



# Evaluation of the Community Health Worker Model for COVID-19 Response and Recovery

Saira Nawaz<sup>1,2</sup> · Kyle J. Moon<sup>1,3</sup> · Rosa Vazquez<sup>4</sup> · Jasmin R. Navarrete<sup>4</sup> · Anne Trinh<sup>1</sup> · Lizette Escobedo<sup>4</sup> · Gloria Itzel Montiel<sup>4,5</sup>

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## Abstract

Community health workers (CHWs), or *promotores de salud*, have long played a role in health promotion, but the COVID-19 pandemic has brought renewed attention to the functions, sustainability, and financing of CHW models. *¡Andale! ¿Que Esperas?* was a 12-month (June 2021–May 2022) campaign that expanded the CHW workforce to increase COVID-19 vaccination rates in structurally vulnerable, Latinx communities across California. This mixed-methods evaluation aims to elucidate (1) the role of CHWs in COVID-19 response, recovery, and rebuilding and (2) the importance, needs, and perils of CHW models in the COVID-19 era and beyond. CHWs facilitated 159,074 vaccinations and vaccine appointments by countering mis/disinformation, addressing mental health and social needs, building digital competencies, and meeting people where they are, all of which expanded access and instilled confidence in the COVID-19 vaccine. CHWs' success in engaging the community lies in their shared lived experience as well as their accessibility and recognition in the community, enabling their role in both immediate response and long-term recovery. Funding instability imperils the advances made by CHWs, and efforts are needed to institutionalize the CHW workforce with sustainable funding models. While Medicaid reimbursement models exist in some states, these models are often limited to healthcare services, overlooking a critical function of the CHW model: building community resilience and mobilizing the community for social change.

**Keywords** Health equity · Community health worker · Promotores de salud · Public health · Evaluation · Mixed-methods

## Abbreviations

AltaMed AltaMed health services corporation  
AQE ¡Andale! ¿Que Esperas?  
CBO Community-based organization  
CHW Community health worker  
FQHC Federally qualified health center

GVHC Golden Valley Health Center  
HOPES Center for Health Outcomes and Policy Evaluation Studies  
LC La Clinica de la Raza  
LCHC Latino Coalition for a Health California  
LHA Latino Health Access  
SYH San Ysidro Health

✉ Saira Nawaz  
Nawaz.16@osu.edu

- <sup>1</sup> Center for Health Outcomes and Policy Evaluation Studies (HOPES), The Ohio State University College of Public Health, 381 Cunz Hall, 1841 Neil Avenue, Columbus, OH 43210, USA
- <sup>2</sup> Division of Health Services Management and Policy, The Ohio State University College of Public Health, Columbus, OH 43210, USA
- <sup>3</sup> Geisel School of Medicine at Dartmouth College, Hanover, NH 03755, USA
- <sup>4</sup> AltaMed Institute for Health Equity, Los Angeles, CA 90040, USA
- <sup>5</sup> Claremont Graduate University, Claremont, CA 91711, USA

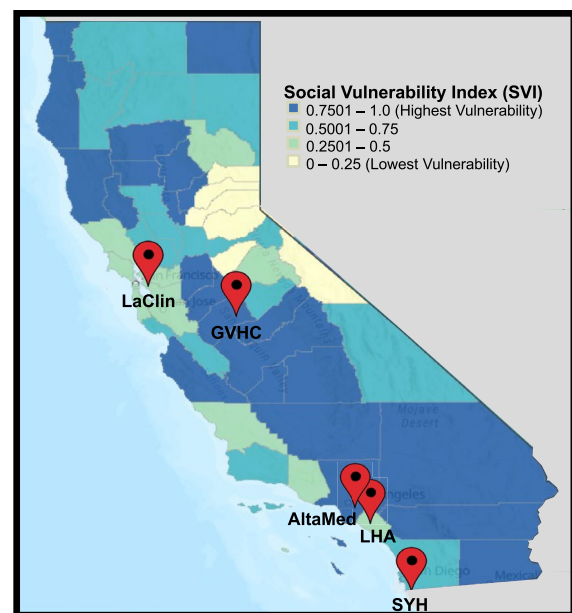
## Introduction

As of November 29, 2022, the United States reported 1,075,779 cumulative deaths due to COVID-19 [1], with Black and Latinx communities reporting an outsized burden. This is reflective of the disproportionate impact that COVID-19 had on Black and Latinx communities in terms of exposure risk, case rate, hospitalization rate, mortality rate, economic hardship, and psychosocial consequences [2], [3], [4], [5], [6]. Such disparities are explained by structural racism—namely, residential segregation, neighborhood disinvestment, restrictive immigration policies,

gaps in healthcare access, barriers to education and career opportunities, and disenfranchisement [4]. It is important to note, however, that health and social inequities did not *arise* in the wake of COVID-19, but instead, extant, entrenched, systemic inequities, were *exacerbated* by the pandemic's unequal impact. When COVID-19 vaccines were made widely available in the United States, there were notable disparities, by race and ethnicity, in vaccination outcomes due to differences in vaccine access and confidence [7]. At present, Latinx/Hispanic Americans, nationally, boast a vaccination rate higher than non-Hispanic white counterparts, but in California, the vaccination rate remains 11 percentage points lower among Latinx individuals, compared to non-Hispanic white individuals [8].

