having had the opportunity to participant in IHS Advanced CHR trainings. Advanced CHR on line trainings include, motivational interviewing, case management, mental health, maternal, and child health and health promotion disease prevention modules. Approximately 63% of CHRs reported having completed an advanced CHR training in health promotion and disease prevention while 53% of CHRs reported completing modules in case management or mental health, with slightly less than

half of CHRs receiving advanced training in maternal and child health. When asked if CHRs would like to receive advanced training in the future, 100% of CHRs wanted both Basic CHR Certification as well as all on line Advanced CHR Trainings offered by IHS. This conference evaluation had a profound effect on the partnership and sparked the collaborative workforce assessment efforts described in this community case study. Arizona CHR workforce assessments are robust in breadth and scope and reported in detail elsewhere (3, 7).

In the summer of 2019, as a result of the success of our conference-based assessment, the Arizona Advisory Council on Indian Health Care (AACIHC), at the guidance of the Arizona CHR Workforce Movement members, sought assistance from longtime university partners at the Northern Arizona University, Center for Health Equity Research (NAU-CHER) with experience conducting CHW workforce assessments, to conduct a multi-phase assessment of the CHR workforce in Arizona. The remaining case study highlights the process and results of Phase 1 and Phase 2 of the 2019–2020 CHR workforce assessment.

KEY PROGRAMMATIC ELEMENTS

For purposes of this community case study, it is important to differentiate the CHR workforce and the CHR Program from the Community Health Aide (CHA) workforce and Community Health Aide Program (CHAP) (13). The CHA workforce consists of mid-level community, behavioral, and dental health paraprofessionals who provide healthcare services, including chronic, preventative and emergency care, to patients in tribal communities. The CHA program has been in place in Alaska since 1968 (16). In 2010 the Indian Health Care Improvement Act (IHCIA) was amended to authorize the creation of a national CHAP in order to expand the program to the lower 48 states (13, 17). This expansion remains in planning and development phase; however, in the last decade, a dozen states (including Arizona) have independently authorized the Dental Health Aide Therapist (DHAT) program component of the CHAP. IHS identifies three key areas that differentiate CHAs from CHRs: legislative authority, funding source, and scope of work. First, in regards to legislative authority, CHAP is authorized under 25 U.S. Code§ 1616l a-d, while the CHR program is authorized under the IHCIA public law 100–713 (13). Secondly, the two programs have different funding sources. While the CHAP in Alaska is funded through the IHS budget under the hospital and health clinics line item, CHRs are funded through a specific line item in the IHS budget. Finally, and most importantly, the scope of work for CHAs and CHRs are fundamentally distinct. Community Health Aides (CHA) and related Community Health Practitioners (CHP) are "mid-level medical providers" whose purpose is to provide basic medical care and connect patients with higher level medical care as needed (16). CHA/Ps function under the medical supervision of a licensed physician, through whom they are given authorization to treat patients, and follow a strict protocol to refer patients to higher medical care. The primary purpose of the CHR program on the other hand, is unique and distinct and in line with broader CHW workforce roles and competencies recognized by several federal entities, including: (1) Relationship and trust-building–to identify specific needs of clients, (2) Communication–especially continuity and clarity, between provider and patient; and traditional knowledge and language, and (3) Focus on Social Determinants of Health–conditions in which people are born, grow, work, live, and age, including social connectedness, traditional knowledge, and spirituality, relationship to the environment and a shared history.

Guided by the tenants of community based participatory evaluation (18) and using promising practices for assessing the CHW workforce (19) partners from NAU-CHER collaborated with the AACIHC and leadership of the Arizona CHR Coalition to define the scope of a multi-phase workforce assessment. In Phase I, CHR job descriptions and scopes of practice (SOP) documents were received from 12 of 19 Tribal CHR Programs, these documents were used to document current and emerging CHR core roles and competencies. In Phase II, collaborators developed a conversation guide for CHR managers to explore more deeply, CHR program organization, structure, financing, health system integration, and evaluation. In both phases all 19 CHR programs were invited to participate. Collaborators also intentionally or purposefully, identified, and recruited. CHR Programs that represented diverse programmatic characteristics, including service area settings, small and large population sizes, and public health and health care delivery program structures (i.e., contracted and compacted programs) to provide the greatest breadth of information for the assessment. NAU-CHER staff conducted 60-min telephone or video conference conversations with seven managers at six CHR programs. SOPs, job descriptions and conversations were analyzed for prominent themes using Atlas.ti Qualitative Analysis software. **Table 1** outlines the specific goals and approaches to both phases of the 2019–2020 CHR Workforce Assessment. Although this assessment is not considered research, findings are confidential and responses are anonymous; information is reported in aggregate or as de-identified case studies to ensure anonymity of all participants and Tribes. In the following sections we describe major assessment topics.

Characteristics, Qualifications, and Training

Phase I of the assessment documented several characteristics, qualifications, and training requirements (**Table 2**). Through an analysis of SOPs and job descriptions, CHRs were found to attain or possess various cultural, traditional, and linguistic experiences. All CHRs were required to have knowledge of the Tribe and community, including familiarity with the culture, traditions, health status, government, and socio-economic context. CHRs' required knowledge of the Tribe and community which is considered to translate to the CHR's ability to establish and maintain good working relationships with Tribal members, staff, IHS staff, and other Tribal departments and agencies. Approximately 58% of CHR Programs required or preferred CHRs to have the ability to communicate in the Tribe's language. Three quarters of CHR Programs required CHRs to be familiar

TABLE 1 | Arizona CHR workforce assessment objectives.

Phase I	1. Document current and emerging CHR core roles and competencies across the CHR workforce. 2. Establish a CHR workforce database to document workforce trends overtime (i.e., demographics, roles and competencies, career progression). 3. Compare CHR core roles and competencies across; (1) Tribal CHR Programs of Arizona, (2) Indian Health Service CHR Standards of Practice and (3) and National Community Health Worker Core Consensus Project.
Phase II	1. Document CHR Program organizational structure and financing. 2. Illuminate CHR core roles and competencies that address the social determinants of health. 3. Characterize the formal/informal relationships between the CHR Programs and Indian Health Service and 638 health systems and other Tribal health programs and sectors. 4. Assess current, planned and desired CHR Program process and outcomes evaluation.

TABLE 2 | CHR required and preferred competencies and skills.

Required and Preferred Cultural and Traditional Knowledge and Skills	
Knowledge of Culture and Tribe	100% (12/12)
Ability to Speak and Understand Language	58% (7/12)
Knowledge of Community Resources	75% (9/12)
Enrolled Tribal Member	42% (5/12)
CHR Required or Preferred Formal Education and Training	
CNA/CMA	75% (9/12)
Health Care Experience	92% (11/12)
FIRST AID/BLS	58% (7/12)
CPR	58% (7/12)
High School Diploma or GED	83% (10/12)
CHR Training and Certification Provided Upon Hire	
CHR Basic Certification^{+}	58% (7/12)
RPMS/PCC	25% (3/12)
CAN/CMA	8% (1/12)
Fist Aide/CPR	17% (2/12)
HIPPA	17% (2/12)
Other Training or Certifications*	75% (9/12)

$^{+}$*Indicates in some cases requirement of the CHR Refresher course 36–48 months after completing the Basic CHR Training course.*
**Evidence-based health promotion curricula or program.*

with the local community and health resources available to clients. In accordance with Title VII of the Civil Rights Act, Sections 701(b) and 703(i) (20), 42% of programs identified a preference for CHR candidates who were of American Indian descent.

Three-quarters of CHR programs preferred a high school diploma or GED equivalent. Approximately 75% of programs required or preferred a Nurse Assistant (CNA) or Medical Assistant (CMA) certification and 58% of programs required or preferred a First Aid or Basic Life Support (BLS) and CPR certifications upon hire or within first year of hire. Approximately 92% of CHR programs required or preferred 6 months to 4 years of experience working in the health field, or in providing direct patient care or employment as a CHR. Most programs noted that any "equivalent combination of education and experience" that allowed the candidate to successfully perform the job duties would be considered. While, more than half (58%) of CHR Programs offered CHR Basic Certification upon hire through the IHS, only 25% of programs provided Patient Care Component (PCC) system coding and Resource and Patient Management System (RPMS) data entry training upon hire. No <75% of programs required or provided the opportunity for continued professional development through additional training or certification.

Core Competencies and Scope of Practice

Phase I also focused on identifying the core roles and competencies of the CHR workforce in Arizona. To achieve this, we applied the National CHR standards of practice set by the IHS CHR Program and the national CHW Core Consensus Project (21) core roles and competencies to assess SOPs and job descriptions submitted by 12 participating Arizona CHR Programs (**Table 3**). The Indian Health Service published the Indian Health Manual, Part 3, Chapter 16 (22), which set forth the goals and objectives of the program, the standards of practice for the workforce, and requirements related to training, oversight, and data collection and reporting. IHS also published the RPMS Training Manual (23) which outlines the CHR service codes used by CHRs to document their services completed with individual patients, community organizations, and other events.

All 12 participating Arizona CHR Programs identified the CHR workforce core roles and competencies included the IHS standard of practice of: health education, case finding and screening, care management and coordination, and patientcare and monitoring. Approximately, 75% required homemaker and transportation roles, while 67% of CHR programs performed interpretation and translation roles. Approximately half of CHR Programs also identified environmental health, community development, and emergency patient care as CHR roles. All 12 (100%) CHR Programs identified the following national CHW core competencies of: (1) Providing culturally appropriate health education and information, (2) Conducting outreach, (3) Providing direct service, (4) Care coordination, case management and systems navigation, and (5) Participating in evaluation and research. One third of CHR SOPs included emerging roles, of community needs assessment and disaster response, and program planning and evaluation.

TABLE 3 | CHR core roles and competencies by Indian Health Service and CHW Core Consensus Project.

CHR Competencies and Roles (15)		**CHW Competencies and Roles (24, 25)**	
Health Education	100% (12/12)	Cultural Mediation among Individuals, Communities, and Health and Social Service Systems	83% (20/12)
Case Find/Screen	100% (12/12)	Providing Culturally Appropriate Health Education and Information	100% (12/12)
Case Management/Coordinate	100% (12/12)	Care Coordination, Case Management, and System Navigation	100% (12/12)
Patient Care (Non-Emergency)	100% (12/12)	Providing Coaching and Social Support	83% (10/12)
Monitor Patient	100% (12/12)	Advocating for Individuals and Communities	83% (10/12)
Other Patient Centered Services	100% (12/12)	Building Individual and Community Capacity	42% 5/12
Transport	75% (9/12)	Providing Direct Service	100% (12/12)
Homemaker Service	75% (9/12)	Implementing Individual and Community Assessments	83% (10/12)
Interpret/Translate	67% (8/12)	Conducting Outreach	100% (12/12)
Environmental Health	50% (6/12)	Participating in Evaluation and Research	100% (12/12)
Emergency Patient Care	58% (7/12)		
Community Development	58% (7/12)		
NEW CHR Roles		**Fall Outside CHW SOP**	
Disaster Response	33% (4/12)	Homemaker services	75% (9/12)
Community Needs Assessment	33% (4/12)	Emergency Patient Care	58% (7/12)
Program Planning and Evaluation	67% (8/12)	Other Patient Centered Services	100% (12/12)

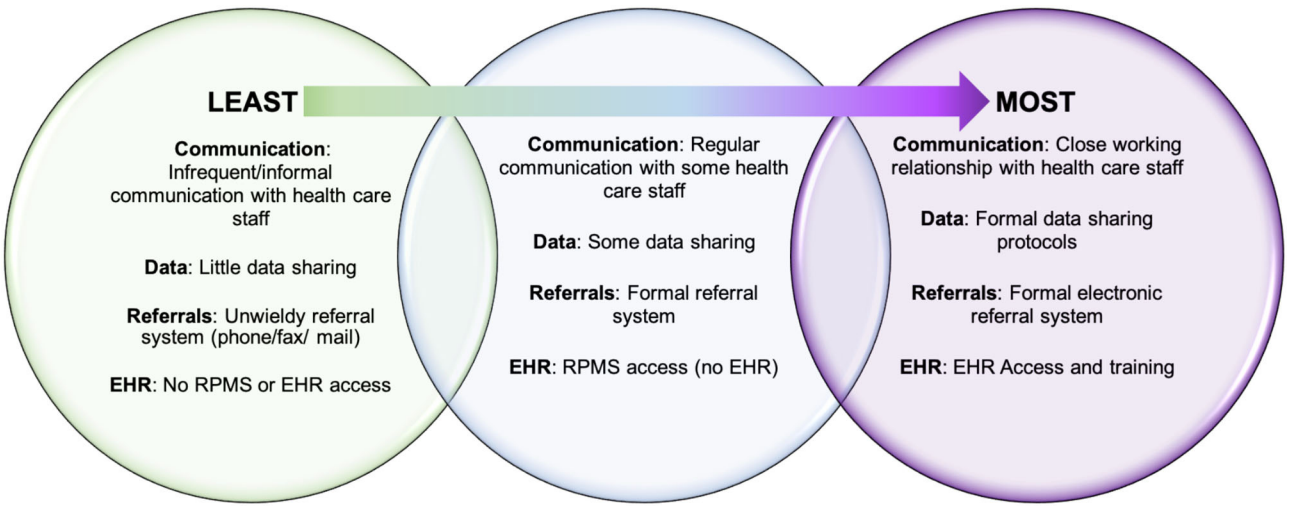

FIGURE 2 | CHR-health system integration spectrum.

CHR Integration Within Systems and Teams

Phase II assessed CHR integration within systems and teams. According to conversations with CHR managers, the level of CHR integration with the IHS/638 health care systems varied among programs (**Figure 2**). In most cases, CHRs worked closely with public health nursing and met or communicated regularly with health facility staff to coordinate case management. Programs that had access to electronic health record (EHR), with the ability to enter notes and review patient charts, were afforded a higher level of integration. Conversely, programs without formal referral or data sharing systems in place were found less integrated into health care systems, resulting in CHR managers feeling that their programs were underutilized.

> *The working relationship with the [IHS] service unit is integral in the delivery of health care services. Today, the CHRs play a critical role in the health care delivery system to link the patient to the IHS system and are intended to prevent avoidable hospital readmissions and emergency department visits through home visits*

to patients with chronic health conditions such as asthma, diabetes and hypertension.

—CHR Program Manager

Complimentary to conversations with CHR managers, Phase I analysis revealed case management and care coordination as prominent CHR roles and competencies defined by three primary activities; service coordination, patient navigation, and advocacy. CHR competency and roles related to service coordination included coordinating patient/family centered services and home health services, with a variety of members of the health care team. CHRs were expected to work across providers and programs including primary care physicians, public health nurses, case managers, social workers, insurance case managers, dialysis clinics, local hospital, and other service providers. In some programs, CHRs were described to developed or execute patient care coordination and or discharge plans and were expected to be involved in chart reviews and monitoring of the patient. Some CHR were required to attend and participate in inter-agency care team meetings or staff meetings in which patient progress and plans were discussed and implemented by various members of that care team, including the CHR. For certain CHR Programs, service coordination required CHRs to coordinate and work closely with various federal, state, county, and local service agencies such as Arizona Medicaid, Arizona Long Term Care System, public health nursing, and Tribal programs. CHRs were designated to be both responsible for generating referrals, as well as receiving and following up on patient referrals. CHRs were expected to ensure communication between the health care team and patients, through delivering messages from the health care team and reviewing instructions for self-care. CHR collaborated with other departments, stakeholders and community groups to comprehend overall goals of the patient care plan, and planned outreach interventions and developed effective communication strategies between health care and social service entities and the patient and family.

Phase 1 also explored CHR care coordination, characterized as involving patient, community, and systems level advocacy. CHRs were expected to serve as the patient advocate through language translation and interpretation, arranging appointments, filing patient complaints, assisting the patient to obtain medication, medical equipment or transportation to ensure continuity of care. CHRs were expected to serve as an advocate for individuals and families by educating on available health programs, health policies and procedures; through assisting community members in seeking and applying for services through other resource agencies; and act as an advocate to communicate the needs of the clients to the medical team, CHR supervisor and public health nursing. CHRs roles also included advocating on behalf of both medical and social needs, such as light house cleaning and or cooking; completing necessary applications and or documents on behalf of the patient due to possible disabilities or physical limitations; picking up medications and delivering prescriptions and monitoring general health needs of the patient. Additionally, CHR roles includes acting as liaison and advocate for the community served by Federal, State and local agencies to improve the cultural responsivity and safety of the systems of care. This systems level advocacy included CHRs clarifying the role of American Indian traditional and cultural value systems, and cultural beliefs. Cultural and traditional advocacy supports the CHR Program goal to "reduce the potential for conflict and misunderstanding regarding the health conditions of American Indian and Alaska native people."

Emerging within the role of care coordination was patient navigation. In some CHR Programs, SOPs and job descriptions articulated CHR ability to work with newly diagnosed clients, or clients with complex chronic conditions, including behavioral health diagnosis, substance use disorders or cancer. CHRs serving such clients were tasked with roles and competencies related to monitoring and support, including identification of the need for a higher level of care, emotional support for clients and their families with a chronic or serious illness or injury and referrals to the proper agencies for clients in crisis, clients experiencing loss, vulnerable clients, and other situations which affected family health and well-being. In some programs, CHR patient navigation activities also included helping clients identify a support network to provide for day-to-day care, arranging for transport of clients for follow-up care following discharge from a health, psychiatric, or residential substance abuse program, as well as transporting clients at high risk of deterioration in emotional or physical health.

Challenges to CHR Integration

Despite robust descriptions of CHR roles and competencies related to integration within systems and team identified in Phase I, conversations with CHR program managers in Phase II, illuminated a number of challenges to integration of their programs within IHS/638 health systems. The two main barriers described by managers were a general lack of understanding about the CHR program on the part of health care staff, and a lack of communication and information sharing between CHR programs and providers.

Familiarity and Trust in CHR

CHR managers attributed the first issue of health care staff unfamiliarity with the CHR workforce in large part to the frequent turnover of IHS staff, often coming from off-reservation. One manager explained that this misunderstanding of CHR capabilities lead to an underutilization of valuable CHR services that extended healthcare into the community. In one case, where the CHR manager described ongoing issues related to health system integration, they pinpointed the heart of the problem as this misperception of CHRs among IHS staff:

They don't really view them [CHR] as part of the system; they still view them as outsiders, more of a lay kind of employee with no technical skills, somebody that's a part of the community. And that's wrong – that's a misconception.

The lack of understanding around CHR roles and responsibilities affected all aspects of CHR integration, from communication to case management. In addition, frequent staff turnover made it difficult to sustain relationships, particularly when the referral and communication processes are not formalized.

Communication and Information Sharing

The second area that CHR managers identified as presenting a significant barrier to health system integration was communication and information sharing, which included issues related to referrals, RPMS reporting, and belated involvement of CHRs in case management. Several program managers identified major gaps in the information-sharing process between CHRs and IHS/638 providers. Referrals were not always standardized and, in certain programs, were delivered via mail, fax or by hand, making them difficult to track systematically. Communication with providers was often by phone, on an as-needed basis, and because the RPMS is not connected to the EHR, the services that CHRs provide and health data they collect (such as blood pressure or blood sugar levels) are not seen by providers. In fact, providers may only be aware that their patient is receiving CHR services if the patient happens to mention it during a visit. One CHR manager, who is actively working to formalize their communication processes with IHS described the problem this way:

> *[…] we serve the same patients that IHS serves. Why is it that we don't talk? Why is it that a CHR will do a journal entry into a patient's folder but yet, the doctor sees the same patient two days later and doesn't even realize that the CHR has taken screening vitals and that was good information for a doctor to look at? So, right now that's the challenge, is that our medical providers are not able to see the CHR notes. So, in a way I feel like our work is just being entered but who cares, nobody's going to use that data.*

This informal "as-needed" approach to communication also meant that CHRs were often contacted to assist with case management after a problem or crisis had emerged. As one CHR manager explained, CHRs were viewed as the "safety net" for patients, brought in to help resolve issues beyond the reach of standard health services, but not provided adequate resources or staff. One CHR manager explained how the health care system would benefit from greater CHR integration and involvement in primary and preventative care:

> *So, they [the providers] will end up connecting with a CHR, but it always happens after the fact. […] if the CHR was actually integrated into the system, their response time would be much quicker, the patients would get quality care, they would get more out of communication with the provider. So, I think that's a misstep on health care systems.*

In spite of these barriers, CHR managers identified several strategies for improving CHR integration, described in the following section.

Opportunities for Improving CHR Integration

CHR managers discussed their efforts to address misunderstanding and misperceptions of CHRs among health system staff. To combat the volatility of frequent staff turnover, CHR managers actively worked to formalize communication and referral processes and advocated for their programs with health system leadership to improve CHR integration. One CHR manager who is relatively new to the position, described their efforts to bolster their program's sustainability:

> *There's a lot of informal right now. Even on our referral process, so we really need to put that in black and white … I started advocating on behalf of the workforce, letting them know that we are an untapped resource yet we go into the community, we're boots on the ground, we are in the villages, week to week, and we know what's going on out there and we're able to assist.*

Another CHR manager suggested that CHR programs could use their position as the health care system's "safety net" as a point of leverage in building relationships with health system leadership and advocating for more resources. Several CHR managers pointed out that the responsibility for changing the current conditions should not fall exclusively to CHR programs. One CHR manager explained how IHS could proactively address the lack of knowledge about CHRs by requiring an orientation to Tribal programs for all new staff:

> *I think there just needs to be some type of introduction to the Tribal programs. Especially the CHRs, so they can get a better idea and sense of how we're more of a resource for them, you know what I mean. I think that's something that needs to be changed and maybe integrated into IHS. I don't think they have a good understanding sometimes of what the CHRs are there for and how we can actually help them.*

CHR managers also frequently mentioned challenges related to the RPMS reporting system and expressed a desire for their CHRs to have access to the EHR. EHR access would allow CHRs to enter notes and vital information for providers to consider in patient care, provide a standardized trackable referral system, and improve CHR services by allowing them to review patient charts. One CHR manager described how EHR access has improved and facilitated the referral and information sharing processes with their 638-health care facility. They explained that while CHRs had been limited to basic data entry into the RPMS, with the EHR they are now able to more fully understand and contribute to their clients' care:

> *And so now they have the capacity to read and understand what's going on with their patients, do some good chart reviews, that kind of thing about what's going on and we're actually starting to train them to put notes in. Because if they're doing the work, we shouldn't be getting in the way of them talking about what they saw and observed.*

DISCUSSION

CHRs are a highly trained, well-established standardized workforce serving the medical and social needs of American Indian communities. In Arizona, through a robust partnership across Tribal CHR Programs and key advocates in American Indian health policy, the CHR workforce remains coordinated and strong. CHR core roles and competencies make them a valuable member of the public health and healthcare system serving American Indian communities with the training,

cultural, linguistic, and traditional knowledge to play a critical role in care coordination and case management. The degree to which each CHR program is integrated with the IHS/638 system is largely determined by the communication and information sharing practices in place. A significant barrier to full integration of CHRs into the health system is the common lack of understanding among IHS/638 staff of the roles of CHRs and the lack of formal protocols for communication and information sharing. CHR managers are actively involved in efforts to increase CHR-health system integration by educating partners about the CHR program, building relationships with IHS/638 leaders and advocating for greater CHR participation in teams. CHR managers identified two ways that IHS could improve CHR integration: first, to require an orientation for new staff to all Tribal programs; and second, to provide CHR programs with access to the EHR system to facilitate communication and care coordination between CHRs, providers and programs. Based on the workforce assessment results, the Arizona CHR Movement developed the following policy and environmental and systems recommendations to strengthen the CHR workforce in Arizona and nationally: (1) Increase awareness and acceptance of CHRs among the health care team by mandating orientation to CHR workforce competency, roles, and responsibilities for all medical and public health care staff; (2) Engage CHR Programs to establish a comprehensive evaluation system; (3) Establish procedures and policies for integrating CHRs as a functioning member of the health care team; (4) Establish a mechanism for reimbursement of CHR activities through state and federal Centers for Medicaid and Medicare; (5) Establish formal mechanisms for data collection and communication between CHR and public health and health care systems to ensure coordination of care and referrals among shared clients and patients; and (6) Support opportunities for CHRs to attain CHW voluntary certification through the state of Arizona. Nationally, the CHR workforce has earned the right to understand their collective workforce and its impact on the patient and population level health of the communities they serve. As a workforce, CHRs deserve to understand and plan for the financial, training, and workforce development of the next 50 years.

Conceptual or Methodological Constraints

Experiences and case studies presented here do not necessarily present a complete picture of the range of CHR Program structures, activities, and health system relationships. Additionally, our analysis of existing CHR scopes of practice, job descriptions, and job announcements and conversations were limited to those CHR Programs of Arizona able to participate at the time of the assessment. Therefore, our analysis was restricted to what was outlined in the documents submitted by the CHR Programs, with some CHR Programs' documents more and less comprehensive, which may have resulted in under reporting of CHR roles and services, and or the lack of detail on roles and services unique to the CHR workforce. This assessment does not reflect CHR Programs in other IHS Service Areas or CHRs employed in non-IHS 638 Programs, such as Urban Indian Health Centers and or not-for-profit agencies serving American Indian populations. Despite these limitations, this workforce assessment is strengthened through its highly collaborative approach to data collection and interpretation of results by CHR Programs and American Indian health policy experts.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because original data is reported in publicly available reports only. Requests to access the datasets should be directed to https://nau.edu/cher/community-health-workers/.

