

RESEARCH

Open Access



# Implementing and monitoring high-quality community health worker care in adult primary care at New York City Health + Hospitals

Jenifer Clapp<sup>1\*</sup>, Alessandra Calvo-Friedman<sup>1,2</sup>, Yuan Jin Tan<sup>1</sup>, Samantha Lily Kumar<sup>1</sup>, Jenna Lupi<sup>1</sup>, David Conley<sup>1</sup>, Evelyn Perdomo<sup>1</sup> and Nichola J. Davis<sup>3</sup>

## Abstract

**Background** This study describes how New York City (NYC) Health + Hospitals implemented a large-scale Community Health Worker (CHW) program in adult primary care clinics between January 2022 and December 2023 and established metrics to monitor program implementation. This study is timely as healthcare systems consider how to scale high-quality CHW programs.

**Methods** We collected metrics in the following areas: (1) Workforce demographics, team structure, and training; (2) Enrolled patient demographics; (3) Patient-centered metrics, such as patient counts (e.g. patients outreached and enrolled) and engagement (e.g. median time in program, caseloads per CHW), and goals (e.g. median number of goals identified and completed). Metrics are based on standard data elements captured through CHW documentation in the electronic health record collected during program implementation. Data cleaning is completed using SQL queries and R scripts.

**Results** In June 2023, there were a total of 97 CHW and 22 CHW Supervisor staff lines in adult primary care across 17 healthcare sites. There were 4.6 CHWs to 1 CHW supervisor on average though this ranged by facility from 1:1 to 1:6. Compared to the population that receives primary care at NYC H + H, CHWs served more African American/Black patients (40% vs. 32%) and an older patient population (35% older than 65 vs. 21% older than 65). From January 2022 to December 2023, 13,812 patients were outreached by CHWs. Of these, 9,069 (66%) were referred by clinicians, 7,331 (53%) were enrolled, and 5,044 (37%) successfully graduated. The median number of goals identified by patients was four, and the median number of goals completed with a CHW per patient was three. The top three goals were primary care engagement (47%), specialty care engagement (46%), and food insecurity (45%).

**Conclusion** Establishing clear implementation and process metrics helps to ensure that CHWs embedded in health systems can meaningfully engage adult patients in health care, address patient-centered goals, and connect patients to community and government services.

\*Correspondence:  
Jenifer Clapp  
clappj@nychhc.org

Full list of author information is available at the end of the article



© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

**Keywords** Community health workers, Social determinants of health, Ambulatory care, Population health, Quality improvement, Safety net hospitals

## Background

Integrating Community Health Workers (CHWs) into healthcare is a promising approach to addressing patients' social needs and improving engagement with healthcare [1–3]. New York City Health+Hospitals (NYC H+H) is the largest safety net system in the United States and provides essential care to approximately one million New Yorkers annually. In September 2021, NYC H+H leveraged federal stimulus funding to establish the “Public Health Corps,” a workforce of Community Health Workers (CHWs) to care for a patient population disproportionately affected by the COVID-19 pandemic. Approximately 250 CHWs and CHW supervisors were hired to provide patient-centered care in outpatient care settings, almost half of whom work in adult primary care. There are many standardized measures available to monitor CHW performance, such as the number of people served, number of referrals made by CHWs, and patient health outcomes [4, 5]. However, little has been written about how to use metrics to support the implementation of a sophisticated high-quality CHW program embedded in a healthcare setting. This study describes how NYC H+H established a CHW program in adult primary care during its first two years and the metrics used to monitor implementation.

## Methods

### Organizational structure

NYC H+H has an integrated network of more than 70 hospitals, community-based health centers, long-term care and rehabilitation facilities, home care services, and correctional health services. The population health team in NYC H+H's central office allocated CHWs to all 11 full-service hospitals and 6 large community health centers that provide primary healthcare services in high-need neighborhoods (“sites”). CHW staff were distributed to adult primary care clinics based on projections of patient volume and numbers of patients with uncontrolled chronic illnesses.

