

# Intervention IP-057: Diabetes Care in American Samoa (DCAS)

## Summary

This intervention aims to improve diabetes management among adult American Samoans with type 2 diabetes. Participants were randomized to receive either the culturally-adapted intervention led by a primary care team, including a nurse and community health worker (CHW), or usual care treatment, which was based on algorithms using patient information to develop risk profiles, which determined frequency and intensity of patient care provided in the intervention. Participants who received the culturally-adapted intervention had lower HbA1c at 12 months than participants who received usual care.

---

## Overview

---

### Purpose of Intervention:

Utilize a culturally-adapted nurse and community health worker team primary-care based approach to improve diabetes management among adult Samoans in American Samoa

### Intervention Type:

Research-Tested — *Interventions with strong methodological rigor that have demonstrated short-term or long-term positive effects on one or more targeted health outcomes to improve minority health and/or health disparities through quantitative measures; Studies have a control or comparison group and are published in a peer-review journal; No pilot, demonstration or feasibility studies.*

## Intervention Details

### Intervention was Primarily Driven, Led, or Managed by:

Academic/Clinical Researchers Only

### Citations:

- DePue JD, Rosen RK, Seiden A, Bereolos N, Chima ML, Goldstein MG, Nu'usolia O, Tuitele J, McGarvey ST. Implementation of a culturally tailored diabetes intervention with community health workers in American Samoa. *The Diabetes educator*. 2013 Nov-Dec;39(6):761-71. Epub 2013 Sep 19. Relevance: Main Intervention
- DePue JD, Dunsiger S, Seiden AD, Blume J, Rosen RK, Goldstein MG, Nu'usolia O, Tuitele J, McGarvey ST. Nurse-community health worker team improves diabetes care in American Samoa: results of a

randomized controlled trial. Diabetes care. 2013 Jul;36(7):1947-53. Epub 2013 Feb 7.

Relevance: Post-Intervention Outcomes

- Hamid S, Dunsiger S, Seiden A, Nu'usolia O, Tuitele J, DePue JD, McGarvey ST. Impact of a diabetes control and management intervention on health care utilization in American Samoa. Chronic illness. 2014 Jun;10(2):122-34. Epub 2013 Oct 1.

Relevance: Evaluations and Assessments

### **Adaptation of Another Research-based Intervention:**

Yes

### **Name of Original Intervention:**

Project Sugar (PS)

### **Name of Original Intervention Author:**

Tiffany L. Gary tgary@pitt.edu

### **URL to original Intervention:**

<https://wiki.duke.edu/download/attachments/14125183/Project%20Sugar.pdf>

### **Citations:**

- Gary TL, Batts-Turner M, Bone LR, Yeh HC, Wang NY, Hill-Briggs F, Levine DM, Powe NR, Hill MN, Saudek C, McGuire M, Brancati FL. A randomized controlled trial of the effects of nurse case manager and community health worker team interventions in urban African-Americans with type 2 diabetes. Controlled clinical trials. 2004 Feb;25(1):53-66.

### **Intervention Primary Outcomes were comparable to the original:**

Yes

## **Contact Information**

### **Primary Contact Name:**

Stephen T McGarvey

### **Primary Contact Affiliation:**

Department of Epidemiology and International Health Institute, Brown University School of Public Health Preventive Medicine, the Miriam Hospital, Providence, Rhode Island, USA & Alpert Medical School at Brown University, Providence, Rhode Island, USA

### **Intervention URL:**

Not available

### **Primary Contact Email:**

stephen\_mcgarvey@brown.edu

### **Primary Contact Phone Number:**

---

## Results

---

### Intention

**Improve minority health or the health of other populations with health disparities (e.g. rural populations, populations with low SES)**

### Intervention Primary Outcome:

HbA1c level

### Intervention Secondary Outcome:

Health care utilization

### Key Findings:

HbA1c was 0.53% lower among CHW participants at the end of treatment than among the usual care group, controlling for confounders ( $b = -0.53$ ;  $SE = 0.21$ ;  $P = 0.03$ ). Those in the CHW group had twice the odds of making a clinically significant improvement in HbA1c of at least 0.5% compared to those in usual care ( $OR = 2.07$ ; 95% CI, 1.00–4.34).

The adjusted incidence rate ratio (RR) for primary care visits was higher in the CHW group relative to the usual care group ( $RR=1.71$ ; 95% CI, 1.25–2.33). The number of ED visits in the prior year modified the intervention effect on ED visits during the intervention ( $p=0.18$ ). There were fewer ED visits among the CHW subgroup who had more ED visits in the prior year. Each additional ED visit in the prior year was associated with a 20% (95% CI: 12%, 26%) reduction in the relative risk of ED visits during the intervention year. Increased primary care physician utilization was associated with greater decreases in HbA1c ( $b= -0.10$ ,  $SE=0.04$ ,  $p=0.01$ ).