AUTHOR CONTRIBUTIONS

SS and LO'M lead the writing of the community case study. KR and CH provided detail review and supported the development of public health policy recommendation. BB, JH, JN, and M-GB participated in the development of the workforce assessment protocol, and including its focus and conversation guides. Each contributed to the interpretation of original community health representative workforce assessment results and provided detail review of reports and reviewed the final versions of the community case study. All authors co-conceptualized the community case study based on the original community health representative workforce assessment results and reports.

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A Participatory Curricula for Community Health Workers and Supervisors to Increase HIV Health Outcomes

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Community Health Workers (CHWs) are becoming essential members of the HIV workforce as emerging evidence demonstrates their effectiveness in engaging people with HIV into care and treatment. In 2018, among the estimated 37,000 persons who received an HIV diagnosis, the majority were from racial ethnic minority communities. CHWs serve as a bridge between the community and health care system and have the potential to address structural inequities and reduce the stigma, discrimination and other barriers that prevent people with HIV from seeking and staying in care and treatment. Effective CHW integration into the HIV primary care team requires a training and supervision system that is culturally responsive to the complex social and medical needs of people with HIV. This article describes a comprehensive training approach and curricula for CHWs and supervisors and its impact on the health care team. Grounded in a Popular Education model and using the CHW core consensus competency (C3) framework, a team of experts in HIV, training and supervision, including CHWs working in HIV care and treatment developed an 80-h CHW and 20-h supervisor curricula. The trainings were delivered via in-person and virtual sessions over the course of 2 years. Using a mixed method evaluation, 23 CHWs and 22 supervisors across 10 clinic sites in eight states participated in the training sessions. Measures included knowledge and confidence related to HIV-specific content, supporting clients with managing stigma and discrimination, ability to communicate with other team members and helping clients navigate the services system. CHWs reported improved skills with documentation in the electronic health record, helping clients with treatment adherence challenges and educating on lab results. Supervisors reported learning strategies for assigning clients to CHWs, self-care techniques, providing strengths-based feedback, and mentoring and coaching. The participatory practice-based curricula allowed supervisors and CHWs to share experiences and solicit input from peers for problem resolution and implementation

of new policies and practices. This training approach focused on HIV specific content with core competency training could serve as a model for CHWs working in primary care settings and with populations experiencing multiple chronic health conditions and social needs.

Keywords: community health workers, training, supervision, capacity building, HIV Education

INTRODUCTION

An estimated 1.2 million people are living with HIV in the United States, with racial/ethnic minority communities experiencing the greatest burden. In 2018, among the 37,000 new diagnoses, 47% were from Black/African American communities and 23% were Hispanic/Latinx. (1) Despite new advances in treatment, only 61% of people with HIV are virally suppressed. To address these inequities and reduce new infections, the National Plan to End the HIV Epidemic and the recently updated National HIV Strategy focus on using community-based interventions to reduce new infections among people at risk for HIV and expanding treatment access for people with HIV by 2025. (2) Community Health Workers (CHWs) can play an integral role in reaching those goals. There is emerging evidence that CHWs, including patient navigators and peer educators, as members of the HIV workforce can effectively link and retain people with HIV in care and improve viral suppression. (3, 4) By functioning as a bridge between the community and health care system, CHWs have the potential to address the structural inequities and reduce the stigma, discrimination and other barriers that prevent people at risk for and living with HIV from seeking and staying in care and adhering to treatment. (5) Though prior studies demonstrate the potential of CHW support services to improve HIV outcomes, few resources exist to guide the process of integrating CHWs into care teams in a clinical setting.

Effective integration of CHWs into the HIV primary care team requires a training and supervision system that is culturally responsive to the complex social and medical needs of the HIV population. (6–13) Challenges to integration are attributed to lack of clearly defined CHW roles as member of a care team, limited reimbursement by insurers, and limited or no access to resources to gain knowledge and enhance skills to carry out their services unlike other health professional programs. (14–18) There are CHW certification programs in the US which can enhance the credibility of the CHW role. (19, 20) New training programs such as ECHO, a distance learning program that has been applied to obesity prevention and addiction management training, offer promising models and approaches specifically for continuing education in specialty areas. (16, 17) Current studies on CHW training have emphasized the importance of competency-based training programs tailored to skills, workplace settings, and CHW scope of practices (21–23).

In HIV care, there is limited information about standardized training curricula and programs for CHWs as part of the HIV health care workforce. National HIV training programs have focused on the clinical care workforce, rather than non-clinical support staff such as CHWs, using on-line sessions to improve HIV knowledge and updates on treatment as well as preceptorships and mentoring programs for managing and treating patients with HIV. (24) While there is no literature focused on general CHW training in HIV care, there are limited studies focused on training programs for developing a system of peer educators. Previous studies found the importance of strengthening the knowledge and skills of people with HIV to serve as peer educators in the HIV clinical team. Key elements for these training programs include building competencies on HIV knowledge and treatment, identifying the peer roles in the HIV care team and enhancing communication skills. (25) Lessons learned from these national training programs also point to the need for continued education on topics and financial support for training and instruction about how to include peers as part of a training and education team.

In 2016, the Health Resources and Services Administration funded a 3 year project: *Improving Access to Care: Using Community Health Workers to Improve Linkage and Retention in HIV Care*. (26) The project provided training, technical assistance and funding to 10 Ryan White-HIV/AIDS Program funded agencies to enhance the integration of CHWs into the care team. The sites were located in eight states across the US. Seven sites served a predominantly urban population while three served a predominantly rural catchment area. Details of the funded sites are published elsewhere. (3) This article describes the national, comprehensive training approach and curricula for CHWs and their supervisors delivered to support effective integration of CHWs into the HIV health care team. Results and lessons learned on CHW and supervisors skills and impact on the health care team are provided. The findings and recommendations provide implementation strategies and mechanisms to enhance CHW efforts as part of the HIV and primary care workforce.

PEDAGOGICAL FRAMEWORK AND METHODS

The pedagogical framework for the training program was grounded in Popular Education (26) and the Community Health Worker Core Consensus (C3) Project's core competencies for CHWs. Popular Education, a social movement founded by Brazilian educator and philosopher Paolo Freire, focuses on empowerment and social justice to reduce inequities. (27) Its principles include acknowledging participants as active in their own learning process and using their lived experience to build knowledge and take action. In this approach, the goal of training and education is for participants to be active change agents in their communities to resolve problems and improve their

lives. This approach has increasingly been adopted into health promotion programs and emerging evidence has demonstrated its effectiveness in improving health outcomes (28, 29).

The C3 Project developed a list of 10 core CHW roles and 11 core skills to describe the scope and practice of CHWs, including in the health care team. (29) Although the C3 Project was not focused specifically on HIV care, the roles and skills provide a framework for developing the CHW's role. The training curricula was informed by these core competencies and were mapped specifically for the role of the CHW in the care team in supporting a person with achieving each outcome along the HIV care continuum: linkage to care, retention in care, adherence to treatment and viral suppression (30).

A team of nine experts in HIV, education, training, supervision and practice developed and implemented both curricula. By profession, the team represented two professional trainers for state CHW training programs, two professional trainers and organizational experts in HIV for clinicians and non-clinicians, two CHW supervisors working in HIV clinical care settings and two CHWs currently working as part of HIV health care teams for city or county health departments. The director of the team was an University faculty member with substantial experience in HIV and peer and CHW training. Three members of the team were persons with HIV. Once the curricula were developed, a team of outside experts reviewed and provided feedback before implementation. This seven person review team consisted of one HIV primary care physician, three CHW and HIV program directors and three CHWs working non-HIV chronic health conditions.

The curricula included 80 h for CHWs and 20 h for supervisors. **Tables 1**, **2** describe the topics and hours for each curriculum. In line with the principles of Popular Education, the training modules were designed to be learner-centered with content and activities designed to engage in discussion and address the structural inequities contributing to the HIV epidemic, such as racial, gender, sexual orientation and economic disparities. CHW participants engaged in approximately 16 h of HIV-based content to educate and support persons with HIV. This included HIV basics; the HIV life cycle and its treatment; managing stigma and disclosure associated with HIV; gender identity, sexual orientation and other factors that contribute to discrimination; and the impact of living with a mental health or substance use disorder on HIV treatment adherence. CHW participants also received training on strategies to support treatment adherence and harm reduction to promote healthy behaviors. In addition to the HIV knowledge base, CHWs received 64 h of training focused on CHW core competencies and skills, including communication, interpersonal relationship-building, service coordination and navigation, capacity building, advocacy, education and facilitation, individual and community assessment, outreach, professional skills and conduct, and evaluation and research skills. The training program was augmented with specialty topics such as addressing intimate partner violence, supporting clients in crisis and a trauma informed care course.

The supervisor curriculum included training on administrative and clinical supervision for CHWs and care team members, mentoring and providing feedback, conflict resolution and orienting health care team members to the role of the CHW. Supervisors were also invited to participate in HIV training sessions to learn strategies and techniques for promoting treatment adherence and support with stigma and disclosure. Both CHWs and supervisors received training on the role of the CHW in the health care team and strategies for working as part of an interdisciplinary team. Cultural humility and trauma informed care were also key modules for both the CHWs and supervisors. Each training session also incorporated "dinamicas" (movement exercises) and self -care techniques, usually 30 min activities, which included yoga or use of affirmations with the group that CHWs could use for themselves or with clients as a way of coping and managing the stress in their lives due to their HIV status.

LEARNING ENVIRONMENT AND TRAINING MODALITY

The training curricula were delivered over the course of 1.5 years from September 2017-January 2019 via in-person and virtual sessions. The initial core training (September 2017) included 5 days (∼40 h) for CHWs and 2 days (approximately 16 h) for supervisors. The initial program focused on the HIV core content, the CHW role in care teams, working in teams effectively, motivational interviewing skills, cultural humility and trauma informed care. CHWs and supervisors participated in sessions both together and separately as noted in **Tables 1**, **2**. Following the initial program, a detailed schedule and courses were mapped to deliver content via 1–3 day in-person sessions (December, 2017, April and July 2018, January 2019). In between the in-person sessions, virtual training sessions were conducted for approximately 60–90 min in length to complete the 80-h program for CHWs. Supervisors were invited to attend virtual sessions. The training team mapped training content to modality (virtual vs. in-person), prioritizing topics for interactive dialogue and group skills (motivational interviewing skills to promote treatment adherence, trauma informed care, facilitation skills) for in-person and subject matters such as assessment, evaluation and research and content (IPV) for virtual sessions. The in-person training sessions were conducted in conjunction with "Learning Collaborative Sessions" which focused on organizational capacity building and opportunities for the 10 sites to share innovations and challenges with integrating CHWs into the care teams and agencies. The lessons from the learning collaborative sessions are detailed in a final implementation manual: https://targethiv.org/chw (31). All participants were awarded certificates of completion based on the number of training sessions completed.

The training team met monthly to discuss training content, logistics and plan for modifications and adjustments to the sessions. After each in-person session, the training team debriefed to discuss adjustments to the agenda, groups dynamics

TABLE 1 | HIV core topics and hours completed by CHWs and supervisors.

Training topics	Time (min) o training	C3 Core competency	Participants
Introduction to social determinants of health	15	Knowledge base	CHWs
Introduction to community health work in the context of the HIV care continuum	15	Knowledge base	CHWs
HIV treatment cascade/care continuum	15	Knowledge base	CHWs
HIV 101	45	Knowledge base	CHWs
HIV viral life cycle	60	Knowledge base	CHWs
Viral cycle: medication	60	Knowledge base	CHWs
Adherence, labs, resistance	90	Knowledge base	CHWs
PEP, PrEP, and TASP	40	Knowledge base	CHWs
Multidisciplinary care teams: how a CHW fits Into an HIV care team	30	Knowledge base	CHWS & supervisors
Stigma and discrimination	60	Knowledge base	CHWs
HIV and other co-morbidities	60	Knowledge base	CHWs
HIV 102: sexual health	45	Knowledge base	CHWs
Addressing medication adherence and treatment parts 1 & 2	120	Knowledge base	CHWs & supervisors
Promoting medication adherence	75	Knowledge base	CHWs
Support for managing HIV disclosure	60	Knowledge base	CHWs & supervisors
Sexual health let's talk about sexuality	75	Knowledge base	CHWs
Supporting clients with disclosure	75	Knowledge base	CHWs
Intimate partner violence*	90	Knowledge base	CHWs
Medications & drug interactions*	60	Knowledge base	CHWs
HIV and aging*	60	Knowledge base	CHWs
HIV and substance use*	60	Knowledge base	CHWs

**Denotes a Virtual session. All other session were in-person.*

and strategies to improve the learning environment. Experienced trainers in adult learning principles and Popular Education paired with new CHW trainers and/or HIV content experts to enhance activities and encourage a participatory and learner-centered approach.

TRAINING EVALUATION METHODOLOGY

A mixed-methods evaluation was designed to assess the impact of the training on CHW and supervisor skills and confidence in applying those skills. All in-person sessions used a pre-posttest design with follow up assessments completed at 1 and 3 months post-training. The assessment consisted of 19 items across three domains: (1) HIV-related content including educating about the viral life cycle, knowledge of treatment and medication side effects and supporting clients with stigma and disclosure; (2) competency in using motivational interviewing and trauma-informed care techniques and (3) tasks and responsibilities as a member of the health care team including communicating with providers about clients, boundaries and self-care. Each item was scored on a 5-point Likert scale, with 1 = low confidence and 5 = high confidence. In-person and virtual trainings consisted of a qualitative methodology of four questions immediately post-training. The four questions were: (1) What information covered today were most impactful/helpful? (2) What information do you wish we covered? (3) What three things worked well today? (4) What three things could be improved?

Descriptive analysis was used to assess trends in changes in CHW confidence over time from the pre-, post-test survey. Thematic content analysis was used to describe the impact on participant knowledge and application to their role as a CHW or supervisor, and for lessons learned for continuing education.

RESULTS

The program trained a total of 23 CHWs and 22 Supervisors across the 10 sites. The majority of the CHWs were female (16), Black (17) or Hispanic (3) or other multiracial group (3) and had some college or post-secondary education (20). While data on participant HIV status was not formally collected as part of the evaluation, nine participants voluntarily disclosed that they were a person living with HIV during the project. Most had experience working in HIV and 45% were new to working in the CHW role. Supervisors were predominantly female, and identified as Asian (1), Black (15), Hispanic (2) or other non-white identity (1) and had graduate degrees (15). While the majority had been in a supervisory role for >3 years, fewer reported experience in the field of HIV. **Table 3** describes CHW and supervisor characteristics.

Twelve CHWs completed the 80-h training program; 11 did not complete it. The range of hours completed was 23–80 h. The most common reason for lack of completion was due to CHWs leaving their agency for other positions or educational opportunities. Three supervisors completed the 20-h supervisor program and 38 h of additional sessions offered through the CHW 80 curricula. The range across supervisors was 7–58 h of training. The most common reason for lack of completion was competing clinic responsibilities and challenges with traveling to attend in-person sessions.

TABLE 2 | CHW core competencies and skills and hours completed by CHWs and supervisors.

Topics and session	Training hours	Core competencies (C3)	Participants
Background and information about training	20	Providing culturally appropriate health education information	CHWs & supervisors
Trust building	30	Providing culturally appropriate health education information	CHWs & supervisors
Introduction to popular education	40	Providing culturally appropriate health education information	CHWs & supervisors
Who are community health workers? History, roles, skills, and qualities	80	Providing culturally appropriate health education information	CHWs & supervisors
What does it mean to be a CHW supervisor	90		Supervisor
Defining a multi-disciplinary team	30		Supervisor
Communicating with staff and CHWs	60		Supervisor
Orienting team members: advocacy for CHWs as part of the care team	35		Supervisor
Supervision frequency, types, modes	70		Supervisor
Providing feedback and mentoring	60		Supervisor
Trauma Informed supervision	60		Supervisor
Establishing and supporting boundaries and confidentiality	75		Supervisor
Recognizing transference and countertransference	45		Supervisor
Establishing and promoting the importance of self care	30		Supervisor
CHW and multidisciplinary teams	30		Supervisor
Explaining CHW role to multi-disciplinary care teams	30		Supervisor
Challenges and solutions to working on a team	45		Supervisor
Prioritizing and organizing your time as a CHW	60	Care Coordination, Case Management, System Navigation	CHWs & Supervisors
Patient navigation*	60	Care coordination, case management, system navigation	CHWs & Supervisors
Documentation skills*	40	Care coordination, case management, system navigation	CHWs & Supervisors
Care planning*	60	Care coordination, case management, system navigation	CHWs & Supervisors
Case conferencing on multi-disciplinary teams	60	Care coordination, case management, system navigation	CHWs & Supervisors
Successes and barriers to collaboration	30	Care coordination, case management, system navigation	CHWs & Supervisors
Appropriate and workable boundaries	30	Professional skills & conduct	CHWs & Supervisors
Professional boundaries & ethics*	60	Professional skills & conduct	CHWs & Supervisors
Boundaries & confidentiality II	90	Professional Skills & Conduct	CHWs & Supervisors
Building a community network *	30	Advocating for individuals & communities	CHWs & Supervisors
Evaluation overview of project	45	Participating in evaluation and research	CHWs & Supervisors
Community based participatory research & assessment*	90	Participating in evaluation and research	CHWs & Superivsors
Wrap up reflections & self-care	90		CHWs & Supervisors
Crisis intervention & prevention	210	Providing coaching and social support	CHWs & Supervisors
Harm reduction	120	Providing coaching and social support	CHWs & Supervisors
Motivational interviewing II	60	Providing coaching and social support	CHWs & Supervisors
Medication adherence II	60	Providing coaching and social support	CHWs & Supervisors
Outreach to engage and retain hard to reach populations*	120	Conducting outreach	CHWs & Supervisors
Protecting personal safety	20	Conducting outreach	CHWs & Supervisors
Medication and treatment II	60	Providing coaching and social support	CHWs & Supervisors
Motivational Interviewing and active listening practice	60	Providing coaching and social support	CHWs & Supervisors
Understanding empathy through the lens of cultural humility	60	Cultural Mediation among individuals, communities and health service systems	CHWs & Supervisors
Trauma-informed care	180	Cultural Mediation among individuals, communities and health service systems	CHWs & Supervisors
Strengths-based feedback	105		Supervisor
Managing conflict and difficult conversations	60		Supervisor
Open forum	75		Supervisor
Guided movement -self-care techniques	15		Supervisor
Self-care/stress management techniques for self and team	80		Supervisor
Practicing self-care techniques	25		Supervisor
Popular education principles: education and facilitation skills	60	Providing culturally appropriate health education information	CHWs & Supervisors
Popular education methods and workshop preparation	60	Providing culturally appropriate health education information	CHWs & Supervisors

(Continued)

TABLE 2 | Continued

Topics and session	Training hours	Core competencies (C3)	Participants
Use of public health concepts and approaches*	120	Providing culturally appropriate health education information	
Leading groups and facilitation skills	60	Providing coaching & social support	CHWs & Supervisors
Facilitation challenges	45	Providing coaching & social support	CHWs & Supervisors
Advocacy skills	60	Advocating for individuals & communities	CHWs & Supervisors
Formal avenues of advocacy	60	Advocating for individuals & communities	CHWs & Supervisors
Empowering leadership	90	Building individual and community capacity	CHWs & Supervisors
Team building skills to support integration	60	Care coordination, case management, system navigation	CHWs & Supervisors
Communication as part of a team	90	Cultural mediation among individuals, communities and health service systems	CHWs & Supervisors

**Denotes a Virtual session. All other sessions were in person.*

TABLE 3 | CHW and supervisor characteristics ($n = 45$).

	Community health workers ($n = 23$)	Supervisors ($n = 22$)
Gender		
Male	7 (30%)	1 (3%)
Female	16 (70%)	21 (97%)
Race/ethnicity		
Asian	0 (0%)	1 (4.5%)
Black/African-AmericanHispanic/Latinx	17 (74%) 3 (13%)	15 (68%)2 (9.0%)
Other	2 (10%)	1 (4.5%)
Multiracial (Black-Native American)	1 (3%)	0 (0%)
White	0 (0%)	3 (14%)
Primary language		
English	20 (87%)	22 (100%)
Spanish	3 (13%)	0 (0%)
Primary education		
High school/GED	2 (9%)	0 (0%)
Some college/post college	14 (61%)	4 (17%)
College graduate	3 (13%)	3 (13%)
Graduate school/professional school	3 (13%)	15 (70%)
Other	1 (4%)	0 (0%)
Years in position (mean, range)	2.6 (1–5)	
Years at the organization (mean, range)	3.0 (1.5)	
Years working in HIV	< 3 year 3 (15%)	<3 years 7 (31%)
	More than 3 years 20 (85%)	3 or more years 15 (69%)
Years of experience in role CHW/supervisor (mean, range)	2.9 (1–6)	<3 years 3 (15%)
	New (<1 year) 10 (45%)	3 or more years 19 (85%)

Changes in CHW and Supervisor Skills and Confidence as Part of the HIV Care Team

Post-training results found improvements in self-reported general HIV knowledge among the CHWs and educating clients specifically about HIV treatment and viral suppression. Greatest improvement was reported related to providing trauma-informed care to clients (mean 3.7–4.5). Confidence in communicating needs to administrative and supportive supervisors decreased slightly in the post period (4.8–4.7). Overall participants reported high confidence in applying information from the training in their daily work in the post period (**Tables 4A,B**).

Similarly, supervisors reported improvements in understanding HIV topics and being able to support CHWs in their work with clients. Confidence in providing-trauma-informed supervision had the lowest mean score although it improved over time (3.67–3.8). Supervisors also reported increased confidence in their ability to support and advocate for CHWs as part of the care team (**Tables 4A,B**).

TABLE 4A | Changes in CHW confidence from initial 40-h HIV training (mean, SD).

Item 1 = low, 5 = high	Pre-test *N* = 11	1 Month post-test *N* = 8	3 Months post-test *N* = 9
General HIV/AIDS knowledge*	4.45, 0.69	4.88, 0.35	4.56, 0.73
Comfort explaining the HIV virus to a participant	4.64, 0.92	4.88, 0.35	4.78, 0.44
Confidence in your ability to explain the importance of medication adherence and viral suppression to your participants	4.73, 0.65	5, 0	4.89, 0.33
Understanding of your roles as a CHW within the HIV care team	4.27, 1.79	5, 0	5.11, 1.54
Confidence in your ability to explain how your role as a CHW impacts the HIV care continuum*	4.27, 1.79	4.88, 0.35	4.44, 0.53
Understanding of PrEP, PEP, and Treatment as Prevention (TasP) and who can benefit from it*	4.09, 0.54	4.88, 0.35	4.67, 0.50
Confidence in understanding your role and tasks as a member of the HIV care team	4.27, 0.79	5, 0	4.22, 0.83
Confidence in your ability to provide trauma informed care to participants*	3.73, 0.79	4.5, 0.76	4.33, 86.7
Confidence in your ability to use motivational interviewing techniques with participants	4.18, 0.75	5, 0	4.33, 0.71
Confidence in your ability to manage your time as a CHW, including your case load	4.45, 1.63	5, 0	4.89, 1.69
Confidence to document your work with participants in the electronic health record*	4.18, 1.40	4.88, 0.35	4.89, 0.33
Confidence in your ability to communicate about participants with other members of the HIV care team in your organization	4.81, 0.40	4.88, 0.35	4.67, 0.50
Comfort communicating your needs to your administrative and supportive supervisors	4.81, 0.40	4.75, 0.71	4.22, 1.09
Confidence in your ability to maintain appropriate boundaries with participants	4.64, 0.67	4.88, 0.35	4.44, 0.53
Confidence in your ability to create time and space for self-care throughout your work	4.55, 0.69	4.75, 0.71	3.89, 1.05
Skills creating partnerships with other community members and stakeholders	4.81, 0.40	5, 0	4.67, 0.50
Comfort in helping participants to address and manage stigma and disclosure related to HIV or other conditions	4.73, 0.47	5, 0	4.44, 0.73
Overall satisfaction with the CHW training	-	5, 0	4.78, 0.44
Confidence in your ability to apply what you learned in the CHW training at work	-	5, 0	4.89, 0.33

**statistically significant.*

Impact on Knowledge and Skills to Strengthen Care for People With HIV

Three key themes that emerged from the open-ended questions in the post-training evaluations: (1) new information and content related to HIV, (2) new techniques and skills to work with clients on HIV or during supervision, and (3) recommendations to the training team related to training modalities for the HIV workforce. Below we describe the most frequently reported themes from these areas and examples of narrative quotes from CHW and supervisors.

***Learning and applying HIV content in their work with clients*:** CHW participants described the importance of learning new information about HIV and the viral life cycle, for whom and how HIV medications and PrEP work, and treatment as prevention. CHWs also mentioned the usefulness of how to look up resources and tailor information for their clients. One CHW reported:

"I used the knowledge of medications of HIV by looking up the chart and checking medications and also learning what works for some people may not work for others as far as different medications."

