ISSN: 2768-3699

Journal of Clinical Diabetes & Obesity

Review Article

Open Access

# Community Health Worker-Led Diabetes Care in Underserved Populations: Effect Sizes and Sustainability

**Ciara Devlin[1*], Vesela Draganova[2] and Nicolas Berthier[3]**

[1]*Department of Public Health, Suir Valley University Hospital, Waterford, Ireland*
[2]*Department of Community Diabetes Services, Rhodope Institute of Metabolic Medicine, Plovdiv, Bulgaria*
[3]*Centre for Health Services Research, Occitan Institute of Diabetes Research, Toulouse, France*

*Correspondence to: Ciara Devlin, Department of Public Health, Suir Valley University Hospital, Waterford, Ireland

Received: 28 January 2025; Accepted: 10 July 2025; Published: 22 December 2025

Copyright: © 2025 Devlin C. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

## Abstract

*Community health workers recruited from the populations they serve have been deployed widely to address disparities in diabetes outcomes, and the evidence that they improve glycaemic control is reasonably consistent. Meta-analysis of 40 studies including 9,606 participants estimated a reduction in HbA1c of 0.39 percentage points (95% CI 0.31 to 0.48), and a smaller synthesis of six studies and 1,280 participants reported 0.50 points (0.28 to 0.71) with low heterogeneity and high certainty. Individual programmes report figures of a similar order. Two features of this literature complicate its translation into policy. Programmes are short, with a median duration of six months, and few studies follow participants after the intervention ends, so whether the benefit persists is largely unknown. And the evaluations that examined implementation identified worker retention and programme sustainability as recurring problems, concluding that community-based programmes can bridge gaps in access without addressing the structural inequalities that produce them.*

**Keywords:** *Community health workers; Diabetes disparities; Glycaemic control; Sustainability; Underserved populations*

## Introduction

Diabetes outcomes differ systematically by income, ethnicity and geography, and the differences persist within health systems that provide nominally equal access [1,2,3]. Community health workers, recruited from the communities they serve and acting as liaisons between those communities and clinical services, have been deployed widely in response [4,5,33]. Systematic reviews describe the range of roles these workers occupy and their functions within primary care [33,34].

The model is intuitive. A worker who shares language, culture and neighbourhood with the person they support can reach people whom clinic-based services do not, and can address practical obstacles that a consultation does not surface [6,7,29]. Randomised trials in Latino, African American and Asian American populations have tested the model directly [19,20,21,30].

This review examines what these programmes achieve, how consistent the estimates are, and what happens to the benefit when the programme ends.

## Material and Methods

Search strategy: PubMed and the archives of the major public health, primary care and diabetes journals were searched for evaluations of community health worker interventions in diabetes. Search terms combined community health worker, lay health worker and promotora with diabetes, HbA1c, glycaemic control, underserved and sustainability. Reference lists of the principal meta-analyses [8,9] were screened by hand for primary sources.

Eligibility: Studies were included if they evaluated an intervention delivered wholly or partly by community health workers in a described population with diabetes and reported a glycaemic or utilisation outcome, or synthesised such studies. Programme evaluations without a comparator are included and identified as such.

Data extraction and handling: Design, setting, population, programme duration and the reported estimate were extracted as published. Whether an estimate comes from a randomised comparison, a matched analysis or a before-and-after evaluation

is stated in each case, because these support different inferences and the literature contains all three. This review reports measured outcomes and makes no dietary, caloric or exercise recommendations. No pooling or re-analysis was performed. Figures 1 to 6 and Tables 1 to 3 reproduce published values only. This is a narrative synthesis and was not registered as a systematic review.

## Results

The pooled effect: A meta-analysis of randomised controlled trials identified 40 eligible studies with 9,606 participants, 4,618 receiving the intervention and 4,988 in control groups, with a weighted average age of 63 and 74 per cent women. Three studies were excluded from pooling for insufficient data. The estimated effect was a reduction in HbA1c of 0.39 percentage points (95% CI 0.31 to 0.48, p < 0.001) (Figure 1) [8].

