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**PROGRAMME PAPER**

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**Developing community health worker diabetes training**W. J. Ferguson<sup>1</sup>, C. A. Lemay<sup>2</sup>, J. L. Hargraves<sup>1</sup>, T. Gorodetsky<sup>3</sup> and J. Calista<sup>3</sup><sup>1</sup>Department of Family Medicine and Community Health and <sup>2</sup>Meyers Primary Care Institute, University of Massachusetts Medical School, Worcester, MA 01605, USA and <sup>3</sup>Outreach Worker Training Institute of Central Massachusetts Area Health Education Center, Inc., Worcester, MA 01609, USA.

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**Abstract**

We designed, implemented and evaluated a 48-hour training program for community health workers (CHWs) deployed to diabetes care teams in community health centers (CHCs). The curriculum included core knowledge/skills with diabetes content to assist CHWs in developing patient self-management goals. Our qualitative evaluation included pre/post-knowledge outcomes and encounter data from the field. CHWs and their supervisors were interviewed providing qualitative outcome data of the training process and program implementation. There were statistically significant increases in the scores of CHWs' self-reported knowledge in 8 of 15 curricular domains. Qualitative analysis revealed that CHWs preferred skill-based and case-based teaching, shorter training days but more contact hours. CHWs reported that pre-deployment training alone is insufficient for successful integration into care teams. CHW supervisors reported that CHC's readiness to accept CHWs as members of the care team was as important to successful deployment as training. With respect to implementation, supervision by social workers was deemed more successful than nursing supervision. Field data showed that patient encounters lasted less than 30 min and self-management goals focused on appointment keeping, diet, exercise and glucose testing. Integration and analysis of qualitative and descriptive field data provide an opportunity to continuously evaluate the effectiveness of implementation.

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**Background**

For decades, community health workers (CHWs) have gained an increasing role in health care delivery, particularly in support of strategies that recognize the influence of an individual's community and environment on health outcomes [1]. The role of CHWs as members of the health care workforce is recognized in recent US health reform efforts [2]. CHWs are defined as lay members of communities who work either for pay or as volunteers in association with the local health care system. Working in both urban and rural environments, they usually share ethnicity, language, socio-economic status and life experiences with the community members they serve [3]. Recent reviews [4, 5] have demonstrated the impact of CHWs on the delivery of necessary services, including the provision of culturally relevant health education, case management, system navigation and case finding. Several national organizations have acknowledged the contributions of CHWs, particularly as a resource for increasing underserved individuals' access to care and recommending their inclusion as integral members of the health care team [3, 6, 7].

Despite increasing integration of CHWs into the health care team, wide variability exists in CHW training. These programs range from comprehensive formal certificate programs to informal training orientations once employed [8]. A recent report to the Office of Rural Health Policy, Department of Health and Human Services describing a survey of

CHW certification and training programs in 17 states [9] identified three potential opportunities to formalize CHW training: providing community college credits for training, on-the-job training to improve CHW capacities and state-level certification of CHWs.

A number of studies that employ CHWs as part of care teams have included descriptions of training. These include formal training programs for employed CHWs without the disease [10–12] and peer CHWs with diabetes who are exemplary role models [13–15]. Common topics covered in these training programs included diabetes and self-management skills, behavioral skills, resource identification, research/administrative skills, interpersonal skills and technical health skills.

Two systematic reviews of the research literature revealed a small proportion of studies describing standards for CHW selection and training processes [8, 16] with considerable variation in selection criteria and standardization of training. One of these reviews presented a useful framework for training design to include foci on skill-based and health-related knowledge targeted to specific conditions as well as curriculum evaluation [16].

Our study assessed the impact of adding CHWs to diabetes care teams in community health centers (CHCs) after the first year (Phase 1) of statewide health disparities collaborative to improve diabetes outcomes. This collaborative employed the Chronic Care Model, an evidence-based conceptual framework developed by Wagner *et al.* [17, 18], to guide practices in chronic care. The framework includes six domains for practice redesign to create prepared proactive teams caring for informed activated patients. These include employment of community resources and policies, organization of the health care system, adoption of self-management support, delivery system redesign, decision support and use of clinical information systems. With respect to self-management goal setting, our evaluation of Phase 1 of the collaborative revealed that care teams made little progress on establishing patient self-management goals. Self-management support, one of six essential components of the Chronic Care Model,

requires collaboration between patients and health care professionals. The interrelationship of self-management, patient–physician communication and adherence is well documented in the health services literature [19]. In addition, coordination, continuity of care and self-management are all facilitated by better relationships between patients and health care professionals [19]. Yet, time constraints and cultural and linguistic differences often serve as barriers. We postulated that CHWs might be able to overcome these obstacles.

