International Journal for Equity in Health

SYSTEMATIC REVIEW Open Access

How is academic medicine engaging with community health workers in the United States?: a systematic review

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Abstract

Objective CHWs are a key workforce to address health disparities and offer expertise in community engagement, health promotion, and system navigation. Academic Medical Institutions (AMIs) play a critical role in supporting CHW workforce development and training, yet a systematic review of how AMIs engage with CHWs has not been conducted.

Methods Literature was systematically searched in November 2022 and February 2024 from the following databases: PubMed, Web of Science, CINAHL, SocINDEX, and PsychInfo. Forward and backward citation searches in February 2025 identified an additional 64 articles. We reviewed 347 full-text articles, and 136 were included in the final sample.

Results CHW/AMI engagement was delineated by three, non-mutually exclusive categories: 1) intervention implementation/evaluation ($n=104$); 2) workforce development ($n=32$), and 3) community-based participatory research (CBPR) ($n=23$). Intervention implementation and evaluation studies measured the effectiveness of CHWs in a variety of healthcare settings. Among intervention studies that assessed efficacy, 52 (79%) found that CHWs significantly improved at least one health outcome. In workforce development, AMIs developed specialized training for CHWs or incorporated CHWs into training for medical students and residents. In CBPR studies, CHWs contributed to recruitment, community engagement, needs assessment, data collection, and community expertise. However, CHWs were rarely included in the interpretation or dissemination of findings, or as authors.

Conclusions CHWs contribute to AMI's tripartite mission and preventive medicine efforts including addressing health disparities, improving patient outcomes and educating future doctors. Developing sustainable CHW career paths with equitable payment structures is essential to move from engagement to partnership.

Keywords Community health workers, Health disparities, Academic medical centers, Preventive health services, Community-based participatory research

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Introduction

This article reviews the literature on community health workers (CHWs) in academic medical institutions (AMIs), in response to an urgent call by medical education experts to incorporate greater community engagement in research, practice, and education to address significant inequities in health [1–3]. Although significant progress has been made regarding preventive medicine and healthcare access since the passage of the Patient Protection and Affordable Care Act (ACA), 25.3 million (7.7%) Americans remain uninsured in 2023 [4]. CHWs have played a significant role in marketplace enrollment assistance as well as Medicaid waiver programs, both of which were funded by the ACA [5, 6]. However, coverage alone does not ensure equitable care, as persistent disparities in access and outcomes remain across the country. These are especially true for minority populations who face higher rates of chronic illness and delayed preventative care [7]. Moreover, inequities have been exacerbated by the COVID-19 pandemic, including social and economic instability and healthcare system challenges such as staffing shortages [8, 9].

Academic medical institutions (AMIs) uphold the tripartite mission of educating the healthcare workforce, conducting innovative research, and delivering high-quality patient care [1]. AMIs play a crucial role both in enhancing patient experience, and in addressing health inequities [10]. AMIs provide care to uninsured and underinsured individuals through a variety of methods including charity care, affiliated safety-net hospitals, student-run free clinics, and clinical or research partnerships with community-based organizations [11–16]. Yet many of these efforts are inadequate to address broader structural determinants of health and reduce long-standing health inequities. Park et al. recommended incorporating community engagement across all three tripartite pillars through community-informed education, diversification of the healthcare workforce, and community-based participatory research [1]. One promising approach to achieving this is through integrating Community Health Workers (CHWs) into AMIs [17, 18].

CHWs are trained public health workers who share cultural, linguistic or lived experiences with the populations they serve, allowing them to act as a trusted link between the community and various health and social services [19–22]. CHW roles span multiple delivery settings – from clinical teams to community-based outreach – which contributes to variation in their titles such as community health representatives, *promotores de salud,* community health representatives, outreach workers, and patient navigators [23, 24]. These roles often overlap and are inconsistently distinguished across institutions due to distinct institutional and cultural models of care, ultimately creating ambiguity in scope of practice, credentialing requirements, and reimbursement [19–21, 25, 26].

Despite being integrated into US public health systems since the 1950s, CHWs have been underutilized in preventive medicine, healthcare systems, and AMIs [19]. In 2010, the passage of the ACA recognized CHWs as key to establishing patient-centered medical homes and allocated federal funding for CHW-led initiatives. In 2013, the Centers for Medicare and Medicaid Services allowed for state Medicaid agencies to reimburse community-based preventive care, including care delivered by CHWs. In 2019, US CHWs formed the National Association of Community Health Workers (NACHW), an organization that centers CHWs in governance and advocates for the interests of CHWs nationally [27]. CHWs are typically integrated into healthcare systems through several pathways including community-clinical linkages, direct employment by healthcare organizations, integration within payers or coordination by public health departments [28, 29]. Core CHW competencies include knowledge, communication, relationship-building, service coordination, capacity building, advocacy, education, assessment, outreach, professional, and evaluation skills [30].

AMIs have facilitated CHW integration into healthcare settings by providing funding for CHW certification or state level training, as well as evaluating CHW effectiveness with varied populations and in diverse settings and implementation approaches [31, 32]. However, there is not currently a systematic review that describes the relationship between CHWs and AMIs.

While the efficacy of CHWs is known in specific healthcare settings such as oncology [33, 34], diabetes [35–37], community-clinical linkage [38], and healthcare utilization [39], the types of interventions that AMIs and CHWs engage in, for which populations, and whether they play a role in community engagement has been understudied. Therefore, we conducted a review to explore the relationship type between AMIs and CHWs. Second, we were interested in describing how AMIs support, learn from, or engage with the CHW workforce. Finally, we were interested in identifying the primary outcomes used to measure CHW impact, efficacy and/or effectiveness. This systematic review therefore fills an important gap in the literature by clarifying how AMIs currently engage CHWs across care delivery, education, and research. By identifying patterns and gaps in CHW integration, our findings can help AMIs strengthen their efforts to advance health equity, build a workforce that is more responsive to community needs, and guide policymakers, health systems, and public health practitioners in designing more effective and sustainable CHW models within academic medical environments.