The outreach and vaccination campaign *¡Andale! ¡Que Esperas?* (which translates to, “Come on! What are you waiting for?”), abbreviated as AQE, was created to respond to the stark disparities observed across the state of California. AQE leveraged findings from previous evaluations of Latino Health Access (LHA), a grassroots public health organization in southern California that employs a CHW model anchored in Freire’s popular education framework [9]. Popular education asserts individuals’ capacity to bring about social change by engaging those who have historically lacked power, increasing awareness of their capacity as change agents, and developing critical consciousness—by identifying injustices they have experienced firsthand and reflecting on root causes—to work towards collective, structural change [10, 11]. Evaluations of LHA’s COVID-19 response efforts that used popular education as a conceptual model, have identified the value and pertinence of CHWs in effective and equitable interventions [12, 13]. This informed AQE’s campaign model development into one that would be led and driven by CHWs. AQE was implemented with five partners across the state (Fig. 1), comprising four federally qualified health centers (FQHCs)—AltaMed, Golden Valley Health Center (GVHC), La Clinica de la Raza (LC), and San Ysidro Health (SYH)—and one community-based organization (CBO), LHA. All five partners serve predominantly Latinx populations in medically underserved regions with high social vulnerability indices (SVI) [14] and either (a) had an existing CHW model or (b) had the requisite capacity or infrastructure, made possible through AQE funding, to institute a CHW model.

CHWs, or *promotores de salud*, have long played a role in the U.S. health care workforce by (a) improving access to care, (b) facilitating navigation of fragmented systems and linkage to social services, (c) reducing healthcare costs, (d) providing peer-to-peer support and accompaniment [9, 15], (e) imparting access to trusted, reliable information [16], and (f) offering culturally and linguistically responsive health education, all of which is key to addressing health inequities [17–19].



**Fig. 1** Centers participating in the AQE Campaign to Deliver COVID-19 Vaccine Outreach superimposed on a map of California shaded according to social vulnerability Index (SVI). Five centers (AltaMed, LHA, GVHC, LC, SYH) representing Alameda, Contra Costa, Los Angeles, Merced, Orange, San Diego, Solano, and Stanislaus counties (all of which have considerable Latinx populations and social vulnerabilities) participated in the AQE campaign. Image adapted from the Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry/Geospatial Research, Analysis, and Services Program. CDC/ATSDR Social Vulnerability Index [2018] Database [California]. Accessed on [7/1/2022]. [https://www.atsdr.cdc.gov/placeandhealth/svi/data\\_documentation\\_download.html](https://www.atsdr.cdc.gov/placeandhealth/svi/data_documentation_download.html)

An emerging tenet of the CHW model that lies central to the AQE campaign is the role of CHWs in activating community for social and policy change [12, 20]. Since the onset of the COVID-19 pandemic, multifaceted CHWs programs have played an essential role on the frontlines, managing contact tracing and testing, addressing barriers to vaccination, combatting mis/disinformation about the vaccine, attending to social and emotional needs, providing critical ground-level information to health and governing systems to strengthen pandemic response, and advocating for state and federal policies related to evictions [19, 21]. For many healthcare systems, CHW programs provide the infrastructure to reach communities that are often systematically excluded and labeled “hard-to-reach,” and the pandemic has illuminated the importance of CHWs to public health writ large, attracting the attention of policymakers and health systems. While improvements are needed to better integrate CHWs into U.S. healthcare and public health systems, the effectiveness of CHWs is threatened by a transition from its community-based roots to a medicalized model [22].

This mixed-methods evaluation aims to elucidate the importance of CHW models in the COVID-19 era and beyond, with an exploration of how systems of care (FQHCs vs non-FQHCs) moderate the effectiveness and sustainability of these models for community strengthening.

## Methods

All data collection procedures described herein were approved by the Institutional Review Board (IRB) at Claremont Graduate University (IRB # 4084). This study makes use of a parallel mixed methods evaluation design [23], such that qualitative and quantitative data were collected and analyzed independently to understand the role of CHWs in COVID-19 response, recovery, and rebuilding.

### Quantitative Data Capture and Analysis

Developed as a community outreach campaign, AQE was designed to increase vaccination rates in structurally vulnerable, Latinx communities in California by increasing the CHW workforce. AltaMed and subcontracted state coordinating entity, Latino Coalition for a Healthy California (LCHC), provided central administration support to implementation partner organizations (GVHC, LC, LHA, and SYH). All five partner sites were responsible for (1) hiring CHWs to conduct community outreach by either activating their existing CHW program or launching one, (2) facilitating the direct connection to vaccinations, and (3) delivering supportive services to communities in their service area. After hiring, each CHW was asked to complete a survey to capture a demographic profile of AQE-affiliated CHWs. For each outreach initiative, CHWs completed surveys via REDCap (Research Electronic Data Capture) hosted at the Ohio State University [24], documenting (a) number of people reached, (b) number of individuals vaccinated, (c) number of vaccine appointments scheduled, and (d) number of supportive services provided. All data entries were made with each CHW's unique ID, enabling analysis of vaccination and outreach outcomes at the individual CHW-level. Two linear regression models were developed, using R Statistical Software (R Foundation for Statistical Computing, version 1.2.5033), to assess predictors (ethnicity, language spoken, previous outreach experience, education level, sex, employment status, age, sexual orientation, and residence) of (a) vaccination volume and (b) number of people reached. Prior to developing regression models, correlation matrices were constructed to identify collinearity and simplify model inputs (predictors).

Throughout the AQE campaign, data entered into REDCap fed into a dashboard system, which was updated weekly and accessible to CHWs, FQHC and CBO administrators.