In the context of the Chronic Care Model [18], our CHWs were trained to work with patients to facilitate patients' self-management of diabetes, establish linkages to community resources and support patients' abilities to build collaborative relationships with health care professionals. Our CHW curriculum included skills-specific knowledge, skills practice and relevant health knowledge on diabetes mellitus. Additionally, as CHWs were working with patients to set realistic, achievable self-management goals, it was important for CHWs to understand a patient's stage of change. The Transtheoretical Model (TTM) has been conceptualized as a five-stage cyclical continuum associated with an individual's readiness to adapt behavior change [20]. While studies on the effectiveness of employing the TTM to improve behaviors affecting diabetes have been 'moderate to weak' [21], at least one study demonstrated significant improvement in diabetes control when the TTM was employed [22]. These authors concluded that the TTM could be applied as a framework for teaching counseling interventions to CHWs. In addition to providing diabetes education, their training included basic methods to incorporate patients' perceptions of their readiness for change and confidence in achieving goals.

This paper focuses on two central questions. First, will a diabetes-specific training program prepare CHWs to work with patients to understand their readiness to change and set self-management goals? Second, will training and ongoing support of CHWs and their supervisors facilitate the integration of CHWs into care teams to conduct self-management goal setting with patients?

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## Training methods

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### Participant organizations and trainees

Twelve CHCs in Massachusetts were chosen and agreed to participate. Six centers randomized to the intervention promoted existing staff or hired new CHW candidates. A CHW job description was provided to the CHCs to guide the hiring of the CHW. In some cases, CHCs chose to send two candidates to the training program. There were a total of 10 CHW trainees. In addition, supervisors of the CHWs participated in a 6-hour training course to familiarize them with the duties of CHWs on diabetes teams and to prepare them to assist CHWs with anticipated supervisory needs.

### Training

Faculty from the University of Massachusetts Medical School collaborated with the Central Massachusetts Area Health Education Center's Outreach Worker Training Institute (OWTI) to develop the 48-hour CHW and 6-hour supervisor trainings. Table I summarizes the CHW and supervisory modules. The OWTI is a career-focused educational pipeline for CHWs and their supervisors in health and social services. The OWTI, led by the Central Massachusetts Area Health Education Center, Inc., is a 501(c) 3 non-profit organization, whose mission is to enhance access to quality health care, promote workforce development and reduce health disparities. The OWTI is based on nationally recognized standards developed by The National Community Health Advisor Study [23] as well as local and statewide community assessments.

The Diabetes Self-Management CHW Certificate Course included both previously developed CHW core competencies and newly developed diabetes-specific competencies designed specifically for the intervention (Table I). The Core competencies were designed to provide participants with principles, methods and knowledge-based and skills-based competencies. The diabetes competencies were designed to impart health knowledge about diabetes, its complications and challenges faced by their patients. Self-management goal setting was a theme woven throughout the curriculum

via practical exercises. Trainees could also receive college credits for their hours of training.

### Additional training

One-hour conference calls were scheduled every 6 weeks to provide opportunities for networking and formal presentations on topics of interest identified by either CHWs or their supervisors. Additionally, three workshops were conducted over the year of deployment. These trainings served two purposes: to provide knowledge based on ongoing needs and to understand and address impediments to the integration of CHWs with care teams (Table I).

### Supervisor training

In addition to CHW training, we developed training for supervisors whose functions include direction and support of CHWs. The training provided supervisors with knowledge and skills to contribute to CHWs' job effectiveness, quality, safety and professional satisfaction. Executive leadership and CHC care teams were briefed on the rationale and details of the intervention.