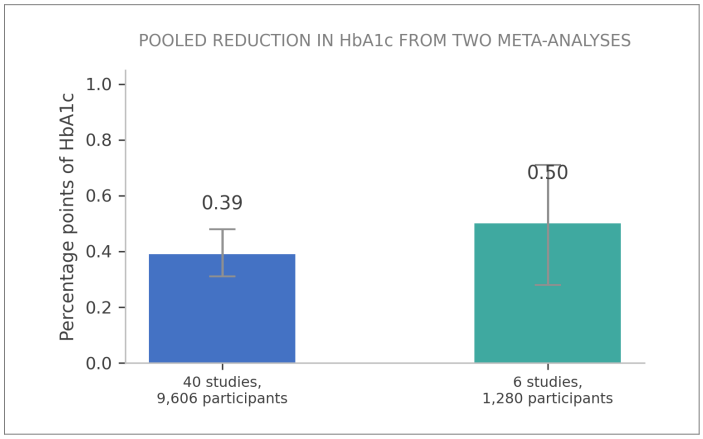


Figure 1: Pooled reduction in HbA1c reported by two meta-analyses [8,9]

A second synthesis: A separate review retrieved 86 studies, of which seven were eligible and six suitable for meta-analysis, including 1,280 participants (Figure 3). The pooled mean weighted difference in HbA1c was 0.50 percentage points (95% CI 0.28 to 0.71, p < 0.0001), with low heterogeneity and an overall certainty rated high [9]. The authors concluded that the reductions were statistically significant and clinically important in people from minority ethnic groups on low incomes [9].

Table 1: Principal studies reviewed, with the effect as reported by the original investigators

What else changed: The Chicago programme reported that at follow-up participants were less likely to be depressed, less likely to forget to take their diabetes medications, and more likely to report higher social support and to score higher on an assessment of diabetes knowledge [11]. Qualitative data from the multi-site evaluation described the value of home visits alongside clinic-based services [12].

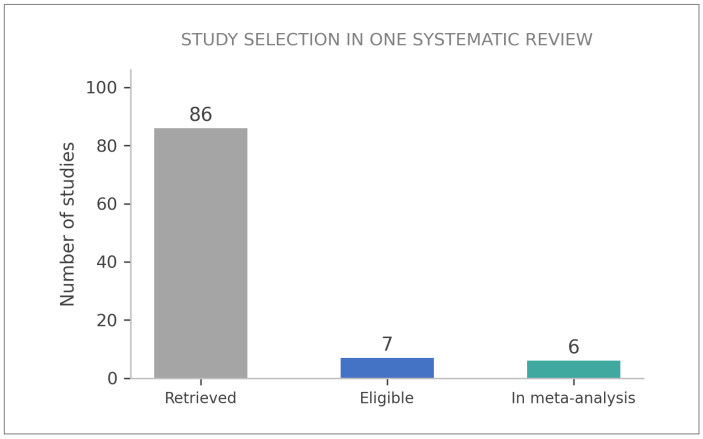


Figure 3: Study selection in one systematic review [9]

Individual programmes: A cluster randomised trial in American Samoa allocated 268 people with type 2 diabetes to a community health worker intervention or usual care, and reported HbA1c 0.53 units lower in the intervention arm at trial completion after adjustment for confounders [10]. A door-to-door outreach programme in two Chicago neighbourhoods enrolled 459 participants, of whom 343 completed follow-up at one year, and reported a mean HbA1c decrease of 0.5 percentage points (Figures 2 and 5) [11]. A multi-site evaluation across three communities reported an HbA1c reduction at one site of 1.3 points (95% CI 0.4 to 2.2), with effects on hypertension outcomes at other sites and no significant effect at all sites [12]. A randomised trial across primary care facilities reported effects on clinical outcomes in low-income patients more broadly [15], and trials in specific communities report effects of a similar order [27].

