

# **Cost-Effectiveness and Social Return on Investment Analyses in the Care of Type II Latino Diabetic Adult Patients from Low-Income Communities through Group Care vs. Standard Care**

**By Jade Sanders**

M.D./Masters Expected 2018 - UCLA PRIME/CDU Medical Education Program  
Charles R. Drew University of Medicine and Science  
David Geffen School of Medicine at UCLA  
GE-NMF Primary Care Leadership Program Scholar

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## **Abstract**

The American Diabetes Association recommends that all patients with Type II Diabetes see their primary care physician on a quarterly basis and obtain annual visits with an ophthalmologist and podiatrist. However, as many of the diabetic patients seen at St. John's Well Child and Family Center (SJWCFC) will remain uninsured in spite of the Affordable Care Act their access to care is limited. As a Federally Qualified Health Center (FQHC), SJWCFC is faced with the task of managing the care of these patients despite limited funding sources.

Over the past few years, the diabetes group care model has been implemented at three of SJWCFC's clinic sites. This preliminary analysis began a prospective study of one of their clinic sites to determine the cost-effectiveness and social return on investment of their diabetes group care model. It seeks to delineate the biophysical benefits of group care for the management of a low-income Latino Type II Diabetes population, quantify the costs associated with maintaining weekly group care, and determine its qualitative outcomes in managing this particular subset of Type II Diabetic patients in comparison to standard care alone. Preliminary two month data reveals a decrease in the number of patients with HbA1c values >7% and NFBS values > 180 mg/dl amongst those patients who have attended at least one group care class. In subsequent work, this study hopes to bolster study sample size and review referral and hospitalization rates as outcomes.

**Keywords:**

Federally Qualified Health Center, Type II Diabetes management, group care, cost-effectiveness, social return on investment, low-income populations

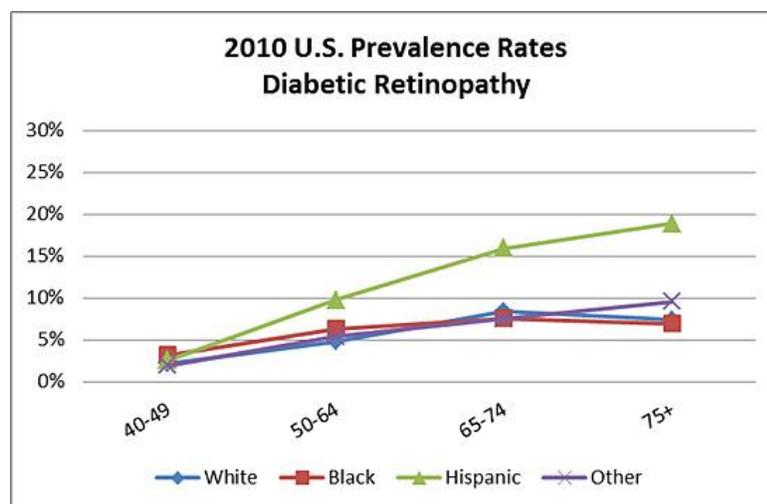
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## **Introduction**

In 2012, it was reported that 29.1 million people (9.3% of the US population) have diabetes [9]. Of those 29.1 million people, 24.6 million are 45 and older [9]. Between the years 2010-2012, racial and ethnic minority groups had much higher percentages of people diagnosed with diabetes. For populations of people aged 20 years and older, 12.8% of Hispanics and 13.2% of Non-Hispanic blacks compared to 7.6% of the Non-Hispanic whites were diagnosed with diabetes. Additionally, 1.3 million people aged 45 and older were diagnosed with diabetes in 2012.