Access to this dashboard provided a high-level overview of campaign activities to inform outreach strategies and enable data-driven decision making for AQE programming.

### Qualitative Data Collection

Focus groups were conducted with (1) community members and (2) CHWs and CHW-based organizations, at all five participating sites. Program managers and administrators at the five partner sites recruited CHWs and community members, using email and flyers, to participate in focus groups. Community members and CHWs were kept separate, such that all participants in the focus group came from one of the two groups. In total, ten (10) focus groups were conducted, with the size of each group ranging from 7 to 14 participants, netting a total sample of 95 individuals, of whom 43 were CHWs, 45 were community members, and 7 were employed by implementation partner sites but do not serve as CHWs. Audio, but not video, was recorded for purposes of transcription, and all participants provided informed consent (IRB # 4084). Focus groups met for 90 min to discuss the following topics: (a) AQE campaign and lessons learned, (b) COVID-19 vaccine access in the community, (c) best practices for reaching the community, (d) successes and looming challenges of the campaign, (e) needs of the community, and (f) role of CHWs. Focus groups, when needed, were conducted in Spanish, with a translator present to ask questions and transcribe responses. All participants were compensated for their time with \$25 Amazon gift cards.

Focus group transcripts underwent thematic analysis [25], with transcripts coded line-by-line with three a priori codes: (1) importance of CHW model (i.e., what do CHWs do?), (2) need for CHWs (i.e., how do CHWs engage the community?), and (3) perils of CHW model (i.e., what challenges do CHWs face?), to identify emergent themes and subthemes [25]. Illustrative quotes were extracted for each theme and subtheme, when applicable, and findings were reviewed for consensus by other team members involved in focus group implementation. Importantly, this approach is grounded in the principle of co-development [26], with members of community-based clinics and academic partners engaged in the design, implementation, and evaluation, including the validation of themes and subthemes.

## Results

### Outreach and Vaccination Outcomes led by CHWs

Sociodemographic characteristics of CHWs hired by AQE partners (N = 146) between June 2021 and May 2022 are presented in Table 1. CHWs conducted 6297 outreach

**Table 1** Sociodemographic Profile of CHWs

	Overall N = 146	AltaMed N = 31	GVHC N = 23	LC N = 10	LHA N = 54	SYH N = 28
Demographic characteristics						
Age, years	33 [22–49]	22 [21–23]	44 [31–49]	25 [22–26]	35 [22–49]	51 [44–61]
Multilingual	131 (90)	28 (90)	23 (100)	8 (80)	50 (93)	22 (79)
Ethnicity						
Hispanic/latinx/chicanx	135 (92)	25 (81)	21 (91)	9 (90)	53 (98)	27 (96)
Non-hispanic/latinx/chicanx	11 (8)	6 (19)	2 (9)	1 (10)	1 (2)	1 (4)
Sex, female	114 (78)	22 (71)	16 (70)	9 (90)	44 (81)	23 (82)
Sexual orientation						
Straight/heterosexual	110 (75)	24 (77)	19 (83)	5 (50)	37 (69)	25 (89)
LGBTQ+	11 (8)	6 (19)	0 (0)	2 (20)	3 (6)	0 (0)
Unknown	25 (17)	1 (3)	4 (17)	3 (30)	14 (26)	3 (11)
Socioeconomic status (SES)						
Own home	32 (22)	8 (26)	NA	3 (30)	11 (20)	10 (36)
Household size	4 [3–5]	4 [4–6]	3 [2–5]	4 [2–4]	4 [3–6]	4 [4–5]
Live in same community as working	105 (72)	21 (68)	20 (87)	5 (50)	44 (81)	15 (54)
Education						
Less than GED/high school	13 (9)	0 (0)	1 (4)	0 (0)	8 (15)	4 (14)
GED/high school diploma	38 (26)	6 (19)	3 (13)	0 (0)	18 (33)	11 (39)
Some college	29 (20)	5 (16)	4 (17)	2 (20)	14 (26)	4 (14)
Associate's degree	12 (8)	3 (10)	3 (13)	0 (0)	4 (7)	2 (7)
Bachelor's degree	36 (25)	15 (48)	4 (17)	8 (80)	5 (9)	4 (14)
Postgraduate certificate/degree	6 (4)	2 (6)	0 (0)	0 (0)	3 (6)	1 (4)
Unknown	12 (8)	0 (0)	8 (35)	0 (0)	2 (4)	2 (7)
Total household income, \$k	30 [8–50]	30 [8–50]	NA	13 [0–21]	41 [27–52]	42 [0–47]
Labor characteristics						
Previous outreach experience	98 (67)	21 (68)	11 (48)	8 (80)	37 (69)	21 (75)
Weekly h worked	36 [25–40]	25 [25–30]	40 [20–40]	40 [15–40]	40 [36–40]	20 [10–40]
Has additional jobs than this	32 (22)	5 (16)	2 (9)	5 (50)	13 (24)	7 (25)
Compensation						
Annual salary	7 (5)	1 (3)	0 (0)	0 (0)	5 (9)	1 (4)
Hourly wage	68 (47)	0 (0)	23 (100)	8 (80)	15 (28)	22 (79)
Volunteer/no compensation	66 (45)	30 (97)	0 (0)	2 (20)	31 (57)	3 (11)
Unknown	5 (3)	0 (0)	0 (0)	0 (0)	3 (6)	2 (7)
Annual salary, \$k	31 [27–33]	N/A	N/A	N/A	N/A	N/A
Hourly wage, \$	18 [17–21]	N/A	N/A	24 [23–24]	17 [17–18]	21 [20–21]

Data presented as median [IQR] or N (%)

initiatives, facilitated 130,414 vaccinations and 28,660 vaccine appointments, and delivered 313,796 supportive services.