Methods

Based on initial search results and heterogeneity of study types, we conducted a systematic review [40]. We utilized a rigorous systematic review strategy, including 1) detailed inclusion and exclusion criteria, 2) a comprehensive search strategy across multiple databases, 3) blinded review with multiple researchers, 4) a multi-phased study selection process, 5) systematic data extraction, and 6) a comprehensive synthesis of findings with feedback from an interdisciplinary team of researchers, including CHWs. The complete search strategy and bibliography of included studies is available in the Open Science Framework repository (https://osf.io/zvn85/). Since this systematic review did not involve human participants or the collection of identifiable personal data, IRB approval was not required.

Search strategy

Search terms were identified in collaboration with a health sciences librarian. Through testing against a set of eight relevant articles, a comprehensive search strategy was developed, adjusted, and validated for PubMed. The search strategy was subsequently translated for other databases. Searches were conducted in November 2022 and February 2024 using the online databases PubMed (National Library of Medicine), CINAHL (EBSCO), PsycINFO (EBSCO), SocINDEX (EBSCO), and Web of Science (Clarivate). Limiters included English language only and publication dates from 2010 onwards when ACA was passed, which increased the integration of CHWs into healthcare and AMI settings [6]. Deduplication was completed in Zotero, and then search results were uploaded into Rayyan, an evidence synthesis screening online tool (https://www.rayyan.ai/) [41]. We reviewed an additional 64 full-text articles through backward and forward hand searching in February 2025.

Selection criteria

Articles had to meet the following inclusion criteria: involve CHWs; study or intervention conducted in a healthcare, public health or community health setting associated with an AMI; peer-reviewed publication; conducted in the United States; published on or after 1/1/2010; and English-language article. We included non-randomized quantitative studies, qualitative studies and descriptive studies to identify all examples of CHW and AMI engagement in the U.S. However, we excluded protocol papers because they do not report findings. Our exclusion criteria comprised of studies that (a) did not include CHWs; (b) did not include explicit information about the background of the interventionist; (c) were not affiliated with an AMI; (d) the CHW, clinic, and/or project was not associated with an AMI setting; (e) were not peer-reviewed; (f) were not conducted in the U.S.; and (g) were conducted before 2010.

Title and abstract review

We followed PRISMA reporting guidelines throughout the review process [42]. During the first-round review in November 2022, two authors completed a blind screening of the title and abstracts and resolved conflicts through consensus. This process was repeated for full-text articles in February 2024.

During the title and abstract review, we identified several articles that referred to patient navigators, community health representatives and/or lay health navigators as opposed to CHWs. Since these roles can often be filled by community members or lay people and based on the advice and consultation that we received from CHW authors, we included abstracts that referred to these roles, particularly patient navigators. However, during the blinded full-text review, papers had to explicitly state that navigators shared cultural, linguistic or lived experiences with the population served, and that CHWs were utilizing at least 3 of the core competencies from the CHW Core Consensus Project [30].

Data extraction & data synthesis

Articles deemed eligible for inclusion were downloaded from Rayyan into REDCap for standardized data extraction [43]. We did not conduct meta-analysis for two reasons: first, due to the inclusion of 63 (46%) studies that were descriptive or qualitative in nature, and second, due to the heterogeneity in study design, purpose, population and outcomes across studies. Instead, we conducted a narrative analysis to describe study characteristics, outcomes and the relationship between CHWs and AMIs.

Quality review

We used the Mixed Methods Appraisal Tool (MMAT) developed by Hong et al. [44] a validated tool designed to appraise the quality of empirical studies across five study designs: qualitative research, randomized controlled trials (RCTs), non-randomized studies, quantitative descriptive studies, and mixed methods studies.

Two reviewers independently applied the MMAT criteria to each study. For each domain, the MMAT includes five methodological criteria, such as appropriateness of measurements, completeness of outcome data, and relevance of sampling strategy. Consistent with MMAT guidance, we did not compute an overall numeric score but rather reported the pattern of responses to provide a nuanced assessment of methodological strengths and limitations across studies.

Results

Of 944 articles screened, 296 full-text articles were reviewed, and 64 additional articles were identified through forward and backward searching. 136 articles met selection criteria and were included in the final sample for data extraction. Refer to Figure 1 for the full PRISMA chart.

Study characteristics

Study design was categorized based on the Mixed Methods Appraisal Tool [44] and included non-randomized quantitative studies ($n = 35$), descriptive quantitative studies, ($n = 34$), RCTs ($n = 27$), qualitative studies ($n = 27$), mixed methods studies ($n = 13$). Sample sizes ranged from 3 to 12,428, with an average of 874 participants, which include patients, clients or CHWs depending on the focus of the study. Studies were conducted in 23 states across all 4 regions in the U.S [45].

CHW studies were conducted in healthcare settings such as outpatient clinics ($n = 61$) and inpatient hospitals ($n = 34$), community settings like patient homes ($n = 21$), public housing or community organizations ($n = 27$), and to a lesser extent virtual settings like Medicaid plans. CHWs provided a variety of services including health education ($n = 78$), system navigation/case management ($n = 71$), outreach ($n = 65$), research or evaluation ($n = 47$) capacity building ($n = 48$), resource referral ($n = 46$), assessment ($n = 37$) and advocacy ($n = 17$). For more details, refer to Table 1.

Quality review

Table 2 summarizes the quality assessment results across all included studies. Overall methodological quality was high among qualitative studies, with nearly all studies meeting each of the five MMAT quality criteria. Most studies used an appropriate qualitative approach, adequate data collection methods, derived findings appropriately, and substantiated their interpretations with supporting data. Similarly, the RCTs generally demonstrated strong quality, as most studies performed proper randomization, reported comparable baseline groups, had complete outcome data, and retained participants in their assigned intervention. However, only half of studies blinded outcome assessors to the intervention assignment ($n = 15$, 56%).