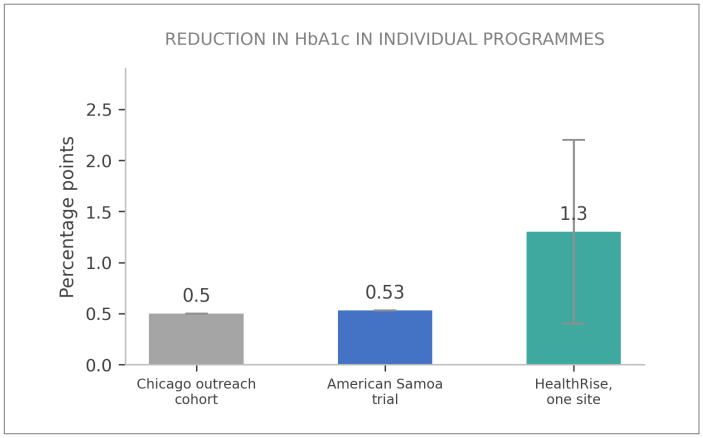


Figure 2: Reduction in HbA1c reported by individual programmes [10,11,12]

How long these programmes run: Programmes using community health workers in diabetes care are typically time-limited, with a reported median duration of six months, and few follow participants beyond the intervention period (Figure 4) [10,14]. The investigators of the American Samoa trial noted that little is known about whether short-term improvements are sustained after the intervention ends, and designed a longer-term analysis to examine change in HbA1c by trial arm across three consecutive one-year periods for that reason [10].

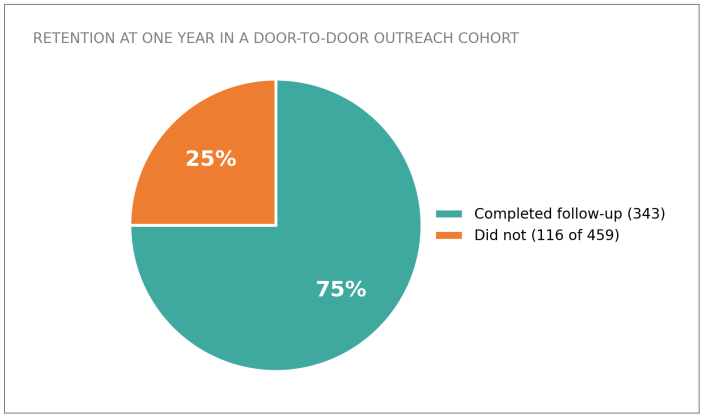


Figure 5: Retention at one year in a door-to-door outreach cohort [11]

| Study | Design and population | Reported effect |
|---|---|---|
| Meta-analysis [8] | 40 trials, 9,606 participants | -0.39% (0.31 to 0.48) |
| Meta-analysis [9] | 6 studies, 1,280 participants | -0.50% (0.28 to 0.71) |
| American Samoa trial [10] | Cluster randomised, 268 people | -0.53 units, adjusted |
| Chicago outreach [11] | 459 enrolled, 343 followed up | -0.5 percentage points |
| Multi-site evaluation [12] | Three communities | -1.3 at one site only |
| Clinic-based programme [13] | 885 patients, five clinics | Improvement reported |

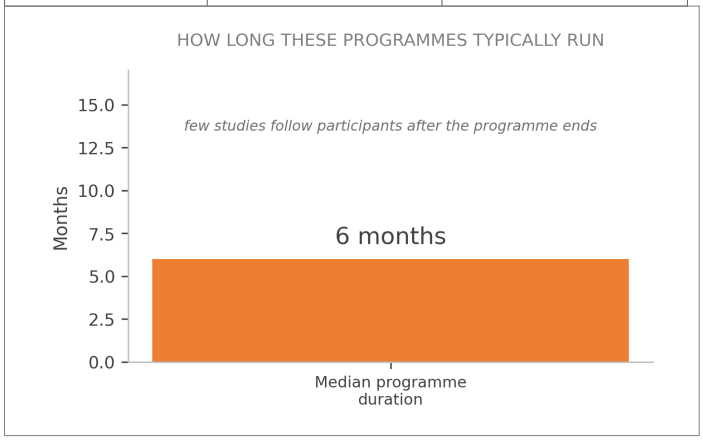


Figure 4: Typical duration of these programmes [10,14]

