A Case Study of a Community Health Worker Program Located in Low-Income Housing in Richmond, Virginia

Iyabo Obasanjo1 · Monica Griffin2 · Alison Scott1 · Sarena Oberoi2 · Charles Westhoff2 · Patrice Shelton3 · Stephanie Toney3

Accepted: 2 December 2021 / Published online: 10 January 2022 © The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2021

Abstract
We reviewed data from the electronic health data system used by Community Health Workers (CHWs) in the Richmond/Henrico Health District of the Virginia Department of Health from January 1st 2013 to December 31st 2020, to map the Community Health Workers’ impact on Social Determinants of Health. We also interviewed the CHWs to obtain demographic information and information about the challenges their communities face. Most referrals were for Healthcare Access (48.7%) and Economic Stability (38.3%), while Neighborhood and Built Environment (0.09%) was the least used referral in the Social Determinants of Health during the time under review. Community Health Workers also carried out 1367 and 565 Blood Pressure and Blood Sugar measurements respectively during the period. The Community Health workers were all women and their education ranged from High School graduate to Master’s degree graduate and they served as Community Health Workers for time ranging from 1 to 8 years. We found their answers to the questions on the issue plaguing the community they serve to indicate empathy and understanding of the issues of low-income communities. Having CHWs working as part of the public health system to deliver health promotion and provide referrals for social determinants of health could serve as a model for improving health access and impacting Social Determinants of Health positively for low-income populations across the country.

Keywords Community health workers · Low-income housing · Health inequities · Social determinants of health

Introduction
The COVID-19 epidemic in the US made evident the issue of health inequities in the US, but this issue goes back to the founding of the country. As the pandemic evolved in the summer of 2020, it soon became obvious that there were higher disease rates and higher death rates from COVID-19 in minority populations [1]. These populations already suffer from higher level of disease burden [2] and any intervention that impacts social determinants of health in low income and minority populations would help alleviate the underlying conditions that lead to high disease burden and mortality in minority populations in general. Interventions would also reduce the death from opportunistic diseases like COVID-19 which tend to cause higher mortality in people with such underlying conditions. In Europe, Bartscher et al. [3] showed that increased social capital led to fewer COVID-19 rates and deaths and Community Health Workers have been shown to help poor and disenfranchised communities increase social capital by advocating for their communities and linking the residents in their communities to social services [4–6]. Ballard et al. [7] highlighted how Community Health Workers could be used effectively in the response against COVID-19 and gave examples of how they could be deployed such as distribution of PPE, distribution of home test kits, provision of information on testing and vaccination.

The use of CHWs in academic health centers and in rural communities and their integration into academic and other health facilities has been reviewed in the literature [8, 9], but there are few programs where CHWs are embedded into the public health system and focus on public housing residents.
There have been reports on the use of CHWs in public housing in NYC and Boston for periods lasting less than a year [10–12]. Our report examines a program in the Richmond/ Henrico Health District of Virginia in which CHWs have been embedded into low-income housing for 10 years. In this paper we provide the review of the data in the electronic health records for 7 years (2013 to 2020) from the Community Health Workers program in the Richmond/Henrico Health district of the Virginia Department of Health (VDH), where the CHWs work out of Resource Center offices in Low-Income Housing. Our goal is to map out the external resources that Community Health Workers link to the population they serve, and to begin to understand how CHWs influence factors that deprive low-income populations the social networks that inhibit their ability to thrive.

**Method**

We reviewed the data available in the electronic data recording system used by the CHWs called CareConnect®. Secondly, we interviewed 9 Community Health Workers who were former or current employees of the program. We obtained approval from William and Mary IRB and VDH IRB in December 2020 and May 2021 respectively, and then conducted the interviews between June 1st and August 30th of 2021. The interviews were conducted using Zoom and were taped and transcribed using the Zoom transcription application. Each CHW was invited to participate by email and when they accepted the invitation to participate in the study, they were sent an informed consent form through Docusign, and an interview date and time was scheduled. Demographic data from the interviews are presented in this report. The interviews were conducted by one of the researchers with one or 2 undergraduate research assistants and they took approximately 30 to 45 min via zoom. In this paper we report the demographic information of the CHWs and their answer to the question on the major challenge the community they serve faces.