### Instructional methods

Teaching methodologies for the CHW course included case-based learning to promote critical thinking, analyzing and problem solving [24] and participatory education to create an interactive learning environment and to contextualize the knowledge and skills required for health promotion and care coordination. The 48-hour curriculum, which was taught by pairing a licensed clinician and an experienced CHW, is based on OWTI's belief that CHWs are vital team members, bringing communities to health services and community outreach experience to the classroom. Engaging an experienced CHW as co-instructor introduces role models from the field, grounding the instructional sessions throughout the course. This methodology has been recognized in the literature as a promising and recommended practice [16]. The curriculum development team recruited clinician and CHW teachers for the training program based on prior work experience and expertise, building on the excellent team of OWTI instructors previously employed to teach in their programs.

**Table 1.** *Diabetes self-management curriculum modules*

CHW core competency modules	CHW diabetes-specific modules	CHW ongoing training following deployment
Service coordination skills	Diabetes in diverse communities	Complications of diabetes
Interpersonal and relationship building skills	Nutrition and physical activity for diabetes self-management	Review of realistic self-management goals
Interviewing and communication skills	Access to services, follow-up and supportive care in diabetes management	Blood glucose testing self-management training (conducted at a workshop)
Organizational and documentation skills	Cross-cultural beliefs and diabetes management	Helping your patients set self-management goals for medication adherence
Advocacy and conflict resolution skills	Primary, nursing and specialty care in diabetes management	Nutrition, diet and self-management goal setting
Individual assessment and empowerment skills	Individual and group teaching skills in diabetes self-management	Using your encounter form data to assist in setting priorities
Cultural assessment and responsiveness skills	Mental health and diabetes management	Review of diabetes and mental health
Presentation skills	Label reading for grocery shopping/practicum	Working with hard to reach populations (conducted at workshop)
Supervisor modules		
Effective job performance and professional development		
Professional boundaries and conflict resolution in a diverse workplace		

## Evaluation methods

Both qualitative and quantitative methods were used to evaluate the curriculum and subsequent deployment in the field. The curricular evaluation utilized CHW pre-assessment completed on the first day of training and self-assessment immediately after completion of the modules. The survey instrument assessed knowledge and self-reported skill confidence using four-point scales (strongly agree, agree, disagree and strongly disagree). To obtain qualitative feedback on the curriculum after training, we conducted focus groups and individual interviews with CHWs and supervisors. To gain a longitudinal perspective on the training process, including the 48-hour curriculum, conference calls and post-deployment training, we repeated these semi-structured interviews at the end of the deployment period.

## Deployment evaluation

The project tracked the work of CHWs by designing a CHW Encounter Form to be used in the field

to document patient encounters (Appendix 1). Encounter data included the types of interactions with patients, stage of change, and the content of the patient interaction. Encounter forms, collected monthly at each of the six sites, were used to inform project leaders on the substance, quantity and quality of the work of CHWs. These data helped develop ongoing training and feedback to CHWs and their supervisors.

## Qualitative evaluation of the diabetes curriculum

Focus groups were semi-structured, conducted separately with CHWs and supervisors respectively and facilitated by two researchers with extensive qualitative research experience. Each 1-hour group was digitally recorded and one co-facilitator took extensive notes. Digital recordings were transcribed verbatim. Individual interviews were conducted by an experienced research nurse. Interviews lasted between 30 and 45 min with the interviewer taking notes. Interview notes were transcribed after each interview.

## Data analyses

Pre- and post-assessments and Encounter Form data were analyzed using the Statistical Package for the Social Sciences (SPSS version 17.0, Chicago, IL, USA). Assessment response scores were coded, with higher scores equaling more agreement, where ‘strongly agree’ equals 4 and ‘strongly disagree’ equals 1. Paired *t*-tests were utilized to compare pre- and post-knowledge scores.

Data from group and individual interviews were assessed using content analysis techniques, centered on thematic analysis related to CHW training and curriculum [25]. We conducted interviews at different time periods to guide subsequent interview content and questions, adopting an inductive approach [26] to establish a framework of common problems, solutions posed by CHWs and their supervisors. This method uses coding procedures for making replicable inferences from data to their context and identifying emergent themes [27, 28]. A coding scheme was developed utilizing the original research questions. Categories were refined through the process of repeated transcript review and discussion between investigators. Verbatim responses were coded and emergent themes were identified.