Other CHWs reported they used the exercises on how to explain and educate clients about HIV. As one participant described: *"…For me utilizing lab results to explain to clients effectively a better understanding of the stages of HIV, the life cycle of HIV and what it all means.."*

CHWs and supervisors also found it useful to learn about the HIV care continuum and share this information with clients. While many CHWs and supervisors were familiar with each stage, learning to assess where clients were in the care continuum and potential challenges were essential to helping clients with self-efficacy to enter care, treatment adherence and ultimately in reaching viral suppression. The training also provided motivational techniques and affirmations to clients for continued success.

TABLE 4B | Changes in supervisor confidence from initial 16-hour training (mean, SD).

Item 1 = low, 5 = high	Pre-test *N* = 12	1 month post-test *N* = 9	3 months post-test *N* = 5
General HIV/AIDS knowledge	4.83, 0.39	4.78, 0.44	4.60, 0.55
Comfort identifying and addressing stigmatizing behavior in the HIV care setting	4.75, 0.45	4.56, 0.53	4.80, 0.45
Confidence in describing CHW roles and skills	4.17, 0.84	4.45, 0.53	4.60, 0.54
Confidence in your ability to describe the CHW role on the HIV care team within your organization	4.25, 0.87	4.45, 0.53	4.60, 0.54
Confidence in your general ability to adequately supervise a CHW who is part of the HIV care team	4.5, 0.80	4.56, 0.53	4.60, 0.54
Confidence in your ability to provide trauma informed supervision	3.67, 0.78	3.78, 0.67	3.80, 0.45
Confidence in your ability to promote self-care for the CHWs you supervise	4.50, 0.52	4.56, 0.53	4.80, 0.45
Confidence in your ability to maintain appropriate boundaries with CHWs you supervise	4.67, 0.49	4.67, 0.50	5.00, 0
Confidence in your ability to provide feedback to your CHWs you supervise	4.67, 0.49	4.78, 0.44	4.80, 0.45
Confidence in your ability to recognize countertransference in yourself during CHW supervision	4.00, 0.85	4.45, 0.73	4.40, 0.55
Confidence in your ability to recognize transference in a CHW during supervision	4.00, 0.85	4.45, 0.73	4.20, 0.55
Confidence in your ability to advocate for CHWs on your HIV care team	4.67, 0.49	5.00, 0.00	4.08, 0.45
Overall satisfaction with the CHW supervisor training	-	4.67, 0.50	4.80, 0.45
Confidence in your ability to apply what you learned in the CHW supervisor training at work	-	4.78, 0.44	4.80, 0.45

New techniques and skills to work with clients and during supervision: *One* of the most frequently mentioned new skills for CHWs was on *documentation and care planning* for clients as part of the HIV care team. CHW participants described the importance of learning how to document their work with clients in charts and differentiating between information that might be mandatory for health records vs. what is unnecessary to protect a client's privacy. As one CHW reported... *"I appreciated the tips on how to write a specific note using the SOAP technique. This gave me example of how I can keep a record of what we did with a client."*

Implementing Motivational Interviewing and self-care skills: Using motivational interviewing (MI) skills such as active listening and avoiding assumptions were reported as useful skills in working with clients in the post training period. A CHW reported that MI helped them learn how to effectively transition clients to another team member and also how to manage client: "*I used to take resistance personal but I don't do that anymore… I learned to be able to handle tough situations with patients, i.e., when they aren't responding to your questions right in front of you."*

Self–care techniques were often most frequently mentioned as useful and applied in CHWs' daily work for themselves or clients. As one CHW reported: "*Self-reflection has been a major part of my life since this training, also MI,*" and another described*: "my self-care has improved by turning the work cell phone completely off after business hours…"*

Supervisors similarly reported being able to implement self-care techniques for their staff and using reflective communication as a tool to help CHWs manage their work with clients and the stress in their lives.

Trauma-informed care and supervision: Both CHWs and supervisors frequently reported the importance of and continued training and support on trauma-informed care techniques. In the initial training, few participants had heard of this approach and its importance in working with clients with HIV.

CHW scope of practice within the care team: Supervisors were able to apply techniques from the trainings to provide encouragement and feedback to CHWs and support a healthy CHW-client relationship. Supervisors reported learning communication techniques to support CHWs as valued members of the team and ensure integration into the care team. One supervisor reported *"The training helped me to tailor my supervisory approach to the needs of the CHW which are different from my existing staff who do clinical work (and) are mostly trained mental health professionals."* Another reported: *"I was able to use my knowledge and understanding of the CHW role to inform other workforce members and community partners (about the role) while at the same time providing support to my CHW*." From a CHW perspective, one participant described the training as "*…helpful in providing valuable insight and practice on preparing and addressing resistance about the CHW role from other members of the team.*"

Recommendations on the training modality: In addition to new information learned and the application of skills, themes also emerged about the delivery of content for the HIV workforce. Both CHW and supervisors reported the *usefulness of individual*

and joint sessions between CHWs and supervisors. CHWs reported the individual sessions were important to have time to talk with other CHWs about ways to effectively communicate needs with their supervisors. For supervisors, this was the first time receiving training and being in a group with other colleagues to talk about supervision techniques. They described the value of training in learning from their peers on how to provide direct, honest feedback and coaching with supervisees to help move them forward with their relationships with clients and other team members. The joint CHW-supervisor sessions then allowed participants to practice communication skills as a team, to have a dialogue around CHW integration challenges, and find resolutions together in a safe environment with others experiencing similar challenges. Finally, the supervisors and CHW participants appreciated the interactive nature of the training sessions which allowed participants to share current client cases, use and demonstrate self-care techniques, and role play scenarios so participants could *"see in real time how problems can be addressed..."*.

DISCUSSION

There is increasing need for evidence-based training tools and materials to strengthen CHW HIV workforce both in US and international settings. UNAIDS declared a need to train 2 million CHWs in Africa as part of the plan for ending AIDS and ensuring sustainable health for all across the continent. In order to scale up and reach this goal, the agency calls for the widespread use and adaptation of training resources to support the CHW workforce and other health care workers to minimize professional resistance. (32) In the US, the National HIV/AIDS Strategy 2021–2025 explicitly calls for the use of CHWs, including peer navigators, as part of the public health workforce and health care delivery system to effectively identify, diagnose, and provide holistic care and treatment for people with HIV to increase viral suppression rates. (2) Our curricula contribute to this body of knowledge providing both HIV content and other core CHW competencies and skills, such as cultural mediation, service navigation and coordination, individual and community assessment and educational support for people with HIV. A unique aspect of our model was including training for CHW supervisors that was specific to an HIV care environment.

In addition, the article presents a participatory process and implementation of comprehensive CHW and supervisor training curricula and program for integrating CHWs into the HIV care team to improve care and treatment access for newly diagnosed and out of care people with HIV. The curricula were developed and delivered by a team of CHWs and supervisors working in HIV care and professionals in training and organizational development. This interdisciplinary team helped to create a practical learning experience with real world examples to build the capacity and skill of CHWs and supervisors working with clients with complex morbidities and competing medical and social needs. The curricula used innovative methods grounded in Popular Education to create both in-person and virtual sessions focused on HIV and CHW core competency skills. A recent systematic review of CHW training programs in African–American and Latinx communities found a continued need for creating and disseminating training programs grounded in evidence-based approaches to engage these communities and rigorous evaluation designs that directly link CHW training programs to health outcomes. (33) The development and approach of these curricula focused on and included people with HIV from racial/ethnic minority communities. The results from this training program contribute to the body of evidence on CHW competencies in both primary health care and HIV specialty care and may be replicated for other chronic disease conditions.

There is limited published information about CHW and supervisor curricula and their impact on CHW skills and team integration. (7, 16, 32, 34) One unique contribution of this work is the theoretical framework and approach. Grounded in the Popular Education model, the curricula provides a framework to deliver content that is learner-based and driven. HIV content was developed and adapted by CHWs and supervisors working in the field and included persons with lived experience with HIV. Cases and problem-solving skills were developed using real life scenarios that CHWs and supervisors were encountering in their practice. This content often included persons with HIV dealing with major barriers to accessing care including stigma related to HIV, sexual orientation, race, and gender identity. Interactive training sessions were provided to encourage dialogue among participants on how to resolve client challenges that would promote linkage and retention in care, adherence to treatment and viral suppression. Results from this analysis indicate that training participants, including those who were experienced in community health work, gained new information that could be relevant and useful in the field.

Another key feature of the curricula was its approach in dismantling silos and enhancing conversation to address power dynamics between CHWs and supervisors and the health care team and people with HIV. The use of joint and individual sessions allowed dialogue between and across roles that is essential in health care teams, which often is hierarchical. Our findings highlight the importance of structured trainings that focus on teamwork skills, highlighting the roles that each team member, specifically CHWs, play in supporting care and treatment adherence. Role playing scenarios, where CHWs can practice educating and explaining in appropriate lay terms how HIV affects a person's immune system and how medications work, was important to new CHWs in learning the role they can play in HIV care. CHWs are well poised to discuss not only the biological dimensions of HIV, but to help clients employ strategies that address their social needs that often impact treatment adherence. These curricula included sessions on communicating effectively in sharing pertinent information with care team members and building client communication skills with health care providers. Having CHWs and supervisors as part of the training team was essential to creating a learner-centered environment and sharing problem-solving techniques to address challenges with the health care system that people with HIV may experience.

The evaluation findings also signal the importance of training members of the care team on the scope and practice of the CHWs. Our curricula include approximately 8 h of joint sessions with CHWs and supervisors on the CHW role, working

as an interdisciplinary team and addressing challenges as a team. Training approaches and methodologies that incorporate opportunities to integrate health care team members and learn about each other's role, unique skills and perspectives are necessary to address economic, social and medical challenges that may hinder viral suppression for people with HIV. Both CHW and supervisors reported the training format and curricula provided an opportunity to network and learn from other peers across the country (35).

Another lesson learned was the role of continuing education on motivational interviewing and trauma-informed practice techniques for CHWs and supervisors. CHWs reported their use of these techniques with clients to address adherence challenges. Self-care techniques, modeling and affirmations used during the training were also replicated in their work with clients.

Virtual training was also feasible to implement but more effective if CHW participants had a webcam and could interact more readily in the group. Our trainings program was implemented prior to the COVID-19 pandemic and given that many health clinics have invested in technology and supported staff to deliver client services via telehealth, CHWs and supervisors may now have greater comfort with remote learning in a post pandemic world. Virtual trainings that engaged participants with brief exercises that practiced skills, provided information on how to look for resources for the clients and engaged group in feedback were more highly received. Specific content areas delivered by experts such as learning about Intimate Partner Violence or sharing tips on documenting information from clients were also effectively delivered in a virtual format.

Our CHW curriculum is not a substitution for certification programs offered in many states for CHWs. However, the 16-h HIV curricula could serve as specialty area training or for CHW continuing education. This was one reason that the CHW curriculum was informed by state certification programs, such as those in Oregon and Texas, and built on the C3 Project core competencies for CHWs.

Finally, a key lesson in designing these curricula was engaging CHWs in the cross-sharing of their varied experiences across the country. The opportunities to share resources, present client challenges for discussion and generate solutions from within the group were critical to a productive learning environment. Approximately 50% of the original cohort completed all 80 h of the curricula, showing the benefit of the training methodology. This training approach, which focused on HIV-specific content with core competency training, could serve as a model for CHWs working in primary care settings and with populations experiencing multiple chronic health conditions and social needs.

Strengths and Limitations of Project

Our training program was developed with a cohort of HIV primary clinics who recognized the need and value to have a CHW as part of the care team. The ten sites had applied for and received funding to support the program. All the programs were Ryan White funded clinics, which have a long history of involving people with HIV in their service delivery as part of this mission and culture. The ten sites represented diverse organizational settings, including federally qualified community health centers and outpatient clinics affiliated with hospital systems. However, our results may not be generalizable and readily replicable to all health care settings, especially those with no previous CHW experience.

In addition, given our small sample size and follow up rate, further study is needed examine the curricula impact on CHW and supervisor knowledge, skills and confidence. The level of training was also supplemented by a learning collaborative and coaching sessions to strengthen collective identities and supportive mechanisms. CHWs met monthly as an affinity group while supervisors met quarterly. Coaching sessions were provided monthly to each of the 10 Ryan White HIV/AIDS Program sites. Coaching sessions were participant-driven, with topics coming from the site staff and facilitated by an organizational training expert. Some example of topics that were discussed included technical assistance needs, program successes, the CHW role, new partnerships to serve the community, and any trainings external to this project that were attended by CHW program staff. This additional time beyond training may have contributed to the ability of CHWs to more readily integrate into the health care team. It was beyond the scope of this evaluation to tease out the effects of the contributions between training and coaching sessions. Future implementation research may assess these strategies separately to elucidate the contributions toward effective CHW integration in the HIV care team.

Finally, ∼50% of the cohort of CHWs and the majority of supervisors completed the entire training program. Creating incentives for both CHWs and supervisors to complete training sessions such as providing continuing education credit, half-day in-person sessions and scheduling virtual sessions during non-clinic hours or days may have improved participation and course completion. Our training curricula promoted professional development and skills such as advocacy skills and empowering leadership. In our supervision curriculum, discussions regarding CHW professional development were also encouraged as part of administrative and clinical supervision. However, the reality of finding opportunities for CHWs to move up within their organizations could be challenging, given funding and agency policies. Another factor contributing ability to complete the full training curricula may be due to the modality of the training. Many of our in-person training were one-day sessions conducted in Boston and occurring just prior to a 2-day learning collaborative to explore organizational integration. For some participants, primarily supervisors, it was challenging to be out of the office and travel out of town for three full days due to competing responsibilities. Thus, some staff elected to miss the training session.

Future Directions for Practice and Research

This training curricula and program contributes to the body of evidence of the training process and strategies for CHWs and supervisors working in primary health care settings. One of the key successes of the curricula was joint sessions between CHWs and supervisors, which enhanced dialogue about promoting client knowledge and decisions about HIV adherence and

treatment, as well as built trust and supportive relationships between care team members. Establishing similar training strategies can improve the quality of care by reducing duplication in services and encouraging clearer scopes of practice between CHWs and other team members. Finally, a further study could also look at the impact of the training on client outcomes such as retention in care.

These CHW and supervisor curricula also highlight the importance of including members on the training team who are CHWs and share gender, race/ethnicity and lived experience. The experiential learning approach grounded in Popular Education led to improved knowledge, skills, and confidence of CHWs and supervisors. Future studies could examine the impact of dose and types of sessions on HIV and other health outcomes.

CONCLUSION

The interactive participatory practice-based curricula allowed supervisors and CHWs to share experiences from the workplace and solicit input from peers for problem resolution and implementation of new policies and practices. This training approach focused on HIV-specific content with core competency training, and could serve as a model for CHWs working in primary care settings with populations experiencing multiple chronic health conditions and social needs.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

AUTHOR CONTRIBUTIONS

SR, LSM, MS, and AB contributed to the conception and design of the study. SR wrote the first draft of the manuscript. LSM, AB, and MS conducted data analysis. BP, JD, AD, SP, LM, PJ, EE, M-LD, and SB contributed to section of the manuscript. All authors contributed to the manuscript revision, read and approved the submitted version.

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BRIEF RESEARCH REPORT
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Formerly Incarcerated Community Health Workers Engaging Individuals Returning From Incarceration Into Primary Care: Results From the Transition Clinic Network

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Over half a million individuals return from United States prisons and millions more from jails every year, many of whom with complex health and social needs. Community health workers (CHWs) perform diverse roles to improve health outcomes in disadvantaged communities, but no studies have assessed their role as integrated members of a primary care team serving individuals returning from incarceration. Using data from participants who received primary care through the Transitions Clinic Network, a model of care that integrates CHWs with a lived experienced of incarceration into primary care teams, we characterized how CHWs address participant health and social needs during interactions outside of clinic visits for 6 months after participants established primary care. Among the 751 participants, 79% had one or more CHW interactions outside of the clinic documented. Participants with more comorbid conditions, longer stays during their most recent incarceration, and released with a prescription had more interactions with CHWs compared to those with fewer comorbidities, shorter stays, and no prescription at release. Median number of interactions was 4 (interquartile range, IQR 2–8) and 56% were in person. The most common issues addressed (34%) were social determinants of health, with the most common being housing (35%). CHWs working in interdisciplinary primary care teams caring for people with histories of incarceration perform a variety of functions for clients outside of scheduled primary care visits. To improve health outcomes among disadvantaged populations, CHWs should be able to work across multiple systems, with supervision and support for CHW activities both in the primary care clinic and within the community.

Keywords: community health worker, incarceration, reentry, primary care, care integration

INTRODUCTION

Over 600,000 individuals return home from prison each year in the United States (US), as it continues to grapple with mass incarceration (1). More return from jails, where about 160,000 individuals on any given day are serving sentences that are less than a year (2). Those incarcerated are disproportionately from poor and racial and ethnic minority populations. Individuals who have experienced incarceration have a higher prevalence of chronic disease conditions compared to their age-matched counterparts who have not experienced incarceration (3–5), with 8 in 10 men and 9 in 10 women in the reentry population reporting at least one chronic condition (6).

Upon release, many individuals return to their communities that are disproportionately experiencing health and social inequities. Returning from incarceration is associated with distinct challenges, such as barriers to securing housing and employment based on one's criminal record, reconnecting with family members, and avoiding reincarceration (7). Health care access is often episodic within the first year following release, mainly occurring through high-cost emergency department visits (8). People returning home from incarceration thus require a community-tailored approach to address the social determinants of health and improve management of chronic health conditions.

The Transitions Clinic Network (TCN) is a national consortium of 45 primary care centers that address the health and social needs of individuals returning from jail and prison (9). Patients are typically those older than 50 years of age or with chronic health conditions, such as physical health conditions (hepatitis C, hypertension, diabetes), mental health conditions (depression, post-traumatic stress disorder, schizophrenia), or substance use disorders (opioid use disorder). The crux of each TCN program are interdisciplinary primary care teams with community health workers (CHWs) with histories of incarceration, who are tasked with identifying and supporting patients returning home from incarceration who are at risk for poor health outcomes. TCN CHWs receive specialized training from the City College of San Francisco through the post-prison healthcare worker certification program administered by the City College of San Francisco to train and professionalize CHWs. The training focuses on the system of mass incarceration, the impacts of incarceration on the health and social needs of returning community members, and the roles of CHWs in providing patient-centered care to these individuals. In clinic, the CHWs use their personal experience of incarceration, their social networks, and awareness of the criminal legal system to bridge knowledge gaps and build therapeutic alliances between the healthcare team and patient populations with high levels of mistrust. They educate the healthcare team about patients' challenges, facilitate patient-provider communication, and help patients navigate and build trust in the medical system. As integrated members of a care team, TCN CHWs also provide essential input on the design of programs and services and advocate for changes in clinic policies and practices to create a more welcoming environment for patients with histories of incarceration.

In addition to supporting patients during clinic visits, TCN CHWs spend a comparable amount of time within the community, where they address social determinants of health, such as housing, food access, or employment, and link patients with community agencies. They play an imperative role as frontline health workers and connect with patients prior to or immediately after release from incarceration, as well as advocate on patients' behalf in interactions with the criminal legal system, especially courts, probation, and parole when appropriate. In general, CHWs provide health education, counseling, social support and advocacy (10, 11). TCN CHWs provide similar functions, guided by their unique understanding of how incarceration impacts chronic health management, and the specific barriers criminal records pose to obtaining housing, food, or employment. Though several studies have described the diverse roles of CHWs (12–14) in caring for disadvantaged patient populations, none have specifically detailed activities of CHWs caring for patients transitioning from incarceration.

Past studies show that receiving care in a TCN program improves primary care engagement and reduces emergency department utilization, preventable hospitalizations, length of hospital stay, and future contact with the criminal legal system (9, 15, 16) as compared to receiving care in standard primary care provider, thus isolating the impact of having a community health worker as part of the primary care team. Further, a qualitative study conducted by a TCN community health worker demonstrated that having a person who is formerly incarcerated serve as a community health worker was critical to patients' forging connections and building trust in the health care system (17). In this brief report, we describe the unique role played by community health workers during their interactions with patients just released from incarceration.

METHODS

Setting and Participants

This study uses data collected on 751 participants that consented to provide information as part of a Center for Medicare and Medicaid Innovation (CMMI) sponsored healthcare innovation project across 11 TCN programs between May 2013 and February 2015 (9). Participants were recently released from prison (within 6 months) and had a diagnosed chronic health condition or were aged 50 years or more.

Data Collection

Participants were administered a baseline questionnaire upon establishing care with a TCN program, which collected data on socio-demographics (age, race/ethnicity, gender, highest education attained), basic needs (housing, food security, and health insurance), medical history, self-reported health, health literacy, and engagement with the health system prior to their most recent incarceration. We grouped responses on housing status into four categories (homeless, transitional housing, staying with family/friends, renting, or owning), and health insurance was categorized into whether the participant had insurance or not (Yes/No). Food insecurity was assessed

with the singular question "Have you gone a whole day without food since your release from prison/jail because you did not have enough money to feed yourself?" Participants were asked a list of chronic health conditions which we then categorized into three groups based on the number of reported health conditions—(1) no reported condition, (2) one to three conditions, and (3) four or more conditions. Self-reported general health was combined into good (Excellent/Very Good/Good) and poor (Fair/Poor) health. Health literacy was measured using The Newest Vital Sign (NVS) (18), a short valid assessment of literacy in primary care, and scores were also combined into adequate (score ≥4) and inadequate (score ≤3) literacy (19). We also collected information on participants' most recent incarceration, including when it started and when they were released, and if they were released with any prescriptions.

CHW Activity Log

As part of the study, CHWs were required to document all closed-loop interactions (two-way communication) with participants that occurred outside of a scheduled clinic visit, using a CHW encounter form. (CHWs were present at every clinic visit and were not asked to document that interaction.) CHWs collected information on the date of the encounter, who initiated the interaction (participant or CHW), mode of communication (in-person, phone, or electronic), purpose/type of interaction, issue(s) addressed during the interaction, and amount of time that the CHW spent with the participant during each interaction.

Data Analysis

First, we compared participants with and without any documented CHW interaction outside of the clinic by sociodemographic and reported health characteristics. Among

TABLE 1 | Participant characteristics and CHW interactions outside of the primary care clinic (*N* = 751).

	No CHW interaction (*N* = 204)	Had one or more CHW interaction (*N* = 547)	*P*-value
Characteristic	*N* (%)	*N* (%)	
Age, years; mean (±SD)	43.5 (±11.5)	47.1 (±11.0)	<0.001
Gender			
Female	27 (13.2)	84 (15.4)	0.49
Male	177 (86.8)	463 (84.6)	
Race/Ethnicity			
Non-Hispanic White	36 (17.6)	98 (17.9)	0.70
Non-Hispanic Black	91 (44.6)	261 (47.7)	
Hispanic	68 (33.3)	159 (29.1)	
Other	9 (4.4)	29 (5.3)	
Highest education level			
Less than high school	122 (60.1)	318 (58.7)	0.71
High school graduate	35 (17.2)	86 (15.9)	
Some college/graduate	46 (22.7)	138 (25.5)	
Housing status at first clinic visit			
Homeless	53 (26.0)	132 (24.1)	0.67
Transitional housing	72 (35.3)	210 (38.4)	
Family/friends	55 (27.0)	154 (28.2)	
Rent/own	24 (11.8)	51 (9.3)	
Had gone 24 h without food	34 (16.8)	117 (21.5)	0.18
Inadequate health literacy*	113 (59.5)	246 (52.9)	0.14
No health insurance at first visit	83 (40.9)	218 (39.9)	0.80
Self-reported general health			
Fair/poor	85 (41.9)	261 (47.8)	0.16
Good/very good/excellent	118 (58.1)	285 (52.2)	
Comorbid conditions			
None	31 (15.2)	80 (14.6)	<0.001
1 to 3	108 (52.9)	202 (36.9)	
4 or more	65 (31.9)	265 (48.4)	
Released with medication prescription	142 (69.6)	427 (78.1)	0.02
No established primary care before incarceration	91 (44.8)	262 (48.4)	0.41
Length of last incarceration, months; median (IQR)	39 (12–71)	39 (16–107.5)	0.04¶

**Health literacy values only for those that provide enough responses to be able to compute a score based on the scale scoring algorithm (655 of 751 participants). ¶Mann Whitney U test p-value. SD, standard deviation; IQR, interquartile range.*

those with documented CHW interactions outside of the clinic, we characterize the interactions using descriptive statistics, including mode of communication, and purpose of interaction and issues addressed. Specifically, the issues addressed by the CHW were grouped into the following categories: physical health management (medications, physical health, care coordination into physical health management), behavioral health management (crisis management, mental health, and substance use), and social determinants of health (housing, employment, etc.). The study was approved by the Yale University School of Medicine Human Investigation Committee, and the Office for Human Research Protections in the US Department of Health and Human Services. All analyses were conducted using SPSS version 26.

RESULTS

Of the 751 participants, 547 (79%) had at least one documented interaction with a CHW outside of a primary care visit within 6 months of establishing care. Participants with at least one CHW interaction were older, mean age 47 (±11.0) years, compared to 44 (±11.5) years for those without a CHW interaction. Both groups were not significantly different in terms of gender, race, ethnicity, and education (**Table 1**). Participants who reported housing issues, food insecurity, not having primary care before incarceration, or lack of insurance were equally likely to have a CHW interaction, as those able to meet these basic needs. Those with four or more comorbid conditions (48 vs. 32%), released from incarceration with a prescription (78 vs. 70%), and a longer length of stay during their most recent incarceration (IQR 16–108 vs. 12–71) were more likely to have a CHW encounter (**Table 1**).