The quality of quantitative non-randomized studies was generally strong, with most studies recruiting representative participants, using appropriate outcome/intervention measures, reporting complete outcome data, and administering the intervention as needed. However, a limitation was that only 25 studies (71%) accounted for confounding factors in their design or analysis. This

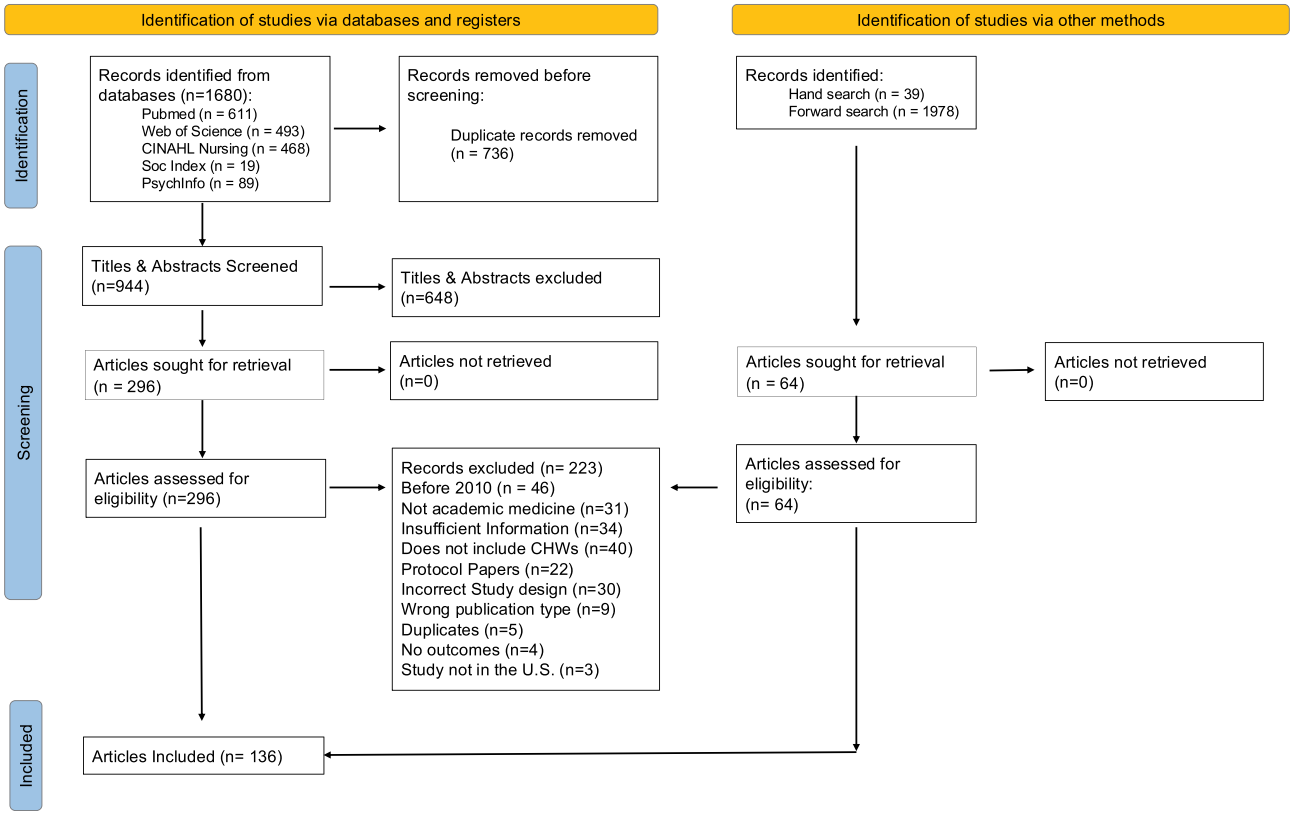

Fig. 1 PRISMA chart

Table 1 Characteristics of included studies ($N = 136$)

First author	Year	Study design	Sample size	Location (State)	Study population	Purpose		
						I/E	WD	CBPR
Alolod	2020	Qualitative	98	multi-site	CHWs	X		
Alvarez	2022	Mixed Methods	24	MD	Community dwelling adults with hypertension		X	
Andreae	2020	RCT	195	AL	Rural residents	X		
Andreae	2021	RCT	177	AL	Community-dwelling adults with diabetes and chronic pain	X		
Apata	2023	Mixed Methods	30	MD	low-income, public housing residents that smoke tobacco	X		X
Aponte	2017	RCT	180	NY	Hispanic adults with uncontrolled type 2 diabetes	X		
Asgary	2017	Descriptive	162	NY	women experiencing homeless	X		
Balaban	2015	RCT	1510	MA	High risk for hospital readmission	X		
Bouchonville	2X018	Descriptive	23	NM	Medically underserved adults in rural NM		X	
Brown	2023	Qualitative	NR	multi-site	Patients with rheumatoid arthritis		X	
Burkett	2022	Qualitative	15	OH	Immigrant Latino families	X		
Burns	2014	RCT	423	MA	Low- income urban community members	X		
Bush	2023	Quant/Non-RCT	192	TX	Adults in East Texas	X		
Carter	2021	RCT	550	MA	High risk for hospital readmission	X		
Caskey	2019	RCT	6245	IL	Medicaid recipients with a chronic condition	X		
Chandrasekar	2016	Descriptive	3000	IL	African-born people	X		
Cherrington	2015	Mixed Methods	72	AL	Patients with poorly controlled diabetes	X		
Chu	2022	Quant/Non-RCT	86	multi-site	Chinese American breast cancer survivors	X		
Colleran	2012	Mixed Methods	23	NM	CHWs in New Mexico		X	
Collins	2024	Qualitative	8	OH	African Americans with poorly controlled hypertension	X	X	
Cottler	2013	Descriptive	1357	multi-site	CHWs engage underserved and underrepresented populations in their own neighborhoods	X		X
Coulter	2022	Qualitative	125	AZ	Latinx adults in Arizona	X		X
Davis	2022	Quant/Non-RCT	42	FL	Immigrant Latinx population	X		
de la Riva	2016	Qualitative	19	IL	Uninsured women with abnormal breast or cervical cancer screening	X		
DeGroff	2017	RCT	843	MA	Urban adults (50–75) referred for a colonoscopy screening	X		
Documet	2022	Descriptive	21	PA	Latino adults and their children	X	X	
Dumbauld	2014	Descriptive	13	CA	CHWs from clinics in a rural, predominately Latino settings		X	
El-Khayat	2022	Descriptive	22	AZ	CHWs, NPNs (native patient navigators), and medical students		X	
Ellis	2019	RCT	50	MI	Adolescents with Type 1 Diabetes and chronically poor metabolic control	X		
Ferrer	2013	Quant/Non-RCT	6000	TX	6000 uninsured patients assigned to a family health center for primary care services	X		
Fink	2023	Qualitative	10	CO	Family Caregivers of patients who lacked decisional capacity due to Alzheimer's Disease and Related Dementias			X
Fink	2020	Qualitative	223	CO	Hispanic adults with stage III/IV advanced cancer	X		
Fiori	2019	Descriptive	4162	NY	Pediatric Patients at a FQHC that screened positive for Social Determinants of Health during a Well-Child Visit	X		X
Fiori Jr.	2018	Descriptive	9	NY	CHWs	X		
Fischer	2018	RCT	223	CO	Hispanic adults with stage III/IV advanced cancer	X		
Fischer	2024	RCT	209	CO	Latino adults with a life-limiting, serious noncancer illness	X		
Fish	2022	Descriptive	1144	PA	Discharged adult ED patients	X		
Flower	2020	Quant/Non-RCT	735	NC	Monolingual Spanish-speaking families	X		
Fouad	2014	RCT	632	AL	African American and low-income women			X
Franz	2020	Quant/Non-RCT	3053	multi-site	Navajo Nation individuals diagnosed with diabetes	X	X	