A number of implementation challenges with data collection were encountered, creating a need for retrospective data entry. Because retrospective data entry was typically performed by a non-CHW employee of the FQHC or CBO, errors were made, such that some outreach activities and vaccinations could not be linked to a particular CHW.

Therefore, the resulting dataset is limited to the activities of 106 CHWs (72.6% of all CHWs hired for AQE), who performed 2439 outreach initiatives that (a) reached 716,343 people and (b) facilitated 20,156 vaccinations. No sociodemographic characteristics of CHWs were significant predictors of vaccination volume ( $0.138 \leq P \leq 0.889$ ) nor number of people reached ( $0.062 \leq P \leq 0.985$ ), with the exception of employment status. Employment status (working as a CHW part-time as opposed to full-time, where part-time

**Table 2** Predictors of CHW outcomes (vaccination volume and number of people reached)

Predictors	Number of vaccinations			Number of people reached		
	Coefficient (95% CI)	P-value	Significance	Coefficient (95% CI)	P-value	Significance
<b>Live where they work</b>						
0. No (N=28)	Reference	0.534		Reference	0.0664	
1. Yes (N=77)	- 27.2 (- 114.0–59.6)			- 6556.3 (- 13,569.3–456.7)		
<b>Ethnicity</b>						
0. Non-hispanic/latinx (N=9)	Reference	0.684		Reference	0.184	
1. Hispanic/latinx (N=97)	29.1 (- 112.7–170.8)			7838.5 (- 3826.1–19,503.2)		
<b>Multilingual</b>						
0. No (N=11)	Reference	0.578		Reference	0.187	
1. Yes (N=94)	33.7 (- 86.6–153.9)			6219.4 (- 3083.2–15,522.0)		
<b>Other jobs/additional employment</b>						
0. No (N=83)	Reference	0.440		Reference	0.959	
1. Yes (N=22)	- 35.6 (- 127.0–55.9)			198.1 (- 7474.9–7871.1)		
<b>Previous outreach experience</b>						
0. No (N=32)	Reference	0.889		Reference	0.102	
1. Yes (N=74)	6.3 (- 83.2–95.8)			6233.8 (- 1264.4–13,732.0)		
<b>Sex</b>						
0. Male (N=20)	Reference	0.148		Reference	0.126	
1. Female (N=84)	- 66.2 (- 156.3–24.0)			- 5901.1 (- 13,512.9–1710.8)		
<b>Education</b>						
0. <GED/high school (N=13)	Reference	Reference		Reference	Reference	
1. GED/high school (N=26)	78.8 (- 54.1–211.8)	0.241		627.5 (- 10,157.5–11,412.4)	0.908	
2. Some college (N=18)	101.8 (- 33.4–237.0)	0.138		6071.6 (- 4894.4–17,037.5)	0.273	
3. Associate degree (N=6)	22.6 (- 165.1–210.4)	0.811		144.6 (- 15,125.4–15,414.6)	0.985	
4. Bachelor's degree(N=28)	64.3 (- 84.1–212.6)	0.390		496.5 (- 11,759.5–12,752.5)	0.936	
5. Postgraduate degree/certificate (N=5)	- 12.7 (- 201.6–176.3)	0.894		11,062.5 (- 4240.5–26,365.4)	0.154	
<b>Weekly h</b>						
0. ≥ 40 h (N=51)	Reference	0.330		Reference	0.0047	**
1. < 40 h (N=53)	- 39.2 (- 118.8–40.5)			9526.0 (3031.2–16,020.9)		
<b>Age</b>						
0. 15–24 years (N=40)	Reference	Reference		Reference	Reference	
1. 25–34 years (N=13)	63.9 (- 76.2–204.0)	0.366		1551.7 (- 10,003.0–13,106.4)	0.789	
2. 35–44 years (N=15)	26.0 (- 96.9–148.9)	0.674		- 7485.1 (- 17,700.3–2730.2)	0.148	
3. 45–54 years (N=26)	- 48.2 (- 161.3–64.9)	0.398		- 8741.8 (- 17,949.1–465.5)	0.0624	
4. 55–69 years (N=10)	- 87.3 (- 240.5–66.0)	0.260		- 9597.8 (- 22,086.5–2890.9)	0.130	
<b>Sexual orientation</b>						
0. Heterosexual (N=80)	Reference	Reference		Reference	Reference	
1. LGBTQ+(N=7)	- 94.0 (- 247.2–59.2)	0.225		- 8611.9 (- 21,026.6–3802.7)	0.170	
2. Prefer not to respond (N=19)	- 30.9 (- 135.1–73.4)	0.557		- 2342.9 (- 10,673.0–5987.1)	0.576	

was defined as < 40 h/week) was a significant predictor ( $P=0.0047$ ) of number of people reached (coefficient [95% CI]: 9256.0 [3031.2–16,020.9]), but not vaccination volume (coefficient [95% CI]: - 39.2 [- 118.8–40.5],  $P=0.330$ ). Complete results from linear regression models are summarized in Table 2.