Ambulatory Care Chiefs at each site were allotted staff lines for CHWs, CHW Supervisor(s), and a Program Manager on the condition that they implemented a standardized program model and assigned a Primary Care Provider (PCP) or Social Worker as clinical lead. The clinical lead established local workflows and was the primary point of contact for clinical matters. The target was for Program Managers to supervise 2–5 CHW Supervisors and CHW Supervisors to supervise 5–8 CHWs. The population health team led by the Chief Population Health Officer provides system-wide support (see Fig. 1).

The population health team met with the Ambulatory Care Chiefs to develop the organizational structure, intervention, and eligibility criteria. The Ambulatory Care Chiefs preferred to embed CHWs in their teams rather than an external team to allow for convenient referral pathways, stronger communication, and recruitment of staff with lived experience relevant to their clinic's patients. The matrixed reporting structure allowed for standardization and quality control across the health system, while tailoring to local clinical workflows and patient needs.

### The workforce

The population health team created universal job descriptions to ensure consistent qualifications and responsibilities for all staff lines. At least one-year of experience doing paid community work was required per a union requirement, which sometimes excluded promising applicants. Upon hire, CHWs received a 9-day virtual training from IMPaCT. CHWs did not implement the IMPaCT model, but the training was comprehensive, scalable, and covered core competencies such as patient-centered goal-setting. The population health team provided significant supplemental training on how to document in the electronic medical record, Epic, and assist patients with medical system navigation, chronic disease risk factor management, and social needs. A team of experienced CHWs provided targeted coaching on implementation strategies and individual skill building such as how to communicate professionally by email.

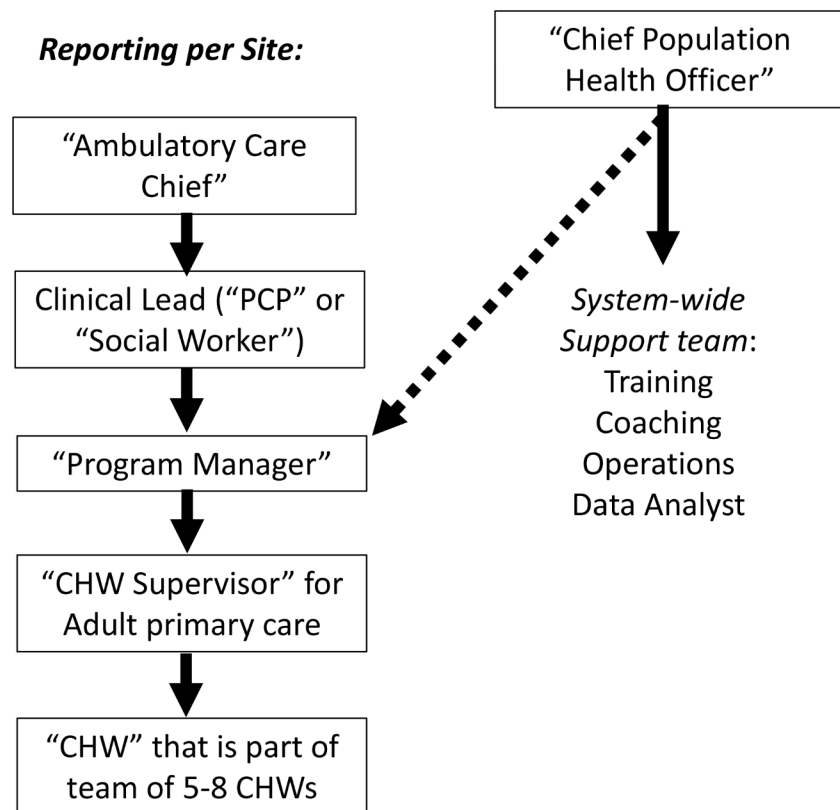
### Implementation strategies

To work with a CHW, a patient must be an established primary care patient, have two or more chronic medical issues, not be enrolled in another intensive care coordination program, and not reside in a long-term care facility. Primary care clinicians referred patients to CHWs. CHWs also conducted proactive outreach to patients identified as high-priority, such as patients with uncontrolled chronic medical conditions.