**Results**

Figure 1, shows the location of the low-income housing communities served by the Community Health Worker program in the Richmond/Henrico Health district of Virginia.

There were 20,166 encounters with clients from January 1, 2013 to Dec 31st 2020, 17,580 were referrals and 2586 were vital signs taken. Table 1, shows the number of referral contacts per year. There were also 1367 Blood Pressure measurements and 565 were Blood sugar measurements carried out by CHWs during the same period. Table 2 shows the category of referrals used in the 7 years under review and the number of referrals for each. Employment/Self Sufficiency was the most used and the 3 top referrals for this category were: Help with Employment Application and Resume with 1,343 referrals, Referral to City Workforce Pipeline with 643 and Referral to Virginia Employment Commission with 110 referrals.

For the second highest referral category, Primary Care Physicians/Specialty, the highest referral was to Daily Planet Southside which is a Safety Net Clinic in the South of Richmond where few other primary care facilities welcome uninsured and underinsured individuals. Daily Planet Southside had 434 referrals within the period under consideration. Other referrals to Primary care providers was 440 referrals and there were 333 referrals to the Resource Center clinics located in the Low-income housing and have weekly visits by a Health Care provider, usually a nurse practitioner. For Housing/Rental Assistance the agency with the highest referral was the Caritas Furniture Bank which is associated with the Catholic church and clients are sent there to obtain furniture for low cost when they move in or need furniture. There were 247 referrals to the Richmond Redevelopment and Housing Authority Resident Assistance.

In Table 3, we map each referral category to one of the five Social Determinants of Health factors, and we found that majority of the referrals were for Healthcare Access and Economic Stability and together they made up a majority of the referrals at 87% of all referrals. Neighborhood and Built environment had the least referrals at 0.9%.

Table 4 shows the medical conditions noted in the client records and High Blood Pressure was the highest recorded condition at 47% of the recorded conditions. Table 5 shows insurance status of clients and the majority were either uninsured or on Medicaid. Majority at 65.5% were unemployed as shown in Table 6.

Nine Community Health Worker were interviewed, 7 were current CHWs in the Richmond/Henrico Health District and two were former CHWs in the Health District. Table 7, provides the demographic information on the Community Health Workers interviewed and their answers to the question of what was the biggest challenges their clients faced. The Community Health Workers were all women, and all were African-American, and one was both African American and Latina. They had served as CHWs for periods ranging from one year to 8 years and their education levels ranged from 3 with High School/GED, 3 with some College, 1 with an Associate’s degree, 1 with a College degree and 1 with a Master’s degree in Counselling. In response to the question on the biggest challenge their community face, the issue that came up most consistently from the CHWs was “Trust”. Many felt that having trust of the community members was the most important factor in their ability to help people in the community. The also articulated the myriad of issues that plague low-income communities ability to thrive.
Figure 2 is a diagrammatic depiction of the Community Health Workers as bridges to link low-income housing communities to external resources that improve their social capital and ability to thrive. From the data we found two main functions the Community Health Workers carry out: 1. They serve as bridges to external resources for the low-income housing residents in their communities and thus increase the social capital of individuals and the community as a whole; 2. They provide prevention health services and monitoring of health conditions by providing health checks such as High Blood Pressure measurements and Blood Sugar measurements.

**Discussion**

The necessity for including CHWs into the health care system for low-income communities has been provided by Pittman et al. (2015) and Lapidos et al. (2019), in that they serve poor, disenfranchised communities in ways the more formal health system cannot [13, 14]. MacCarville et al. (2021) found that CHWs integrated better with communities because they are more accessible to them and have relationships with members of the community and empathize and understand their living conditions [9].