### Importance of CHWs

In describing the role of CHWs throughout the AQE campaign, four themes emerged (Table 3); CHWs were key actors in (1) instilling confidence, (2) attending to mental health needs, (3) overcoming barriers to vaccination, and (4) ensuring that the community is represented in COVID-19

**Table 3** Thematic analysis to elucidate the importance of, need for, and perils of the CHW model (N = 95)

Code	Definition	Theme	Subtheme	Illustrative quote	Speaker
Importance	What do CHWs do?	Instill confidence	Distill information	<p>"The issue was oversaturation of information"</p> <p>"All of the information we got was via internet. Or news. The field doesn't have access at hand, no internet access. At the beginning, COVID would spread, but we didn't know how. So field workers kept getting in the buses, in the vans with their families, so we're more impacted because we didn't know that information [about transmission]. We didn't have resources to protect ourselves either: we didn't have rapid tests available, and we couldn't do the exams."</p> <p>"More than anything, they [CHWs] have motivated us to get vaccinated. A lot of people were fearful. So many myths about the vaccine online on social media. They [CHWs] tell us the facts."</p> <p>"An informed immigrant is an empowered one."</p> <p>"Promotors were essential because [the doctors] trained us and we were the messengers. My need to save my people was motivating and moved us to learn about this and teach others or we, as a community, would be stuck as misinformed."</p> <p>"They helped with COVID anxiety, job loss, and I've felt supported. I would call, and the promotoras were always there to help. They motivate us. Because of their psychological help, I feel better. I felt supported."</p> <p>"They [the CHWs] would call me when I was depressed and she [the CHW] would lift my spirits, told (sic) me that I had to accept that I was anxious. She would take time to help me out. They have such patience to listen...I confided in her things that I didn't even tell my family. When I lost a job, she helped me out so much."</p> <p>"It helped because we left them the information directly at home. We would knock on doors, at supermarkets, we brought tables to all places in Orange County."</p>	<p>CHW</p> <p>Community member</p> <p>Community member</p> <p>Community member</p> <p>Community member</p> <p>Community member</p> <p>Community member</p> <p>CHW</p>
		Attend to mental health	N/A		Community member
		Overcome barriers	Meet people where they are		CHW

Table 3 (continued)

Code	Definition	Theme	Subtheme	Illustrative quote	Speaker
				"We would also go see farm hands. Not many of them were willing. But we gave them a class. They wanted it then and there. And we had to make the second trip with vaccines. They convinced each other to get vaccinated."	CHW
				"Offering services and vaccines in high traffic spaces, [like] flea markets, schools, churches, stores, community buildings, parks, homes, and homeless encampments—places where people were already going."	CHW
				"Even in rain, shine, cold, we did months of work and talking one-on-one with these people. And sometimes we had to get up at the crack of dawn. We had to identify where people needed the info. We'll go to Home Depot, but we can't arrive at 10am—we need to be there at 6am so we can find people."	CHW
				"To go where the undocumented and low income are. Vendors and vaccines was (sic) the goal—make sure all of the vendors were all vaccinated. And then vaccinate the community. We knew that three thousand pass through the flea markets."	CHW
				"We didn't wait for them to come to the clinic, but rather investigated where people were."	CHW
		Address more than just the virus		"No access to the vaccine at the start...It would break my heart—waiting in line [and] at the end of the day, majority of those folks was (sic) Latinx community. They didn't have access to the internet to register them for the vaccine. Many of us were scared to register in a government agency where they would have my name, phone number, and address. They [the online forms] asked for the insurance. We learned later [from CHW/s] you didn't have to put it in, but it stopped a lot of people [from registering] because it seemed like it was necessary."	Community member

Table 3 (continued)

Code	Definition	Theme	Subtheme	Illustrative quote	Speaker
				<p>"From day one, we started working. Contact tracing, support groups, outreach, and we could do all of this work because we could talk to them about other things too. We would connect them to other resources: emergency food, other resources like rent, and then the vaccine can come to the forefront. Now I'm ready, so the promotora work is a complete package because we could get calls from sick, depressed folks. And going above and beyond and to help. It was a complete service. We would provide support. We can take food to your door, all of those things to help. Community and us. Indestructible."</p>	CHW
				<p>"We would help make them an appointment for [public benefits]. To get that support. Not just the space for vaccines but also paying bills, rent."</p>	CHW
				<p>"They've brought us a lot of help that wouldn't even be given to us at a hospital. Vaccines, support groups, emotional support, and they didn't ask for anything in return."</p>	Community member
				<p>"I was surprised when I got food at my door. They would bring me food and allowed me to share with all the other old folks in my area... Without knowing them, they were worried about me [and] about the community, too."</p>	Community member
				<p>"I told her [CHW] I need food and diapers. We were so sick. And that day they [the CHWs] arrived with diapers and food. She [CHW] called to ask for more information and what my other needs were. Told her we needed help with rent. She said they'd look into it. They even helped me pay my rent. They keep checking in on me, help[ing] with gas cards and bus passes. They hype us up—they lift our self-esteem. They check in on us and motivate us."</p>	Community member

Table 3 (continued)