What the implementation evaluations found: The multi-site evaluation reported that challenges remained, specifically community health worker retention and programme sustainability, and concluded that while community-based health programmes can help bridge healthcare gaps, they alone cannot fully address the structural inequalities experienced by many underserved communities (Figure 6) [12,15].

| Dimension | What the evidence shows |
|---|---|
| Effect on HbA1c | Consistent, 0.39 to 0.50 percentage points [8,9] |
| Certainty of that estimate | Rated high in one synthesis [9] |
| Duration of programmes | Median six months [10,14] |
| Persistence after programmes end | Little studied [10,14] |
| Workforce retention | Identified as a recurring problem [12] |

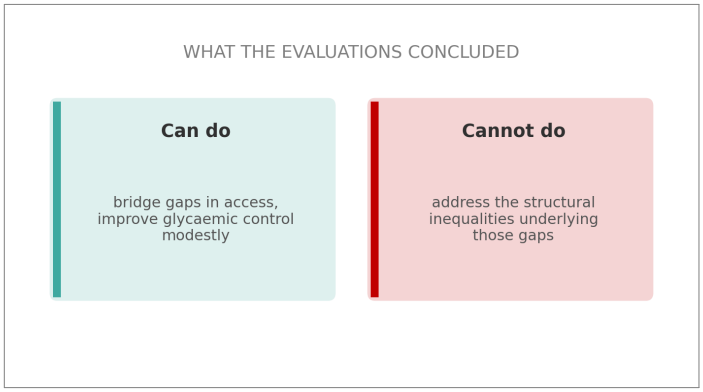


Figure 6: What the implementation evaluations concluded [12,15]

Table 2: What is established about these programmes and what is not

In lower-resource settings: A systematic review and meta-analysis of community-based interventions in developing countries reported effective reduction in HbA1c and argued that culturally adapted, community-driven approaches enhance applicability and cost-effectiveness where healthcare resources are limited [16,17]. A large-scale programme evaluation from an urban health district has described experience of sustaining such a workforce at scale [18]. Scoping and systematic reviews have examined the role in self-management specifically [22,23,24,25], and mediators of the effect have been analysed in at least one programme [26].

| Design | What it can support | Present in this literature |
|---|---|---|
| Randomised trial | Effect of allocation | Yes, including cluster designs [8,10] |
| Meta-analysis of trials | Pooled effect size | Yes, two syntheses [8,9] |
| Before-and-after evaluation | Change in a treated group | Yes, frequently [11,13] |
| Post-programme follow-up | Persistence of benefit | Rarely [10,14] |

Table 3: Study designs represented in this literature and what each establishes

Trials in specific communities: Beyond the pooled estimates, randomised trials have tested the model in defined populations, including Latino, African American and Asian American communities and in team configurations pairing a worker with a nurse case manager [19,20,21,27]. A trial across primary care facilities examined clinical outcomes in low-income patients irrespective of diagnosis and reported effects beyond diabetes alone [15]. The consistency of direction across these settings is one of the stronger features of the literature [23,24].

The economic argument: Evaluations report favourable returns on investment and cost-effectiveness, driven partly by reduced emergency and inpatient use rather than by the glycaemic effect itself [28,31,32]. That is a reasonable case for funding the model, and it is worth separating from the clinical question: a programme can be cost-effective while its glycaemic

benefit remains modest and of unknown duration [8,14].

## Discussion

The effect is real and it is modest. Two independent syntheses covering very different numbers of studies converged on 0.39 and 0.50 percentage points of HbA1c, with low heterogeneity and high rated certainty in the smaller one [8,9]. For a behavioural intervention delivered by non-clinical staff to populations that clinical services reach poorly, that is a meaningful result, and it is roughly the order of effect achieved by adding an oral agent.