### Statistical Method Used:

Mixed effects longitudinal regression models, intent to treat analyses, and longitudinal regression model with generalized estimating equations accounting for clustering.

### Was statistical method used to analyze data from original Intervention comparable to the original:

Yes

## Evaluations and Assessments

---

### Were Any of the Following Assessments Conducted (Economic Evaluation, Needs Assessment, Process Evaluation)?:

Yes

- **Economic Evaluation:** We assessed cost-effectiveness of the CHW intervention against usual care by collecting clinical, utilization and cost data over two years, and modelling quality-adjusted life years (QALYs) gained based on HbA1c improvements in the CHW group. The CHW group mean increase was \$594, but 0.05 QALYs. The incremental cost-effectiveness ratio (ICER) for CHW group compared to

usual care control was \$1,121 per percentage point HbA1c reduced and \$13,191 per QALY gained; intervention was cost-effective.

- **Process Evaluation:** While developing intervention materials and training of the CHWs, we held frequent informal discussions about approach and intervention language, goals and illustrations. We tested CHWs diabetes knowledge, measurements and techniques and trained project staff. Progress notes were approved by the Nurse for entry into participants' chart. A focus group with CHWs and a nurse was done at end of intervention along with discussions with hospital and health center staff on what did or did not work.

---

## Demographic and Implementation Description

---

### Diseases, Disorders, or Conditions:

Type 2 Diabetes

### Race/Ethnicity:

Native Hawaiian or other Pacific Islander

### Populations with Health Disparities:

People with Lower Socioeconomic Status (SES), Racial and Ethnic Minority Populations, Underserved Rural Communities

### Age:

Adults

---

## Socio-demographics / Population Characteristics

---

### Community Type:

Rural, Villages on the main island of Tutuila, American Samoa

### Other Populations with Health Disparities:

People with Low Education

### Geographic Location:

American Samoa

### Socio-Economic Status:

Low SES

---

## Minority Health and Health Disparities Research Framework

---

		Levels of Influence			
		Individual	Interpersonal	Community	Societal
<b>Determinant Types</b>	<b>Biological</b>				
	<b>Behavioral</b>	✓	✓		
	<b>Physical / Built Environment</b>				
	<b>Sociocultural Environment</b>				
	<b>Health Care System</b>	✓	✓	✓	

## Community Involvement

The community's role in different areas of the Intervention (Choices are "No Role", "Participation", and "Leadership"):

### **Design:**

Participation

### **Dissemination:**

Participation

### **Evaluation:**

Participation

### **Implementation:**

Participation

### **Outreach:**

Participation

### **Planning :**

Participation

### **Recruitment:**

Participation

### **Sustainability:**

Participation

---

## Characteristics and Implementation

---

### **Intervention Focus Area:**

Behavior Change, Patient-Clinician Communication

**Disease Continuum:**

Tertiary Prevention

**Delivery Setting:**

Clinic / Health Care Facility, Home

**Mode of Delivery:**

In-person

**Who delivered the Intervention?:**

Community Health Worker/Promoters, Healthcare Professional (Physician, Nurse, Technician)

## **Conceptual Framework**

**Intervention Theory:**

Precede-Proceed model

**Intervention Framework:**

PRECEDE-PROCEED

## **Implementation**

**Intervention Study Design:**

Cluster Randomized Controlled Trial

**Targeted Intervention Sample Size:**

268

**Actual Intervention Sample Size:**

268

**Start Year:**

2009

**End Year:**

2011

## **Intervention Exposures**

**Duration of Intervention/How Long it Lasted:**

10-12 months

**Frequency of Intervention Delivery:**

Frequency depended on risk profile of participants, ranging from every week to every three months (answer also applies to #13; number of sessions varies)

**Number of Sessions/Meetings/Visits/Interactions:**

More than 10 Sessions

**Average Length of Each Session/Meeting/Visit/Interaction:**

1-2 Hours

**Format of Delivery:**

Dyad/Group of two (e.g. participant & partner; mother & child), Group (e.g. Community leaders), Individual

**Highest Reading Level of Intervention Materials Provided to Participants:**

Grade 4-5

---

## Adaptations and Modifications

---

**Were modifications made?**

Intervention Elements	Modified
Content	Yes
Context	Yes
Implementation	Yes
Funding	Yes
Organization	No
Participants	No
Providers	No
Sociopolitical	No
Stages of Occurrence	Yes