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## Findings

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### Characteristics of participants

Of the 10 CHW trainees, 8 were women. Seven trainees were bilingual, five proficient in Spanish and two in Portuguese. Of the 10 trainees, 3 were college graduates and 5 had some college education. Four were certified medical assistants and four were trained medical interpreters. Eight were previously employed in other positions in CHCs. Of these, seven had previous experience as members of the Phase 1 chronic care quality improvement collaborative. Supervisors in the six CHCs included two social workers, three registered nurses and one health administrator.

### Quantitative findings: CHW curriculum and training

Results of the pre- and post-evaluation completed by CHW participants are included in Table II. There

was a statistically significant improvement in the pre- and post-scores in 8 of 15 curriculum domains. One of the largest improvements occurred in the module on evaluation and empowerment skills modules. In total, more than half of the changes occurred in modules focusing on Core skills, particularly communication and professionalism skills. With respect to the Diabetes curriculum, two of the three modules with statistically significant improvement focused on cultural diversity and disparities experienced by diabetics. The third focused on health care team roles in the care of diabetic patients.

### Qualitative findings: CHW curriculum and training

CHW trainees suggested that a pre-course needs assessment would have helped document experience levels and skills of trainees to inform the faculty on the training level needed for each topic. Many felt that a 1-hour orientation prior to the first class would also have better prepared trainees.

With respect to the 48-hour curriculum design, most trainees provided positive feedback on the interactive design of the curriculum, inclusive of role-playing and group discussions. Additionally, they appreciated the real life examples and case studies included in the workshops and the use of photos and videos as instructional methods. With respect to constructive feedback, trainees felt that the days were too long and that the objectives were too ambitious. Participants preferred a longer course (i.e. more days) running 4 hours each day. A major suggestion would reorganize the curriculum by including all Core modules first followed by the Diabetes-specific modules. CHW trainees thought that less time should be spent on presentation of information with more time devoted to skill practice and role-play. Finally, although participants were provided evaluation forms following each module, they emphasized that evaluation at the end of each session would have led to course improvements via formative feedback.

On the topic of faculty, trainees felt that a primary faculty instructor for both the Core competencies and the Diabetes modules would have led to better continuity and less repetition across sessions. Trainees also believed that there was considerable variation in

**Table II.** Results of pre-post self-assessed knowledge and skill

Class content	Pre test, mean (SD)	Post test, mean (SD)	<i>P</i>
Service coordination skills	3.35 (0.13)	3.60 (0.22)	0.094
Diabetes in diverse communities*	3.44 (0.13)	3.86 (0.06)	0.001
Interpersonal and relationship building skills	3.18 (0.21)	3.48 (0.05)	0.058
Interviewing and communication skills*	3.20 (0.22)	3.58 (0.13)	0.024
Organizational and documentation skills*	3.25 (0.19)	3.68 (0.05)	0.018
Advocacy and conflict resolution skills*	3.10 (0.10)	3.40 (0.00)	0.007
Nutrition and physical activity diabetes self-management	3.35 (0.25)	3.50 (0.08)	0.300
Access to services in diabetes management	3.30 (0.00)	3.30 (0.00)	n.s.
Individual assessment and empowerment skills*	3.23 (0.10)	3.55 (0.06)	0.001
Cultural assessment and responsiveness skills	3.15 (0.10)	3.45 (0.10)	0.078
Cross-cultural beliefs and diabetes management*	3.35 (0.17))	3.58 (0.05)	0.047
Presentation skills*	3.25 (0.17)	3.88 (0.05)	<0.0001
Primary, nursing and specialty care DM management*	3.23 (0.10)	3.43 (0.13)	0.045
Individual and group teaching skills DM self-management	3.50 (0.20)	3.63 (0.13)	0.331
Mental health and diabetes management	3.15 (0.17)	3.35 (0.06)	0.071

\*  $P < 0.05$ .

the coordination between lead instructors and co-instructors. Finally, participants felt that each instructor should be required to produce a slide presentation of the module content for future reference.

Several areas of additional training and review were identified, including complications of diabetes; mental health and diabetes; review of realistic self-management goal setting especially with respect to medication adherence, blood glucose testing and nutrition and diet.