Overall, there were 3,342 documented interactions, with a median of 4 (IQR, 2–8) interactions per participant among those with at least one CHW interaction outside of a scheduled primary care visit. About half of the interactions were initiated by the CHW and the median time the CHW spent with the participant during an interaction was 23 min (IQR, 17–34). Most of the interactions were in person (56%), and CHWs addressed a range of concerns including preparing or assisting participant before a scheduled health care visit (48%), following up with participant after a visit (41%), and addressing social determinants of health (36%) (**Table 2**).

For interactions that addressed social determinants of health, the most common issue addressed was housing (35%), followed by health insurance (15%), transportation (13%), and accessing government benefits (12%) (**Figure 1**). **Figure 2** illustrates how the total number of participants with a CHW interaction and proportion of participant concerns addressed among all interactions changed over time. Sixteen percent of participants with CHW interactions had an interaction between release from prison and their first clinic visit, and most interactions occurred within 1 month after establishing care within the clinic.

TABLE 2 | Characteristics of CHW encounters within 6 months of establishing care with the TCN (*N* = 547).

Characteristic	*N*	%
Total	3,342	100.0
Median number (IQR)	4 (2–8)	
Median duration, minutes (IQR)	23 (17–34)	
Initiated contact		
Patient	1,723	51.6
CHW	1,619	48.4
Mode of interaction		
In person	1,867	55.9
Telephone	1,288	38.5
Text messages	177	5.3
Email	10	0.3
Timing of encounter		
Before primary care visit	1,618	48.4
Post primary care visit	1,379	41.3
Post ED/hospitalization	40	1.2
Post criminal justice system contact	13	0.4
Accompanied patient to a service	292	8.7
Concerns addressed[¶]		
Social determinants of health	1,200	35.9
Medication management	446	13.3
Physical health	347	10.4
Care coordination	515	15.4
Mental/behavioral health	166	5.0
Other (e.g., emotional support, wellness check-in)	495	14.8

[¶]*Percentages add up to over 100% because more than one concern was addressed at some interactions. IQR, interquartile range.*

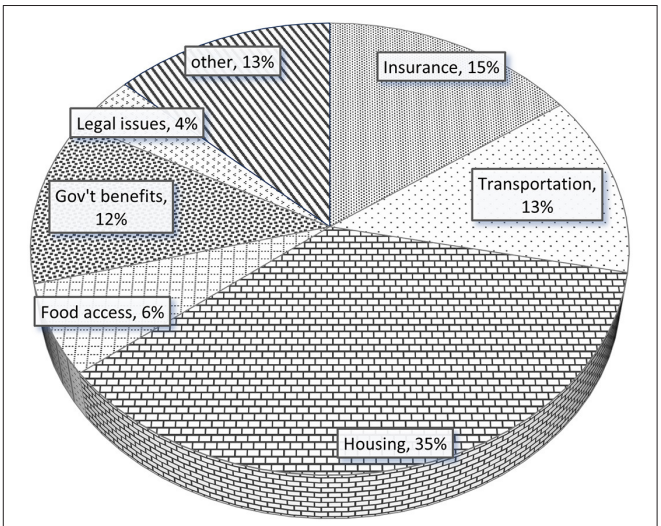

FIGURE 1 | Social determinants of health addressed during CHW interactions.

DISCUSSION

Our characterization of the interactions between CHWs with lived experience of incarceration and patients returning from incarceration outside of the primary care setting illustrates the multi-faceted roles played by CHWs as they assisted their clients in improving their health and successfully reentering into the community. Participants who were older, those with more

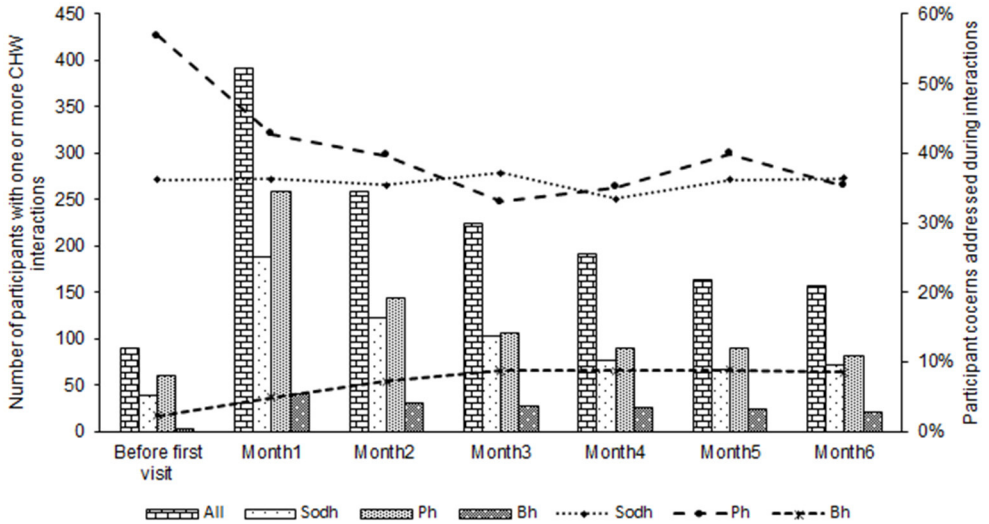

FIGURE 2 | Number of participants with a CHW interaction and participant issues addressed during interactions over time. NB: Bars represent number participants with an interaction and issues addressed. Lines represent proportion of all interactions that addressed Sdoh, Bh, and Ph issues. Sdoh, social determinants of health, Ph, physical health management; Bh, behavioral health management. Some participants had more than one concern address during an interaction with the CHW.

medical needs (had more co-morbidities or had a prescription that required refill), and those more disconnected from the community (had longer prison stay) were more likely to have a CHW encounter.

CHWs engaged with participants even before their first primary care visit, and most of the interactions registered were within the first month after establishing care. Most interactions were in-person and occurred around scheduled primary care visits, with 48% before and 41% after a primary care visit, and addressed a variety of patient needs, including social determinants of health, medications management, care coordination and physical and behavioral health coaching. It is worth noting that all interactions before the first primary care visit occurred in the community after release from prison due to barriers related to prison in-reach at the time of this study. To optimize engagement in primary care services and connection to community resources at reentry, CHWs should be allowed to interact with individuals prior to release from incarceration. These interactions may take the form of one-on-one in-person meetings between CHWs and patients, phone, or video calls, and in-person presentations to groups of individuals nearing release. This shift in paradigm would require a re-alignment of Medicaid payment structures to cover CHW activities, such as allowing Medicaid enrollment and reimbursement 30 days pre-release as seen in some states (20).

Among social determinants of health addressed during interactions by CHWs in our study, assisting participants with housing (35%) was the number one issue. Individuals who have experienced incarceration have high rates of unstable housing or homelessness that can negatively affect both reentry and health outcomes (21–23). This is driven by lack of social support, discriminatory policies and other collateral consequences of incarceration that makes it difficult to access stable housing and is accentuated in the immediate post-release period (23, 24). As community health workers within the TCN were especially attuned to the structural barriers to housing following release, it is not surprising that assistance with housing was the primary social issue addressed by CHWs in our study.

Individuals returning from incarceration have complex needs spanning social determinants of health, physical and behavioral health. However, the provision of post-release support to meet these needs is often inadequate because it fails to appreciate the unique difficulties patients encounter and the complexity of health care and social service systems (25). The TCN model encompasses aspects from three common CHW care models described in the US: extension of clinic systems, CHWs working through community non-profits and CHWs at the interface of health systems and the community (26). TCN CHWs' worked across systems performing multiple functions such as care coordination, health coaching, social support, resource linkages, case management, medication management, advocacy, and follow-up among other responsibilities. By integrating CHWs fully into primary care teams but also enabling CHWs the latitude to provide support and services within the community, CHWs are more able to help patients prioritize the many competing priorities of reentry from correctional systems.

LIMITATIONS

While our study is unique in reporting on the role and functions of CHWs with lived experience of incarceration employed by TCN primary care programs, there are some limitations. The current study does not capture the full range of functions performed by TCN CHWs, as we only

collected data on CHW interactions outside of the scheduled primary clinic visit. Data on CHW interactions during primary health care clinic visits—and activities not linked to individual patients such as policy advocacy—could elucidate a different set of roles played by CHWs. Also, CHWs collected data on paper forms while in the community and later entered this information into an electronic data collection platform, which could have led to some underreporting if the CHW was not in possession of a form at the time of interaction. Last, data were collected and reported by CHWs based on their assessment of patient needs and some mislabeling of patient concerns may have occurred.

CONCLUSION

Individuals returning from incarceration have complex medical and social service needs. To address these needs, CHWs must be able to work across multiple systems and perform a broad range of functions, including assisting individuals with navigating health, social service, and criminal legal systems. Improved tracking of CHWs' activities through mobile electronic format (i.e., smartphone app) that can be linked to the electronic health records would not only enhance care management of people returning from incarceration, CHW supervision and support, but could be helpful for illuminating the full range of activities CHWs participate in (during clinic and outside in the community), facilitating patient outcome evaluation and developing reimbursement structures for CHW activities. Further, establishing standardized quality metrics for primary care delivery for this vulnerable population including CHW activities are needed and should address the full range of patients' health and social service needs.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article is available from the corresponding author, on reasonable request.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Yale University School of Medicine Human Investigation Committee, and the Office for Human Research Protections in the US Department of Health and Human Services. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

JA: study conception and design, data analysis, writing original draft, and writing review and editing. JS and JC: data collection, review, and editing. TH, AS, and EK: writing—review and editing. EW and SS: study conception and design, funding acquisition, and writing review and editing. All authors contributed to the article and approved the submitted version.

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BRIEF RESEARCH REPORT
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What About *Promotores*? *Promotores'* Psychosocial Determinants That Influenced the Delivery of a Cervical Cancer Education Intervention to Hispanics

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This study tested whether a cancer education intervention affected *promotores'* self-efficacy to deliver an intervention to Hispanics and which psychosocial determinants of *promotores* influenced the number of Hispanic residents reached by *promotores* in the subsequent education intervention. A quasi-experimental, pre/post-design with a treatment group (no control) assessed differences for *promotores* ($n = 136$) before and after exposure to the cancer education intervention. The design also included a cross-sectional evaluation of the number of residents *promotores* reached with the educational intervention. After being trained, the *promotores* delivered the intervention to Hispanic residents ($n = 1,469$). Paired *t*-tests demonstrated increases in *promotores'* self-efficacy from pre- to post-intervention. Regression models assessed associations between the numbers of residents reached and select psychosocial determinants of *promotores*. Age and *promotores'* years of experience influenced their delivery of a cervical cancer education intervention to Hispanics, but not their delivery of breast or colorectal cancer education interventions. This is the first study to examine which psychosocial determinants influence *promotores* delivery of cancer education interventions. The outcomes potentially have implications for CHW interventions and training by examining this potential connection between CHWs' psychosocial determinants and intervention outcomes.

Keywords: training, Hispanics, cancer education intervention, promotores, community health worker, psychosocial determinants

INTRODUCTION

> "*Promotores are everyday people who are already living, working and engrained in the community… They are the individuals others go to when they have problems, need advice or even just want to gossip over a cup of coffee*" (1).

As frontline public health workers, *promotores* [community health workers (CHWs)], function as liaisons between health and social service providers and the priority population to facilitate access to services and improve the quality and cultural competence of service delivery through a wide array of skillsets. *Promotores* are trusted members of the community and have a remarkable understanding of the community, may work for pay or as volunteers, and usually share ethnicity, language, socioeconomic status, and life experiences with the community members they serve (2–4). Core functions of *promotores*/CHWs have included health education, promotion, outreach, case management, service coordination, informal counseling, social support, advocacy, referrals, and health behavior interventions (5, 6). The utilization of *promotores* in the United States has grown particularly in the past 10 years (7, 8) along with evidence supporting the effectiveness of *promotores* in delivering interventions (9–11). Numerous studies have highlighted the use of *promotores* and their effectiveness among Hispanic populations in helping their priority populations achieve positive health outcomes (5, 8–11).

Training involved in preparing *promotores* to conduct interventions is substantial and comprehensive and incorporates *promotores* in decision making and feedback regarding project implementation after the training (12–14). Yet, even with intensive training, like other conduits for the delivery of health education content, there are barriers to the implementation of interventions delivered by *promotores* (15, 16). An important translational science question is what characteristics of *promotores* influence the delivery of interventions (17, 18). Proven, effective interventions involving *promotores* delivered under highly controlled settings are fruitless if, in a practice setting, there are problems with the delivery of the intervention by *promotores*. A greater understanding of what characteristics influence that delivery is needed for the more efficient diffusion of interventions led by *promotores*.

This study seeks to fill this gap by examining the psychosocial determinants of *promotores* in relation to the delivery of a cancer education intervention to Hispanic residents. Few studies have looked at psychosocial determinants of *promotores*' delivery of an intervention (19), and no studies were found that focus on these psychosocial determinants of *promotores* specific to cancer education interventions. Psychosocial determinants are defined as the interaction of psychological factors (e.g., an individual's thoughts, self-efficacy, intentions, and behaviors) and social factors (e.g., education, employment, social norms and attitudes, social support and interactions, and socioeconomic conditions) that influence health status (20, 21).

This study focused on cancer delivered interventions among Hispanic populations given that cancer is the second leading cause of death among Hispanics (22); Hispanics are less likely to obtain cancer screenings (23, 24); Hispanics are often diagnosed and treated at later stages of cancer (25–27); and Hispanics face greater cancer survivorship barriers than non-Hispanic Whites (25, 27). Evidence suggests key factors contributing to poorer cancer outcomes in Hispanics include the following: socio-demographic factors such as poverty, lack of education and information, and lack of health insurance; language barriers; and low health literacy (26, 28–30). Furthermore, this study included information on cervical cancer education intervention since Hispanic females have the highest incidence and the second highest mortality rate of cervical cancer in the United States (25, 31) and face numerous barriers regarding cervical cancer prevention and screening (31–34).

This study had two main aims: (1) to test whether a cancer education intervention affects *promotores*' self-efficacy from pre- to post-training; and (2) to examine which psychosocial determinants of *promotores* might influence how many Hispanic residents receive cancer education interventions delivered by the *promotores*. Self-efficacy is an important outcome given its role in different health behavioral theories (e.g., Health Belief Model) as an antecedent of health behavior. It can be defined in terms of people's beliefs in their capability to perform a specific behavior to achieve an anticipated outcome (35). The psychosocial determinants of *promotores* examined included *promotores*' years of work experience, work status (paid or volunteer), self-efficacy to deliver cancer education to Hispanic residents, intention to use the information in his/her work and *promotores*' certification status.

DATA AND METHODS

Parent Study

The parent study—*ÉPICO: Education to Promote Improved Cancer Outcomes*—was a cancer education intervention evaluated by an exploratory quasi-experimental, pre-test-post-test study design. The overall strategy of *ÉPICO* was to train and utilize *promotores* as learners and educators to deliver a cancer education intervention to Hispanic *colonia* residents. Community Health Workers/Promotores in Texas are certified, which means they have either completed a 160-h certification training as CHWs/Promotores or they obtained certification through at least 1,000 verified hours of work as a CHW/Promotora (36). *Colonias* are unincorporated sub-divisions lacking basic infrastructure and services (37). The study consisted of three separate training modules that were 8 h in length each (one 8-h training for breast cancer prevention, treatment and survivorship; one 8-h training for cervical cancer prevention, treatment and survivorship; and one 8-h training for colorectal cancer prevention, treatment and survivorship). While the curriculum covered the continuum of cancer prevention, treatment, and survivorship, each training had specific elements and evidence-based information for each section as well as covering information related to prevention, treatment, and survivorship throughout the 8-h trainings. Promotoroes could choose to attend one, two, or all three *ÉPICO* trainings, provided at different times during the project period. The selection criteria

for participation was self-identification as a promotora and being at least 18 years of age.

The *ÉPICO* cancer education interventions were grounded in the socio-ecological model, the health belief model, the stages of change (transtheoretical) model, and evidence-based principles of adult learning theory—engaging *promotores* in an interactive environment based upon discussion and skill-building exercises (38, 39). The focus groups and surveys utilized constructs from the aforementioned theories; these theories also then provided a framework for the module content. For example, from the health belief model, the training materials addressed perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (40). For a detailed outline of content for each *ÉPICO* cancer education intervention and for more information on methods, refer to previous publications on the *ÉPICO* study (41, 42).

Study Design

For the purposes of this manuscript, a quasi-experimental, pre-post, one group design was used for this exploratory study. Pre/post-tests assessed differences for *promotores* ($n = 136$) before and after exposure to the intervention on prevention, treatment, and survivorship for breast, cervical, or colorectal cancer. The design also included time-lagged evaluations of the number of residents *promotores* reached. Data were collected from *promotores* who attended an 8-h training on prevention/early detection, treatment, and healthy survivorship for breast, cervical, or colorectal cancers *via* pre/post-tests as the data collection instruments. These measures included an assessment of psychosocial determinants of the *promotores*. Data were collected from the *promotores* on the number of Hispanic residents they reached with a cancer intervention within the 2 months following their initial training. This data included intervention logs of the number of residents reached as the data collection instrument.

Study Setting

The study setting included 8-h trainings on prevention, treatment, and healthy survivorship for breast, cervical, or colorectal cancers for self-identified *promotores* conducted in four south Texas border counties. The trainings were conducted by six state-certified *promotora* instructors employed by the *ÉPICO* project at community partner facilities, including the following: academic partners (four trainings—two in Hidalgo County and two in Cameron County), a community resource center (one training, Hidalgo County), and a county-owned facility (one training, Cameron County). *Promotores* who received the *ÉPICO promotora* cancer education intervention then delivered the interventions to Hispanic *colonia* residents in the four counties as part of their regular *promotora* outreach and education responsibilities.

Recruitment and Procedures

Study participants included both *promotores* and Hispanic *colonia* residents. The study did not include a study size calculation. First, *promotores* serving Hispanic *colonia* residents in the four counties were recruited by emails to distribution lists, participants from previous trainings, partnering entities, the state *Promotora*/CHW Program contact list, and word of mouth. Study staff obtained informed consent, and participants filled out the pre-test questionnaire. *ÉPICO* certified instructors gave the 8-h trainings to the *promotores*, which covered detailed information on prevention, treatment, and healthy survivorship specific to either breast, cervical or colorectal cancers. The training included activities to ensure that the topics were learned and a review and practice time associated with the specifically designed intervention modules that were to be delivered to residents. After the training, *promotores* completed the post-test questionnaire, which included the pre-test measures and demographic and psychosocial measures. Second, within 2 months of receiving the training, *promotores* were given the option to implement the educational intervention with Hispanic *colonia* residents. The intervention for the residents consisted of the same topics—prevention, treatment, and healthy survivorship—for either breast, cervical, or colorectal cancers; the resident interventions covered broader, key points pertaining to these topics and included important facts, photos, questions and answers, and action planning. *Promotores* opting to deliver the cancer education interventions obtained consent, conducted the intervention (i.e., 1.5 h of education per cancer type with residents), collected resident collection pre/post-tests and evaluations, and returned study instruments to *ÉPICO* staff within 2 months of the initial *ÉPICO promotora* training. *Promotores* who educated at least 10 Hispanic *colonia* residents received a $25 Wal-Mart gift card. The *promotores* were not compensated through salary support for their time to provide the education to *colonia* residents.

Measures

The pre/post-tests had 15 knowledge and six self-efficacy survey items. Self-efficacy was measured using a Likert scale (low confidence: 1–2; medium confidence: 3–4; and high confidence: 5–6) and measured participants': (1) confidence in delivering (breast, cervical, colorectal) cancer prevention/early detection messages; (2) confidence in motivating others to take steps toward (breast, cervical, colorectal) cancer prevention/early detection; (3) confidence in developing (breast, cervical, colorectal) cancer treatment messages; (4) confidence in motivating others to obtain (breast, cervical, colorectal) cancer treatment; (5) confidence in delivering (breast, cervical, colorectal) survivorship messages; and (6) confidence in motivating others to take steps toward healthy (breast, cervical, colorectal) cancer survivorship behaviors. In addition, post-test included demographic and psychosocial measures. The dependent variable was the number of *colonia* residents who received the cancer education intervention by the *promotores*. This was determined from the *promotores*' intervention logs detailing the number of residents educated by cancer education module. The number of Hispanic *colonia* residents reached by *promotores* was treated as a continuous variable. We also examined the number of *colonia* residents reached by *promotores* per cancer type (i.e., breast, cervical, or colorectal).

The independent variables were separated into two categories: psychosocial determinants of *promotores* and control variables.

Psychosocial determinants of *promotores* included: (1) *promotores*' years of work experience; (2) work status (paid or volunteer); (3) self-efficacy in delivering cancer education to Hispanic *colonia* residents; (4) intention to use the information in his/her work (scale from 1 to 4 with 1 = not at all true, 2 = not true; 3 = somewhat true; and 4 = very true); and (5) certified *promotor/a* (yes/no). For *promotores*' self-efficacy, measures were recorded for each cancer type both pre- and post-training, (scale from 1 to 6, with low self-efficacy being 1 and high self-efficacy being 6). Three questions measured self-efficacy for each specific type of cancer module: (1) self-efficacy in delivering (breast, cervical, colorectal) cancer prevention/early detection messages; (2) self-efficacy in delivering (breast, cervical, colorectal) cancer treatment messages; and (3) self-efficacy in delivering (breast, cervical, colorectal) cancer survivorship messages. Cronbach alphas were used to test the reliability of the scale measuring the self-efficacy values. The self-efficacy variables for pre- and post-measures for breast, cervical, and colorectal cancers all had reliability values of $\alpha = 0.96$ or higher (reported in **Table 3**).

Control variables included the following: (1) age (years of age); (2) gender (male/female); (3) education (with the following responses: some high school; high-school graduate; GED; technical degree; some college; Bachelor's degree; advanced degree); and (4) the number of cancer type trainings received by the *promotores* (with the following responses: one cancer type; two cancer types; and three cancer types).

This study was approved by the Committee for the Protection of Human Subjects (CPHS) at the University of Texas Health Science Center, and the parent study was approved by the Institutional Review Board (IRB) at Texas A&M University.

Data Analysis

Analyses were conducted using STATA 12.0 (43). Missing values were replaced with mean scores since data were missing in <5% of any variable (44). Factor analysis and Cronbach's alphas were run on each of the sets of self-efficacy items for pre- and post-measures for breast, cervical, and colorectal cancers. Paired *t*-tests for the pre- and post-self-efficacy scores were run to test for differences among the pre- and post-self-efficacy means for the three cancers; *p*-values < 0.05 were considered significant. Regression models were run to assess potential associations between the continuous dependent and continuous and dichotomous independent variables. Three regression models (one per cancer) assessed predictors and included statistically significant variables ($p < 0.05$) related to the dependent variable.

RESULTS

A total of 136 *promotores* received the *ÉPICO promotor/a* training modules. Of those, 50% (68) delivered the cancer education intervention to 1,469 Hispanic *colonia* residents. **Table 1** further details the number of residents receiving the specific cancer education interventions delivered by *promotores*. The psychosocial determinants and demographic control variables of the *promotores* who received at least one *ÉPICO* cancer education intervention are displayed **Table 2**. *Promotores* tended to be women (95%), had an average age of 48 (range of 20–73), had a high-school education or less (53%), had an average of 6.5 years of work experience as *promotores* (ranged from 0 to 25 years), and were Texas-certified *promotores* (68%). Hispanic *colonia* residents who received a cancer education invention delivered by these *promotores* included 450 residents receiving the breast cancer education intervention; 506 residents receiving the cervical cancer education intervention; and 513 residents receiving the colorectal cancer education intervention. The factor analysis followed a normal distribution, with no outliers and points randomly distributed about zero.

TABLE 1 | The number of residents receiving the specific *ÉPICO* cancer education interventions delivered by *Promotores*.

Cancer education intervention	# Of *Promotores* who received this intervention training	# Of *Promotores* who delivered this intervention to *colonia* residents	# Of *Colonia* residents who received this intervention
Breast cancer	94	41	450
Cervical cancer	74	42	506
Colorectal cancer	81	45	513
Total numbers	136	68*	1,469

**Total number of unduplicated promotores who trained colonia residents. Some promotores attending more than one ÉPICO cancer education intervention training delivered multiple cancer education interventions to colonia residents.*

The paired *t*-test results for the pre- and post-*promotora* training self-efficacy scores on the three cancer topics are shown in **Table 3**. There were significant increases in *promotores*' pre- and post-training scores for each cancer specific training (*p*-values for all three cancers < 0.000).

Table 4 depicts results of the regression models examining whether there are significant psychosocial determinants associated with delivering cancer education; on breast cancer (model 1); on cervical cancer (model 2); and on colorectal cancer (model 3). For the delivery of cervical cancer education, *promotores*' years of work experience ($P > |t| = 0.000$), age ($P > |t| = 0.003$), and the number of *promotor/a* cancer trainings received ($P > |t| = 0.001$) were significant in the cervical cancer model, which included all of the independent and control variables. Additionally, the number of *promotor/a* cancer trainings received was also significant for breast cancer ($P > |t| = 0.000$) and colorectal cancer ($P > |t| = 0.020$). The R^2-values for each module were as follows: $R^2 = 0.26$ for breast cancer, $R^2 = 0.41$ for cervical cancer, and $R^2 = 0.12$ for colorectal cancer.