Table 1 (continued)

First author	Year	Study design	Sample size	Location (State)	Study population	Purpose		
						I/E	WD	CBPR
Galbraith	2017	RCT	975	MA	High-risk patients in a safety-net system	X		
Gardiner	2023	Quant/Non-RCT	375	multi-site	Latinas aged ≥50 years	X		
Garza	2020	Descriptive	56	TX	The Hispanic population in the Lower Rio Grande Valley		X	
Glaser	2023	Qualitative	27	NY	Breast cancer survivors and breast patient navigators			X
Gleason-Comstock	2022	Quant/Non-RCT	96	MI	African American adults	X		
Green	2023	Mixed Methods	50	IL	Postpartum Medicaid recipients	X		
Gwede	2013	Qualitative	7	FL	Individuals and families who are uninsured and underinsured	X		
Heisler	2014	RCT	188	MI	Adults diagnosed with type 2 diabetes	X		
Heisler	2019	RCT	290	MI	Veterans Affairs patients with Diabetes	X		
Henderson	2020	Descriptive	779	IL	Uninsured and underinsured women at federally qualified health centers	X		
Herrera	2022	Descriptive	45	NY	Uninsured patients aged ≥50 years due for colorectal cancer screening		X	
Holcomb	2022	Qualitative	NR	TX	CHWs	X		
Holcomb	2022	Quant/Non-RCT	7	TX	CHWs		X	
Horyna	2020	Quant/Non-RCT	364	TX	Older adults (50–89 years) with two or more chronic conditions	X		
Jiménez	2023	Qualitative	46	AZ	CHWs		X	
Kangovi	2018	Qualitative	21	PA	Fourth-Year Medical Students		X	
Kangovi	2017	RCT	302	PA	Patients who lived in a high-poverty neighborhood, were uninsured or publicly insured, and were diagnosed with 2 or more chronic diseases	X		
Kangovi	2014	RCT	446	PA	Hospitalized patients who were uninsured or insured by Medicaid and discharged home to a high poverty neighborhood	X		
Kangovi	2018	RCT	592	PA	Patients who lived in a high-poverty neighborhood, were uninsured or publicly insured, and were diagnosed with 2 or more chronic diseases	X		
Katzman	2021	Descriptive	9765	multi-site	Clinicians and CHWs		X	
Kenya	2014	Mixed Methods	115	FL	Patients with diabetes	X		
Khodneva	2021	RCT	195	AL	Community-dwelling adults with diabetes and chronic pain	X		
Kobetz	2013	Descriptive	506	FL	Community-dwelling adults in Little Haiti, Miami Florida			X
Komaromy	2020	Quant/Non-RCT	282	NM	high-need-high-cost Medicaid patients.	X		
Komaromy	2020	Quant/Non-RCT	770	NM	high-need-high-cost Medicaid patients.	X		
Lapidos	2022	Quant/Non-RCT	113	MI	CHWs		X	X
Leong	2024	Quant/Non-RCT	535	NY	Newborns that did not pass universal hearing screening	X		
Lin	2017	RCT	72	MA	People with a high number of ED visits over a 30-day period	X		
Luckett	2015	Quant/Non-RCT	4199	MA	Women with abnormal results from cervical cancer screening	X		
Mancera-Cuevas	2018	Quant/Non-RCT	55	IL	Latino community	X	X	
Marin	2022	Descriptive	48	NY	Congregants in Latino and African American faith-based organizations		X	
Martinez	2022	Quant/Non-RCT	474	IL	Postpartum Medicaid recipients	X		
Matiz	2014	Descriptive	750	NY	Latinos receiving at primary care medical homes	X		
Maxwell	2015	Mixed Methods	813	CA	Community members who self- identified as Mixteco or Zapoteco	X	X	
McCalmont	2016	Descriptive	NR	NM	Family Medicine residents		X	
McCarville	2021	Qualitative	4	IL	Teams that employ CHWs	X		
McElfish	2022	Descriptive	1511	AR	Marshallese individuals who tested positive for COVID-19	X		
McElfish	2020	Quant/Non-RCT	10	AR	Marshallese adults with type 2 diabetes	X		X

Table 1 (continued)