CHW Supervisors reviewed referrals for eligibility and assigned CHWs to patients based on caseloads and language preference. CHWs then contacted the patient to offer enrollment. Once enrolled, CHWs conducted a semi-structured interview, lasting 30 to 90 min, to learn about the patient's life, health and wellbeing challenges, and protective factors. CHWs and patients set goals and developed plans together. CHWs focused on the root cause of the patients' health priorities. For example, some patients with uncontrolled diabetes described limited

**Sites include:**

*Bellevue Hospital*  
*Elmhurst Hospital*  
*Harlem Hospital*  
*Jacobi Hospital*  
*Kings Hospital*  
*Lincoln Hospital*  
*Metropolitan Hospital*  
*North Central Bronx Hospital*  
*South Brooklyn Hospital*  
*Queens Hospital*  
*Woodhull Hospital*  
*Belvis Health Center*  
*Cumberland Health Center*  
*East New York Health Center*  
*Gouverneur Health Center*  
*Morrisania Health Center*  
*Sydenham Health Center*

**Reporting per Site:**

**Fig. 1** CHW reporting structure

food as a barrier to dietary adherence; the CHWs prioritize food insecurity.

CHWs accompanied patients to healthcare and community appointments and referred patients to healthcare-based programs, such as financial counselors, and to local, culturally appropriate community partners. CHWs conducted patient home visits, beginning in August 2022. CHWs worked with patients for approximately three months. The program could end sooner if patient goals had been completed or extended by two weeks at a time for up to one month if goals were not completed. Upon graduation, patients received a packet describing the goals achieved, important contacts, next steps, and upcoming appointments.

**Metrics and data analysis**

The population health team developed standardized tools in Epic used by all sites, including the referral to CHWs and the CHW documentation templates. CHWs completed documentation on patient encounters in structured fields in Epic's care management platform, Compass Rose. Data from Epic were aggregated, cleaned, and analyzed using R and SQL before being made available on a Tableau dashboard (See Fig. 2). The dashboard enabled program staff to visualize key metrics by month and by site. Patient demographics were included in a

secondary tab of the dashboard to ensure equitable access and outcomes. The population health team met regularly with clinical leads, Program Managers and CHW staff to provide recommendations to improve implementation, plan quality improvement efforts, and offer technical assistance informed by these metrics.

Data on demographics of the Public Health Corps workforce of 250 CHWs and Supervisors were self-reported by staff through submission of an onboarding questionnaire to Human Resources upon hire. This information was analyzed by the population health team annually, including in June 2023, to ensure that CHWs were recruited from communities served. Other workforce data including training completed and retention metrics were tracked on Excel spreadsheets by the population health team on a monthly basis.

Descriptive statistics examined include (1) Workforce metrics (e.g. workforce sex; ethnicity; zip code of residence; size of workforce; ratio of supervisors to CHWs; workforce retention and vacancy rates; time until initial foundational training); (2) Enrolled patient demographics (e.g. patient age; sex; race/ethnicity; language group; insurance type); (3) Patient-centered metrics outlined in Table 1.