The reason it deserves more scrutiny than it usually receives concerns time. The median programme runs six months, and few studies follow anyone afterwards [10,14]. Every pooled estimate here therefore describes the effect while the intervention is being delivered. Whether a person supported for six months holds that improvement at two years is the question a commissioner is actually asking, and the literature largely does not answer it. The investigators of one trial said as much and built a longer analysis to address it [10].

That matters more for this intervention than for most, because the mechanism is relational. A community health worker helps by knowing the person, by following up, by smoothing access. None of those is a durable change to the patient in the way that starting a drug is; they are properties of an ongoing relationship. It would be unsurprising if the benefit tracked the presence of the worker, and the studies reviewed here are not designed to detect that.

The workforce finding compounds it. Retention of community health workers was named as a recurring problem alongside programme sustainability [12]. A model whose effect depends on a sustained relationship and whose workforce turns over is fragile in a specific way, and the evaluations that examined implementation rather than efficacy are the ones that noticed.

The most honest sentence in this literature belongs to the multi-site evaluation: these programmes can help bridge healthcare gaps, but they alone cannot fully address the structural inequalities experienced by many underserved communities [12]. That is worth quoting because the enthusiasm around this model sometimes implies otherwise. Half a percentage point of HbA1c is a real gain and it is not a substitute for the income, housing, food security and insurance coverage that produce the disparity in the first place [1,3,15]. Economic evaluations report favourable returns on investment, which is an argument for funding the model rather than evidence that it substitutes for structural change [28,31,32].

A distinction worth preserving is between what the workforce does and what it is asked to substitute for. Reviews describing the roles these workers occupy list outreach, education, navigation, translation and advocacy, which are functions a health system might reasonably employ someone to perform [33,34]. The difficulty arises when the same posts are funded as a cheaper alternative to clinical capacity, or as a response to deprivation that other parts of government have not addressed [3,15].

On that reading the sustainability problem is not accidental. Short project funding produces short programmes, short programmes produce workforce turnover, and turnover undermines the relationships through which the model works [12,18]. The large-scale programme that has been sustained at district level is instructive precisely because it treated the workforce as permanent rather than as a project [18].

## Study limitations

The limitations belong to the underlying literature. Interventions grouped under this heading vary widely in intensity, content, training and setting, so pooling them produces an average over heterogeneous things even where statistical heterogeneity is low [8,9]. One of the two syntheses rests on six studies and 1,280 participants, which is a narrow base for a high certainty rating [9]. Blinding is impossible in these designs and outcome ascertainment is frequently unblinded [8,10]. Several of the individual programmes are before-and-after evaluations without a comparator, so regression to the mean cannot be excluded [11,13]. Retention varies and those lost to follow-up are plausibly those doing worse, as in the outreach cohort where a quarter did not return [11]. Programme duration is short relative to the condition, and post-programme follow-up is rare [10,14]. Effects differed between sites within the same multi-site programme, which suggests context dependence that the pooled estimates conceal [12]. And the literature is dominated by particular populations and health systems, so transfer to other settings is not straightforward [16,17,18].

## Conclusion

Community health worker-led diabetes care improves glycaemic control by around 0.4 to 0.5 percentage points of HbA1c, an estimate consistent across two syntheses covering 40 and six studies respectively, with high rated certainty in the smaller. That is a worthwhile effect from a workforce that reaches people clinical services do not. What the evidence does not establish is whether it lasts, because programmes run for a median of six months and almost none follows participants afterwards. Given that the mechanism is a relationship rather than a durable change, and that worker retention is itself a recognised problem, the sustainability question is not a technicality. And as one evaluation put it plainly, these programmes can bridge gaps in care without touching the inequalities that created them.

## Acknowledgements

The authors thank the community health workers whose programmes are evaluated in this literature, and the investigators who followed participants after their interventions had ended, which is the part most studies omit.