Code	Definition	Theme	Subtheme	Illustrative quote	Speaker
			Build digital competencies	<p>"We had to train folks how to use zoom, how to join classes via Facebook live, or resolve tech issues. We've had to help them...so that they can show up to the things they need."</p> <p>"We noticed that it was difficult to make appointments online...because there was (sic) many parents who had never used the computer or the phone to do these kinds of things."</p>	CHW CHW
		Ensure community is represented	N/A	<p>"The impact we have is huge. The doctors were so busy, and who would give the information? If I wasn't here, who would give it? From knocking on doors to leaving information at the door, inviting them over for vaccines, leaving food at the door when they're infected, and providing hygiene products or medications or money to pay rent."</p> <p>"Without the promotora, who do you think would have done this job?"</p> <p>"We were essential because we were community, and we knew the needs of folks."</p> <p>"I felt that as a promotora, I am a part of community. I know what it's like to live here."</p> <p>"How did we reach people? I knew of a lot of places where I knew we could reach folks who needed help."</p> <p>"The blue shirts meant messengers for the vaccines. There was (sic) also people who would call us the angels in blue because of all of the information we had."</p> <p>"Promotoras are the model of community. They can see us doing the things we preach. We set the example."</p> <p>"They would feel safer if I told them I was already vaccinated. And would ask where they could go to get vaccinated. It's a lot of work to try and convince them. The flyer is not just it. We have to talk and explain."</p>	CHW CHW CHW CHW CHW CHW CHW CHW
Need	How do CHWs engage the community?	Shared lived experience	N/A		
		Trusted presence	Community recognition		

Table 3 (continued)

Code	Definition	Theme	Subtheme	Illustrative quote	Speaker
			Accessibility	"The promotor is the one who goes and gives info to the home, to the community and works hand-in-hand. Doesn't worry about what may happen because it is for community. If I wasn't a promotor, I would want someone to come to my house and give me info."	CHW
				"People keep our personal numbers now and then they call us when they need help."	CHW
Perils	What challenges do CHW's face?	Funding instability	N/A	"We face hour cuts because there are no funds—it's a grant"	CHW
				"As promotoras, they cut us back, but community doesn't know why we're not there anymore."	CHW
				"If the question is the future, where is plan b? We still get folks asking for things and asking who we can send now. Now that the program is over, who will go?"	CHW
				"The promotoras are paid 5 days, but she works 7 [days], advocating for things. They understand the world needs action."	Community member
		Need for mental health training	N/A	"We had a woman whose sons got deported, someone got evicted, needed medicine, had cancer, and how can these things be happening? As a promotora, I think it would be helpful for me to prepare mentally and have that training to help others. We didn't know what to do in the height of the pandemic. It had a huge impact on our mental health."	CHW
		Inadequate resources to address entrenched problems	N/A	"Woman with four kids, in the height of the pandemic, lost their home because she lost her job. They went to go live in a hotel and even now, they are still unhoused, they are living in a garage with their family now, but they are not on stable footing. Still unable to recover. They can't look for someplace else. Rent is too high, and they are having hard times. Mental health has also played a part. So many folks are still unable to recover. Still battling with the economy, with high prices. How else can I help?"	CHW

**Table 3** (continued)

Code	Definition	Theme	Subtheme	Illustrative quote	Speaker
				"This is a rural field and the employers are white and even now, they aren't respecting the pay or the isolation period. If they didn't show up, they would be fired. Even if they say slavery is over, it's still out there for the Latinos, for the undocumented. That's how they're treated. They didn't get the chance to stay isolated, even with hotel isolation, they weren't given that access. It was only for whites in construction, in packaging sites, but for those in the field, they didn't get that benefit. Simply because they were Latinx or Asian and didn't have papers."	Community member

Ten focus groups were conducted (N=95) with community health workers (N=43), community members (N=45), and clinic employees (N=7)

response and recovery efforts. The AQE messaging was viewed favorably by CHWs and community members alike, but one community member criticized the framing due to the entrenched structural barriers present in the community, noting, “It was always ¡Andale! ¡Andale! What are you waiting for? But the community encountered so many obstacles and myths.” CHWs were vital assets that allowed community members to respond to the urgent call of the AQE campaign by instilling confidence in the vaccine and addressing barriers to vaccine access, in tandem. Vaccine confidence was accomplished by (a) addressing mis/disinformation, especially “myths about the vaccine online on social media,” and (b) consolidating and distilling information in the face of information saturation, making information accessible in English and Spanish, especially to those with limited access.

Beyond education, CHWs helped community members overcome barriers to COVID-19 vaccination and recovery by (a) meeting people where they are, (b) confronting structural vulnerabilities and addressing more than just the virus, and (c) building technological competencies to bridge the digital divide. “Meeting people where they are” undergirded CHWs’ outreach strategy; as one CHW aptly noted, “we didn’t wait for them to come to the clinic.” CHWs were “offering services and vaccines in high traffic spaces...places where people were already going,” including flea markets, schools, churches, stores, community buildings, parks, homes, homeless encampments, and supermarkets. Having a presence at flea markets was especially important in reaching undocumented and low-income communities. For other “hard-to-reach” groups, such as farmworkers, CHWs went to them directly, with one *promotora* recounting,

[Initially] not many of them were willing. But [CHWs] gave them a class. They wanted it then and there. And we [the CHWs] had to make the second trip with vaccines. They [the farmworkers] convinced each other to get vaccinated.

Timing of outreach initiatives and vaccination clinics was equally important to CHWs’ strategy in meeting people where they were, so events were facilitated “at the crack of dawn” and over the weekends to accommodate work schedules.

Effectively overcoming barriers to COVID-19 vaccination meant addressing more than just the virus, acknowledging and confronting structural barriers. CHWs assisted community members in addressing a number of social needs, including food insecurity, rental and financial assistance, and transportation. CHWs offered “help that wouldn’t even be given to us [community members] at a hospital,” with one community member sharing,

I told her [CHW] I need food and diapers. We [the family] were so sick. And that day they [the CHWs]

arrived with diapers and food. She [CHW] called to ask for more information and what my other needs were. I told her [CHW] we needed help with rent. She [CHW] said they'd look into it. They [CHWs] even helped me pay my rent. They [CHWs] keep checking in on me, help[ing] with gas cards and bus passes. They [CHWs] hype us up—they lift our self esteem. They [CHWs] check in on us and motivate us.