First author	Year	Study design	Sample size	Location (State)	Study population	Purpose		
						I/E	WD	CBPR
Mechanic	2022	RCT	2553	MA	Primary care and gerontology outpatients	X		
Menon	2022	Descriptive	678	AZ	American Indians between 50 and 75 years old	X		
Menon	2020	Quant/Non-RCT	345	AZ	older adults	X		
Molina	2019	Qualitative	70	IL	Community-engagement advisory board members	X		X
Monton	2023	Quant/Non-RCT	3	multi-site	African American patients with advanced cancer	X		
Morse	2017	Descriptive	100	NY	Women scheduled for or recently released from incarceration	X		
Nebeker	2021	Mixed Methods	19	CA	CHWs		X	
Newman	2023	Mixed Methods	46	OH	Children with high-risk lead exposure	X		
Newman	2014	Qualitative	84	NM	Zuni Indians with a diagnosis of diabetes or prediabetes or a caretaker of a family member with diabetes			X
Ohuabunwa	2021	Quant/Non-RCT	154	GA	High risk for hospital readmission	X		
Page-Reeves	2016	Descriptive	3048	NM	Patients in a family medicine clinic	X	X	
Pati	2015	Quant/Non-RCT	311	NY	Children less than 2 years of age	X		
Percac-Lima	2018	RCT	1200	MA	Current smokers aged 55–77	X		
Percac-Lima	2016	RCT	1612	MA	Primary care patients overdue for cancer screening	X		
Peretz	2023	Descriptive	1437	NY	Emergency department patients	X		
Purvis	2017	Qualitative	NR	AR	Marshallese community			X
Rhodes	2024	Qualitative	28	multi-site	Low-income women currently breastfeeding			X
Robertson	2023	Qualitative	19	DC	Children and adolescents with mental health conditions.	X	X	
Rocque	2016	Descriptive	8787	multi-site	Medicare beneficiaries 65 years and older with a cancer diagnosis	X		
Rocque	2017	Quant/Non-RCT	12428	multi-site	Medicare beneficiaries 65 years or older with a cancer diagnosis	X		
Rodriguez Espinosa	2024	Qualitative	540	CA	CHWs			X
Rovner	2023	RCT	200	PA	Black adults 35 years and older with type 1 or type 2 diabetes and an ED admission	X		
Ruiz	2012	Mixed Methods	12	NY	CHWs		X	
Sánchez	2014	Quant/Non-RCT	6	NM	Hispanic adult patients with hypertension	X		
Shamasunder	2022	Mixed Methods	392	CA	Adult residents exposed to neighborhood pollution	X		X
Simon	2019	Descriptive	678	IL	Chinese women 21 and older	X	X	X
Smith	2015	Descriptive	6	CT	CHWs		X	
Sokan	2022	Quant/Non-RCT	47	MD	Patients with heart failure and chronic obstructive pulmonary disease	X		
Spatz	2012	Qualitative	46	CT	Uninsured individuals	X		X
Spencer	2018	RCT	222	MI	Latino adults with diabetes	X		
Stanford	2016	Descriptive	NR	FL	Individuals at high risk of Hepatitis B	X		
Steinman	2023	Mixed Methods	152	CA	Older Latino adults who are underserved	X		
Stevenson	2022	Qualitative	NR	WI	CHWs during COVID-19	X		
Stewart	2015	Descriptive	3578	AR	Community residents	X		X
Stiles	2020	Descriptive	1000	OH	Medicaid-insured children	X		
Sugarman	2021	Mixed Methods	138	LA	CHWs		X	
Talon	2020	Descriptive	29	IL	Youth aged 25 years or younger with Medicaid and a diagnosis of asthma, diabetes, sickle cell disease, or prematurity	X		
Tan	2023	Qualitative	11	IL	Black women with breast cancer	X		
Trevisi	2019	Quant/Non-RCT	3053	multi-site	Navajo Nation	X		
Tully	2015	Quant/Non-RCT	83	WI	Black adults with uncontrolled hypertension	X		
Varma	2020	Descriptive	2371	multi-site	Communities underrepresented in research	X	X	X
Vasan	2020	RCT	1340	PA	Patients who lived in a high-poverty neighborhood, were uninsured or publicly insured, and were diagnosed with 2 or more chronic diseases	X		

Table 1 (continued)

First author	Year	Study design	Sample size	Location (State)	Study population	Purpose		
						I/E	WD	CBPR
Vaughn	2019	Qualitative	112	OH	Latino immigrant adults	X		X
Weinstein	2021	RCT	223	IL	Pediatric patient with uncontrolled asthma	X		
Wennerstrom	2015	Qualitative	31	LA	CHWs	X		
Wennerstrom	2022	Descriptive	146	multi-site	CHWs		X	
Wennerstrom	2022	Descriptive	146	multi-site	CHWs		X	
White	2021	Quant/Non-RCT	114	SC	African American Women with Lupus	X		
Williams	2023	Descriptive	2741	AL	Low-income oncology patients with a median age of 64			X
Williams	2022	Quant/Non-RCT	6510	multi-site	Medicare beneficiaries over 65 years old who survived at least 1-year post-cancer diagnosis	X		
Williams	2019	Quant/Non-RCT	27	SC	African American women with Lupus	X	X	
Williams	2018	Quant/Non-RCT	4	SC	African American women with Lupus	X		
Williams	2021	Qualitative	NR	KS	CHWs	X		X
Willock	2015	Descriptive	21	GA	CHWs		X	
Wilson	2015	Quant/Non-RCT	370	TX	Hispanic men	X		
Wolfe	2022	Quant/Non-RCT	819	CA	Racial/ethnic minorities (black and Hispanic populations)			X
Yee	2017	Quant/Non-RCT	474	IL	Women receiving prenatal care at a Medicaid-based university clinic.	X		
Zamudio-Haas	2023	Qualitative	18	CA	Spanish-speaking transgender Latinas	X		

Note: I/E = Implementation and/or Evaluation; WD = Workforce Development; CBPR = Community Based Participatory Research

was due to methodological limitations, such as using chi-square or t-tests that are unable to account for confounding factors. Regarding the quality of quantitative descriptive studies, most used relevant sampling strategies, recruited representative samples, applied appropriate measurements, maintained low nonresponse bias, and conducted appropriate statistical analyses. Finally, most mixed methods studies provided justification, met the quality standards for both qualitative and quantitative methods and integrated and interpreted both components.

Study demographics

Approximately half of the studies ($n = 63$, 46%) included Hispanic/Latino individuals or communities; however, 44% failed to report the ethnicity of the population served. Similarly, only 55% of studies reported the racial identity of the population served. Of those that reported race, most included Black ($n = 65$, 85%) or White communities ($n = 45$, 60%), followed by Asian ($n = 23$, 31%), American Indian ($n = 15$, 20%), Native Hawaiian/Pacific Islander ($n = 7$, 8%), and/or multi-racial ($n = 7$, 9%). Finally, 34% of studies included English-speaking populations, 23% included Spanish speaking, and 19% included other languages such as Mandarin, Cantonese, Vietnamese and Creole. However, 46% did not report the language spoken by the population.