## Funding

No dedicated funding from public, commercial or charitable sources supported the preparation of this review.

## Conflict of Interest

The authors declare no competing interests.

## Ethics Statement

This article reviews previously published studies only. No new patient data were collected and no participants were recruited, so ethical approval was not required.

## References

1. Walker RJ, Strom Williams J, Egede LE. "Influence of race, ethnicity and social determinants of health on diabetes outcomes". Am J Med Sci 351(2016):366-373.
2. Hill-Briggs F, Adler NE, Berkowitz SA, Chin MH, Gary-Webb TL, Navas-Acien A, et al. "Social determinants of health and diabetes: a scientific review". Diabetes Care 44(2021):258-279.
3. Agarwal S, Wade AN, Mbanya JC, Yajnik C, Thomas N, Egede LE, et al. "The role of structural racism and geographical inequity in diabetes outcomes". Lancet 402(2023):235-249.
4. Perry HB, Zulliger R, Rogers MM. "Community health workers in low-, middle-, and high-income countries: an overview of their history, recent evolution, and current effectiveness". Annu Rev Public Health 35(2014):399-421.
5. Norris SL, Chowdhury FM, Van Le K, Horsley T, Brownstein JN, Zhang X, et al. "Effectiveness of community health workers in the care of persons with diabetes". Diabet Med 23(2006):544-556.
6. Rosenthal EL, Brownstein JN, Rush CH, Hirsch GR, Willaert AM, Scott JR, et al. "Community health workers: part of the solution". Health Aff 29(2010):1338-1342.
7. Kangovi S, Mitra N, Grande D, Long JA, Asch DA. "Evidence-based community health worker program addresses unmet social needs and generates positive return on investment". Health Aff 39(2020):207-213.
8. Seghers LE, Hussein S, Mafi A, Maharaj R. "Effectiveness of community health worker interventions in type 2 diabetes care: a systematic review and meta-analysis of randomized controlled trials". SSRN preprint (2025).
9. Systematic review authors. "Evaluating the effectiveness of community health worker interventions on glycaemic control in type 2 diabetes mellitus: a systematic review and meta-analysis". BMJ Open 15(2025):e094418.
10. American Samoa investigators. "Long-term impact of a community health worker intervention on diabetes control in American Samoa". Prev Chronic Dis 12(2015):E180.
11. Chicago outreach investigators. "Community-based diabetes community health worker intervention in an underserved Chicago population". J Community Health 41(2016):1249-1256.
12. HealthRise investigators. "Assessing the impact of community-based interventions on hypertension and diabetes management in three Minnesota communities: findings from the prospective evaluation of US HealthRise programs". PLoS One 18(2023):e0282094.
13. Diabetes Equity Project investigators. "Impact of a community health worker-led diabetes self-management education program on clinical outcomes in medically underserved communities". Diabetes Educ 40(2014):556-567.
14. Palmas W, March D, Darakjy S, Findley SE, Teresi J, Carrasquillo O, et al. "Community health worker interventions to improve glycemic control in people with diabetes: a systematic review and meta-analysis". J Gen Intern Med 30(2015):1004-1012.
15. Kangovi S, Mitra N, Norton L, Harte R, Zhao X, Carter T, 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 178(2018):1635-1643.
16. Developing countries meta-analysis authors. "Efficacy of community-based interventions in reducing HbA1c levels among patients with type 2 diabetes mellitus: a systematic review and meta-analysis of recent studies conducted in developing countries". J Prim Care Community Health 16(2025):21501319251391593.
17. Leonard E, De Kock I, Bam W. "Barriers and facilitators to implementing evidence-based health innovations in low- and middle-income countries: a systematic literature review". Eval Program Plann 82(2020):101832.
18. Thomas LS, Buch E, Pillay Y, Jordaan J. "Effectiveness of a large-scale, sustained and comprehensive community health worker program in improving population health: the experience of an urban health district in South Africa". Hum Resour Health 19(2021):153.
19. Carrasquillo O, Lebron C, Alonzo Y, Li H, Chang A, Kenya S. "Effect of a community health worker intervention among Latinos with poorly controlled type 2 diabetes: the Miami Healthy Heart Initiative randomized clinical trial". JAMA Intern Med 177(2017):948-954.
20. Spencer MS, Rosland AM, Kieffer EC, Sinco BR, Valerio M, Palmisano G, et al. "Effectiveness of a community health worker intervention among African American and Latino adults with type 2 diabetes: a randomized controlled trial". Am J Public Health 101(2011):2253-2260.