This approach of addressing more than just the virus and responding to community members' social needs as a way of increasing vaccination rates was expanded upon by one CHW, who shared,

From day one, we [CHWs] started working. Contact tracing, support groups, outreach, and we could do all of this work because we could talk to them about other things, too. We would connect them to other resources: emergency food, other resources like rent, and then the vaccine can come to the forefront.

CHWs sought to address many structural vulnerabilities, with technology being a prominent barrier. CHWs worked to bridge the digital divide by building technological competencies, teaching community members how to register for appointments online and how to utilize Zoom and Facebook Live.

Discussions of structural vulnerabilities exacerbated by the pandemic, along with the disparate impacts of COVID-19, were central to conversations among CHWs and community members. The mental health impacts of the pandemic were brought up in all focus groups, with community members sharing how CHWs provided much needed peer support to address anxiety and depression. Strikingly, suicide was explicitly named and discussed in eight out of ten focus groups. The nature of these discussions varied, but consistently, CHWs were called upon to assist community members who (a) had lost a child to suicide, (b) had endured a suicide attempt in the family, or (c) had experienced suicidal ideation themselves, underscoring the role of CHWs in attending to the mental health needs of the community.

From overcoming barriers and attending to community mental health needs to instilling collective confidence, CHWs described the importance of their role in ensuring the community is represented and included in COVID-19 response and recovery efforts. As one CHW framed it, "Without the *promotora* [CHW], who do you think would have done this job?" This sentiment was echoed by a number of CHWs, who noted their role as messengers in the community and asked, "If I wasn't here, who would give the information?" These illustrative quotes serve to emphasize the unique position of CHWs as community advocates in public health response.

## Need for CHWs

After identifying the essential roles and responsibilities of CHWs, two themes emerged in understanding what qualities of CHWs contribute to their effectiveness in engaging the community: (1) shared lived experience and (2) trusted presence. Shared lived experience recognizes that, as one CHW put it, "[as] a part of community (*sic*), I know what it's like to live here." This local expertise of the community's needs—and where those folks work and reside—informs CHWs' outreach and vaccination strategies.

Equally important is the trusted presence of CHWs, which can be attributed to their (a) recognition in the community and (b) accessibility to community members. Regarding recognition in the community, CHWs' recognizable and consistent uniforms helped community members recognize them as messengers, or ambassadors, for the vaccine. One CHW, whose implementation site rolled out blue shirts for CHWs, shared that some community members referred to them as "the angels in blue because of all of the information [they] had." CHWs play a crucial role in modeling and setting the example for the community, such that community members "can see us [CHWs] doing the things we preach." This contributes to the CHWs' ability to instill confidence in the vaccine, with one CHW sharing that community members "would feel safer if I told them I was already vaccinated—and would then ask where they could go to get vaccinated." Conversations with community members depend upon the accessibility of CHWs, who often receive phone calls from community members directly.

## Perils of CHW Model

Focus group participants were asked about the challenges CHWs face in the context of the current CHW model, during which three themes emerged: (1) funding instability, (2) inadequate resources to address entrenched problems, and (3) need for mental health training. Funding constraints were the foremost concern among CHWs, noting that grants are the current funding mechanism by which CHW programs operate, causing discontinuities for both (a) CHWs themselves, who face hour reductions, and (b) communities, who are still in need of services and programming after the grant period has ended. The lack of stable funding disrupts community members' access to services, but also has the potential to erode community trust, as one CHW pointed out: "As *promotoras*, they cut us back, but community (*sic*) doesn't know why we're not there anymore." Community members similarly acknowledged the pitfalls of the current funding structure, stating, "The *promotoras* are paid 5 days, but she works 7 [days], advocating for things. They [CHWs] understand the world needs action."

In addition to the funding instability, focus group participants voiced concerns about having inadequate resources to address entrenched problems. CHWs recounted the horrors endured by several community members facing so many interlocking forms of oppression and wondering, “how else can I help?” This sentiment was echoed by a community member who works in agriculture, explaining how undocumented individuals did not have the same working conditions or tools for infection control or prevention, simply because of their immigration status. CHWs recognized their heightened exposure to grief and stressors, working with community members who (a) experienced the deportation of their children, (b) had terminal illnesses, and (c) faced evictions. One CHW asked, “How can these things be happening? We didn’t know what to do at the height of the pandemic.” Looking to the future, they drew attention to the need for mental health training, affording them the opportunity to prepare mentally and have training to adequately respond to the needs of their community.

## Discussion

CHWs have long been recognized as critical assets and trusted partners in health promotion, bridging the gap between health and social services [27]. Globally, CHWs often contribute to disaster relief, vaccinations, nutrition, and maternal and child health [27]. In the wake of the COVID-19 pandemic in the U.S., CHWs were on the frontlines, attending to communities facing grave inequities by leading contact tracing efforts and addressing emergent social needs [19, 28]. The role of CHWs in pandemic preparedness and public health system strengthening—evidenced by CHWs’ ongoing role in long-term recovery beyond the pandemic—has brought newfound attention to the CHW workforce, namely the functions, sustainability, and financing of CHW models [29–31]. This mixed-methods evaluation adds to this discussion by elucidating the importance, needs, and perils of CHW models in the COVID-19 era and beyond. Summary of salient findings are as follows: (1) 146 CHWs facilitated 159,074 vaccinations and vaccine appointments in Latinx communities across California with low vaccination rates by (a) distilling information and addressing mis/disinformation to instill confidence, (b) addressing more than just the virus, especially mental health challenges, (c) meeting people where they are to overcome barriers in vaccine access, (2) building trust with the community through CHW engagement that (a) centered shared lived experience and (b) increased community recognition and ongoing accessibility to supportive services, providing a pulse on community needs; and (3) funding instability presents the most pressing challenge in sustaining the advances made by CHWs.