McCullom et al., 2016 found in a review of publications on CHW programs that the programs improved equity in

Table 1 Number of referrals by Certified Community Health Workers per year

| Year | Number of referrals |
|------|---------------------|
| 2013 | 579                 |
| 2014 | 1641                |
| 2015 | 1558                |
| 2016 | 3929                |
| 2017 | 4047                |
| 2018 | 2738                |
| 2019 | 1853                |
| 2020 | 1235                |

There were 20,166 client contacts between Jan 1, 2013 and Dec 31, 2020 and 17,580 were referrals.
access to health promotion, disease prevention and use of curative services [6]. In our review of the client database, we found that employment assistance had the highest number of referrals. This is an important social determinant of health, and this intervention is important to getting people out of public housing especially since 65% of the clients were unemployed. When we grouped the referrals based on Social Determinants of Health, Healthcare access was the most referred category followed by Economic Stability which includes Employment assistance.

Kangovi et al. (2018) using CHWs in a population living in a high poverty neighborhood whose residents were mainly uninsured or publicly insured as in our data, showed that those who got CHW intervention to assist with management of their chronic health conditions, had improved mental health and less hospitalizations [5]. Our population in this study had 47% rate of High Blood Pressure diagnosis, followed by Depression/Anxiety at 17.5% and Obesity at 16% and the CHWs carried out 1367 blood pressure measurements and 565 blood sugar measurements during the 7-year period under review. Krantz et al. [4] showed that a CHW program in rural Colorado for Coronary Heart Disease (CHD) patients, had statistically more improvement in their CHD risk compared to those not using CHWs. We were not able to measure the direct impact of CHW on health risk since we only had retrospective data but CHWs provided the High Blood Pressure measurements and Blood Sugar measurements at no cost to clients, and it could be seen as an important intervention for a population with both high rates of High Blood Pressure and Diabetes.

Bowen et al. (2016), found that Community health workers with a minimum requirement of high school graduation or GED as in our study, working in public housing in Boston, were able to effectively deliver service, and the same group carried out a study that found residents of public housing in the Boston area accepted and had improvements in weight management, nutrition, and physical activity levels due Community Health Worker intervention [11, 12]. CHWs in our study used healthy lifestyle and nutrition referrals and exercise referrals. Given the high burden of diseases that could be intervened with healthy lifestyle, nutrition and exercise in the population, ways to increase outreach and programming in these areas in ways that would be adopted by community members could be examined.

A 3-month study in New York City Public Housing using Community Health Workers also found that they improved health care access and improved social determinants of health such as reducing food insecurity and improving ability to pay rent on time and improving access to exercise and exercising among residents [10]. In this study we could not determine the effects of specific interventions, but our next step is to interview clients of community health workers to determine how they view the interventions they received from the CHWs. We were able to show that it is possible to embed CHWs into the public health system specifically to serve low-income housing where there are severe effects of social determinants of health, on health outcomes and that such CHWs show empathy and understand the needs of their communities in ways outsiders would not be able to. We feel such interventions would be valuable towards reducing health inequities due to race and income.

The cost-effectiveness of using Community Health Workers has been demonstrated in several studies mainly because they reduce use of more expensive interventions such as emergency rooms and costly medical procedures by focusing on prevention [15–17]. The need to incorporate Community Health Workers into state healthcare systems has been highlighted as a way to improve quality of health care delivery and lower costs [18]. In this paper we show that the external linkages CHWs create are in the realm of the social determinants of health that would impact people