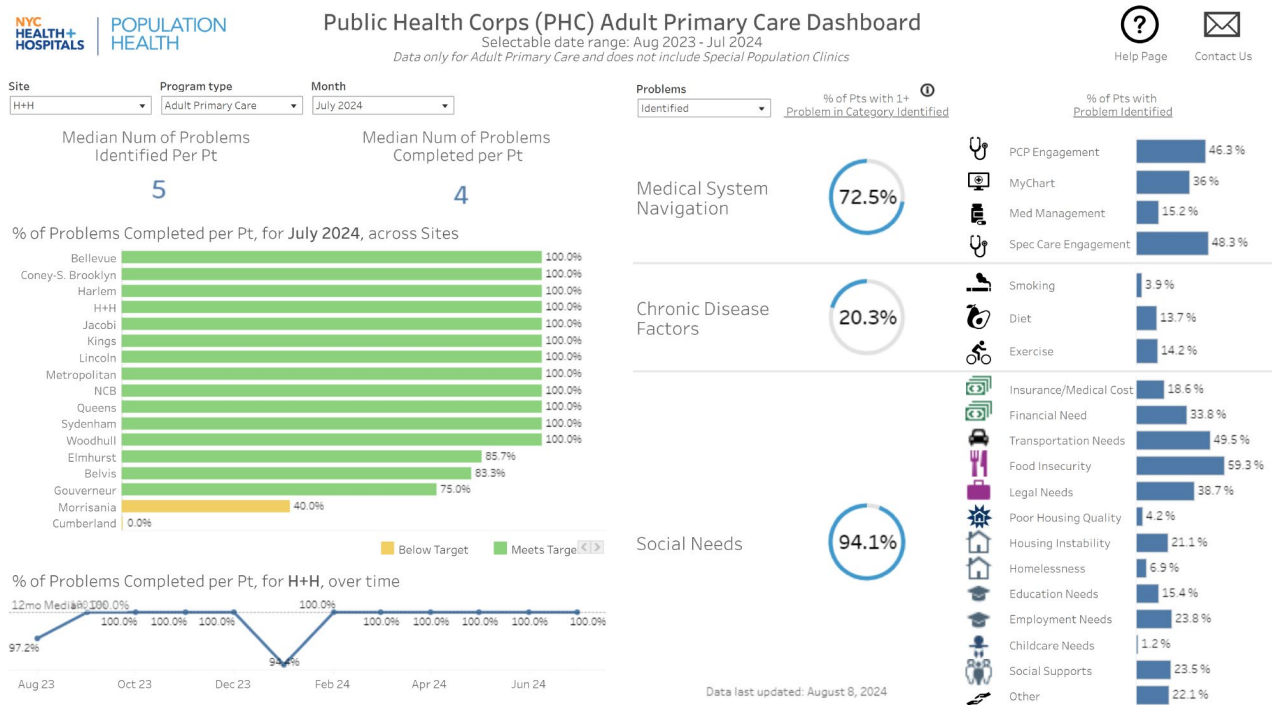


Fig. 2 Public Health Corps adult primary care data dashboard

Table 1 Definitions of patient-centered metrics

Metric	Definition
Number of referrals to CHWs	Patients referred to CHWs by primary care team members.
Number of outreached patients	Patients proactively contacted by CHWs to offer program enrollment.
Number of enrolled patients	Patients who agreed to work with a CHW.
Number of patients that complete the program	Patients who completed their work with CHWs for any reason, including graduations, dis-enrollments, lost to follow up, and deceased patients; patients who were previously enrolled but do not have a completion reason documented are excluded (often a documentation error).
Number of patients that graduate the program	Patients who completed their identified goals and were graduated by CHW.
Median time in program	Duration of time that CHWs and patients worked together. The target was 3 months.
Average number of encounters per patient per CHW	Total number of telephonic and in-person meetings between the patient and CHW during enrollment. The target was 12 (one time per week over 3 months).
Average caseload per CHW	Number of patients whom CHW worked with at one time. The target was 15–20 patients per CHW.
Rate of home visits completed	CHWs offered all patients a home visit; the expectation was that home visits were completed with at least 35% of all enrolled patients.
Number of goals identified	Goals identified to work on by the patient and CHW.
Number of goals completed	Goals that the patient and CHW completed (successfully addressed).
Nature of patient goal	CHWs worked with patients on over 20 specific issues that span social needs and supports, medical system navigation, medication management, and chronic disease risk factors.

**Results**

**The workforce**

From January 2022 to December 2023, there was significant hiring of the CHW workforce. In June, 2023 there were a total of 97 CHWs and 22 CHW supervisor lines across 17 sites. On average, teams had 6 CHWs (range from 1 to 10) and an average ratio of CHW to supervisor of 4.6:1 (range 1:1 to 1:6). The retention rate that month was 97.22%. The demographics of the Public Health Corps workforce were 79.9% Female and 20.1% Male;

26.9% Hispanic/Latinx, 54.6% Black/African American, 10.1% Asian/Pacific Islander, 6.5% White, 1.9% Other. Many staff resided in the same zip codes as NYC H+H sites (30.4%) and/or zip codes identified as having a disproportionately high burden of health and socioeconomic disparities (50.8%).

From January 2022 to December 2023, 100% of CHWs and CHW supervisors received intensive training within two months of hire.