Null findings from the regression model indicate that the successes achieved by CHWs, whether number of people reached or vaccinated, cannot be reduced to or predicted by mere demographic characteristics. While employment status was a significant predictor of the number of people reached by CHWs, with part-time CHWs reaching a higher number of people, this is likely the result of part-time CHWs’ use of social media for outreach, affording greater flexibility with regard to time commitment. While social media outreach reaches larger audiences, this does not necessarily translate to higher vaccination volume, which could explain why part-time status was a significant predictor of number of people reached but not vaccination volume.

The effectiveness of CHWs lies in their connection to the community, as community members themselves, to understand the unique and unmet needs, which allows them to better facilitate services that are culturally and linguistically responsive. CHWs’ shared lived experience informed strategies utilized by the AQE campaign to meet people where they are, overcoming barriers to care vis-à-vis vaccine access. This philosophy informed the campaign’s efforts in (a) education, identifying prominent sources of mis/disinformation and streamlining messaging and (b) vaccine delivery, pinpointing areas where people already worked and lived, offsetting transportation barriers and time poverty. The idea of “meeting people where they are” extends to what services were offered in the first place. In order for the vaccine to come to the forefront of people’s concerns, CHWs needed to address social, economic, and mental health impacts of the pandemic—and its disparate impact—by actively seeking out community members and attending to their needs through direct service and policy advocacy. CHWs “didn’t wait for them to come to the clinic,” as one CHW astutely noted during a focus group, which draws attention to the fact that while community clinics and CBO partners have physical infrastructure in communities rendered most vulnerable, it is insufficient. Effective responses depend on action at the neighborhood-level, guided by the expertise of those in the community, like CHWs, to (a) provide peer support and direct services, (b) develop swift and strategic interventions that consider the needs and challenges of this *specific* community rather than relying on blanket narratives or assumptions (e.g., vaccine hesitancy among communities of color), (c) advocate for policy change at the organization/agency and municipal/county/state levels, and (d) gather community feedback to adapt and improve interventions to meet community needs. This underscores the role of CHWs as *accompagneurs*, a key function of CHWs well established by Farmer and colleagues at Partners in Health [32], but also as agents of social change and community activation. This crucial role makes CHWs well positioned to respond in times of crises but also work towards long-term recovery and rebuilding, fostering community resilience.

The effectiveness of CHWs is threatened by funding instability—a point of discussion that was raised in most focus groups, among both community members and CHWs alike. Current financing models of CHW programs depend on cyclical grant funding, which affects (a) CHWs' direct financial wellbeing, who are often paid substandard wages and face hour reductions, both of which cause economic uncertainty and precarity and (b) community members, who are left with lingering needs beyond the grant period, which would later create barriers for CHWs to build and renew trust. This notably impairs program sustainability, hampering progress towards health equity and eroding community trust, emphasizing the need for sustainable funding models that invest in maintaining the presence of CHWs in neighborhoods.

Recent successes of CHW models in COVID-19 response have brought renewed attention to funding for CHW models [33, 34]. These calls draw on the extant evidence base that demonstrate the cost-effectiveness of CHWs for health systems and payers, citing a positive return on investment (ROI) for Medicaid by addressing patients' social determinants of health (SDoH) [35]. To institutionalize the CHW workforce and solidify funding models via Medicaid reimbursement, states must develop plans that outline (a) services CHWs can provide, (b) supervision and oversight requirements for the CHW workforce, (c) payments and rates, and (d) requisite training, experience, and credentialing for CHWs [36]. Mechanisms do exist to cover certain pathways of care provided by CHWs, often linked to chronic disease management [37], but efforts related to building community resiliency—often efforts that require significant time investment in building trust with the community—are not considered reimbursable services. Steps are needed to formalize and expand mechanisms of continuous, sustainable funding for CHW programs. Careful attention should be directed to ensure CHW programs are not medicalized, reducing the area of focus to healthcare alone [22], but instead, remain rooted in community and emphasizing the role of CHWs in community activation and social change.

## Conclusions

Community health workers (CHWs) have long served an essential—and cost-effective—role in crisis response and care navigation, but significant expansions have been made to the CHW workforce over the course of the COVID-19 pandemic. The *¡Andale! ¿Que Esperas?* (AQE) vaccination campaign invested in the CHW workforce in California, expanding access to and instilling confidence in COVID-19 vaccines among Latinx communities. These findings elucidate the importance of CHWs in both immediate crisis

response and long-term recovery, both of which are imperiled by funding instability for CHW programs.

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**Data Availability** Datasets generated and analyzed in the present study are not publicly available to protect the privacy of individual participants.

**Code Availability** Not applicable.

## Declarations

**Conflict of interest** The authors have no conflicts of interest to disclose.

**Ethical Approval** All study procedures were approved by the Institutional Review Board (IRB) at Claremont Graduate University (IRB # 4084).

**Consent to Participate** All focus group participants provided written informed consent.

**Consent for Publication** Not applicable.

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