Nearly half the studies ($n = 59$, 43%) failed to report the racial, ethnic or linguistic background of the CHWs involved in the study. Of the papers that did report this information, studies predominantly included Hispanic or Latino CHWs ($n = 39$, 74%) followed by Black CHWs ($n = 23$, 43%), Native American CHWs ($n = 10$, 19%), Asian CHWs ($n = 9$, 17%), Native Hawaiian or other Pacific Islander CHWs ($n = 6$, 11%), or multiracial CHWs ($n = 5$, 9%). The language(s) spoken by CHWs were primarily English ($n = 57$, 98%) or Spanish ($n = 36$, 62%), while almost one-third of studies ($n = 16$, 28%) included CHWs that spoke other languages like Mandarin, Cantonese, Vietnamese and Creole.

Engagement type

There were three primary purposes for CHW and AMI engagement, namely, 1) the design, implementation or evaluation of CHW interventions, 2) workforce development of CHWs or other healthcare professionals, and 3) community-based participatory research (CBPR).

CHW intervention studies

The most common engagement reason was the design, implementation and evaluation of CHW interventions ($n = 104$, 76%). CHW interventions typically focused on the provision of health education, prevention services, chronic disease management, and/or post-hospitalization transitional care. Most CHWs were included in the implementation of interventions ($n = 95$, 92%), followed by data collection ($n = 29$, 28%), and to a much lesser extent, study design ($n = 7$, 7%), data interpretation ($n = 5$, 5%), or dissemination ($n = 4$, 4%). Only 12 intervention studies (12%) included CHWs as authors on

Table 2 Quality assessment of included studies (*N* = 137)

Study Design Category	Number of Studies	Methodological Quality Criteria	Yes	No	CND
Qualitative studies	27	1.1 Is the qualitative approach appropriate to answer the research question?	26	0	1
		1.2 Are the qualitative data collection methods adequate to address the research question?	25	0	2
		1.3 Are the findings adequately derived from the data?	25	0	2
		1.4 Is the interpretation of results sufficiently substantiated by data?	25	0	2
		1.5 Is there coherence between qualitative data sources, collection, analysis and interpretation?	26	0	1
Quantitative Randomized Control Trials	27	2.1 Is randomization appropriately performed?	25	2	0
		2.2 Are the groups comparable at baseline?	22	5	0
		2.3 Are there complete outcome data?	24	1	2
		2.4 Are outcome assessors blinded to the intervention?	15	8	4
		2.5 Did the participants adhere to the assigned intervention?	20	4	3
Quantitative Non-Randomized Studies	35	3.1 Are the participants representative of the target population?	32	1	2
		3.2 Are measurements appropriate for the outcome and intervention?	33	1	1
		3.3 Is there complete outcome data?	30	2	3
		3.4 Are the confounders accounted for in design and analysis?	25	5	5
		3.5 During the study period, is the intervention administered as intended?	33	0	2
Quantitative Descriptive	34	4.1. Is the sampling strategy relevant to address the research question?	33	0	1
		4.2. Is the sample representative of the target population?	31	1	2
		4.3. Are the measurements appropriate?	34	0	0
		4.4. Is the risk of nonresponse bias low?	30	0	4
		4.5. Is the statistical analysis appropriate to answer the research question?	29	1	4
Mixed Methods Studies	13	5.1 Is there an adequate rationale for using a mixed methods design to address the research question?	12	1	0
		5.2 Are the different components of the study effectively integrated to answer the research question?	11	2	0
		5.3 Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	11	2	0
		5.4 Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	11	2	0
		5.5 Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	12	1	0

peer-reviewed publications, which was determined either by the article explicitly stating this within the affiliations and/or acknowledgements section or by cross-referencing publicly available information regarding the authors listed on the study. Of the intervention studies, approximately half reported improvement in at least one health outcome ($n = 51$, 49%). Refer to the Supplemental Table 1 here (https://osf.io/zvn85/) for a full list of intervent ion efficacy studies, outcomes included and significant results.

Workforce development studies

The second most common engagement reason was workforce development ($n = 32$, 24%). The vast majority of workforce development studies include CHWs as learners ($n = 29$, 90%). In these studies, AMIs developed specialized training materials for CHWs to learn about various health conditions (e.g., diabetes, cervical cancer, lupus, COVID-19), populations (e.g., perinatal patients, Indigenous communities, African Americans, Latinos) or settings (e.g., faith-based communities, virtual care, Medicaid managed care).

Only three studies incorporated CHWs into resident or medical student training ($n = 3$, 12%). Of the studies that focused on residents, medical students and other professionals as learners ($n = 3$, 12%), only one study included CHWs as instructors [46]. One study embedded CHWs within a medical education "learning experience" within a free clinic care team, but the CHW was not responsible for directly instructing, training or supervising the medical students [47]. The other study trained medical students to perform patient navigation skills alongside CHWs, but CHWs were not explicitly included as instructors [48]. Among workforce development studies, 8 (24%) included a CHW as an author on the publication.

CBPR studies

The least common engagement reason was to support CBPR efforts, projects or studies ($n = 24$, 18%). CHWs played important roles in CBPR studies: providing support with community engagement, participant recruitment, conducting needs assessments, and serving on community advisory boards. While CBPR emphasizes the importance of community involvement across the

Table 3 Studies by engagement type and outcome (*N* = 136)

Intervention Implementation and/or Evaluation (n = 104)	Workforce Development (n = 32)	CBPR (n = 24)
•Process outcomes (45) •Healthcare utilization (39) •Patient-reported outcomes (36) •Qualitative outcomes (32) •Health outcomes (22) •Healthcare costs (12) •Program or CHW costs (6)	•Process outcomes (18) •Qualitative outcomes (13) •Training or education outcomes (7) •Patient-reported outcomes (6) •Program, CHW or healthcare costs (4) •Healthcare utilization (2)	•Process outcomes (13) •Qualitative outcomes (12) •Patient-reported outcomes (5) •Health outcomes (2) •Healthcare utilization (1) •Healthcare costs (1)

study process, most studies included CHWs in data collection ($n = 13$) and implementation ($n = 16$), but rarely with study design ($n = 2$), data interpretation ($n = 1$) or dissemination ($n = 2$). Further, only 4 (17%) of the CBPR studies included CHWs as authors on publications.