DISCUSSION

This study is the first of its kind to examine which psychosocial determinants of *promotores* influence their delivery of cancer education interventions to Hispanic *colonia* residents. Results showed that *promotores*' years of work experience, *promotores*' age, and the number of cancer trainings received by *promotores* were significantly associated with the number of Hispanic *colonia* residents who received the cervical cancer education

TABLE 2 | Psychosocial determinants and control variables of *Promotores*.

Independent variables	Counts	Frequency	*M*	SD
Psychosocial determinants of *Promotores*				
Promotores of years of work experience	-	-	6.49	5.93
Employment status, paid				
No	52	38.2%	-	-
Yes	74	54.4%		
Missing	10	7.4%		
Employment status, volunteer				
No	89	65.4%	-	-
Yes	37	27.2%		
Missing	10	7.4%		
Breast cancer, pre-test self-efficacy	-	-	4.67	1.19
Breast cancer, post-test self-efficacy			5.50	0.79
Cervical cancer, pre-test self-efficacy			4.63	1.01
Cervical cancer, post-test self-efficacy			5.43	0.75
Colorectal cancer, pre-test self-efficacy			4.37	1.17
Colorectal cancer, post-test self-efficacy			5.53	0.63
Intention				
Not true at all	0	0%	-	-
Not true	0	0%		
Somewhat true	10	7.4%		
Very true	126	92.6%		
DSHS certified *Promotor/a*				
No	52	38.2%	-	-
Yes	84	61.8%		
Age	-	-	47.91	9.15
Gender				
Female	129	94.9%	-	-
Male	7	5.1%		
Control variables				
Education				
Some high school	26	19.1%	-	-
High-school graduate	17	12.5%		
GED	27	19.9%		
Technical degree	9	6.6%		
Some college	16	11.8%		
Bachelor's degree	15	11.0%		
Advanced degree	10	7.3%		
Other	16	11.8%		
Number of trainings received by *promotores*				
One	64	47.1%	-	-
Two	32	23.5%		
Three	40	29.4%		
Employing agency				
Medical clinic	8	5.9%	-	-
Hospital	0	0%		
Home health agency	11	8.0%		
Other medical entity	0	0%		
Non-profit	58	42.7%		
Social service entity	5	3.7%		
University/academic	16	11.8%		
Other	38	27.9%		

TABLE 3 | Paired *T*-test results for *Promotores'* pre- and post- training self-efficacy scores.

Variable	Obs.	Mean	Std. Dev.	95% Conf. interval
Breast cancer				
$N = 94$, $\mathbf{p < 0.000}$				
Self-efficacy - pre-test	94	4.67	1.19	(4.42, 4.91)
Self-efficacy - post-test	94	5.50	0.79	(5.34, 5.66)
Difference between pre and post	94	−0.83	0.91	(−1.02, −0.65)
Cervical cancer				
$N = 74$, $\mathbf{p < 0.000}$				
Self-efficacy - pre-test	74	4.63	1.01	(4.40, 4.87)
Self-efficacy - post-test	74	5.43	0.75	(5.26, 5.60)
Difference between pre and post	74	−0.80	0.76	(−0.96, −0.62)
Colorectal cancer				
$N = 71$, $\mathbf{p < 0.000}$				
Self-efficacy - pre-test	81	4.37	1.17	(4.11, 4.63)
Self-efficacy - post-test	81	5.53	0.63	(5.39, 5.67)
Difference between pre and post	81	−1.16	0.99	(−1.38, −0.94)

Bold values are statistically significant p value < 0.000 is highlighted.

intervention. This is noteworthy because this is the first study to suggest which psychosocial determinants might affect the delivery of a cancer education intervention. In light of the burden of cervical cancer incidence and mortality on Hispanic females, interventions utilizing *promotores* in cervical cancer education interventions might consider these psychosocial determinants—age, *promotores*' years of work experience, and number of other relevant trainings—when recruiting *promotores* to implement interventions. Our results also suggest that psychosocial determinants of *promotores* are associated with intervention delivery—which constitutes a novel contribution to the literature.

Another important finding was the effectiveness of the cancer education interventions to increase *promotores*' self-efficacy pre- and post-training. We found that the changes between pre- and post-self-efficacy measures were significant for all three cancers and that the self-efficacy measures were reliable. Though self-efficacy was not found to be significant in these regression models to predict the number of residents reached, this finding of the cancer education interventions might have influenced other desired outcomes not examined in this study (such as increased knowledge of the residents receiving the intervention and higher residents' intentions to change behavior). Future studies could examine how this increased self-efficacy might have influenced additional outcomes of interest.

Lastly, of note in this study is what associations between variables were not found to be significant. First, the study examined breast, cervical, and colorectal cancer education interventions for Hispanic *colonia* residents, yet, only two psychosocial determinants were found to be significant for cervical cancer. This creates questions regarding why these factors were significant for one cancer and not the

TABLE 4 | Regression analysis for psychosocial variables predicting number of *Colonia* residents trained in cancer education ($N = 136$).

	Model 1 (Breast cancer)		Model 2 (Cervical cancer)		Model 3 (Colorectal cancer)	
Independent variables	**Coef.**	***t***	**Coef.**	***t***	**Coef.**	***t***
Promotores' years of work experience	−0.1663	−1.73	**0.4627**	**3.72**	0.0349	0.27
Employment-Paid	0.7229	0.37	−1.623	−0.53	−1.060	−0.38
Employment-volunteer	2.547	1.21	−0.0602	−0.02	−0.7504	−0.26
Self-Efficacy, post-test (breast, cervical, colorectal)	0.4585	0.64	1.409	1.31	0.4196	0.32
Intention	−0.1374	−0.06	1.200	0.70	−0.8633	−0.27
DSHS-certified	−1.850	−1.55	3.078	1.71	0.9739	0.56
Age	0.0876	1.35	**−0.2856**	**−3.07**	0.0985	1.22
Gender	3.423	1.39	3.660	1.21	−1.599	−0.41
Education	0.2600	0.85	0.7079	1.70	0.0887	0.22
Number of trainings received	**2.767**	**4.25**	**3.454**	**3.59**	**2.165**	**2.39**
Prob > *F*	**0.0037**		**0.0001**		0.4708	
R^2	0.2592		0.4087		0.1225	

Numbers in BOLD and BLUE represent a significant P > |t| value.

others—suggesting that *promotora* psychosocial determinants influencing intervention delivery to residents may be different depending the intervention topic—whether type of cancer or specific chronic disease. Second, though the study looked at numerous *promotora* psychosocial determinants, few were found to significantly impact their intervention delivery to *colonia* residents. This draws out another key question in terms of why these determinants—self-efficacy, *promotores*' certification status, intention to implement the intervention, gender, educational level, and work status—were not associated in this study with the delivery of an intervention to the priority population. Future research can examine these and other psychosocial determinants to further elucidate possible associations. For example, *promotora* marital status and work experience in occupations may be important psychosocial determinants influencing *promotores*' ability to voluntarily deliver cancer education interventions. Additionally, the regression models showed variance in the models, yet the psychosocial determinants were not significant in explaining this variance. This finding brings additional questions as to what else could explain the variance in the models if not the independent variables. This suggests that additional psychosocial determinants may need to be examined and also a larger sample size could yield significant results for these same psychosocial determinants. In this regard, the small sample size could be prone to Type II error. The results from this study demonstrate the need for future studies to continue investigating what psychosocial determinants of *promotores* do influence delivery of interventions since this is one of the first studies to do so.

Challenges and Limitations

The lack of a control group as well as the exploratory nature of this pre-post, one group design, quasi-experimental study limits this study's demonstration of causation. While comparisons of pre- and post-self-efficacy involve panel data permit inferences of causation, as does the implementation of time-lagged independent and dependent variables in the regression analysis, the study does not prove causation, for which further study is warranted to examine potential causal links. In addition, the results of this study may not be generalizable to all Hispanic groups and *promotores* because there may be significant variations among both *promotores* and Hispanic residents since the samples were not randomly selected or assigned to intervention condition. Another limitation was that the study did not use a study size calculation and also used a convenience sample so whether or not a randomized design would yield different or identical results is unclear. Further, response to study questions may have been influenced by subject's educational level or other factors and skew study results. For example, participants with lower educational and literacy levels may not have understood a question on the instruments and could have selected responses that did not accurately reflect their true responses—particularly if participants were not familiar with Likert-type responses. To address this limitation, pre- and post-instruments with third grade reading levels were used. Additionally, the instruments were read aloud to participants with time for them to select responses independently.

Further, the self-efficacy measurement was simplistic and a limitation. Future work can address this limitation through utilization of established markers (for example, "I am confident I can deliver breast cancer prevention information to Hispanics with lower literacy levels within the next 30 days."). Another potential limitation is not controlling for promotora experience as well addressing employment status of the promotores. Future studies should consider how to measure and control for experience and type of employment of promotores. Non-response and missing data were also a potential limitation, which was handled by replacing missing values with mean scores given the low percentage of missing data. Lastly, another limitation was the small sample size, which could have contributed to type I error.

Conclusions

The major findings in this study point to the potential connection between promotores' psychosocial determinants and their influence on behavioral outcomes of program participants—which has been studied very little in the past. Knowing what psychosocial determinants that potentially improve behavioral and health outcomes of those served by promotores could help in the recruitment and training of promotores, which in turn, could yield greater health outcomes for the priority populations served by promotores. This study has a number of areas to expand upon. For instance, future studies should examine which psychosocial determinants of *promotores* may influence the delivery of an intervention to the priority population based on the specific type of cancer. Further, studies could explore additional psychosocial determinants and characteristics of *promotores* that might influence the delivery of an intervention that were not examined in this study such as acculturation, social capital, social support, health status, and relationships with the priority community. Also, additional inquiry is needed on how *promotores*' self-efficacy may influence subsequent indicators of resident training.

One strength of the study was the large number of *promotores* trained on the same cancer education interventions and then following them over time to assess the use of these interventions in practice. An additional strength of the study was the use of reliable measures to assess increases in self-efficacy to deliver cancer education interventions. Lastly, another strength of the study was the ability to connect psychosocial measures of *promotores* to examine the scope of their work—the number of Hispanic *colonia* residents who received the cancer education intervention delivered by *promotores*—and to contribute to this literature on which there is currently little information. Our findings are just a starting point for further research on which psychosocial determinants influence delivery of an intervention. Future research should focus on the T3 step of translational science—the identification of new questions (e.g., additional psychosocial determinants of *promotores* that might influence intervention delivery), barriers, and gaps through dissemination and implementation research. This is an iterative process that allows researchers to return to prior translational stages. Once goals are reached in the T3 step, additional studies can then engage in the T4 step of policy research. This might include looking at developing and implementing policies regarding the utilization of *promotores* in intervention in terms of *promotores*' psychosocial determinants.

In closing, this study examined which psychosocial determinants of *promotores* may influence the delivery of the intervention to the priority population based on the specific type of cancer and has numerous possibilities for areas of future research that could significantly impact research practice and design of cancer education interventions delivered by *promotores*.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because the corresponding author conducted the research at a previous institution. Requests to access the datasets should be directed to https://nchwtc.tamhsc.edu/, chw-training@tamhsc.edu.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Committee for the Protection of Human Subjects (CPHS), University of Texas Health Science Center; Institutional Review Board (IRB), Texas A&M University. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR'S NOTE

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AUTHOR CONTRIBUTIONS

JS was the PI on the original EPICO study and conducted this study as part of a dissertation. BR served as the dissertation committee chair and guided the study development, conduction, and analysis. She participated significantly to the writing and revising of the manuscript. HB and MV-S served on the dissertation committee and guided the study development, conduction, and analysis. They reviewed and revised the manuscript. CB was a Co-I on the original study and served on the dissertation committee. He played a significant role in analyzing the data and writing up the results. All authors contributed to the article and approved the submitted version.

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Online High School Community Health Worker Curriculum: Key Strategies of Transforming, Engagement, and Implementation

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Background: Ample research evidence has demonstrated that Community Health Worker (CHW) programs are a cost-effective, culturally integrated, and impactful way to improve community health. Although most existing CHW programs recruit adults as CHWs, high school students, with their intellectual readiness and intimate community knowledge, also have great potential to be engaged as CHWs that impact community health. With this potential in mind, the High School Community Health Worker Curriculum (HSCHW), for face-to-face training, was created in 2016 at Morehouse School of Medicine (MSM) as an innovative solution to improve community health in underserved, urban neighborhoods. Sixteen Metro Atlanta high school students participated in the program's first cohort. The face-to-face HSCHW training program received very positive feedback from the students and community partners involved. Additionally, during the inaugural training, the program received more than 150 nationwide inquiries about an opportunity to either participate in the program or replicate its curriculum. Hence, in 2018, a corresponding online curriculum was created to meet these needs. The online HSCHW curriculum covers the roles and competencies described in the CHW Core Consensus (C3) Project and focuses on developing high school students' critical thinking, decision-making, and communication skills. As of February 2021, 346 high school community health workers have participated in this online curriculum.

Purpose: This paper reports on the research study of the critical processes and strategies of transforming, engaging, and implementing the online HSCHW curriculum.

Method: The project team conducted the research study to identify the key strategies to transform the face-to-face HSCHW curriculum, the engagement strategies embedded in the online curriculum's content development, and, ultimately, the curriculum's outcomes. Altogether, this mixed-method study analyzed and reported on the learning outcomes of 265 students', in tandem with 17 high school students' focused-group interviews and responses to online surveys.

Results: The results showed that integrating instructional design processes is critical for the online curriculum's success. "Interestingness," the latent concept embedded in the online HSCHW curriculum, engages high school students in learning about complex CHW skills, through digital content and activities. Furthermore, the successful implementation of the program and its student learning outcomes was assured by integrating the online curriculum with local schools and community resources, training the local community and school "trainers" to facilitate the curriculum online, and providing ongoing coaching support from the program team.

Impacts: This paper provides a research report on the key strategies and processes of creating and implementing an online CHW curriculum for high school students. Its findings will inform future endeavors to develop an online CHW curriculum for lifelong learners and increase training effectiveness. The online HSCHW curriculum increases the national capacity of community health workers, whose work will increase community engagement and health equity. The curriculum also empowers high school students to acquire health knowledge that can bridge the educational gap between health knowledge acquisition and health knowledge application. Additionally, the online HSCHW curriculum presents a concrete example of leveraging digital platforms to teach complex public health competencies to young adults who can positively impact community health.

Keywords: community health worker (CHW), high school student, online curriculum design, technology, student learning outcomes, satisfaction

INTRODUCTION

Worldwide Community Health Worker (CHW) training programs have witnessed a robust vigor in efforts to promote health, health behaviors, and health treatments (1–7). In the United States, since the 1980s, health program planners have more increasingly collaborated with CHWs to deliver various health promotion programs and, in doing so, have identified the shared outcomes and characteristics of an effective CHW training program (3, 4, 7, 8). As a cultural insider, a community health worker has established an emotional connection and trust within the communities and can help to promote healthy behaviors and improve health interventions. However, challenges persist (9). A systematic literature review revealed that one constant challenge of a CHW program across all documented CHW programs is the attrition of CHWs due to real-life challenges (10).

One way to alleviate this persisting challenge is to engage high school students from underserved communities and empower them with CHW knowledge and competencies to bridge the health equity gap. High school students have not only attained the intellectual and cultural readiness to be trained as CHWs, but are also enthusiastic about acquiring practical health care knowledge and skills to serve their communities. Having grown up in underserved communities and schools, they have experienced health challenges among their family members and neighbors, and throughout surrounding neighborhoods. At their respective schools, they have learned via introductory health and science curricula (11). Moreover, they are at a formative age where they are beginning to make career choices formation age relevant to career choices and are likely showing strong interest in learning about health and health care careers (12). Yet, there exist no nationwide high-school community health worker programs.

The High School Community Health Worker (HSCHW) training program was created to fill that void (13). The year-long training program aims to increase trained student health workers assisting with community health improvement in underserved communities. Once trained, the students will be equipped with the knowledge and skills to act as change agents, engaging family, peers, and other community members to implement strategies for better health and wellness.

The program was launched in 2016. As a result, 16 high school students were trained, in a face-to-face training setting, to become community health workers in their schools, households, and communities. The 2017 cohort trained an additional 20 high school community health workers. At that point, the program had received over 150 inquiries about joining the program or replicating the training model. As a result, the project team embarked upon the effort to respond to the increasing need for curriculum participation, as well as the flexibility of the curriculum offer. The next step was the development of a digital curriculum. The development of the online HSCHW curriculum began with the inclusion of the roles and competencies described in the CHW Core Consensus (C3) Project (14).

The creation of such an online program is inevitably coupled with conceptual and practical challenges. When converting a face-to-face curriculum to an online equivalent, immediate technology solutions come to mind—such as lecture recordings, videos, and online resources—that equate the curriculum transforming process to a technology and media transforming process. While an online curriculum development

entails straightforward media development and technology consideration, the transformation of a curriculum to a different instructional modality involves reconstruction of the teaching environment, and a redesign of learning activities, assessments, and their interactions with technologies.

This research study aims to share the design process and inform further development and delivery of a working online CHW curriculum. Specifically, this study summarizes and reports the process of transforming a face-to-face CHW training program to an equally effective online CHW training program. In addition, it presents students' evaluation of the online curriculum experience, learning contents, and their learning outcomes from the online HSCHW curriculum.

METHODS AND MATERIALS

This study applied a mixed-method approach, using both qualitative and quantitative methods to identify the process of transforming the face-to-face curriculum to an online equivalent; exploring and validating the strategies to engage students, and examining the evidence of learning from the online curriculum. The study was conducted in three phases:

Phase I: Online CHW Curriculum Conceptualization and Development

Phase I of the project focused on the conceptualization and development of the online curriculum. Between August 2017 and June 2018, the project team was formed to conceptualize and develop the online curriculum. Each team member came with a diverse background in public health, community health worker training, medical education, instructional design, e-learning development, and business operation. During this phase, the team mapped out and executed the process flow. In summary, the team first conducted the instructional design process, during which existing curriculum content, structure, and activities were analyzed to generate an overall understanding of the nature of the learning, instructional hours, student learning load, and online module distribution. Then, a sample module was selected for the online module instructional design prototype and proof-of-concept development. After completing the proof-of-concept development, the project team evaluated the online sample module. This evaluation determined the extent to which the module prototype can be transferred to the overall curriculum design. A consensus of the online curriculum's pedagogical approach, assessment plan, and digital learning solution was reached before moving to the development of the entire curriculum. The first step of the curriculum development process was drafting, during which e-learning developers and community health experts worked together and created the rest of the online modules. Once the online modules were developed, internal team members, public health graduate students, and instructors were invited to review the online module content, experience the online curriculum, and provide feedback. The team members also scored the curriculum using the online course readiness rubrics based on the Quality Scorecard Card designed by Online Learning Consortium (15). The online curriculum was then edited based on the feedback. Then five high school students were invited to conduct a formative evaluation of the curriculum.

Phase II: Curriculum Preliminary Implementation and Training-of-Trainer (TOT) Program

Between July 2018 and June 2019, the online HSCHW curriculum was piloted among 35 students, including a cohort of 30 students from Metro Atlanta and five students from rural Georgia. In addition to implementing HSCHW online learning modules, the project team also implemented the school/community-based health projects during phase II. The purpose of the practicum project was to bridge the gaps between online knowledge and conceptual training and real-world community health worker competencies. As a result, five local community health projects were implemented, and 60 family and community members were monitored monthly during the online curriculum pilot phase.

The online facilitator training program was developed based on the HSCHW online curriculum. It included two components: a synchronous training-of-trainer online workshop and four asynchronous online training modules. The four asynchronous online training modules covered the topics of (1) Introduction to curriculum and technology; (2) Training strategies; (3) Recruiting and engaging students; and (4) Logistics. These four online learning modules aim to address the key factors influencing the successful implementation of the online HSCHW student curriculum. The first training-of-trainer (TOT) curriculum was delivered in February 2019 to five remote-site trainers.

Initial curriculum survey, focus group study, and curriculum outcome evaluation were conducted. The online survey asked about the course's overall interestingness: (1) overall interestingness of the course, (2) interestingness of learning videos, (3) interestingness of learning tasks, and (4) overall course learning and instruction. In addition, the focus group interview asked the students to assess the interestingness of learning videos and the online curriculum overall.

Phase III: Online Curriculum National Implementation and Enhancement

The third phase of the online curriculum highlighted implementing strategies to allow remote sites to join the HSCHW curriculum and enhance its flow and features to improve students' learning experience. Four improvements were made to the online curriculum: first, we replaced VoiceThread technology with Flipgrid, for its ease of user experience. Second, we incorporated a virtual reality experience into the curriculum to enhance students' community learning and cultural experiences; third, during the COVID-19 pandemic, a new module of Contact Tracing Training was created and added to the online curriculum. Fourth, for the Training- of- trainer (TOT) program, a 41-page TOT participant's manual, HSCHW Program Design Worksheet, and TOT evaluation plan were created and added to the TOT training program.

As of February 2021, 346 students nationwide from 12 remote sites have been enrolled in the online HSCHW curriculum. The project team continued to monitor and evaluate participant outcomes from the online curriculum, and enhance the curriculum to ensure the quality of training and its impacts on community health and engagement.

Data Collection and Data Analysis

Multiple sources were used to gather data for the study. First, project documentation was reviewed to synthesize and visualize the online curriculum's developmental process. Second, characteristics of key online curriculum components, design statistics, and results were reported.

In October 2018, the online survey and focus group interview was conducted through Morehouse School of Medicine's online learning management system, Canvas (www.instructure.com). Seventeen students participated in both online surveys and focus-group interviews.

Students' responses to the online survey were analyzed using both qualitative and quantitative methods. First, the researchers went through students' responses to get a sense of them. Based on the respective responses given, all students' answers were categorized as "positive" opinions, "negative" opinions, or "neutral" opinions. A positive opinion was coded as a student indicating his or her agreement and expressed favorability of learning videos or learning tasks. A negative opinion was defined as a student indicating dislike of learning videos or learning tasks. A "Neutral" opinion was defined as a student expressing an opinion with distance from a positive one through the use of phrases like "sometimes" or "to some extent." Next, the numbers and percentages of positive opinions, negative opinions, and neutral opinions were calculated, and sample quotes for each coding category were presented.

Students' answers to focus group questions were first transcribed with an online transcribing service. Then the researchers read the transcript to obtain an overall understanding of the feedback on the online curriculum—and reasons—and corroborated the focus-group data with the online survey data.

Finally, the participating students' learning outcomes from the online HSCHW curriculum were evaluated by the program completion rate, curriculum grades, and practicum project completion rate. Furthermore, paired sample *t*-tests were performed to identify learning gains before and after learning each online module.

RESULTS

Online HSCHW Curriculum Transforming Process

Figure 1 shows the instructional design process in the creation of online HSCHW. The process included the key steps of an instructional design, development, implementation, evaluation, and update cycle.

As shown in **Figure 1**, the high school community health program's existing teaching material was first analyzed based on learning objectives, teaching methods, instructional time, and possible online learning approaches. By doing so, learning objectives were aligned with online learning contents, activities, and assessments.

The next was the prototype and development stage, during which feedbacks, initial learner testing, and revision were completed. Based on the analyses from the previous step, a sample module that represented typical learning approaches in the curriculum and had the potential for adopting various technologies and activities was identified for prototype development. In the HSCHW curriculum, module 5, Culture Competency, was selected as it included direct teaching, debating, discussion, hands-on practices, and enabled the test of various technologies and activities such as online games, animation videos, voice-thread discussion, online debating, and relevant rubric design. Once the project team designed and reviewed the sample module, the team moved to develop other modules in the curriculum.

During the curriculum implementation stage, efforts were spent on helping the online learner become familiar with the online learning environment, learning technologies, online learning flows, and expectations; doing so constructs a smooth, intuitive, technology-friendly environment. Finally, the evaluation and revision constituted the last step of the instructional design process. Students' feedback on the online learning experience was gathered and reviewed for the online curriculum revision and updates.

This formal instructional design process allowed the online HSCHW curriculum team to answer the critical curriculum quality questions at the early stage of online curriculum design such as the training time equivalence, the core competencies of the online curriculum, and evaluation rubrics. The process also served as a critical stepping stone for the future implementation of the curriculum nationwide.

This instructional design process was guided by two most cited instructional design models: the ADDIE model (16) and Dick, Carey, and Carey's model (17). The ADDIE model offers five steps of course design: Analysis, Design, Development, Implementation, and Evaluation (ADDIE). The Dick, Carey, and Carey's instructional design model prescribed nine linear steps (e.g., identifying instructional goals, developing instructional objectives, instructional strategies, instructional materials, developing formative evaluations, and summative evaluations). Although both models have offered valuable guidance for online course design and were well-referenced, they also have shown disadvantages in practices among educators, such as: being too linear, rigid, inflexible, cumbersome, instructor-focused, and not encouraging creativity (18, 19). Thus, during the process, we incorporated some iterative elements of design thinking (20, 21) to compensate for the noted disadvantages: Empathize, Define, Ideate, Prototype, and Test. We employed empathetic design practices and designed from teenage learners' perspectives through considering and testing how our teenage learners would learn best in the online environment and what materials, activities, and experiences will engage them. The instructional design process afforded us flexibility, creativity, and consistency in the CHW online curriculum design.