### Enrolled patient demographics

Table 2 highlights the demographic characteristics of patients enrolled in contrast to all H+H primary care patients. Compared to the overall primary care population CHWs served more African American/Black patients (40% vs. 32%) and an overall older patient population (35% older than 65 vs. 21% older than 65).

**Table 2** Demographic characteristics of CHW-enrolled and other primary care patients in 2022 or 2023

Demographic Characteristics	CHW-Enrolled Patients (n=7331)	Patients who had at least 1 primary care visit at NYC H+H in 12 months (n=364285)
SEX		
Male	38.1% (2796)	42% (152978)
Female	54.8% (4021)	58% (211307)
Missing Sex	7% (514)	0% (0)
AGE		
18–44 years old	15.1% (1109)	39.6% (144431)
45–64 years old	42.6% (3122)	39.2% (142702)
65–80 years old	29.9% (2193)	17.9% (65217)
81 + years old	5.4% (393)	3.3% (11935)
Missing Age	7% (514)	0% (0)
RACE/ETHNICITY		
Asian/Native Hawaiian/Pacific Islander	5.7% (416)	6.2% (22595)
Black or African American	40.2% (2946)	31.5% (114577)
Hispanic/Latinx	40.9% (3001)	46.4% (169079)
Native American/Alaskan Native	0.3% (22)	0.3% (1101)
Other	8.2% (603)	8.6% (31395)
Two or more races	0.2% (17)	0.2% (761)
Choose not to disclose	1.1% (81)	1.5% (5490)
White	3.3% (245)	5.3% (19287)
Missing Race/Ethnicity	0% (0)	0% (0)
LANGUAGE GROUP		
Bengali	1.2% (87)	0.9% (3323)
English	58.5% (4288)	54.9% (200002)
French	0.9% (64)	1.1% (4098)
Mandarin Chinese	0.5% (36)	0.7% (2578)
Other	4.6% (340)	5% (18056)
Russian	0.4% (32)	0.8% (3078)
Spanish	33.9% (2484)	36.5% (133121)
Missing Language Group	0% (0)	0% (29)
PRIMARY PAYER		
Commercial	8.8% (647)	19.3% (70368)
Medicaid	6.9% (506)	2.8% (10252)
Medicaid Managed Care	23.4% (1714)	27.4% (99708)
Medicare	6.2% (457)	3.1% (11451)
Medicare Managed Care	22.8% (1671)	12.6% (45990)
Self-Pay	31.5% (2309)	34% (123839)
Other	0.4% (27)	0.7% (2677)
Missing Primary Payer	0% (0)	0% (0)

### Patient-Centered metrics

From January 2022 to December 2023, 9,069 patients were referred to CHWs by a clinician and 4,743 were engaged through outreach calls. Of the 13,812 patients referred or outreached, 7,331 were enrolled. There was a higher rate of enrollment among patients who were referred by a provider (62%) than those engaged through outreach (39%). Of the patients enrolled, 5,901 (80%) completed the program by the end of December 2023. Of the patients completed, 5,044 (85%) successfully graduated.

Of the 5901 patients who completed the program, the median time spent in the program was 13 weeks. The median number of encounters completed with a CHW was 13; 427 (7%) of completed patients had more than 20 encounters with CHWs and 435 (7%) patients were re-referred back to the program after graduation.