| Referral Category                        | # Referrals |
|-----------------------------------------|------------|
| Employment/Self-Sufficiency             | 2554       |
| Primary Care Physicians/Specialty       | 2340       |
| Housing/Rental Assistance               | 1658       |
| Utility, Food, and Clothing Assistance   | 1145       |
| Insurance Assistance                    | 1079       |
| Food—Clothing—Rent—Utility—Housing     | 1012       |
| Medical Specialty—Other Health          | 846        |
| Pregnancy                               | 842        |
| Education                               | 811        |
| Healthy Lifestyle/Nutrition             | 779        |
| Medical Home                            | 646        |
| Mental Health/Domestic Violence/Substance Abuse | 640    |
| Women’s Health                          | 600        |
| Maternal and Child Health               | 393        |
| Dental                                  | 373        |
| Leadership and Self-Sufficiency         | 357        |
| Seasonal/Specialty Event                | 304        |
| Legal Aid                               | 300        |
| Department of Social Security           | 227        |
| Early Development/Youth (Over Age 5)    | 207        |
| Exercise                                | 153        |
| Seniors                                 | 76         |
| Virginia Community College System       | 76         |
| Reentry Assistance                      | 67         |
| Children—Child Education                | 40         |
| Diabetes Self Management                | 36         |
| Felony Assistance                       | 10         |
| Financial Literacy                      | 9          |
| Total                                   | 17,580     |
living in poverty positively since this is what affects their daily lives and results in compromised health status leading to disease. The CHWs mainly work in effecting Healthcare Access and Economic Stability but they also provide health assessment interventions such as blood pressure measurements and blood sugar measurements. Given that Neighborhood and Built environment had the least number of referrals and factors such as sanitation and availability of outside leisure areas are pervasive issues in public housing, we would encourage more activity in such areas to improve the wellbeing of residents.

While the use of Community Health Workers to serve low-income communities started in low-income countries, it has been proven that they have similar effect in US communities suffering from high poverty rates as occurs with people living in public housing. The next step in our research is to delve into the work of the CHWs from their own perspective and to interview the residents

Table 3 Mapping of Each Category to the 5 Social Determinants of Health

| Healthcare                          | Economic Stability                                  | Social and Community Context                       | Education Access                           | Neighborhood and Built Environment |
|-------------------------------------|----------------------------------------------------|----------------------------------------------------|--------------------------------------------|-----------------------------------|
| Dental (373)                        | Employment/Self-Sufficiency (2554)                  | Department of Social Services (227)                | Children-Child Education (40)              | Exercise (153)                    |
| Diabetes Self Management (36)       | Financial Literacy (9)                              | Early Development/Youth (207)                      |                                           |                                    |
| Healthy Life-Style and Nutrition (779) | Food, Clothing, Rent, Utility and Housing Assistance (1012) |                                             | Education (811)                           |                                    |
| Insurance Assistance (1079)         | Housing/Rental Assistance (1658)                   | Legal Aid (300)                                   | Virginia Community College (76)           |                                    |
| Maternal and Child Health (393)     | Leadership and Self-Sufficiency (357)              | Re-entry Assistance (67)                           |                                           |                                    |
| Medical Home (646)                  | Utility, Food and Clothing Assistance (1145)       | Seasonal/Specialty Event (304)                     |                                           |                                    |
| Mental Health/Domestic Violence/Substance Abuse (640) | Total: 6735                                          | Seniors (76)                                      |                                           |                                    |
| Pregnancy (842)                     |                                                     | Total: 1191                                        |                                           |                                    |
| PCP/Specialty (2340)                |                                                     |                                                    |                                           |                                    |
| Women’s Health (600)                |                                                     |                                                    |                                           |                                    |
| Medical Specialty (846)             |                                                     |                                                    |                                           |                                    |
| Total                               |                                                     |                                                    |                                           |                                    |
| 48.7%                               | 38.3%                                              | 6.8%                                               | 5.3%                                      | 0.9%                              |

Table 4 Medical Diseases noted in Client Records for Data from Jan 1, 2013 to Dec 31, 2020

| Medical Disease                  | # Clients | %  |
|----------------------------------|-----------|----|
| Asthma                           | 59        | 8  |
| Cancer                           | 8         | 1  |
| Depression and/or Anxiety        | 129       | 17.5|
| Diabetes                         | 76        | 10.3|
| High Blood Pressure              | 346       | 47.0|
| Obesity                          | 118       | 16.0|
| Total                            | 736       | 100 |

Table 5 Insurance status of clients serviced by CHWs between Jan 1, 2013 and Dec 31, 2020

| Insurance                        | # Clients | %   |
|----------------------------------|-----------|-----|
| Medicaid                         | 578       | 39.1|
| Medicaid MCO                     | 13        | 0.8 |
| Medicare                         | 75        | 5.1 |
| Private                          | 166       | 11.2|
| Uninsured                        | 644       | 43.6|
| Total                            | 1476      | 100 |