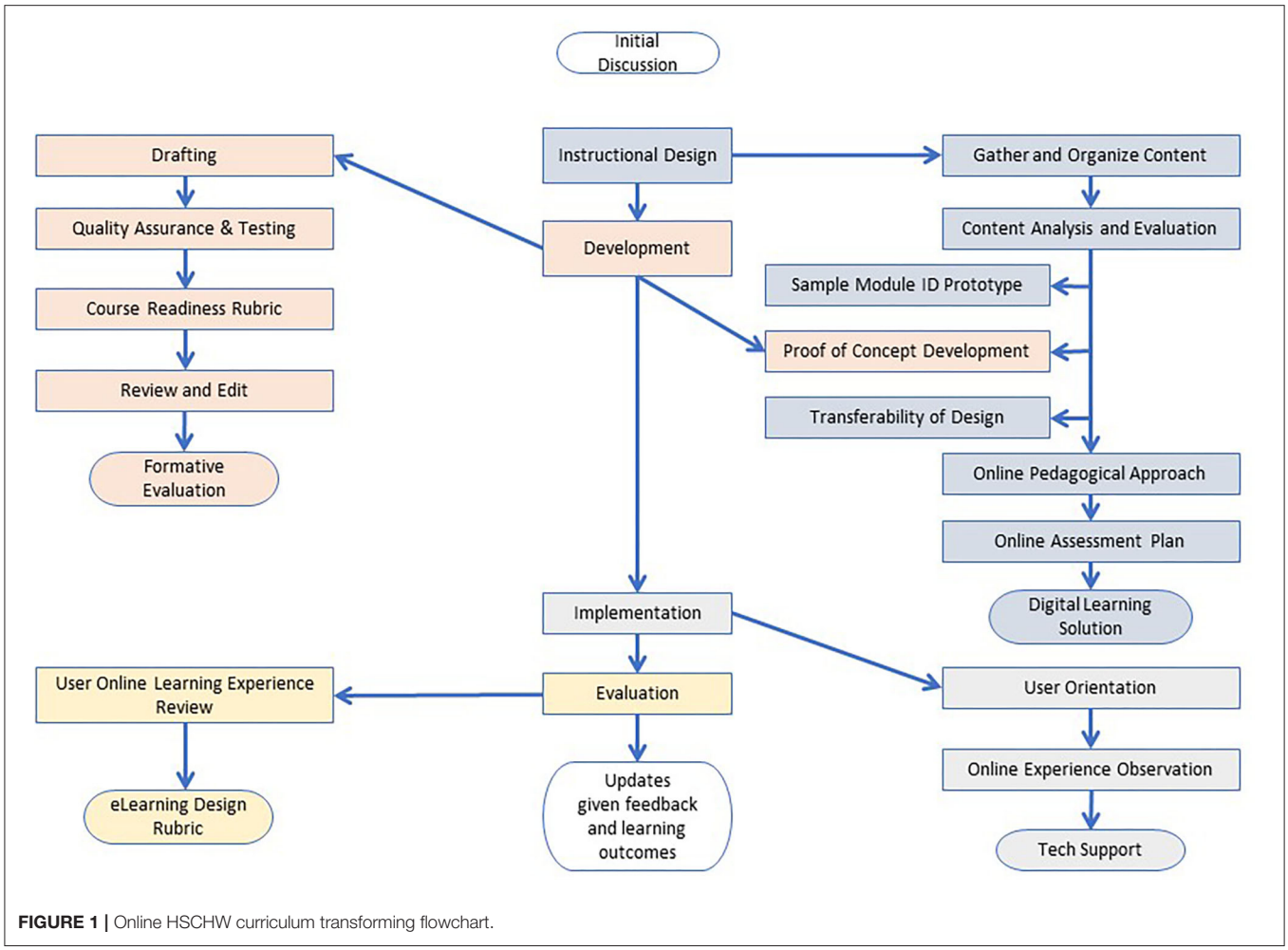

FIGURE 1 | Online HSCHW curriculum transforming flowchart.

A Description of the Online HSCHW Curriculum

The online HSCHW curriculum consists of 20 learning modules covering community health worker core competencies, each focusing on developing students' skills around communication and ethics, health and health disparities, care management and coordination, and community engagement and supports. A full list of the online HSCHW curriculum competencies and modules is included in **Appendix II**. The online curriculum was delivered in an 8-week learning timeframe. Students completed the online learning modules and finished their shadowing project, community project, and proposal project with remote site facilitators.

Specifically, module 1 is designed to develop the competencies of the role of community health workers. Modules 3, 4, and 18 are designated to establish the competencies of communication skills and ethics. Modules 2, 6, 7, 8, 9, 10, 14, 15, 19, and 20 intend to build health and health disparities competencies. Modules 11, 12, and 19 are designed to develop the competencies of care management and coordination. Lastly, modules 5, 13, 16, and 17 are designated to create community engagement and support competencies. Among them, modules 17 and 19 focus on Community Health Project and Family and Community Monitoring projects, where students apply their CHW knowledge and skills to the competencies of improving community health. Module 20 was developed during the spring of 2020 to support students in understanding the COVID-19 pandemic and what they could do to help their families and communities.

Embedded Learning Video *Interestingness* Strategies

Based on our knowledge from the face-to-face interactions with high school CHWs in previous cohorts and suggestions from the video-based online learning research literature (22–28), we decided that the guiding principle of creating and selecting instructional videos would be its capability to convey the instructional knowledge succinctly and, at the same time, increase learning experience and students' interest in learning. Two criteria were used: (1) Length –preferably <5 min. As a result, 144 instructional videos were created and curated for the online curriculum. Out of the 144 videos, 102 (71%) of them are under 5 min. The maximum length of a video is 16 min, and a minimum length of a video is 1 min and 30 s. (2) Video type: the instructional videos included various animation videos,

lectures, documentaries, case-study storytelling videos, and how-to tutorials. The use of various video types was to align with the nature of the learning content and its ability to capture students' interest. Short, animated videos were used primarily to provide a brief explanation of didactic information such as cultural competency and obesity. Knowledge-based videos were selected from TED-talk-styled health or behavior education. "How-to" videos were created for skills demonstration and process learning. In addition, documentary-style videos were used for showcasing and role modeling purposes.

Embedded Online Learning *Interestingness* Strategies

The curriculum engaged students in the series of watching, trying, writing, commenting, creating, presenting, and competing in the achievement of the instructional outcomes. Therefore, the first strategy was to design interesting learning tasks, in each online learning module, using the TPACK (29) framework. The TPACK framework emphasizes the discovery of sweet spots among technology, pedagogy, and teaching content. As a result, each learning module included the following learning tasks:

1. Students watched a 1–2 min animated warm-up video.
2. Students finished a pre-quiz, using an online game-based quiz system (www.quizizz.com) where students are motivated to compete with each other and see their names ranked on the games' social rank board, as their quiz scores improve. Pictures and brisk, lively tempo music are accompanied. Students are now fully warmed up to learn.
3. Students watched instructional videos about the module's specific content.
4. Students completed writing reflection journals based on the video content.
5. Students completed online case studies and interactive voice-based discussions using VoiceThread (www.voicethread.com).
5. Students presented their module project by using the online presentation tool, Prezi (www.prezi.com).
6. Students finished a post-quiz, using the same online interactive game-based quiz system. They are motivated to compete to see their names on the social rank board, as their scores improve.

The second strategy was to combine the online curriculum with local community engagement and shadowing projects. As the HSCHW focuses on student CHW competencies, the knowledge and skills must be implemented through actual community service projects and reflected on healthcare and community monitoring outcomes. Therefore, modules 17 and 19 were designed for students to undertake community health projects, and then bridge the knowledge and competency gaps of community health and community health workers.

Specifically, in Module 17-Community Health Project, a student used human-centered design principles and worked with his/her team to create and implement a community health project. Examples of student-created community health projects included "Buddies over bullies," "D-stress Exposition," "Fit Kids: Redefining Exercise," and "Healthy Eating." Module 19 aims to translate students' community health knowledge into practical community health worker skills. In this module, students conducted a health monitoring of self, family, and community, by following the family and community monitoring protocol. In the monitoring component, each student monitors four family/community members and their health each month. Students conducted monitoring, measuring, connecting, encouraging, problem-solving, and reporting activities, during this period. In addition, they assisted family and community members with adherence to doctors prescribed plan-of-care and provided health literacy information to family and community members. As a result of these practicum modules, participating students from eight remote sites initiated 83 community health projects.

The third strategy was to develop the "training-of-trainer" (TOT) program. The purpose of TOT is two-fold: (1) to instruct a remote curriculum facilitator on the highlights and outcomes of the curriculum, and (2) to guide remote facilitators through the major facilitating moments and key conceptual and project coaching moments, throughout the curriculum. The remote facilitators completed the TOT program at the beginning of the virtual curriculum. They were trained on the curriculum flow, as well as technologies and strategies to motivate and coach students in the online modality. Online facilitators take the major role of checking online learning activities, interacting with students, and facilitating online group activities. As of February 2021, 16 remote curriculum facilitators were trained to implement the curriculum.

Student Evaluation of *Interestingness* of Online Curriculum

The online survey and focus-group interview results during phase II revealed evidence of the interestingness of the online curriculum from the students' perspectives. **Table 1** presented the results from the online survey, followed by further explanations of the reasons, gathered from open-ended, online survey answers and the focus-group interviews.

When asked whether they thought the online CHW lessons were interesting and why, 11 out of the 17 (64.71%) students answered that the online curriculum was interesting. The two most stated reasons were: (1) the students have learned new knowledge about health and health management through the curriculum. Repetitively, students commented, "*Lessons were interesting because we learned a lot of things we didn't know about*." And "*because I have learned new things that can help me throughout life and it opened my eyes to certain things I did not know*," and *"It has opened my eyes a lot about different aspects about my health, and I have learned things I never knew about my health being in this training program*." (2) The learning videos were interesting and exceeded their expectations; comments included: "*Yes. When I heard of the program and watched the video, I thought that the program would be boring. I noticed in the video everyone mentioned diabetes, so I thought that that was going to be the only thing we talked about. But the lessons were interactive*" and "*Yes, I have found the lessons interesting. Almost*

TABLE 1 | Student evaluation of interestingness of the online HSCHW curriculum.

Questions	Positive comment	Negative comment	Neutral comment	Sample student quotes for positive comment	Sample student quotes for negative comment	Sample student quotes for neutral comment
Overall, did you find the online HSCHW curriculum interesting?	11 (64.71%)	2 (11.76%)	4 (23.53%)	Yes, because it gave me a new way of learning about different topics in a way I can recollect the information.	No, I did not because they were just talking and showing us uninteresting videos.	Some lessons are interesting and engaging; however, they could be more things for us to do. I think that the lessons are sometimes interesting.
How interesting were animated introduction videos	14 (82.35%)	3 (17.65%)	0	They were very interesting, and because I am a visual learner, it was the easiest way for me to comprehend the concepts the videos displayed. And when asked about a topic I can now picture it in my head.	The animated videos were not interesting at all.	None
Did you find the Youtube learning videos interesting?	9 (52.95%)	6 (35.29)	2 (11.76%)	Definitely. Being a visual learner as many are, watching the videos allowed me to connect the ideologies of the lesson	Videos were not interesting because most were long and had the same boring tone. We would watch videos back to back.	They were kind of interesting to learn about real-life situations. Some of the videos were interesting. The short Ted Talks, the IPV videos, animated videos, and easily understood videos. The descriptive hard to understand long videos were boring, and I didn't get anything from them
Did you enjoy the VoiceThread activities?	3 (17.65%)	14 (82.35%)	0	I enjoy the VoiceThread activities. I have never used it and it is a cool way of turning in assignments.	Definitely not. I hate the voice threads I don't like talking into my computer, and it just seem like more work.	None
Did you enjoy the format of the pre-and post-tests on Quizzes?	16 (94.12%)	0	1 (5.88%)	Yes. I like that it is short and covers the main details. It is interactive, and everyone wants to be the first place.	None	Somewhat. They were straight forward but not enough time was given, and many questions had wrong answers. I would advise that it be revised with a current and more accurate layout.
Did you feel like you learned a lot from watching the videos?	13 (76.47%)	1 (5.88%)	3 (17.65%)	Yes, much more than I would have read it, I am not good at comprehending. It takes me a minute to understand what I am reading, so the videos were perfect.	Not really, because I still had questions	Sometimes because some were so long, I zoned out. Certain one. Not a lot, but I learned from them. I will try to take notes, but the videos move too fast. However, some videos really help me understand—for example, the video of IPV.
In terms of the instructions given in each assignment, were the expectation clear about what you needed to do?	14 (82.35%)	2 (11.76%)	1 (5.88%)	Yes, they were very straightforward and easy to understand. The directions were definitely clear. They went straight to the point and even gave you resources I could use an outline.	No to me, the modules were kind of confusing. no, they weren't clear	Sometimes

every module has an animated video along with it, and it makes it intriguing. As a student, I am used to seeing documents and reading, so the videos have redirected my focus."

Individual students mentioned two additional reasons. First, the students commented on the dynamics of the online facilitator: "*Yes, I found the lessons extremely interesting because Dr. Chris taught me things that I never knew, and he didn't make it boring either*." Second, another student pointed out that the online curriculum provided a new way of learning: *"Yes, because it gave me a new way of learning about different topics in a way that I can recollect the information."*

Two students, who rated the curriculum uninteresting, also gave their reasons, one student still preferred face-to-face training and felt that the video content could be covered during the face-to-face sessions: *but I feel like we should have been able to do the modules in class because they were saying the same things that the videos were saying.* Another student commented on the density of the course content: *"the videos can be too long and not interesting. There are also too many sections in some of the modules."*

When asked which course elements are the most interesting, students' answers confirmed the previous answer about the curriculum's overall interestingness. First, students pointed out the interestingness of the learning content, such as sex education, mental health, HIV and AIDS, and chronic illness. In their own words: "*Of all the lessons, the best one was the one about sex education." Second,* "*The lesson about chronic illness such as asthma, obesity, diabetes, etc., was the most interesting in my opinion because there were a lot of things I did not know about the long-term symptoms."*

Within their answers, six students mentioned that the learning videos were the most interesting part of the curriculum; one student explained, "*The videos are the most interesting components of the lesson. It was interactive and showed us more about the lesson."*

Particularly, the students appreciated various video types and paid attention to specific video presentation styles and their effects on learning. During the focus-group interview, they pointed out that the visual presentation styles—such as animation, quantity of visuals, transitions between scenes, vibrant color schemes, conversational techniques, diversity of speakers and actors, and mini-movie storytelling—are what made the videos interesting. Invariably, the students commented on the animated video:

- *"I like...the animation." It is interesting because of the animation style."*
- *"The animation how they illustrate how the lungs work."*
- *"Animated things have just always been my thing. That's all I watch on TV, so if it is animated, it already got my attention."*
- *"The animations go along with the words."*
- *"Add a little animation and every once in a while."*
- *"It (the animated video) just showed more actions, the more out there like you can see it."*

As another example, music videos were used in the Nutrition module. Students rated the video as very interesting and engaging, by all the ratings, because of its music's rhythm, beat, and repetition, as well as the lyrics embedded in the music. When asked "What makes this video interesting?," the focus-group students answered: *"everything, the beat, the rhythm, the rock;"* "*the beat itself;"* and "*rhythm and repetition*."

Moreover, when asked about the curriculum's most interesting component, students acknowledged the interestingness of learning tasks. Students notably mentioned pre-and post-tests, discussions, and Prezi presentations. The students also appreciated the local community engagement project, as they responded, "*I like the fact that we have an opportunity to create a project that helps our community."*

However, during the online survey and focus-group interviews, the students found the online voice-based discussion activity the least interesting. Out of the 17 students, only three students indicated that the voice-based online discussion was interesting. The rest of the 14 expressed disengagement from the task. One reasons behind it included technological difficulty: students found the technology hard to use, and they felt uncomfortable talking to a computer.

As a summary, the online survey and focus group interview results, conducted in phase II, showed that the students have found the online HSCHW curriculum to be interesting.

Online HSCHW Curriculum Learning Outcomes

Out of the 364 high school students from 12 remote sites, the grades of only 265 students from 10 sites were available for learning outcome analysis. **Table 2** showed the student curriculum completion rate, community health projects, and average curriculum grades from each of the 10 remote sites.

Among the 10 online cohorts, student training completion rates varied from 42.86 to 94.74%, with an average completion of 77.36%. Curriculum grades among these 10 cohorts ranged from 71.58 to 97.56, with an average of 86.92, which meant that the participating students could achieve the mastery of the designed CHW content in the curriculum. As the remote sites increased, the completion rates and average grades remained effective across the remote sites. However, some variations in attrition rate were observed. Out of the 10 cohorts, seven showed a curriculum completion rate above 80% and three below 80%. Worth mentioning is that cohort 10 showed a low completion rate of 42.86% but very high average curriculum grades of 97.56. Further study will be conducted to investigate the reasons behind this.

Furthermore, pair sample *t*-tests were conducted to measure students' learning gains in the online HSCHW curriculum. As showed in **Table 3**, paired sample *t*-tests showed that among the 265 participating high school students, the learning gains on all online HSCHW modules, reflected from pre- and post-tests, were all significant ($p = 0.000$). In addition, the students showed significant pre-post-test score gains in each module, from module 1 to module 18, with modules 17 and 19 designated to community health workers shadowing projects and containing no pre- and post-tests.

Overall, the students showed a high HSCHW curriculum completion rate, curriculum grades, and significant learning gains from each learning module.

TABLE 2 | Online HSCHW curriculum completion rates and students grades.

Cohort	Enrollment	Attrition	Completion	Community health projects	Completion rate (%)	Average curriculum grades
1	27	3	24	17	88.89	80.87
2	5	1	4	1	80	79.31
3	18	2	16	11	88.89	86.92
4	19	1	18	18	94.74	94.60
5	30	3	27	6	90	83.58
6	19	1	18	18	94.74	92.27
7	35	6	29	0	82.86	71.58
8	51	17	34	12	66.67	89.62
9	26	6	20	0	76.92	92.92
10	35	20	15	0	42.86	97.56
Total	265	60	205	83	Average = 77.36	Average = 86.92

TABLE 3 | Students' learning gains between pre- and post-tests.

Paired samples test								
Post-test – pre-test	Paired differences					*t*	df	Sig. (2-tailed)
	Mean	Std. deviation	Std. Error mean	95% confidence interval of the difference				
				Lower	Upper			
Module 1	0.109	0.360	0.024	0.157	−061	−4.467	218	0.000
Module 2	0.231	0.350	0.024	0.184	0.278	9.761	218	0.000
Module 3	0.185	0.301	0.020	0.145	0.226	9.052	216	0.000
Module 4	0.139	0.383	0.026	0.088	0.189	5.389	220	0.000
Module 5	0.245	0.349	0.023	0.199	0.291	10.493	223	0.000
Module 6	0.181	0.343	0.022	0.137	0.224	8.128	237	0.000
Module 7	0.178	0.353	0.023	0.133	0.223	7.792	237	0.000
Module 8	0.132	0.311	0.020	0.093	0.172	6.568	236	0.000
Module 9	0.138	0.308	0.020	0.098	0.178	6.854	234	0.000
Module 10	0.243	0.358	0.023	0.197	0.289	10.438	236	0.000
Module 11	0.076	0.265	0.017	0.042	0.110	4.390	234	0.000
Module 12	0.064	0.271	0.018	0.029	0.099	3.593	230	0.000
Module 13	0.141	0.315	0.021	0.101	0.182	6.842	231	0.000
Module 14	0.114	0.284	0.019	0.078	0.151	6.157	234	0.000
Module 15	0.118	0.274	0.018	0.082	0.153	6.559	232	0.000
Module 17	0.058	0.340	0.022	0.014	0.102	2.591	231	0.010
Module 18	0.085	0.287	0.019	0.048	0.122	4.514	232	0.000

DISCUSSION

In our 3-year long journey of developing the online HSCHW curriculum, we have encountered three major challenges. First, CHW training is a competency-based training curriculum involving health science knowledge such as diabetes, sexually transmitted diseases, obesity, and real-life health care skills, such as blood pressure measurement, community health monitoring, and health data tracking and communication. Therefore, developing an online curriculum to teach both conceptual and real-life skills posed an immediate challenge. Second, high school students were known as digital natives. They were generally technology savvy, interested in multimedia, learning by indicative discovery, emotionally open, and communicating visually (30, 31). Thus, engaging high school students on an online curriculum, and sustaining their engagement through the continuation of the learning contents and activities posed a design challenge to the curriculum transformation. The third challenge resided in the design of the facilitator's role in the virtual curriculum. A curriculum facilitator, who interacted with students daily, would guide students throughout the curriculum and develop bonds with them throughout delivery of the face-to-face curriculum. However, the role of an online facilitator became a challenge when moving the curriculum online and

taking advantage of the flexibility of the digital platform to offer the curriculum to thousands of students. It would not be as easy to replicate the day-to-day, dynamic coaching relationship in an online curriculum as it is in the face-to-face relationship. Therefore, creating an online curriculum that fosters students' independent learning, while providing facilitator coaching and online community building, surfaced as another major challenge.

In this project, we used the concept of interestingness as a focal design point and a target metric to address these challenges. At the onset of the online curriculum creation, a focus was placed on asking how we could create an interesting online curriculum from students' perspectives. The use of the concept of "interestingness" and frequent discussions about it during the design process pushed us to select, create, and evaluate learning videos and tasks from students' subjective points of view. In the existing research literature, interestingness was derived from the educational psychology research on situational interest (32, 33). Situational interest was defined as a momentary state of interest triggered by events in a learning environment (34). Research on situational interest showed that making a lesson more interesting can improve students' learning outcomes and students tend to perform better on learning materials that interest them (35). Furthermore, researchers studied how learners appraised the "interestingness" of learning materials, particularly text-based reading materials (36–39). They found three components in the "interestingness" appraisal model: novelty, complexity, and coping potential. Interest should occur when an event is appraised as new but comprehensible. When a learning event is too difficult or beyond a students' coping potential, feelings of confusion, and anxiety could rise. Recently, in computer science research, the concept of "interestingness" was used to gauge characteristics embedded in an online video in social media to attract viewers' interest in viewing it (40, 41). It is found that the "interestingness" of online videos has both subjective and objective features. Subjective features included unexpected, novel, and actionable features, and objective features included coverage, support, and accuracy. In online curriculum design, the concept of interestingness, though relevant, has not been applied yet.

The HSCHW online curriculum used the components suggested in previous interestingness research and shared three "interestingness" strategies to overcome these three challenges in the HSCHW online curriculum and increased its novelty, complexity, and coping potential.

First, two practice modules were designed to help students bridge the gaps between online community health knowledge and real-world community health work. Based on the suggested interestingness components, these two practice modules should enhance the complexity component of interestingness of the online curriculum. Students worked either individually or with a team to design and implement a community health project. As a result, 83 community health projects were initiated and implemented by the participating students. In module 19, each student monitored four families and community members' health, helped to develop a plan for adherence to doctor's treatment, and shared relevant disease and health information to family members. These practice elements helped students to use the community health worker knowledge to serve their families and communities.

Second, from the technology and content engagement standpoint, the curriculum adopted various technologies, such as short videos, music videos, animations, VoiceThread, Prezi, virtual reality, etc., to engage and sustain high school students' online learning. The use of various technologies and learning videos was expected to enhance the novelty of the online curriculum's interestingness. One surprising finding in phase II is that, during the focus-group interview and online survey, 14 of 17 students found the voice-based online discussion activity Voice-thread to be uninteresting. The students indicated that the technology was hard to use. This suggested that as we introduced new technologies to the curriculum, we may also introduce the unwanted logistic complexity to the learning process and decreased students' coping potential of the learning task, as students have expressed that it is unnatural for them to construct voice-based online conversations asynchronously. The project team reviewed the learning tasks and the technology and updated the technology with Flipgrid (www.flipgrid.com), which allowed better user flow and video discussion and increased the students' online presence, ultimately enhancing the interaction. In the online HSCHW curriculum, technology plays a critical role in support of students' curriculum success. If used effectively, it can motivate students, increase engagement, and generate desirable learning outcomes. Thus, both a theoretical evaluation of online technology and a practical assessment of its usage are essential to students' continued online curriculum success.

Third, the TOT program supported the facilitation of the online curriculum. The training programs contain three core components: the TOT participant manual, four asynchronous online learning modules, and one interactive online synchronous workshop. Over the last 3 years, these elements were gradually developed and enhanced based on informal feedback from the 16 training participants. In 2021, the project team finished the TOT evaluation plan and intended to conduct a formal TOT evaluation. The effort would increase the facilitator's and students' coping potential when the curriculum was implemented in remote sites.

The study has its limitations. First, through the TOT program, we have trained 16 online facilitators and worked with the online facilitators on focus-group interviews. Although the online facilitators showed appreciation and satisfaction during the online training interaction, their formal evaluation results of the TOT program are not available in this study as a systematic and evidence-based approach to the TOT's effectiveness.

Second, as shown in **Table 3**, remote cohort #10 showed a low completion rate but high curriculum grades. Those who finished the curriculum achieved very high curriculum grades. We are working with the online facilitators to identify the reasons and provide tailored supports to ensure the online success of each student. The result also showed that only some sites and some students have implemented the community-health project. This was partly due to the COVID-19 pandemic, which greatly limited face-to-face interactions in the year 2020. Another reason was that some student groups "bite off more than they can chew" and end up not implementing their planned projects.