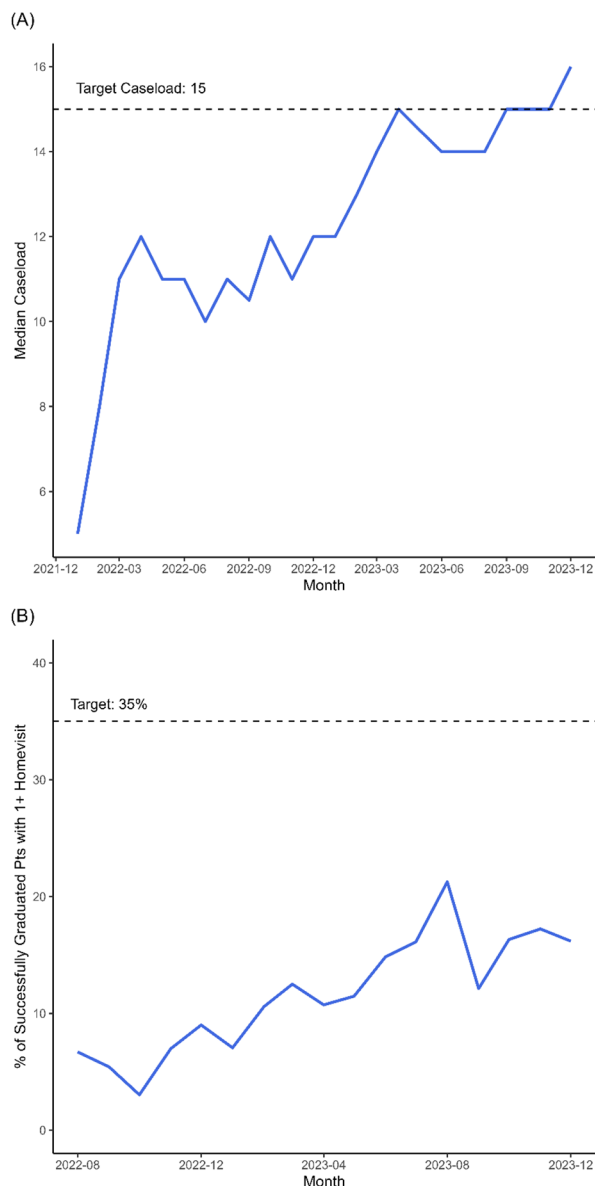
The target median caseload of 15 was achieved by September 2023 (see Fig. 3). At the end of December 2023, the median caseload was 15.5. Across all sites, the average number of patients with a completed home visit in December 2023 was 16%.

The median number of goals identified by patients was four, and the median number of goals completed per patient was three. Table 3 describes the nature of the most prevalent goals.

### Conclusions

A standardized model with clear metrics supported the implementation of a CHW program in NYC H+H adult primary care clinics during its first two years. Consistent with Agarwal et al., our metrics included measures to assess implementation including recruitment, training and supervision [5]. Having CHWs document in Epic in a structured template provided data to monitor programmatic implementation.

Some metrics pointed to positive program performance. CHWs predominantly were residents of low-income neighborhoods, which reflects the goal to hire staff reflective of patient communities. The majority of patients engaged by CHWs were referred by providers, indicating that CHWs were integrated members of primary care teams. CHWs implemented the program effectively by enrolling over half of the patients outreached and successfully graduating 85% of patients. Other metrics surfaced opportunities for improvement. For example, achieving the caseload target was a challenge, in part because referrals can be inconsistent or CHW outreach was unsuccessful. In response, the population health team promoted the program among providers, developed strategies to use proactive outreach to supplement provider referrals, and coached CHWs on outreach skills. By September 2023, the target median caseload was met. Meeting home visit targets was also a challenge.



**Fig. 3** Month by month trends for median caseload and home visits. Legend: Panel **A** shows the month by month trend from January 2022 to December 2023 and Panel **B** shows the month by month trend from August 2022 to December 2023 for median caseload and home visits respectively

The population health team provided intensive coaching on how to offer and conduct a home visit. The percentage of patients with a home visit increased over time but remained below target.

This study has several limitations. We could not provide details on how social needs were met due to the complexity of the social services sector or patient satisfaction with CHW care. Additional research will be conducted to measure impacts of this CHW model on healthcare utilization, health outcomes, and social outcomes. However, this study demonstrates how relevant, meaningful and feasible metrics can be established to

**Table 3** Prevalence of goals identified for CHW-enrolled patients

Goals Identified	CHW-Enrolled Patients (n = 7331)
PCP Engagement	46.9% (3436)
Specialty Care Engagement	46.3% (3393)
Food Insecurity	45.3% (3321)
Transportation Needs	34.8% (2554)
MyChart Activation	31.2% (2284)
Legal Needs	29.2% (2139)
Financial Insecurity	28.9% (2122)
Medication Management	28.3% (2078)
Social Supports	26.8% (1967)
Other	24.5% (1795)
Insurance/Medical Cost	22.9% (1676)
Housing Insecurity	22.6% (1660)
Diet	15.4% (1130)
Employment	14.5% (1066)
Exercise	12.8% (939)
Education	10.3% (756)
Homelessness	5.2% (378)
Housing Quality	4.6% (339)
Smoking	1.9% (138)
Childcare	1.4% (104)

monitor a healthcare-embedded CHW program. It is timely as more healthcare systems consider how to scale quality CHW programs and policymakers promote CHW care, including through reimbursement [6].