Table 6 Employment Status of Clients using services of CHWs from Jan 1, 2013 to Dec 31, 2020

| Employment status     | # Clients | %  |
|-----------------------|-----------|----|
| Employed              | 256       | 27.7|
| Self-employed         | 16        | 1.7 |
| Student               | 48        | 5.2 |
| Unemployed            | 607       | 65.5|
| Total                 | 927       | 100 |

This indicates the importance of addressing the root causes of health disparities and the need for comprehensive community-based interventions.
they have worked with, to determine the results of the CHW interventions. In this study we have mapped out how Community Health Workers embedded into Public Health programming to impact health outcome in low-income communities through interventions on social determinants of health. We believe such interventions are valuable to reducing the impact of poverty on health outcomes and getting people out of poverty. CHW programs should be a strategy used nationally by public health departments.

COVID-19 has shown the need to better deliver public health to minority populations and lower income populations. Community Health Workers as part of the public health system are lower cost health personnel that are culturally aware and trusted assets to a community; they are

| Age | Years of Experience as a CHW | Highest level of education | Biggest Challenges Clients Have |
|-----|-----------------------------|---------------------------|-------------------------------|
| CHW 1 | 48 | 10 years (8 years paid, 2 years volunteer) | High school | Some of the biggest challenges clients face include transportation issues, lack of childcare, financial troubles, low food security, mental illness, and a dearth of youth activities for children aged 16–18 |
| CHW 2 | 31 | 6 years | GED | Many community members have struggles involving the social determinants of health in the form of transportation, food and housing security, clothing, and childcare. Childcare and transportation are the largest issues, but also says that substance abuse is very prevalent in the community |
| CHW 3 | 44 | 4 years | Some college | The biggest challenge her community faces is building trust. Gaining the trust of community members is hard, long, and slow process. Additionally, once one CHW gains a client’s trust, it doesn’t necessarily mean that that client will trust other CHWs |
| CHW 4 | 39 | 4 years | GED | The biggest challenges her clients face are related to safety. She emphasized how important it is that clients feel secure in their community and get fresh air, but said that shootings are frequent and violence has practically become a norm |
| CHW 5 | 28 | 3.5 years | Some college | The biggest challenges my community faces are establishing and maintaining trust. One bad experience can negatively impact someone’s trust for a long time, and that makes it very difficult to build personal connections with clients. Personally, she finds the best ways to foster trust are with complete honesty and demonstrations of genuine care |
| CHW 6 | 41 | 3–4 years | Some college | The biggest challenges that my clients face are transportation issues, finding well-paying employment, and access to education and childcare |
| CHW 7 | 43 | 6 years | Master’s degree in Counselling | Many challenges that my clients face are community assessments being superficial, negative mindsets, social services operating ineffectively within the community, gaps in the new Medicaid guidelines, a lack of representation in the media, a lack of community leadership, confusion about identity, and an abundance of red-tape put down by the government making it difficult to receive adequate support |
| CHW 8 | 42 | 3 years | Bachelor’s degree | The biggest challenges the community faces revolve around trust. Community members grew distrustful after years of empty promises made by people saying they could help them. Now CHWs have to overcome these trust issues. She says that one of the most difficult parts of her job is getting people to actually show up to events and let CHWs help them |
| CHW 9 | 39 | 1 year | Associate’s degree | There’s a major lack of care and concern for the community as various issues such as food shortages, a ubiquitous presence of mold and mildew, and a lack of proper garbage disposal systems remain unaddressed. Ultimately, she believes the biggest problem in her community is people not being heard