Outcomes

All studies reported at least one outcome. Across the different engagement types (refer to Table 3), process or implementation outcomes were the most commonly reported ($n = 61/136$, 45%) such as number of patients contacted, screened, enrolled or retained in the intervention.

Studies that focused on intervention implementation and/or evaluation tended to report healthcare utilization ($n = 29$), patient-reported outcomes ($n = 26$) and health outcomes ($n = 19$) and to a lesser extent healthcare costs ($n = 9$) and program costs ($n = 4$). Common healthcare utilization measures included length of hospital stay, hospital readmission, ED readmission, and primary care utilization. Common patient-reported outcomes included health-related quality of life, mental health, patient satisfaction, self-efficacy and self-confidence. Common health outcomes included glycemic control (HbA1c), blood pressure and BMI. Studies that focused on workforce development tended to report process outcomes ($n = 18$), qualitative outcomes ($n = 13$) and training outcomes ($n = 7$), and CBPR studies followed a similar trend.

Discussion

Our systematic review highlighted that CHWs contribute to AMI's tripartite mission and preventive medicine efforts, including addressing health disparities and improving patient outcomes through education, health promotion, and system navigation. Prior reviews have explored the role of CHWs in managed Medicaid and research more broadly, yet it still needs to be clarified to what extent and capacity AMIs are specifically engaging with CHWs. We provide evidence that AMIs evaluate and implement CHW interventions, provide training and workforce development to CHWs, and collaborate in community engagement. However, it is still unclear how these decisions are made, whether CHW preferences are considered and whether AMIs are learning from CHWs to better inform their own community engagement and health care delivery strategies.

AMIs seem to play an important role in incorporating CHWs into healthcare delivery systems as well as evaluating CHW intervention efficacy through implementation studies and more rigorously designed studies like RCTs. Based on the findings from this review, CHWs engaged predominantly in intervention implementation, with their background and lived experience identified as an asset in patient care and prevention. CHWs often supported recruitment, outreach, and intervention delivery within AMIs, as they have directly experienced or witnessed the challenges communities face in accessing care. Leveraging the diverse experiences of CHWs, as well as the trust built by CHWs with medically underserved populations, could support AMI's reach and impact.

AMIs also played an important role in sustaining CHW workforce development through CHW certification and specialized training in health conditions [28, 32]. However, a gap that we noticed in workforce development studies was the lack of incorporating CHW expertise and knowledge into medical student and resident education. The vast majority of workforce development studies included CHWs as learners, and the few that focused on medical students and residents included CHWs as care team members or referral resources rather than instructors, facilitators or supervisors.

Contrary to a previous review that found CHWs were mostly involved in CBPR focused research, our review identified CBPR as the least likely reason for AMI/CHW engagement, and found that CHWs were most involved in recruitment or intervention implementation [49]. This was evident not only in the limited involvement of CHWs in research design, but a lack of reported CHW involvement with data analysis and dissemination. Only 21 studies (15%) included CHWs as authors; this was only marginally better for publications that explicitly used a CBPR approach (17%). Therefore, our findings suggest that AMIs should provide broader research and evaluation opportunities to CHWs across the research process, particularly at the beginning during the design phase or at the end during the analysis and dissemination phase. Moreover, research and evaluation are core CHW competencies and CHW leaders and allies in the field have encouraged more intentional and explicit involvement of CHWs such as the CHW Common Indicator Project [50, 51].

This review revealed that the majority of studies were conducted with Latino populations, consistent with the origins of CHWs or p*romotores de salud*, in low-resource settings throughout Latin America [52]. However, studies inadequately reported the ethnic and racial identities of the populations served, and the demographics of the CHW. This inconsistent reporting of demographics limits our ability to understand for whom CHW interventions work best, and best practices for cultural adaptation. Further, lack of attention to CHW background and experiences with the community served is concerning as it is central to reducing health disparities of medically underserved populations [1].

Implications for research, practice and training

As members embedded in the communities being served, CHWs can provide crucial insights on the development and implementation of prevention and intervention efforts, with a particular focus on feasibility and acceptability. Moreover, communities can experience research fatigue, without seeing a clear benefit of research in the community [53, 54]. Therefore, CHWs can assist not only with the community dissemination of research findings, but also the translation of research into practice and policy level efforts. The inclusion of CHWs in research and policy could improve the retention of CHWs in AMIs through sustainable workforce development and leadership opportunities [55].

These findings also suggest that while CHWs are providing crucial support to preventive medicine and community outreach, the quality of the engagement, particularly related to partnership and equity, requires further consideration. Due to the demonstrated effectiveness of CHWs in addressing the social determinants of health, moving from engagement to partnership is crucial for AMIs to meet their tripartite mission. CHW involvement in medical education is key for grounding students in social determinants of health and coordinated care, and this was a major gap in the current literature. Healthcare system factors such as inadequate or unsustainable funding severely limit the quality of CHW and AMI partnerships [56]. It also raises concerns about whether CHWs are adequately recognized for their importance or compensated equitably within a system that largely does not compensate for CHW services [25].

[1, 52] In terms of intervention implementation and evaluation, AMIs can better design, plan and implement health equity efforts by leveraging CHWs as assets across all phases of intervention research [50]. CHWs leverage the trust, community knowledge and lived experience to positively impact the design, implementation and evaluation of research. Moreover, CHWs are projected to grow at a rate of 11% by 2034, much faster than other cadres of the healthcare workforce [57]. As the CHW workforce grows, diverse stakeholders such as health departments and community-based organizations will need to be included in the design and implementation of innovative models of care to best address health inequities. AMIs are central to innovation in healthcare and are dedicated to service, making them well-positioned to support collaborative approaches with CHWs and provide the administrative support to evaluate their effectiveness in addressing health inequities [12, 58–60].