Also, there is attrition where some students may not stay in the program due to school, sports, work commitments. This may cause the group not to be able to implement their projects. Local communities and partners' engagement can be another challenge to implement the community-health project as well. To engage local communities and partners, we have an Annual Stakeholders Meeting in January of each year where we talk to our partners about assisting student groups with Community-based and School-based projects. The students do their project presentations in late July/early August. The presentations are open for community members and partners to join. In October of every year, we ask those partners who may be interested in working with the current student projects to join us on a Saturday meeting call to help the students plan to implement their projects. We shared our experiences with remote sites during the implementation process and supported them in adopting similar approaches.

Third, the focus group and online survey on the interestingness of the curriculum were conducted during project phase II, and had a small sample size of 17 students. The online survey assessed students' opinions of the curriculum's interestingness, based on the curriculum team's design intention. It will be revised to fully capture students' online learning experiences, as well as their engagement in learning content and completing assignments. Moreover, the paper used the concept of "interestingness" based on previous research on interestingness pertinent to reading materials and online videos. The attempt serves as an initial effort to evaluate an online curriculum from the theoretical constructs of interestingness. Future efforts are needed to evaluate how the dynamics of novelty, complexity, and coping potential in interestingness would change when new technologies and learning formats are introduced to a curriculum.

The online students provided initial positive feedback on our learning videos and their effectiveness in engaging learners; however, we are also aware of the limits of learning videos. They are still a two-dimension screen-based learning experience. Therefore, the next step is to enhance the online HSCHW curriculum and bring the most impactful learning experience to our learners through advanced technology, including virtual reality and augmented reality.

In summary, the paper shared the process and strategies to develop the first online HSCHW curriculum, as well as the initial evidence of its outcomes. Overall, the students found the online HSCHW curriculum interesting and showed high curriculum completion rates, curriculum grades, and significant pre-and post-module learning gains. The positive results from this study revealed the effectiveness of the curriculum design process and its strategies. Additionally, the positive results contributed to the future public health colleagues' endeavor of creating a CHW online curriculum.

The findings will inform future endeavors to develop and deploy an online CHW curriculum for lifelong learners and increase training effectiveness. The Online High School Community Health Worker curriculum alleviates the national shortage of community health workers in urban, impoverished neighborhoods. It empowers high school students to learn health knowledge, and bridges the difficult educational gap between health knowledge acquisition and health knowledge application. The Online HSCHW program presents a concrete example of leveraging digital platforms to teach complex public health competencies to the population, among whom health assistance is most needed.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Morehouse School of Medicine Internal Review Board. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

All authors have made a substantial contribution to the conception and design and/or the analysis and interpretation of data, drafting the article, as well as revising it critically for intellectual content.

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SUPPLEMENTARY MATERIAL

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Adding a Seat at the Table: A Case Study of the Provider's Perspective on Integrating Community Health Workers at Provider Practices in California

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Blue Shield of California's Community Health Advocate Program was created to support whole person-health needs by helping individuals of all socio-economic statuses navigate and access community resources, social services, and medical systems. Blue Shield's Health Reimagined team is partnering with medical providers, community resources centers, and community partners to provide intensive person-centered and technology-enabled care to patients, ensuring social needs are met while promoting health equity. A key aspect of the Health Reimagined initiative embeds Community Health Advocates (CHAs) within physician practices serving patients using a payor-agnostic approach, by which Blue Shield aims to increase access to social services and community resources, improve health outcomes, reduce medical costs, and improve overall patient experience. The purpose of this case study is to understand the provider's perspective of embedding a CHA into the care team and the resulting impact on the practice and patients. Blue Shield also sought to identify best practices and barriers of a CHA program within primary and specialty care practices. As part of an ongoing two-year mixed-methods impact evaluation (2019–2021), 10 semi-structured interviews were conducted with a total of 18 providers and office staff at five primary care and specialty practices where CHAs have been embedded. We also conducted two focus groups with the same five CHAs at different points in time. Several themes emerged from the provider, office staff, and CHA interviews. Provider practices found great value in adding a CHA to their care team as the CHA brings flexibility and continuity to patient care. They also found that having access to a CHA with shared life experiences of the communities they served is a key component to the program's success. Providers and staff reported a new understanding of the social determinants of health that impacts a patient's wellbeing with the embedding of a CHA in the care team. Overall, practitioners expressed high satisfaction with the

CHA program. During the COVID-19 pandemic, CHAs have been critically important in care, as social needs have increased, and resources have shifted. The CHA program is constantly adapting to address challenges faced by all stakeholders and applying new knowledge to ensure best practices are implemented within the CHA program.

Keywords: community health worker (CHW), health equity, social determinants of health (SDOH), provider integration, community health, social needs, holistic health

INTRODUCTION

With the various health needs of diverse populations and the limited resources available to support these needs, it is imperative to support advocacy initiatives that transform community health (1). Social Determinants of Health, or the inherent conditions in which people live, learn, work, and play, often affect a wide range of health risks and outcomes.[1] Research has shown that up to 80% of a patient's health is impacted by social determinants (2), and these needs may be better addressed outside of traditional health care delivery systems. In 2020, the widespread impacts of the COVID-19 pandemic on historically marginalized communities have made the need for holistic, community-integrated care even more urgent and visible.

Community Health Workers/Promotores (CHW/Ps) are positioned to provide support and identify patients' social needs, help navigate the medical system, and provide referrals and connections to community resources. These public health workers often share a sociocultural background with the patients in the communities they serve, which allows them to establish trust and improve the health system's ability to provide higher quality and culturally appropriate care (3). Evidence shows that CHW/P interventions can improve health outcomes for marginalized communities by increasing access to primary care, improving behavioral health, reducing the likelihood of 30-day hospital readmissions, supporting chronic disease management, and lowering hospitalization rates (4–7).

CHW/Ps are traditionally managed by community-based organizations or organizations that function as the liaison between health systems and communities (8–10). With increased financing and delivery of health care services, a recent approach to CHW/Ps as an extension of the clinical system has been introduced that blends these traditional approaches and expands the CHW/P role into healthcare settings. As members of the clinical care team, CHW/Ps can help improve health care systems to be more appropriate and accessible for community members by shifting to a patient-centered, preventative approach to care (11). Integrating CHW/Ps into multidisciplinary care settings allows CHW/Ps to take on a wider spectrum of responsibilities and complement the skills of clinical staff to support complex medical and non-medical care needs that go beyond the walls of the clinic (12).

While research has shown that integrating CHW/Ps into primary care settings is effective and the interventions can result in improved health outcomes,[2] evidence is still developing on how to assess and improve organizational readiness for integration into primary and specialty care settings. The healthcare system lacks a widespread care delivery system and readiness effort aimed at integrating the CHW/P role into coordinated care delivery models. Understanding and respecting the CHW/P model within the clinical setting is essential for CHW/Ps to be fully integrated within care delivery systems and utilized to the fullest potential (9).

The purpose of this case study is to identify best practices and barriers of a CHW/P program established by Blue Shield of California (Blue Shield). The study shares background about the CHW/P program's approach and findings to date related to the recruitment and training, but primarily the integration of CHW/Ps into primary and specialty care teams and practices. Drawing on results from practice interviews and focus groups, the case study shares key insights and lessons learned from the perspective of providers, staff, and CHW/Ps. While the program is in the pilot phase at the time of publication, there is ongoing evaluation from the program's initiation, which has allowed for continuous learning. This case study focuses on a subset of the CHA programs at one medical group in California across five practices. The case study identifies facilitators and barriers of the program's implementation and early impact to practices and patients from the provider, practice staff, and CHW/P perspectives.

BACKGROUND

Blue Shield reviewed the evidence base for CHW/Ps and began its own program called the Community Health Advocate (CHA) program. Blue Shield adopted the "CHA" title for CHW/Ps to introduce roles within the enterprise and provider partners. Blue Shield first introduced CHAs to the Blue Shield Promise Health Plan (a Medicaid managed care plan) in 2018, with 11 CHAs who served over 4,200 Blue Shield Promise Medi-Cal members by supporting at-risk members with accessing care and addressing health and social disparities.

Blue Shield later launched the CHA pilot program across the state in partnership with multiple medical groups and community organizations, as part of the comprehensive Health Reimagined initiative aimed at transforming the healthcare

[1]Centers for Disease Control and Prevention. About Social Determinants of Health. (2021). https://www.cdc.gov/socialdeterminants/about.html (accessed March 15, 2020).

[2]Centers for Disease Control and Prevention. Integrating Community Health Workers on Clinical Care Teams and in the Community. (2020). https://www.cdc.gov/dhdsp/pubs/guides/best-practices/chw.htm (accessed March 15, 2020).

TABLE 1 | High-level data from the CHA program through December 2020 is outlined below.

Metric	Sacramento county	Monterey county	Butte county	Los Angeles county	All regions
# Of social needs assessments	2,327	426	67	18	**2,838**
# Of patients	∼1,000	843	42	21	**1,906**
# Of referrals	2,332	1,170	71	29	**3,602**
Top referral type	Mental and behavioral health	Physical health	Transportation	Food assistance	**Physical health**

17 CHAs have served over 1,900 patients and created 3,600 referrals. The top referral types vary by region, as each region has a diverse population with specific social needs. The program start dates and number of practices/CHAs vary by region, impacting total volume in some areas.
A patient may have more than one referral. The CHA program in Sacramento was the first to launch and has more CHAs than the other regions, which contributes to its higher volume of patients and referrals. Bold values are for totals across all regions.

system.[3] As of January 2021, there are 17 CHAs in the Health Reimagined CHA pilot program. The CHAs are integrated into 10 primary and specialty care practices across four regions in California, including six practices from Hill Physician Medical Group[4] in Sacramento County, three practices in Monterey County, one practice in Butte County, and one practice in Los Angeles County. Blue Shield CHAs can serve all members at a practice, regardless of member health plan insurance coverage or carrier.

A key aspect of the Health Reimagined pilot program embeds CHAs within primary and specialty care practices serving patients using a payor-agnostic approach, meaning the pilot reaches the entire practice's patient population and is not limited to Blue Shield members. This approach is intended to increase access to social services and community resources, improve health outcomes, reduce medical costs, and improve overall patient experience. The pilot program includes a high-touch, personalized provider-embedded and field based-approach to bridge to community resources and integrate social needs in the care plan. The CHAs are an expansion of the care team with workflows built into the day-to-day operations.

Patient population reached by the CHA Program: Since the CHA Program's initiation in October 2019, 17 CHAs have served a total of 1,906 patients and created 3,602 referrals, screening their populations for social needs over 2,838 times. A summary of high-level CHA program data by region can be seen in **Table 1**.

The CHAs serve a diverse patient population. Sixty percent of the patients connected with a CHA were female, and one-third identified as Latino/Hispanic. At initial connection to a CHA, one in three patients who were referred to a CHA reported "fair or poor" health when screened for health-related quality of life measures. Patients reported an average of 19 unhealthy days of the past 30 days, including 7.7 physically unhealthy days and 11 mentally unhealthy days.

The top social needs identified from screening patients include housing, access to health care, and unemployment. CHAs made referrals to appropriate community resources to help patients address their unmet social needs. The top referral types were physical health and access to health care, individual and family support, food assistance, mental and behavioral health, and housing and shelter. The types of referrals to resources vary by gender and race/ethnicity. For example, for women, top referrals were for access to health care and mental/behavioral care. For Black/African American patients, the top referral type was for mental/behavioral health, and for Latino patients, the top referral type was for access to health care.

The top referral types also varied by practice type. Overall, Mental and Behavioral Health was the most prevalent among primary and specialty care practices. Primary care also had more physical health-related referrals, while specialty care practices had more referrals related to basic needs, such as housing and shelter, and individual and family support. The top referral types varied within each specialty care practice type, as shown in **Table 2**.

Recruitment Process

Recruiting CHAs from the communities they serve brings significant benefits for the patient population because those individuals are more likely to have an intimate understanding of the socioeconomic factors faced by fellow residents. Evidence shows the importance of recruiting CHAs who can cross cultural and language barriers to bridge the gaps between providers and communities, and ultimately address key social determinants of health (13). CHAs must be able to connect to their neighbors and translate their interventions and messages in a way the community can understand. Qualifications of a successful CHA are focused on knowledge of the community, personality, and communication skills, rather than technical abilities (14). CHAs must guide their communities to realize their potential to create opportunities to achieve better health and well-being (15).

Approach: Blue Shield has a recommended recruitment process to ensure the most qualified individuals are selected for the CHA role (i.e., credibility in the community, language(s) spoken, rapport with organizations, ability to navigate community systems, etc.). Blue Shield's hiring team created the job descriptions medical groups use in their recruiting efforts. A sample job description can be found in Section 1 of the **Supplementary Material**. The recruitment process is led by the medical group's hiring team and management. Interviews are conducted by the medical group, who evaluate candidates based on their resumes and a Blue Shield evaluation form,

[3]Blue Shield of California. Health Reimagined. (2021). https://healthreimagined.blueshieldca.com/ (accessed March 15, 2020).
[4]Hill Physicians. (2021). https://www.hillphysicians.com/ (accessed March 15, 2020).

TABLE 2 | The top referral types varied by practice type.

Practice type	Top referral #1	Top referral #2	Top referral #3
Primary care	Mental and behavioral health	Physical health	Benefits navigation
Specialty care	Mental and behavioral health	Housing and shelter	Individual and family support
Ob/gyn	Mental and behavioral health	Housing and shelter	Clothing and household goods
Pulmonary medicine	Mental and behavioral health	Benefits navigation	Utilities
Orthopedic	Transportation	Food assistance	Benefits navigation
Endocrinology	Physical health	Wellness	Transportation

Mental and behavioral Health was most prevalent among both primary and specialty care practices.

make a final decision on who to extend offers, and finalize all pre-employment requirements.

Training and Education

CHA training programs vary in content, focus, education, rigorousness, and time. One limitation to implementing a CHA program in California is the lack of state-level or industry standards for industry preparation (16). Most training programs are focused only on the development of skills that are needed in a very specific setting and cannot be widely scaled. Because of the lack of consistency and clarity in training, barriers exist to scaling CHAs within health care, public health, and social services settings on a state and national level (17). Several organizations, such as the California Future Health Workforce Commission, have developed plans of action to address the challenges related to supply, diversity, and geographic distribution of CHAs in primary care, prevention, and behavioral health settings. The Commission's recommendation is to scale the engagement of CHAs through certification, training, and reimbursement mechanisms (17).

Approach: To address training needs in our state-specific context, the Health Reimagined CHA Program partnered with experts in the field who are familiar with training processes for CHAs across the state. Blue Shield worked in collaboration with various subject matter experts and community-based organizations, such as Partners in Care Foundation[5] and Rush University Medical Center – Center for Health and Social Care Integration[6] to co-develop and deliver curriculum for the CHA program. CHAs from current cohorts or key partnerships serve as subject matter experts in their field and participate in the training process for future CHAs. Blue Shield also worked with HealthBegins[7] to provide training to our provider practices on how to address social determinants of health in our member population. More insight into Blue Shield's external partners can be found in Section 2 of the **Supplementary Material**.

[5]Partners in Care Foundation. (2021). https://www.picf.org/ (accessed on March 15, 2021).

[6]Rush University Medical Center. Social Work and Community Health Services. (2021). https://www.rush.edu/services/social-work-and-community-health-services (accessed on March 15, 2021).

[7]HealthBegins. (2021). https://healthbegins.org/ (accessed on March 15, 2021).

Blue Shield CHA Curriculum

Blue Shield engaged with Partners in Care Foundation as a training vendor with years of community-based experience to recruit the right individuals and share meaningful training aimed at refining CHA interactions with patients. The curriculum is designed to be a universal standard for all CHAs and includes various training modules that can be translated to any health setting. Racial justice and equity are themes interwoven throughout the curriculum and in ongoing trainings. CHAs complete training topics specifically focused on equity and inclusion in healthcare. The curriculum also incorporates an understanding of the racial/ethnic disparities in communities and how the CHA role aims to bridge the gap that exists between social and health disparities observed in the community with the care provided by the medical system. The curriculum is currently being used outside of Blue Shield and will be freely available for all Community Colleges in California. The curriculum includes CHA core competency training, behavioral and mental health, field training, and one-on-one mentoring. The mentoring aspect will resume post-COVID-19.

a. The Blue Shield CHA training is 40 h of in-classroom instruction and 16 h of mentoring/shadowing in the community. The training curriculum addresses core roles/responsibilities and core competencies, with an emphasis on social justice, cultural humility, motivational interviewing, mental health, and health/chronic conditions, that are essential skills for CHAs to perform duties that include:

   - Assessment of social determinants of health needs for patients, documenting assessment results, educating patients, and communities, referring patients to community-based organizational resources to close unmet social needs and address health inequities
   - Active engagement, building rapport, establishing a trusting relationship, and continuous transparent communication with patients and their family support systems
   - Assisting patients with problem-solving barriers to health conditions by identifying, locating, connecting to, and navigating needed community and medical system services, including visiting patients at their homes, accompanying patients to medical and related appointments, and assisting patients with completing forms to access needed services.

- Documenting activities and progress notes in appropriate systems and providing reports to management and providers.
- Identifying gaps in community resources and medical systems and supporting the implementation of new solutions or services to close identified gaps through advocacy and education

b. The Blue Shield CHA Behavioral Health training provides an additional 24 h of in-classroom instruction with a focus on behavioral health to support community members (mainly uninsured/underserved/migrants/homeless communities). The behavioral health training included background information on several mental health conditions, including depression, anxiety, PTSD, substance abuse or misuse, and cognitive function, among others. CHAs were also introduced to trauma-informed care and approaches to incorporate into their duties.

Integration Into Teams, Provider Practices, and the Community

Evidence shows that CHAs have maximum impact when they are fully integrated into a care team by having defined roles and expectations, clear reporting and documentation structure, and mutual respect with supervisors and clinical staff (17, 18). These components ensuring optimal success for CHA integration into clinical teams are outlined in this section.

Approach: Prior to CHA implementation at the medical group's practices, Blue Shield carefully selected the practices in distinct regions across the state of California. Practices shared unique qualities that made them ideal to partner with for piloting solutions based on readiness and other factors (including rural/urban, specialty/primary care, large/small practice, etc.). This process involves evaluating the potential sites against baseline criteria and researching the current standing with the partner. Blue Shield presented the program and confirmed the interest of each provider practice, then defined shared goals and objectives of the practices to ensure the success of the CHA program. Following this initial engagement, a readiness assessment was conducted to determine viability for the CHA program. All sites in this study indicated a need for CHAs at their practices.

Tools and Infrastructure to Support CHA Integration

Documenting data on the CHAs daily activities is a key aspect of successful integration into clinical settings. The workflows of a CHA program are strongly influenced by integrating patient medical records with documented interactions between CHAs and their patients. This can be done by implementing a user-friendly, community-based platform that centralizes these functions (19). Documentation has proven instrumental to monitor interventions, provide feedback to CHAs and their supervisors, and identify training needs for the future (20).

Blue Shield leveraged tools and infrastructure to help facilitate the training and implementation of CHAs as described above. Meaningful data from the tools used to support CHA infrastructure was utilized in the evaluation to understand the impact of the CHAs in the program. The CHAs begin by engaging with the patient, then, screening for social needs using a social determinants of health screening tool called the Protocol for Responding to and Assessing Patients' Assets, Risks, and Experiences (PRAPARE)[8]. From the initiation of engagement, they begin building rapport with the patient as they co-develop a care plan during home visits, or telephonically, to identify the patients' goals and interventions required to achieve these goals. Upon identifying needs or gaps in a patient's care, the CHAs make referrals to community resources to address health and social needs. Additionally, they continue to work with the patient and community to support the implementation of new solutions that ultimately improve community health.

Blue Shield leverages a tool called mySidewalk,[9] which allows CHAs to identify social risk factors of communities and conduct rapid community health needs assessments by creating customized reports and dashboards. Blue Shield collaborated with mySidewalk to develop The Neighborhood Health Dashboard,[10] which allows CHAs, providers, and all other Californians to create customized health reports on community strengths and needs. The Department of Health Care Services (DHCS) recently awarded Blue Shield the first place Innovation Award for the Neighborhood Health Dashboard.

The second tool, Unite Us,[11] is used to facilitate bidirectional referrals across an array of service types, and to support prevention, early identification and treatment of individuals' top priority health concerns and social needs. The platform tracks the number of patients a CHA connects with, the social needs identified through the PRAPARE screener, responses to the CDC Healthy Days questionnaire, and referrals created to address the patient's social needs. Research has shown the effectiveness of referral systems that provide an important link from the community to the broader health system (21).

Provider and Clinical Staff Training

In addition to training the CHAs, it is also important to inform the provider and clinical staff on how embedding a CHA in the medical group practice will impact their work. Sharing information on the CHA role, the types of social needs observed in the community, and the capabilities of the CHA with the provider and clinical staff is critical for the success of the program. The CHAs give voice to the patients' social needs and provide a new lens on the lives of their patients for the providers and clinical staff to see. Blue Shield encourages the practices to discuss the CHA program's aims and capabilities with all staff at the practice, and include the CHAs in these meetings where the CHA can share key aspects of their work. CHAs translate data to action by obtaining insight into local community factors with the use of mySidewalk and Unite Us. The CHA can share data and

[8]National Association of Community Health Centers. Protocol for Responding to and Assessing Patients' Assets, Risks, and Experiences. (2019). https://www.nachc.org/research-and-data/prapare/ (accessed on March 15, 2021).

[9]mySidewalk. (2021). https://mysidewalk.com/ (accessed on March 15, 2021).

[10]Blue Shield of California. Neighborhood Health Dashboard. (2020). https://healthreimagined.blueshieldca.com/neighborhood-health-dashboard (accessed on March 15, 2021).

[11]Unite Us. (2021). https://uniteus.com/ (accessed on March 15, 2021).

key insights with the providers and staff on social needs that are unmet and discuss how this can impact patient health.

Team Huddles and Enhancement

Blue Shield recommends the providers and clinical staff engage in regular team meetings to ensure the CHAs have the information they need to succeed, and their patient population receives appropriate services to address their needs. Studies have demonstrated the value of frequent team meetings to discuss progress and outcomes of patient interventions, or to review CHA roles and training (22). The approach for the Blue Shield CHA program is to include the CHA in team huddles with the practice to discuss care planning, 360-degree information sharing, and identification of resources and barriers for the patient. The CHAs share their external subject matter expertise of community resources and extend the information to the practice.

METHODS

Evaluation and quality improvement are integrated into the CHA program pilots that run from 2019–2021. The evaluation approach uses the Center for Disease Control's Program Evaluation Framework to incorporate standards and phases that are "useful, feasible, ethical, and accurate" (23). The goal is to have a process of continuous and systematic learning with the pilots. Stakeholders are engaged and part of program improvement from the beginning of implementation. Blue Shield's CHA program logic model (**Figure 1**) illustrates how the interventions are designed to yield desired outcomes.

Blue Shield uses a mixed-method approach and incorporates qualitative and quantitative data collection throughout the CHA program's two-year pilot period. Quantitative data collection is ongoing, which includes the number of patient cases opened and closed, social needs identified, and types of referrals to resources. Additional quantitative data is being collected to capture the provider and practice perspectives on the CHA program *via* a practice survey.[12] This survey is currently being administered and some practice responses are pending. Thus, this case study focuses primarily on qualitative results from interviews with providers, practice staff, and CHAs. Qualitative data methodologies are described in additional detail below. This project was conducted for the purpose of Blue Shield's evaluation and quality improvement operations and does not meet HHS's definition of research.

Qualitative Data

Research shows that engaging CHAs in the evaluation process is essential, their unique perspectives and roles strengthen the evaluation efforts and help identify unmet community needs (24). To date, Blue Shield has conducted two focus groups with five of the CHAs included in this case study. The first focus group took place approximately 3 months after their start date in January 2020 and included four CHAs embedded at four different practices. The second focus group consisted of five CHAs and took place in September 2020, about 11 months after their start, which included the original four CHAs. Each focus group lasted approximately 90 min. Interview domains included training and onboarding, integration into the practice and care team, their experience screening and referring patients for social needs, and their impact on the practice and patients. The CHA interview guide can be found in Section 3 of the **Supplementary Material**.

Approximately 9 months after the CHA program was implemented, Blue Shield staff conducted 10 semi-structured interviews with a total of 18 providers and office staff at five primary care and specialty practices where the CHAs are embedded. Interviews were conducted telephonically over a two-week period in June 2020, and each lasted $\sim$ 60 min. Interview domains included provider and staff experience with the CHA program, preparation for integrating the CHA into the practice, impact on the practice and patients, and understanding of the CHA role and social needs of the practice's patient population. The provider/staff interview guide can be found in Section 4 of the **Supplementary Material**.

Participation in the focus groups and semi-structured interviews was voluntary. The evaluation is conducted for the purpose of Blue Shield's usual qualitative improvement operations. All participants are informed of the goals of the evaluation, what their participation will involve, and how their information with the CHA program will be used for quality improvement.