Fig. 2 Diagram of Profile of the Communities, Community Health Workers and the External Resources they link Community members to
able to respond appropriately with sensitivity and empathy to issues raised by the communities they serve. The Community Health Workers in this study were all minority women serving predominantly minority public housing communities. We feel such approach would induce mutual trust and understanding between community residents and health workers since the CHWs would understand and use the appropriate messaging to enable their client take-up positive steps to improve their health. Their answers to the questions on the biggest challenges faced by the community they serve, indicated empathy and understanding of the issues plaguing low-income communities. They increased the social capital of their clients and communities by linking them to external resources and they also provide valuable preventive health services. Social capital as defined by Putnam (2000) involves the ability to provide bridges to external resources and having communities, especially low-income ones, be able to access resources they would otherwise not know how to access is a significant intervention especially because increase in social capital improves health [19]. By providing linkages to external resources for jobs, healthcare and the other categories in Table 2, CHWs in Richmond increase the social capital of their clients. And by providing access to health monitoring, preventive healthcare and health management, to a population with high disease burden they serve an important preventive healthcare function.

Acknowledgements The following students helped with interviews: Ruth Bekele, Victor Adejayan, Munachi Udenyi and Miguel Monllor-Pacheco. Ruth Bekele was supported by a Summer Research Grant from the Charles Center of William and Mary. Sarena Oberoi did the data extraction and data management from the Electronic Health Record system used by the Community Health Workers program. We want to extend our thanks to the Community Health Workers who worked in the health district over the years under review and are responsible for generating the data and the ones that participated in the interviews.

Authors Contributions The linkage with VDH was started by IO and she wrote the manuscript. MG wrote the proposal to VDH, managed students working on the project and supervised the GIS map production using publicly available data and she also obtained the IRB approvals. AS developed the questionnaire and trained students on qualitative analyses. CW reviewed the interviews and compiled the table on CHW responses. SO downloaded data from Care Connect and summarized it. PS is the senior CCHW under whose supervision the study was carried out and explained the data in the electronic database. ST gave information on the history of the program and how the program is designed.

Funding Not Applicable for the research, but undergraduate students who worked on the research were supported by grants from the Charles Center of William and Mary.

Availability of Data and Materials Interview videos and data are available after obtaining permission from the Virginia Department of Health.

Code Availability Not Applicable.

Declarations

Conflict of interest None for all the authors.

Ethical Approval PHSC-2020-12-03-14655 from William and Mary and Study Number 70042 for Virginia Department of Health.

Consent to Participate Each Community Health Worker signed an informed consent through Docusign before the interview and each acknowledged signing at the beginning of each interview.

Consent for Publication No images of the interviewees will be published or are the videos available for public use. All interviewees accepted that their responses could be used for research purposes as part of the signed informed consent form.

References

1. Shiels, M. S., Haque, A. T., Haozous, E. A., Albert, P. S., Almeida, J. S., García-Closas, M., Núñez, A. M., Pérez-Stable, E. J., Freedman, N. D., & de González, A. B. (2021). Racial and ethnic disparities in excess deaths during the covid-19 pandemic, March to December 2020. Annals of Internal Medicine. https://doi.org/10.7326/m21
2. Centers for Disease Control and Prevention. (2017, July 3). African American Health. Centers for Disease Control and Prevention. Retrieved October 20, 2021, from https://www.cdc.gov/vitalsigns/africanamericanhealth/index.html.
3. Bartscher, A. K., Seitz, S., Siegloch, S., Slotwinski, M., & Wehrhöfer, N. (2021). Social Capital and the spread of covid-19: Insights from European countries. Journal of Health Economics, 80, 102531. https://doi.org/10.1016/j.jhealeco.2021.102531
4. Krantz, M. J., Coronel, S. M., Whitley, E. M., Dale, R., Yost, J., & Estacio, R. O. (2013). Effectiveness of a community health worker Cardiovascular Risk Reduction Program in public health and Health Care Settings. American Journal of Public Health. https://doi.org/10.2105/ajph.2012.301068
5. Kangovi, S., Mitra, N., Norton, L., Harte, R., Zhao, X., Carter, T., Grande, D., & Long, J. A. (2018). Effect of community health worker support on clinical outcomes of low-income patients across primary care facilities. JAMA Internal Medicine, 178(12), 1635. https://doi.org/10.1001/jamainternmed.2018.4630
6. Ballard, M., Bancroft, E., Nesbit, J., Johnson, A., Holeman, I., Foth, J., Rogers, D., Yang, J., Nardella, J., Olsen, H., Raghavan, M., Panjabi, R., Alban, R., Malaba, S., Christiansen, M., Rapp, S., Schechter, J., Aylward, P., Rogers, A., … Palazuelos, D. (2020). Prioritising the role of community health workers in the COVID-19 response. BMJ Global Health. https://doi.org/10.1136/bmjgh-2020-002550
7. McCollum, R., Gomez, W., Theobald, S., & Taegtmeyer, M. (2016). How equitable are community health worker programmes and which programme features influence equity of Community Health Worker Services? A systematic review. BMC Public Health. https://doi.org/10.1186/s12889-016-3043-8
8. Maes, K., Closser, S., & Kalofonos, I. (2014). Listening to community health workers: How ethnographic research can inform positive relationships among community health workers, health institutions, and Communities. American Journal of Public Health. https://doi.org/10.2105/ajph.2014.301907
9. McCarville, E. E., Martin, M. A., Pratap, P. L., Pinkser, E., Seweryn, S. M., & Peters, K. E. (2021). Framing the integration of community health workers into health care systems along health
care and community spectrums. *Journal of Ambulatory Care Management, 44*(4), 271–280. https://doi.org/10.1097/jac.0000000000000396