While many studies demonstrated promising advancements in integrating CHWs across research, practice and education within AMIs, there are still implementation challenges at a local level that future studies should consider. First, CHW certification eligibility varies on a state-by-state basis, with 23 states offering certification and 14 being in progress. Second, only 29 states have incorporated CHW services into Medicaid reimbursement [61, 62]. Future studies should address the myriad of challenges facing AMIs that engage with CHWs, particularly those related to professional development and sustainability. Additionally, in order to transition from AMI and CHW engagement to equitable partnership, AMIs need to develop sustainable career paths for CHWs [55]. While our current healthcare and public health infrastructure is primarily limited to a fee-for-service, reimbursement-based system, moving towards value-based payment models that incentivize population health metrics and outcomes could benefit patients, communities and CHWs alike. Therefore, AMIs should support CHW workforce development and CHW sustainability efforts through advocating for pay equity and reimbursement structures.

Strengths & limitations

A first limitation of this study is the inclusion of descriptive studies; therefore, we assessed the overall quality of included studies. More rigorous research is warranted on the effectiveness and cost-effectiveness of CHW interventions within AMIs such as a meta-analysis with RCTs. Second, we kept our search terms narrowly focused on variations of CHW (e.g., promotora, community health representative and patient navigator) to reflect the terms predominantly used in healthcare settings. However, by excluding more general terms like peer navigator or health coach, we may have inadvertently excluded relevant literature. Third, this review excluded studies outside of the US. However, there are many international studies that could provide further evidence regarding the relationship between academic medicine and the global CHW workforce. Fourth, using 2010 as a cutoff point due to the ACA implementation means that we may have excluded earlier studies relevant to our search.

Finally, the review may be limited by publication bias whereby the work of CHWs may not be accurately

represented by the literature that has been published. Moreover, the distribution of study types we observed may also reflect publication bias. Intervention and efficacy studies are more likely to receive funding, be completed within academic timelines, and be accepted for publication, which may inflate their representation in the peer-reviewed literature as showcased in Table 3. Conversely, implementation, demonstration and CBPR studies may be underpublished despite being conducted within AMI settings. Similarly, we were only able to report whether a CHW was an author or part of the dissemination and publication of a study if it was reported within the paper via affiliations and/or acknowledgements or by cross-referencing all author details with publicly available information on organizational or institutional websites or professional websites like LinkedIn. Therefore, the authorship data we report may not fully reflect the contributions made by CHWs on the included studies.

Despite the limitations of our review, there are strengths to highlight. This is the first systematic review, to our knowledge, that has described how AMIs are engaging the CHW workforce. As the US healthcare system continues to address persistent health disparities, it is essential to integrate CHWs, who are trusted and culturally aligned with the populations served. Second, our research team included CHWs across the entire project, from conceptualization, data extraction, interpretation and writing. This was particularly important during the search strategy phase, where we wanted to be inclusive of CHWs even if that exact term was not used. Therefore, we decided to include the term "patient navigator" as it is often used to describe CHWs within AMI settings. With CHW guidance, we then decided to independently confirm that patient navigators shared a cultural or linguistic identity with the population served and met at least 3 of the 10 CHW core competencies [30]. Third, our systematic review provides a useful synthesis for policymakers, public health professionals, health systems and AMIs that want to increase and improve CHW implementation and integration. Finally, we utilized a rigorous systematic search and data extraction strategy to create a comprehensive and novel summary of findings [40, 42].

Conclusions

The inequitable distribution of resources for medically underserved populations remains a major contributor to persistent health disparities in the U.S. CHWs provide expertise in community engagement, health promotion, and system navigation for these communities. This review highlights that CHW interventions can improve patient health outcomes, reduce unnecessary healthcare utilization, and have the potential to reduce health inequities at the population level. Our review demonstrates the important role that AMIs play in engaging with CHW workforce development, training, and sustainability. Moreover, CHWs could ensure that community engagement is incorporated across the tripartite mission of education, clinical care, and research.

As CHWs are further integrated into healthcare systems, it is essential that their services are integrated into standard healthcare reimbursement systems and value-based reimbursement systems are encouraged to ensure sustainability and community trust. Their expertise in community health is crucial to successfully implementing and translating interventions into community settings. While CHWs form the bedrock of community trust and engagement with healthcare systems, AMIs are the vanguard to healthcare delivery and innovation; therefore, equitable CHW and AMI partnerships could not only improve our healthcare system but transform it beyond its current structure to be more responsive and compassionate.

Supplementary information

The online version contains supplementary material available at https://doi.org/10.1186/s12939-026-02770-w.

Supplementary Material 1

Acknowledgements

Not applicable.

Authors' contributions

All authors reviewed and approved the final manuscript. Please see below for a detailed CRediT statement. Liana Petruzzi, PhD, MSW: Conceptualization, Methodology, Data Curation, Formal Analysis, Visualization, Writing – Original Draft, Supervision, Project Administration. Akhil Mandalapu, BS: Conceptualization, Data Curation, Formal Analysis, Visualization, Writing – Original Draft. Bruce Mang, BSA: Data Curation, Formal Analysis, Writing – Review & Editing, Visualization. Eric Quan, BSA: Data Curation, Formal Analysis, Writing – Review & Editing, Visualization. Imelda Vetter, MLIS: Methodology, Validation, Software, Writing – Review & Editing. Joshua Collier, BA, CHW: Conceptualization, Methodology, Writing – Review & Editing. Ricardo Garay, BA, CHW: Conceptualization, Methodology, Writing – Review & Editing. Rishit Yokananth: Data Curation, Formal Analysis, Writing – Review & Editing, Visualization. Carmen R. Valdez, PhD: Writing – Review & Editing, Supervision. Rebecca Cook, MD, MSc: Conceptualization, Methodology, Writing – Review & Editing, Supervision. Tim Mercer, MD, MPH: Conceptualization, Methodology, Writing – Review & Editing, Supervision.

Funding

There is no funding to disclose.

Data availability

The complete search strategy and bibliography of included studies is available in the Open Science Framework repository: https://osf.io/zvn85/.

Declarations

Ethics approval and consent to participate

Since this systematic review did not involve human participants or the collection of identifiable personal data, IRB approval was not required.

Consent for publication

Not applicable.

Competing interests
The authors declare no competing interests.

Received: 10 November 2025 / Accepted: 19 January 2026
Published online: 04 February 2026

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