Data Analysis

In each focus group and interview, two Blue Shield team members were present, one led the conversation and the second took detailed notes. Recording was not available and thus the detailed and summary notes from the Blue Shield staff were used for analysis. All qualitative data was de-identified and aggregated for analysis. Using qualitative thematic analysis all data was coded using QSR NVivo software to identify themes that highlight provider, staff, and CHA perspectives on the impact of the CHA joining the practice.

Five members from the Blue Shield team collected, coded, and analyzed the data from the provider/staff interviews and CHA focus groups. Two team members created initial code books based on objectives of the pilot and core themes of interest, one for the CHA focus groups and one for the provider/staff interviews. To align on definitions and use of the codes, all five team members coded one provider/staff interview. The team discussed differences and aligned on definitions. The remaining interviews were each coded by two team members. The same process was followed for the CHA focus groups. If a new theme was identified through the coding process, the team discussed the potential new code and added if consensus was reached. Prior interviews were re-coded to incorporate the new codes. Codes were then organized into higher level concepts. The team reviewed the emerging concepts and identified themes. Findings were summarized and learnings were shared with stakeholders, including CHAs, providers, and practices. Stakeholder input facilitated the ability to confirm findings and develop actionable learnings for program improvement.

[12] Practice survey was distributed to Clinical Providers (MD, DO, NP, PA, RN) and Staff (office managers, administrative staff). Community Health Advocates did not receive the practice survey.

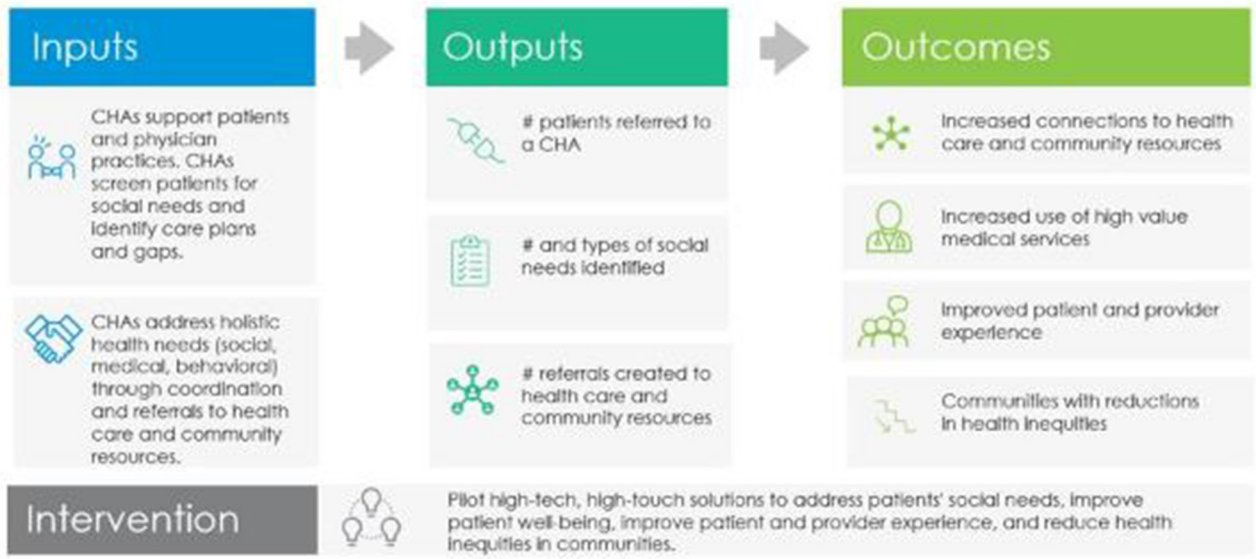

FIGURE 1 | Logic model for blue shield's CHA program.

FINDINGS

Recruitment Process

Blue Shield found that having a direct collaboration with the medical groups in the recruitment efforts resulted in streamlined communication and yielded successful recruitment results. The candidate pool was diversified, and all candidates considered were well-qualified. The effectiveness supported the overall hiring goal because it was efficient enough to deliver high-quality, more engaged hires that led to a competitive advantage that directly impacts the program. Additionally, the resulting CHA workforce is diverse and shares life experiences with the patients in the communities they are assigned to serve.

Training and Education

The Blue Shield CHA curriculum is a compendium of materials from partners, subject matter experts, and several publicly available sources. The CHA curriculum is critical to ensure CHAs are adequately trained and supported so they can be effective in their roles of supporting patients around social needs. The curriculum and training approach is meant to be comprehensive and includes core competencies around social needs and social determinants of health, an introduction to behavioral and mental health tools, mentorship, and one-on-one training. With holistic training, the CHA is able to improve access to health and community services for patients, contribute to community development, and ultimately impact social determinants of health in the local community. CHAs have reported high satisfaction with the content and depth of the training. The CHAs receive continuous training every quarter further supporting the educational material introduced in the curriculum as well as creating opportunities for CHAs to share best practices with other CHAs.

Integration Into Teams, Provider Practices, and the Community

Interview Findings

In the 10 interviews with providers and staff and the two focus groups with CHAs, interviewees described their perspectives on the role of a CHA, and what factors helped enable his or her success. Key themes are described in this section and are outlined in **Table 3**.

Shared Life Experiences

The CHA Program intentionally hired a diverse CHA workforce that has shared life experiences with the communities they serve (e.g., CHAs with language competencies or who are members of the community). Providers and the CHAs have noted the importance of having CHAs who understand and can relate to their patients and cite this as a key component of the program's success.

Shared life experiences or characteristics can help CHAs establish trusting relationship with their patients that has often allowed them to overcome social or cultural barriers with patients. As one CHA recalled, *"I have experienced working with the patient and the patient is hesitant to tell me their social needs (female CHA talking about male population). Machismo is very established and I'm a 5'1 female, every time I have a new male patient referred by a male friend I'm surprised."* This CHA understood the nuances of gender expectations that existed with her Latino patient, yet the trust and rapport that she patiently established with the patient provided an opportunity to support a patient that may not otherwise have engaged with the practice. Another CHA found that sharing her own story around a local event that affected the community helped patients see her as someone with a deep understanding of the community. The

TABLE 3 | There were six key themes from provider, staff, and CHA interviews and focus groups on the perspectives of the CHA role, and what factors enabled his or her success.

Themes	Quotes from practice staff
CHAs with shared life experiences as patients	*"I have experienced working with the patient and the patient is hesitant to tell me their social needs (female CHA talking about male population). Machismo is very established and I'm a 5'1 female, every time I have a new male patient referred by a male friend I'm surprised." – CHA "When you are looking for a health advocate, I think diversity is really important. And that really expands the outreach to different patients, depends on their ethnicity, their language. The CHA helped me a lot to reach out to patients where language was the biggest issue." – Provider "Our CHA has a social services background, and a military background. He has had much success connecting patients to Veteran services. He has experience with homeless populations, and he has had much success with housing, and food services." – Practice staff*
Establishing role clarity at the practice	"*There was not a lot of information for all staff at the practices on the role of the CHA prior to implementation*" and "*the first day I showed up and the clinic staff didn't know what the position was."– CHA "For me, it felt nebulous because we weren't totally sure how to use the CHA. What the actual role would be." – Provider*
Increased understanding of patient populations' social needs	"*This (CHA) is one of those things I didn't really believe in. I was not an enthusiastic adopter. I was foolish. I thought people were doing better than they are, and I was wrong." – Provider*
Primary Care vs. Specialty Care Practices	*N/A*
Improved patient engagement with their health and care	*CHAs "give the patients a lifeline and a personal number they can call." – CHA "What [CHA] has done is go into the community and find the resources that are already there, but they are different bodies not really connected to each other. She went to a place where resources were available, she brought those resources into my clinic…the doctor is telling them to eat healthy, now this CHA is telling them where they can get these foods." – Provider*
Impact of COVID on social needs and CHA response	*"Whatever routine the patient had before has mostly been put on hold. Causing tremendous stress." – CHA "We want to create a trusting relationship and because of the relationship (with the CHA) we've mitigated the need for some patients to be hospitalized." – Practice staff*

ability to build trust is important with patients, as providers noted that patients may not always ask for help.

The providers and staff highlighted several instances where the CHA's shared background or life experiences (e.g., military service, language) enabled the CHA to reach a broader patient population. The shared background, coupled with the additional time the CHA can spend with a patient, allows them to create a connection with the patient beyond what the provider could achieve.

The findings are similar to what other studies have shown (3), that understanding the culture and practices of the communities where CHAs reside is essential to implementing solutions to improve the health of community members. Health care providers serving diverse communities often lack an understanding of their community's language, culture, and history, creating gaps in effectively treating marginalized communities (24). Being embedded in the community also allows CHAs to work alongside their patients more conveniently, and increases their ability to assist those who have difficulty accessing care (13).

Establishing Role Clarity

CHAs report that it takes time to develop good working relationships with providers and practice staff. Some CHAs noted that when they began in their position, other practice staff seemed unaware of the purpose of their role, or how to interact with them. As one CHA said, "*there was not a lot of information for all staff at the practices on the role of the CHA prior to implementation*" and "*the first day I showed up and the clinic staff didn't know what the position was."* In some cases, only practice leadership were familiar with the CHA's role, and other practice staff were not, resulting in uneven utilization of the CHA's services. Most CHAs said that after several months, relationships improved, as other staff members became more familiar with the role.

Providers and practice staff agreed in interviews that there was an opportunity to further communicate the capabilities of the CHA with the full practice. The CHA role was new at all practices and for some providers having a CHA *"felt nebulous because we weren't totally sure how to use the CHA. What the actual role would be." One* provider who was actively involved in the onboarding of a CHA said he did not promote the CHA enough to clinic staff at the start of the program and as a result, the practice was not using the CHA to their full capacity. The provider states, "*I assumed that when I told people about and introduced her and gave her a lot of verbal support "hey you guys should try this" I thought if I did that once or twice it would be enough."* Clinic staff had similar feelings to the providers and felt that *"people gravitate towards those in charge and don't focus on other members of the team, who may not be involved in practice leadership."* Improving adoption of the CHA was dependent on clearly establishing activities of the CHA role, ensuring that all providers and staff at the practice were aware of the CHA, and continuous communication throughout the practice.

Practices that established clear onboarding processes – including introducing the CHAs to the entire staff— reported that integrating the CHA into the practice went smoothly. One practice also emailed all patients to introduce the CHA and

highlight how they could support patients. This multi-channel communication strategy helped connect CHAs, practice staff, and patients from the beginning.

Practices reported that CHAs were increasingly effective over time, as they continued to carve out their niche in the practice infrastructure. During the COVID pandemic, CHAs have been integral to supporting patients, as social needs have increased, and available resources have changed.

Understanding Social Needs

Providers often underestimate the level of social needs of their patient population. After having a CHA in their practice, providers consistently note the success of the program and the increased ability of the practice to care for their patients because the CHAs help the entire care team to better understand and address patients' social needs. In the current COVID environment providers recognize the need for CHA services. As one provider mentioned, "*Many people live alone, and don't have family nearby and have lost their social support."* Some providers believe that the CHAs are time savers and improve quality of care provided; *"the CHA is greatly improving the care we can give to our patients."*

Several providers initially reported they did not believe their practice needed CHA services. However, after the CHA was integrated into their practice, the providers reported appreciating learning more about their patients' social needs. For instance, one provider had been seeing a patient for 10 years and did not realize the financial burden the patient faced as a result of weekly dialysis until the CHA brought it to the provider's attention. Another provider said "*this (CHA) is one of those things I didn't really believe in. I was not an enthusiastic adopter. I was foolish. I thought people were doing better than they are, and I was wrong."* CHAs contribute to the provider and practice a new or different perspective of their patients, sharing a window into the patient's life that the provider might not otherwise see, but that can impact the patient's health or care.

Primary Care vs. Specialty Care Practices

CHAs were successfully integrated into Primary Care and Specialty Care practices in the CHA Program. Across the five practices, there was no clear pattern in facilitators or barriers to embedding CHAs by practice type. Some practices had more bandwidth related to time and staff that facilitated implementing the CHA program and were able to embed the CHA more quickly than other practices. Additionally, while all practices had a provider champion, there were varying levels of readiness and receptiveness by the practice to addressing social needs for patients via the CHA program. Some provider champions were more proactive in communicating the importance of social needs and the CHA to the rest of the practice, which enabled all providers and staff to incorporate the CHA role into the practice workflow, care team, and the broader culture. For the provider champions that were less engaged in communicating the importance of the CHA role, integration into the practice culture and care team took longer.

For both primary and specialty care practices, behavioral and mental health was among the most pressing social needs, which coincides with the COVID-19 pandemic. Among the specialty practices, the CHAs were able to tailor their support around specific populations or needs within a smaller scope. For example, a CHA at a specialty care practice coordinated classes with a community-based organization focused on diet and food for diabetes care management. The specialty care practice had an engaged pool of patients with diabetes that benefited from the support of the CHA. In specialty practices, the CHA was often able to focus their support and scope based on the specific needs of the patient population. At primary care practices, the scope of social needs was broader, and the types of support needed by patients varied. In primary care practices, the top referrals to resources were for mental and behavioral health, such as individual counseling, benefit navigation, housing, and transportation. For specialty care practices, the top referrals to resources varied by specialty type. For example, the CHA at an obstetrics and gynecology practice had the highest referrals for mental health, support groups, and housing, while a CHA at an orthopedics practice had the highest referrals for ride coordination, emergency food, and job search. In each of these examples, the CHAs in specialty practices supported patients around social needs associated with the care and management most needed by the specific patient population, whereas the CHAs in primary care practices had more diversity in the types of social needs and the resources they engaged with to best support their patient population.

Patient Engagement With Their Health and Care

Patients feel empowered by the CHA program and are starting to treat their healthcare differently. CHAs report that some patients have learned to advocate for themselves and are able to ask providers and community organizations for resources at the recommendation of the CHA. With help from the CHA, patients have become more comfortable using the mediums of communication from their providers, such as the provider's online platforms, and are now more engaged with accessing services and communicating with providers.

CHAs build trust with their patients by sharing their own stories and finding commonality in their experiences with patients. In this way, CHAs can often learn about a patient's needs that a patient would not have otherwise shared with a provider. As one CHA mentioned, CHAs *"give the patients a lifeline and a personal number they can call."* The trust between a CHA and a patient can translate to improved relationships between patients and providers. As one CHA recalled the story of a homeless patient whom he had supported with accessing housing, the patient now saw the practice as his family and came in several times a month to socialize.

For providers, the CHA can support the care and recommendations a provider gives a patient. At one provider's practice, the CHA partnered with a community-based organization to bring nutrition classes for patients into the provider practice. The CHA can help patients put into action the provider's care plan. As the provider noted *"the doctor is telling them to eat healthy, now this CHA is telling them where they can get these foods."* As the CHA supports the find resources to address the patient's needs, the CHAs also help the patient

translate the provider's recommendations, allowing the patient to more fully engage with their own care.

COVID Impact

During the COVID pandemic, CHAs have been critically important in supporting patients, as social needs have increased, and available resources have shifted. Some providers report their patients are experiencing increased angst, drug/alcohol abuse, domestic violence, decreased physical activity, vaccine confusion and hesitancy, along with stresses from lack of school consistency, loss of jobs and inability to pay for rent, food, and transportation. The additional limitations in support systems, in combination with the above, have also led to role shifts — with some CHAs providing more of a counselor/support role, on top of their roles screening and provider referrals for needs. One CHA described the fear and stress their patient was encountering because of the pandemic and the changes in accessing health care: "Whatever routine the patient had before has mostly been put on hold. Causing tremendous stress." When supporting patients in quarantine because of COVID, staff also expressed how the CHAs deescalated the fear and stress of being in isolation and reduced unnecessary hospitalizations: "we want to create a trusting relationship and because of the relationship (with the CHA) we've mitigated the need for some patients to be hospitalized." As patients shifted to virtual care or rescheduling procedures and appointments, CHAs helped to coordinate care for patients and provider overall support during the process.

CHAs also described the changing availability of resources for their patients as COVID impacted the availability and funding of all sectors, including the local organizations that patients could be referred to. CHAs had to do additional outreach to resources and think creatively to address patient's social needs.

DISCUSSION

Similar to previous research (18, 25, 26), Blue Shield found that the Community Health Advocate program improved care coordination, increased referrals to resources, and improved support of social needs of patients. Results also found that CHAs can impact the provider and practice experience and assist providers in deepening their understanding of the social needs of their patients. Having this additional knowledge allows providers and staff to tailor their care to the patient's needs. Understanding the types of social needs that patients may have and are able to share in a clinical setting with the CHA can provide valuable information to providers and health plans, to better target the needs of patients and the community.

Blue Shield has successfully incorporated CHAs into primary care and specialty practices and to those serving mainly commercial patients. The CHA program effectively balances its standardized high-quality didactic and experiential training, while allowing flexibility to adapt training to various practice types and workflows. The CHA program contributes valuable insights into creating and implementing a payer-agnostic, provider-embedded model.

While all provider practices found the CHA beneficial to their patients and practice, some had challenges ensuring the full practice understood the role and capabilities of the CHA. There was no observable difference by type of practice, i.e., primary vs. specialty care. Slower adoption of the program and integration of the CHA into the care team differed by practice bandwidth (time and staffing), level of engagement by the provider champion, and overall culture of the practice around the importance of social determinants of health. Discussions are underway with subject matter experts, Blue Shield, and providers and clinical staff to provide detailed education and communication of the CHA program at future implementations and to share best practices from the initial providers. This includes clear communication of the CHA role and abilities, change management among the practice to institute effective workflows and increase communication between all providers, staff, and the CHA, and increase awareness of social determinants of health and the link to health care. To address some challenges with data sharing and communication between CHAs and practices, Blue Shield is maximizing the technology and resources CHAs use in their day-to-day work and partnering with providers and medical groups to align on data sharing and access.

COVID-19 Response

The pandemic has exposed and amplified long-standing systemic health and social inequities along with the associated increased risk of infection, hospitalization, and death in marginalized racial and ethnic groups[13]. The impact of COVID-19 on both the CHAs and patients had to be addressed in the CHA program efforts. Several standard protocols in the CHA workflow were adjusted to fit the needs of members and CHAs to accommodate COVID-19 pandemic precautions. CHAs moved predominantly to telehealth solutions as alternatives to home visits, except under situations where telehealth would not adequately address member needs. CHAs also administered a unique COVID-19 screening assessment tool developed by Unite Us in place of the PRAPARE screener to evaluate patient social needs at risk or impacted by COVID-19. Additionally, CHA role flexibility allowed some practices to leverage CHAs using telehealth to help bridge the impacts to access to care when the pandemic first began. CHAs were able to provide support to patients who were experiencing stress and fear during the pandemic, by assisting with telehealth use, coordinating care, finding resources for new social needs, and being a source of emotional support for patients. In response to the availability of changing resources, Blue Shield made emergency funds available to the CHAs for immediate need or if no resources were available.

Healing Circles

In response to the added stresses and uncertainties of the COVID-19 pandemic, Blue Shield has implemented Healing Circles, offering them to all CHAs. Healing Circles help people step out of their day-to-day and into a safe and accepting environment where they explore ways of healing. They provide a safe place to discuss the impact of the recent events on the CHAs themselves, their patients, and families, and provide an environment for CHAs to decompress emotionally and mentally.

[13]Centers for Disease Control and Prevention. Health Equity Considerations and Racial and Ethnic Minority Groups. (2020). https://www.cdc.gov/coronavirus/2019-ncov/community/health-equity/race-ethnicity.html (accessed March 15, 2020).

They also provide ways for CHAs to learn to support each other, and practice self- and stress-management tools. Healing Circles have been shown to enhance camaraderie and support for practitioners who work with patients with significant needs (27). They have also resulted in statistically significant improvements in quality of life and emotional relief for participants (28).

Future State of CHA Program

Blue Shield values the work of CHAs and recognizes the unique role they play in health care. Blue Shield intends to remain a leader in promoting this work for members, the communities where they reside, and scale similar programs on a broader level so other communities can benefit from this work.

CHAs and Statewide Implementation

A statewide Community Health Advocate Program has the potential to maximize positive impact in addressing Blue Shield members' unique social needs, while improving social determinants of health, and ultimately producing a sustainable, affordable, and equitable reduction in high-cost unnecessary utilization costs. Blue Shield is launching a pilot for Blue Shield members in specific regions to commence the statewide approach. CHAs will serve and conduct telephonic outreach to members at risk of having a need, as well as high-risk members with care gaps, complete a psychosocial assessment, and telehealth solutions as alternatives to home visits. This will allow Blue Shield to proactively reach patients to be connected to CHAs without having to be referred by a provider.

Targeting Populations

Building on lessons learned from the initial experience with the CHA program to date and considering ways to address racial inequities, Blue Shield is developing pilots for targeted populations that could benefit from a CHA program. One example is racial inequities in maternal and infant health. According to the US Department of Health & Human Services Office of Minority Health, Black women are three–four times as likely to die from pregnancy-related causes than non-Hispanic White women, and Black infants have over two times the infant mortality rate as non-Hispanic Whites[14,15]. Blue Shield acknowledges the perpetual racial health inequities that directly impact Black mothers and infant maternal health, and is piloting initiatives to remove social barriers and disparities seen in Black maternal and child health outcomes. One of these initiatives is the addition of doulas to the Community Health Advocate program to improve pre- and post-partum support systems, improve member access to critical maternal care services, improve maternal quality of care, and address maternal behavioral and mental health.

[14]Taylor J, Novoa C, Hamm K, Phadke S. Eliminating Racial Disparities in Maternal and Infant Mortality. (2019). https://www.americanprogress.org/issues/women/reports/2019/05/02/469186/eliminating-racial-disparities-maternal-infant-mortality/ (accessed March 15, 2020).

[15]U.S. Department of Health and Human Services Office of Minority Health. Infant Mortality and African Americans. (2019). https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlid=23 (accessed March 15, 2020).

Funding and Reimbursement Mechanisms

Part of the evaluation of the CHA program includes the consideration of the financial and social returns for health plans, providers, patients, and community partners. Funding CHAs is a challenge that has been widely identified, as providers or practices alone may not be able to carry the financial burden of funding a CHA role (29, 30). Blue Shield is exploring various CHA program models to ensure the continuity of the CHA role and expansion of the workforce across California and nationwide. Blue Shield is also looking at reimbursement mechanisms similar to nationwide Medicaid programs.

Limitations

This case study of the CHA program presents initial data from the provider and CHA perspective and is limited to early learnings of the program. Future work will include additional data sources to complement the current findings, such as completed practice surveys, aggregated patient health outcomes, and Blue Shield member utilization and cost of health care. Additionally, this case study focuses on a subset of the CHA programs at one medical group, thus generalizability to a broader population is limited.

The payor-agnostic model of the CHA program presented challenges to implementation, specifically around fidelity of the model as Blue Shield did not have full control of implementation at the practice level. Additionally, the internal evaluation is limited due to the ability to access only Blue Shield members' health care utilization information. Blue Shield does not have access to patient specific outcome data for non-members, thus limiting evaluation of the full patient population at the practices, and as a result, the full impact of the CHA program.

The COVID-19 pandemic has impacted the CHA program in multiple ways, such as exposure to the virus among patients and staff, protocol changes to the CHAs workflows and changes to their scope of work, and drastic limitations to in-person care. Each practice site put in different protocols to address the pandemic, resulting in greater variations to the CHA program than anticipated.

The challenge of sustainability beyond a health plan's pilot program is similar to that of other organizations that struggle with funding CHA programs. While CHA programs have been shown to benefit providers and patients, ensuring proper funding for CHAs remains an ongoing challenge that requires significant statewide and anchor organization (including CHW organizations) partnerships to resolve.

CONCLUSION

The Blue Shield CHA program continues to address the gaps in recruitment efforts, training and education, and successful integration of CHAs into teams, provider practices, and the community. The program saw positive outcomes from recruiting a diversified pool of applicants, as it supported the delivery of high-quality candidates that directly impacted the program's success. Blue Shield's thorough CHA training curriculum, co-developed with subject matter experts in the field, proved critical to improving access to health and community services and ultimately impacting social determinants of health in the

local community. Interviews with all stakeholders around the integration of CHAs into provider practices and the community brought out several themes on what factors enabled CHA success. Providers found value in having access to a CHA workforce with shared life experiences of the communities they served. CHAs embedded in the care team also increased the provider and staff's understanding of the social determinants of health that impact a patient's health. Embedding CHAs in the care team also impacted the patients' engagement with their health and care and allowed them to be more comfortable communicating with providers.

While all provider practices reported successful outcomes of embedding CHAs in the practice, the CHA program continues to adapt to address challenges faced by all stakeholders. The COVID-19 pandemic has especially amplified the need to support patients, with increased social needs prevalence in the community. Blue Shield plans to remain a leader in promoting CHA work for all patients and the communities they reside.

DATA AVAILABILITY STATEMENT

The data supporting the conclusions of this article will be made available by the authors upon request and with approval from Blue Shield of California's outbound data process.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

SC, LP, and JE contributed to conception and design of the program. ST and MA oversaw the data collection and analysis plan. ED, ST, BBe, RP, AL, and LM performed the qualitative analysis. CP and ED wrote the first draft of the manuscript. BBe, LM, ST, and RP wrote sections of the manuscript. BBo, JS, and AC served as subject matter experts and contributed to interpretation and analysis of the findings. All authors contributed to manuscript revision, read, and approved the submitted version.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpubh.2021.690067/full#supplementary-material

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The remaining author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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