**Modification Details**

	Explanation
<b>Content</b>	
Adding Elements	<p>To facilitate CHWs' teaching, the project team developed flip charts, modeled on the National Diabetes Education Program flipcharts for diabetes prevention and adapted for the 8 topics listed previously. The CHW flipchart pages included background information, talking points, and a small view of the corresponding participant's page, while the participants' flipcharts included parallel pages with bigger images and minimal text. Although project staff and many Samoans are bilingual, flipcharts included both languages, as many speakers shift from one language to the other.</p> <p>Cultural features identified during the formative research were incorporated, such as motivational quotes from focus groups, healthy local foods and exercise, examples of barriers to medication taking, sources of stress, and effective coping strategies. Group visits also utilized flipchart content, as well as other teaching aids in Samoan language.</p>
<b>Context</b>	
Format, Personnel, Setting	We adapted the Project Sugar intervention to the local Samoan social, cultural and economic context. This required broadening the range of people selected and trained to be CHWs, the reality of how Samoan physicians and nurses cared for people with diabetes, and the level of health literacy about type 2 diabetes among the participants.
<b>Implementation</b>	
Delivery	More frequent visits were planned for those with higher HbA1c levels, due to the range of HbA1c levels we found among those with a diagnosis of type 2 diabetes. This was implemented with a clearly defined algorithm as explained in full detail in our publications.
<b>Funding</b>	
Federal Government	We were able to receive an administrative supplement from NIH/NIDDK that allowed us to take longer to perform the formative work and then adapt the intervention to the Samoan context.
<b>Stages of Occurrence</b>	
Planning/Pre-implementation/Pilot	We performed detailed and lengthy formative work using qualitative methods of focus groups with type 2 diabetes patients and families, in-depth individual interviews with some patients, and with health care providers, a certified Samoan diabetes educator, and nutritionists in American Samoa. This research led us to adapt and expand, and more thoroughly deepen the context of the intervention for the sociocultural and economic context of American Samoa.



---

# Impact, Lessons, Components

---

## Produced an impact or change beyond the primary or secondary outcome:

Yes

The American Samoa Dept of Health was able to hire two of our CHWs and the nurse to positions as outreach workers. They were able to influence others about diabetes care and educate patients in the community.

## Essential Aspects for Success:

Individual CHW visits to patients' homes and detailed and flexible goal setting conversations during the intervention

## Intervention Impact:

The American Samoa Dept of Health was able to hire two of our CHWs and the nurse to positions as outreach workers. They were able to influence others about diabetes care and educate patients in the community.

## Lessons Learned

### Key Lessons Learned and/or Things That Could be Changed or Done Differently:

1. Flexibility of scheduling individual visits was necessary especially for the high-risk participants.
2. Health literacy must be assessed more clearly to maximize the intervention.
3. Goal setting between CHWs and patients was crucial.

## Insights Gained During Implementation

Insight Category	Insight Description
Cost of Implementing or Sustaining	The local Dept of Health was not able to sustain the intervention due to insufficient buy-in from leadership due to competing budget demands.
Equipment / Technologies	We were unprepared for the difficulty that participants had in purchasing portable glucometers and test strips.
Training / Technical Assistance	In the formative stage, we met with local diabetes care providers and offered updated training about the levels of blood glucose they should try to achieve with their patients. There is a need for regular continuing medical education for local diabetes care providers.
Staffing	We found that motivated individuals can be CHWs regardless of prior formal education and health training.

## Intervention Components

### Intervention Has Multiple Components:

Yes

### Assessed Each Unique Contribution:

No

---

# Products, Materials, and Funding

---

Expertise, Partnerships, and Funding Sources

	<b>Used for Implementation</b>	<b>Needed for Sustainability</b>
<b>Expertise</b>		
<b>Clinical Care</b>	Yes	Unknown
<b>Patient Navigation</b>	Yes	Unknown
<b>Health Education / Health Literacy</b>	Yes	Unknown
<b>Community mobilization, community organization/coalition building</b>	Yes	Unknown
<b>Key informants, Tribal leaders, Community gatekeepers</b>	Yes	Unknown
<b>Research/Data science</b>	Yes	Unknown
<b>Behavior Change Theory &amp; Practice</b>	Yes	Unknown
<b>Qualitative Formative Research</b>	Yes	Unknown
<b>Epidemiology and Anthropology among Samoans</b>	Yes	Unknown
<b>Chronic Care Model &amp; Patient-doctor communications</b>	Yes	Unknown
<b>Partnerships</b>		
<b>Health care facilities (local clinics)</b>	Yes	Unknown
<b>Government agencies (city/state/county health department, law enforcement/criminal justice agencies)</b>	Yes	Unknown
<b>Community groups (e.g. faith-based organizations, barbershops, beauty-salons, laundromats, food markets, community centers, cultural associations, tribal groups)</b>	Yes	Unknown
<b>Political leaders</b>	Yes	Unknown
<b>Universities</b>	Yes	Unknown
<b>Funding Sources</b>		

	Used for Implementation	Needed for Sustainability
Public funding (e.g., federal, state or local government)	Yes	Unknown
Private funding (e.g., foundations, corporations, institutions, facilities)	Yes	Unknown

**Product/Material/Tools**

[illegible]

	<b>Tailored For Language</b>	<b>Language(s) if other than English</b>	<b>Material</b>
Brochures/Factsheets/Pamphlets	Yes	Samoan	Attachment available for request at the bottom of the page.
Brochures/Factsheets/Pamphlets	Yes	Samoan	Attachment available for request at the bottom of the page.
<b>Measurement Tools</b>			
Non-Standardized Instruments/Surveys/Questionnaires	Yes	Samoan	Attachment available for request at the bottom of the page.
Non-Standardized Instruments/Surveys/Questionnaires	Yes	Samoan	Attachment available for request at the bottom of the page.