**Acknowledgements**

The authors would like to acknowledge the contribution of Emily Foote, Natalie Pierre-Noel, and Charlotte Brookover to the design of the work described in this study.

**Author contributions**

JC made a substantial contribution to designing and drafting the work. AC-F made a substantial contribution to designing and revising the work. YJT made a substantial contribution to the acquisition, analysis, and interpretation of data. SLK made a substantial contribution to the acquisition, analysis, and interpretation of data. JL made a substantial contribution to the design of the work. DC made a substantial contribution to the design of the work. EP made a substantial contribute to the design of the work. ND made a substantial contribution to the conception and revision of the work. All authors approved the submission version and agreed both to be personally accountable for the author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work, even ones in which the author was not personally involved, are appropriately investigated, resolved, and the resolution documented in the literature.

**Funding**

There are no sources of funding to report.

**Data availability**

The datasets generated and analyzed during the current study are not available because they are based on electronic medical records and subject to patient privacy laws.

**Declarations**

**Ethics approval and consent to participate**

The authors considered all applicable Federal, State, and local laws and regulations that govern research as well as the ethical principles found in the Belmont Report. The need for IRB approval and/or consent was deemed

unnecessary, per 45 CFR part 46. Data was collected and analyzed for quality improvement and do not satisfy the definition of "research" under 45 CFR 46.102(d). HHS regulations for the protection of human subjects do not apply to this type of quality improvement activity, and there is no requirement under these regulations for this analysis to undergo review by an IRB or for these activities to be conducted with provider or patient informed consent.

#### Consent for publication

Not Applicable.

#### Competing interests

The authors declare no competing interests.

#### Author details

<sup>1</sup>Office of Ambulatory Care & Population Health, NYC Health + Hospitals, New York City, NY, United States of America

<sup>2</sup>Department of General Internal Medicine, NYU School of Medicine, New York City, NY, United States of America

<sup>3</sup>Department of Population Health, NYU School of Medicine, New York City, NY, United States of America

Received: 13 May 2024 / Accepted: 12 August 2024

Published online: 02 September 2024

#### References

1. Kangovi S, Mitra N, Grande D, et al. Patient-centered community health worker intervention to improve posthospital outcomes: a randomized clinical trial. *JAMA Intern Med.* 2014;174(4):535–43. <https://doi.org/10.1001/jamainternmed.2013.14327>
2. Kangovi S, Mitra N, Grande D, et al. Community health worker support for disadvantaged patients with multiple chronic diseases: a randomized clinical trial. *Am J Public Health.* 2017;107:16601667. <https://doi.org/10.2105/AJPH.2017.303985>
3. Kangovi S, Mitra N, Norton L et al. Effect of community health worker support on clinical outcomes of low-income patients across primary care facilities: a randomized clinical trial. *JAMA Intern Med.* 2018;178(12):1635–43. <https://doi.org/10.10001/jamainternmed.2018.4630>
4. Rodela K, Wiggins N, Maes K, Campos-Dominguez T, Adewumi V, Jewell P, Mayfield-Johnson S. The community health worker (CHW) common indicators project: engaging CHWs in measurement to sustain the profession. *Front Public Health.* 2021;9:674858. <https://doi.org/10.3389/fpubh.2021.674858>
5. Agarwal S, Sripad P, Johnson C, et al. A conceptual framework for measuring community health workforce performance within primary health care systems. *Hum Resour Health.* 2019;17:86. <https://doi.org/10.1186/s12960-019-0422-0>
6. Shippy J, Tranchina M, Pawlak B, Woda S. Increasing Community Health Workers' role in supporting Medicaid members. 2023. Increasing Community Health Workers' role in supporting Medicaid members - Manatt, Phelps & Phillips, LLP. Accessed 13 May 2024.

#### Publisher's note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.