10. Freeman, A. L., Li, T., Kaplan, S. A., Ellen, I. G., Gourevitch, M. N., Young, A., & Doran, K. M. (2020). Community health worker intervention in subsidized housing: New York City, 2016–2017. *American Journal of Public Health, 110*(5), 689–692. https://doi.org/10.2105/ajph.2019.305544

11. Bowen, D. J., Bhosrekar, S. G., Rorie, J.-A., Goodman, R., Thomas, G., Maxwell, N. I., & Smith, E. (2015). Resident Health Advocates in public housing family developments. *Family & Community Health, 38*(2), 141–148. https://doi.org/10.1097/fch.0000000000000068

12. Quintiliani, L. M., Whiteley, J. A., Murillo, J., Lara, R., Jean, C., Quinn, E. K., Kane, J., Crouter, S. E., Heeren, T. C., & Bowen, D. J. (2021). Community health worker-delivered weight management intervention among public housing residents: A feasibility study. *Preventive Medicine Reports, 22*, 101360. https://doi.org/10.1016/j.pmedr.2021.101360

13. Pittman, M., Sunderland, A., Broderick, A., & Barnett, K. (2015). Bringing community health workers into the mainstream of U.S. health care. *NAM Perspectives*. https://doi.org/10.31478/201502c

14. Lapidos, A., Lapedis, J., & Heisler, M. (2019). Realizing the value of community health workers—New opportunities for sustainable financing. *New England Journal of Medicine, 380*(21), 1990–1992. https://doi.org/10.1056/nejmp1815382

15. Ryabov, I. (2014). Cost-effectiveness of community health workers in controlling diabetes epidemic on the U.S.–Mexico Border. *Public Health, 128*(7), 636–642. https://doi.org/10.1016/j.puhe.2014.05.002

16. Gaziano, T. A., Bertram, M., Tollman, S. M., & Hofman, K. J. (2014). Hypertension education and adherence in South Africa: A cost-effectiveness analysis of community health workers. *BMC Public Health*. https://doi.org/10.1186/1471-2458-14-240

17. Vaughan, K., Kok, M. C., Witter, S., & Dieleman, M. (2015). Costs and cost-effectiveness of community health workers: Evidence from a literature review. *Human Resources for Health*. https://doi.org/10.1186/s12960-015-0070-y

18. Blackman, K., & Scotti, S. (2015). Incorporating community health workers into state health care Systems: Options for Policymarkers. Retrieved October 21, 2021, from https://www.ncsl.org/Portals/1/Documents/Health/CHWbrief2015.pdf.

19. Putnam, R. D. (2000). *Bowling alone*. New York: Simon & Schuster.

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.