### Qualitative findings: supervisor training

During interviews, supervisors recommended that they should be assigned to CHW trainees at the onset of the course and provided with information pertaining to expectations for CHWs, the potential of role drift among CHWs and the need for clear boundaries related to relationships with clients. Most CHW supervisors suggested that the training time for supervisors should be increased. Many felt that supervisor training conducted simultaneously with CHW training might increase the opportunity for synergy. Similar to the CHW trainees, supervisors

believed that formative evaluation and feedback at the end of each class would lead to ongoing refinement of the curriculum and training. Supervisors also felt that ongoing training on the role and responsibilities of CHWs would be useful.

### Findings: deployment and integration within teams

Qualitative and quantitative results suggest three important lessons from experiences of the CHWs deployed to health care teams to carry out the prescribed intervention: (i) role confusion by CHWs supervisors and other members of the clinical team leading to deviation from planned duties, (ii) issues centering on supervisory and administrative support and (iii) analogous work experience and familiarity with the organization.

### Role confusion

During interviews, CHWs noted unrealistic expectations or misunderstanding of the CHW role and responsibilities. Confusion also related to the half time funding for this position, with most working in other

positions, such as medical assistants or interpreters. This often created confusion for both the CHW and the members of the health care team. Encounter Form data support these findings (Table III). In the 13 months of the intervention, CHWs completed 1198 encounters with 540 patients in six CHCs. While the project was designed to prepare CHWs to work with patients 20 hours each week, the documented encounter time suggested that some CHWs were working less than 5 hours each week in direct patient care to improve patient self-management and spent the remainder of their time assigned to other duties in the CHC. With this data in mind, site visits and telephone calls with CHWs and supervisors followed to reinforce the expected work of CHWs in the field.

### Supervision and administrative support

Participants identified the following facilitators during deployment: senior leadership buy-in, having a proactive and supportive supervisor, having opportunities

for continued training and having established times for networking with other CHWs. CHWs felt that there would have been less role confusion if supervisors had been better prepared, perhaps providing them with job descriptions and expectations. An important issue emerged regarding the clinical training of the supervisor. CHW trainees believed that those supervisors with social work or mental health backgrounds provided better support than nursing supervisors.

### Familiarity with the organization

Finally, participants observed that deployment was easier if CHWs had previous experience working in the CHC or on a quality improvement collaborative team in their organization. CHWs new to the CHC encountered the barrier of learning to navigate the organization in addition to demonstrating their value and establishing their place on the health care team.

## Discussion

This course was designed to train CHWs to serve diabetic patients in a disease management intervention designed to improve process and outcome measures. We believe that our evaluation provides useful lessons on the training process and content as well as strategies for deployment to the workplace.

Similar to previous studies [10–12], CHWs reported improvements in knowledge after training. CHWs reported improvement in all but one module and significant improvement in more than half of the modules. The greatest improvement occurred in the module on evaluation and empowerment skills, perhaps the most important module for the prescribed intervention involving self-management goal setting. There was no significant score improvement in the module on diabetes self-management. This finding might be explained by previous training on self-management, which took place during the Phase 1 health disparities collaborative on diabetes in which these CHCs (and seven CHW candidates) were involved. Several modules for which we observed non-significant increase in CHW knowledge (nutrition, mental health and relationship building) were identified by CHWs and their supervisors as areas in need of ongoing training.

**Table III.** Characteristics and content of encounter data (N = 1198)

Encounter characteristics	N (%)
Type of encounter	
Group	70 (6)
Individual	541 (45)
Telephone	587 (49)
Length of encounter	
15 minutes or less	585 (49)
16–30 minutes	405 (34)
More than 30 minutes	208 (17)
Education strategies <sup>a</sup>	
General diabetes education	469 (39)
Healthful eating	350 (29)
Exercise	245 (21)
Glucose testing	228 (19)
Medication adherence	150 (13)
Self-management goal	
None	445 (37)
Keeping/scheduling appointment	190 (16)
Monitoring blood sugar	179 (15)
Diet	158 (13)
Exercise	113 (9)
Other	113 (9)

<sup>a</sup>Total will be more than 100% as multiple responses could be selected.

Results of pre/post-knowledge assessment may also have been influenced by the rather high educational attainment of CHWs participating in the study. Collecting pre- and post-assessments were valuable and having additional information from semi-structured group and individual interviews was also important to develop a deeper understanding of CHW needs and experiences.