## **Implementation Materials and Products**

	<b>Material</b>
<b>Implementation/Delivery Materials</b>	
CHW Manual topics 2 Healthy eating	Attachment available for request at the bottom of the page.
CHW Manual topic 3 being active	Attachment available for request at the bottom of the page.
CHW Manual topic 4 Monitoring	Attachment available for request at the bottom of the page.
CHW Manual topic 5 Taking medication	Attachment available for request at the bottom of the page.
CHW Manual topic 6 Reducing risks	Attachment available for request at the bottom of the page.
CHW Manual topic 7 Healthy coping	Attachment available for request at the bottom of the page.
CHW Manual topic 8 Problem solving	Attachment available for request at the bottom of the page.
Training/Operations manual	Attachment available for request at the bottom of the page.
<b>Implementation/Output Materials</b>	
No Implementation/Output Materials provided.	

## **Articles Related to Submitted Intervention**

	Article
<b>Reports/Monographs</b>	
Final Project Report to NIH for grant award period	Attachment available for request at the bottom of the page.
<b>Additional Articles</b>	
social context	Attachment available for request at the bottom of the page.
Evaluation	<a href="https://diabetesjournals.org/care/article/36/7/1947/32971/Nurse-Community-Health-Worker-Team-Improves">https://diabetesjournals.org/care/article/36/7/1947/32971/Nurse-Community-Health-Worker-Team-Improves</a>
Methodology	Attachment available for request at the bottom of the page.
Cost-related	Attachment available for request at the bottom of the page.
Qualitative findings	Attachment available for request at the bottom of the page.
Qualitative findings	Attachment available for request at the bottom of the page.
Qualitative findings	Attachment available for request at the bottom of the page.
Qualitative findings	Attachment available for request at the bottom of the page.
Evaluation	Attachment available for request at the bottom of the page.
Evaluation	Attachment available for request at the bottom of the page.

## **Materials Available for Request**

- Script for Radio Spot April 29 08.doc
- Recruitment Script for Calling Subjects April 30 2008.doc
- Brown & AS IRB apprvd Consent Main study transl 6-25-08.doc
- NDEP-67 Four steps to control your diabetes for life in Samoan language.pdf
- flip chart #1 intro pt pages.ppt
- flip chart #2 healthy eating pt pages.ppt
- flip chart #3 Being Active pt pages.ppt
- flip chart #4 monitoring pt pages.ppt
- flip chart #5 taking medication pt pages.ppt
- flip chart #6 reducing risk pt pages.ppt
- flip chart #7 healthy coping pt pages.ppt
- flip chart #8 problem solving- patient.ppt
- Baseline Interview 4-1-09 Final version.docx



- 12-Mo Follow-up Interview final.doc
- DCAS Flip Chart CHW Topic 2 Healthy eating.ppt
- DCAS Flip Chart CHW Topic 3 Being active.ppt
- DCAS Flip Chart CHW Topic 4 Monitoring.ppt
- DCAS Flip Chart CHW Topic 5 Taking medication.ppt
- DCAS Flip Chart CHW Topic 6 Reducing risks.ppt
- DCAS Flip Chart CHW Topic 7 Healthy coping.ppt
- DCAS Flip Chart CHW Topic 8 Problem solving.ppt
- DCAS Flip Chart CHW Topic 1 Intro.ppt
- Final Progress Report Sept 2013 DCAS 9-20-13.doc
- AJPH DePue et al DCAS Nov 2010 print.PDF
- The Diabetes Educator-DCAS Implementation DePue et al print pub 12-20-13.pdf
- CEA Samoan T2DM CHW intrvntn publshd 3-5-19.pdf
- Stewart et al Medication taking beliefs print pub Mar 2013.pdf
- Held et al depression & diabetes pub Nov 2010.pdf
- Elstad et al 2008 living w ma'i suka Prev Chron Dis.pdf
- Rosen Anthro Perspectives on Diabetes & Obesity from CHW intervention May 2013.pdf
- DCAS Utilization print pub Chronic Illness 5-13-14.pdf
- DCAS long-term diabetes control e pub Preventing Chronic Disease 10-26-15.pdf

Request Materials

Enter Email Address

Request