21. Gary TL, Batts-Turner M, Yeh HC, Hill-Briggs F, Bone LR, Wang NY, et al. "The effects of a nurse case manager and a community health worker team on diabetic control, emergency department visits, and hospitalizations among urban African Americans with type 2 diabetes mellitus". Arch Intern Med 169(2009):1788-1794.

22. Little TV, Wang ML, Castro EM, Jimenez J, Rosal MC. "Community health worker interventions for Latinos with type 2 diabetes: a systematic review of randomized controlled trials". Curr Diab Rep 14(2014):558.

23. Trump LJ, Mendenhall TJ. "Community health workers in diabetes care: a systematic review of randomized controlled trials". Fam Syst Health 35(2017):320-340.

24. Kim K, Choi JS, Choi E, Nieman CL, Joo JH, Lin FR, et al. "Effects of community-based health worker interventions to improve chronic disease management and care among vulnerable populations: a systematic review". Am J Public Health 106(2016):e3-e28.

25. Egbujie BA, Delobelle PA, Levitt N, Puoane T, Sanders D, van Wyk B. "Role of community health workers in type 2 diabetes mellitus self-management: a scoping review". PLoS One 13(2018):e0198424.

26. Shah MK, Kieffer EC, Choi H, Schumann C, Heisler M. "Mediators and moderators of the effectiveness of a community health worker intervention that improved dietary outcomes in pregnant Latina women". Health Educ Behav 42(2015):593-603.

27. Rothschild SK, Martin MA, Swider SM, Tumialan Lynas CM, Janssen I, Avery EF, et al. "Mexican American trial of community health workers: a randomized controlled trial of a community health worker intervention for Mexican Americans with type 2 diabetes mellitus". Am J Public Health 104(2014):1540-1548.

28. Ryabov I. "Cost-effectiveness of community health workers in controlling diabetes epidemic on the U.S.-Mexico border". Public Health 128(2014):636-642.

29. Whitley EM, Everhart RM, Wright RA. "Measuring return on investment of outreach by community health workers". J Health Care Poor Underserved 17(2006):6-15.

30. Islam N, Shapiro E, Wyatt L, Riley L, Zanowiak J, Ursua R, et al. "Evaluating community health workers performance linking Asian Americans to health resources". Health Equity 1(2017):64-73.

31. Brownstein JN, Chowdhury FM, Norris SL, Horsley T, Jack L, Zhang X, et al. "Effectiveness of community health workers in the care of people with hypertension". Am J Prev Med 32(2007):435-447.

32. Jack HE, Arabadjis SD, Sun L, Sullivan EE, Phillips RS. "Impact of community health workers on use of healthcare services in the United States: a systematic review". J Gen Intern Med 32(2017):325-344.

33. Scott K, Beckham SW, Gross M, Pariyo G, Rao KD, Cometto G, et al. "What do we know about community-based health worker programs? A systematic review of existing reviews on community health workers". Hum Resour Health 16(2018):39.

34. Hartzler AL, Tuzzio L, Hsu C, Wagner EH. "Roles and functions of community health workers in primary care". Ann Fam Med 16(2018):240-245.

Citation: Devlin C, Draganova V, Berthier N. "Community Health Worker-Led Diabetes Care in Underserved Populations: Effect Sizes and Sustainability". DOI: 10.5281/zenodo.22261266