While we anticipated many of the findings in our planning and worked to address them prospectively, group interviews clearly indicate that more concentrated effort was needed to successfully prepare health care teams to accept CHWs. These included pre-work with administration, development of a job description, scope of duties and supervisor training. Likewise, while periodic conference calls with additional training occurred, CHWs felt that there were insufficient contact hours following the initial 48-hour course. Additional ongoing training and contact with CHWs after initial training may have reduced the role drift and improved the integration of CHWs as members of the health care team. One other study points to challenges with intervention fidelity during deployment, with CHW attrition, job satisfaction, low self-confidence in knowledge and skills as educators and difficulty in managing large caseloads all noted as barriers [29].

Utilizing part time CHWs who were also trained as medical assistants or medical interpreters, regardless of the amount and quality of their training, may have increased role confusion. For community-based organizations interested in developing CHWs as members of the health care team, it is recommended that organizations plan for full-time employment to decrease role confusion and dilution of impact. Moreover, strict protocols for CHWs should be instituted including a well-defined scope of duties, procedures for identifying patients in most need of services and implementation of worksheets for structuring encounters. Ongoing training and contact with CHWs should incorporate continuous use of encounter form data to guide CHW activities.

The development and implementation of the Encounter Form served as a unique and ongoing monitoring tool for the training and integration of

CHWs within teams. As such, the field data informed the need for additional training on patient outreach, non-adherence to treatment and documentation following patient encounters. Individual interviews with CHWs and supervisors helped to identify and address important implementation obstacles. For example, this form was vital for assessing CHWs productivity, providing opportunities to redirect CHWs in their efforts to support patients.

CHW supervisor training is also essential. Moreover, supervision may be more successful if located in social services rather than nursing or clinical departments. CHWs often must address the social determinants of health as well as the medical needs of their patients. The issues of setting appropriate boundaries and avoiding burnout were most appropriately handled utilizing a social work approach.

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## Recommendations

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Based on the results of individual and group interviews, a series of improvement cycles during the intervention, and the analysis of Encounter Forms, we propose the following recommendations for other organizations. First, assess organizational readiness to implement practice redesign that includes a CHW within practice teams and develop a clear scope of duties while obtaining ‘buy in’ from leaders and clinicians with whom a CHW will be working. Identify supervisors with the skills to support CHWs and to reinforce clear boundaries and expectations. In our experience, social work supervisors were more successful in this role. Second, redesign curricula to outline expectations prior to the start of the design training sessions that are 3–4 hours in length and sequence training to include all core competency trainings first, followed by condition specific trainings. Third, design workshops that include reasonable amounts of knowledge with heavy emphasis on skill development and reinforcement. Fourth, identify faculty who have continuity across modules and model teamwork between a content expert clinician and a CHW co-instructor. Finally, lengthen the supervisor training and design some

workshops to be held jointly for both CHW trainees and supervisors.

The role of CHWs in health system reform efforts is expanding from outreach, enrollment and health promotion to include direct efforts to assist patients living with chronic conditions [30–32]. Curriculum to train CHWs can be expanded to include core skills that consist of knowledge (e.g. medical information and resources), logistics (e.g. transportation and interpretation) and interpersonal skills (e.g. deep knowledge of patients' language and culture) [33]. Our study found that CHWs can assimilate a broad skill set to play a comprehensive role as a valued member of the health care team. CHWs can be used in many settings to reduce and eliminate health disparities, particularly disparities related to chronic conditions. It is for this reason that evaluations need to assess the content of training and continuous education of CHWs, especially since there is growing evidence that CHWs can help patients in their self-management activities [34, 35].

This study has its limitations. It represents a singular effort to develop a diabetes-specific CHW training course that was offered to a single cohort of 10 participants. It was offered in a single state to CHWs working in one setting, CHCs. Thus, it may not be generalizable to other settings. However, CHCs from different geographical locations within the state were included in the training. The qualitative analysis of the interviews was semi-structured and may not reflect all of the nuances to be gleaned from the group interviews.

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## Conclusions

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Providing CHW training in isolation, prior to deployment is insufficient for successful integration of CHWs into diabetes care teams. Collection and analysis of field data provide unique opportunities to evaluate training and deployment effectiveness, beyond pre/post-knowledge and skill assessments. These data, combined with ongoing interviews, help to identify necessary changes in organizational culture to lead to successful implementation of care models, which includes CHWs.

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## Conflict of interest statement

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No conflicting or competing interests.

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