With the prevalence of Type II Diabetes rising in recent years, the estimated total diabetes cost in the US rose to \$245 billion in 2012 [9], with \$176 billion occurring as direct medical costs and \$69 billion occurring as indirect costs (disability, work loss, and premature death). The Centers for Disease Control (CDC) reports that the medical costs for people with diabetes are twice as high as for people without diabetes [9]. To combat these high costs of care in this population of patients, the group care model has been adopted in a variety of healthcare settings. For example, Katon et al. found a significant reduction in total health care costs among Type II Diabetes patients that participated in a stepped-care intervention to treat major depression after two years, but not yet after 12 months [8]. This is an important finding as among people with diabetes, depression is associated with 50-75% increases in health service costs [7]. Additionally, those who did not participate in the stepped-care intervention in comparison to those who did participate had a lower mean age, higher probability of medical specialty care use, higher probability of comorbid heart disease, higher mean HbA1c levels, and higher probability of having no HbA1c within the past year [7].

Diabetes complications were the strongest predictor of total costs [11]. Accordingly, 5.3 million people aged 18 and older have diabetic retinopathy, a complication that was shown to be most prevalent in the aging Latino population [10]. Additionally, 71% of adults, aged 18 years or older with diabetes, had blood pressure  $\geq 140/90$  mmHg or used prescription medication to lower their blood pressure [9]. This is of concern as diabetic patients and patients with high blood pressure are at greater risk of developing chronic kidney disease (CKD) and approximately 1 of 3 adults with diabetes and 1 of 5 adults with high blood pressure has CKD [10].



Source 10: Centers for Disease Control and Prevention- Diabetes Fact Sheet

Yet, Type II Diabetes is a chronic condition that can be prevented with healthy eating and exercise. Even after being diagnosed with Type II Diabetes it can be managed well with healthy eating and exercise in addition to medications. To prevent complications including: cardiovascular disease, stroke, retinopathy, nephropathy, and neuropathy it is essential to have Type II Diabetes under control. To establish and maintain controlled Type II Diabetes, patient education and regular visits with a primary care physician concerning diabetes management are critically important in the ongoing care of diabetic patients.

Various models have been developed in recent years to provide the most effective care to patients with Type II Diabetes. One particular model of interest is the group care model. This model facilitates a group setting to educate Type II Diabetic patients about their condition and lifestyle changes that can help them to better manage it. While the specific structure of these group care settings often differ, they generally consist of a time to obtain patient vitals including: weight, blood pressure, and fasting/non-fasting blood glucose, deliver diabetes-related education, and conduct physical activity. Throughout this time, patients with specific concerns and needing to see a physician are seen via individual in-class appointments.

Although many group care models have not been developed to directly address depression associated with having a chronic illness, depression remained strongly associated with increased costs at all levels of diabetes severity [11]. Despite this, offering the general structure of the group care model to Type II Diabetes patients have proven effective in other ways. It has been shown to reduce emergency department visits, visits to specialists, hospital admissions, and the associated costs of care. A 2008 study involving inadequately insured minority adult patients showed group care patients to have a 34.7% increase in outpatient charges, 49.1% lower emergency department expenditures, and 30.2% lower total expenditures compared with those of the control group [2]. Additionally, previous systematic reviews concerning the effectiveness of group care for adult diabetic patients have shown positive benefits of group care including reductions in HbA1c, a 3-month marker of blood glucose levels [1]. One study consisting predominantly of  $\geq 45$  years old, obese, African-American women showed a decline in HbA1c in 76.9% of group care participants compared with 54.3% in the comparison group [3]. This reduction in HbA1c is a significant finding shown in multiple studies. Additionally, a meta-analysis of randomized controlled trials showed that for every year

increase in duration of group care there was a decrease drop in HbA1c of 0.25 [1]. However, this study did not contribute the effect to the frequency of group care [1].

Rather, some studies attribute the impact of group care to the time allocation of self-management education leading to reduced perceived barriers to behavior change and promotion of patient engagement in care [3]. Thus, simply measuring the cost-effectiveness of group care may not be sufficient to account for all of the value provided to participants and society as these educational benefits would not be included in that analysis. A more all-encompassing form of analysis is social return on investment, which places value on environmental and social impacts that are not currently reflected in conventional financial accounts. It thereby measures the non-monetary value gained relative to the resources invested and it is thereby more practical in informing the decision-making of organizations that seek to optimize their social and environmental impacts; often a defining characteristic in the mission of FQHCs.

## **Background**

St. John's Well Child and Family Center (SJWCFC) is a FQHC located in South Los Angeles. It has been providing healthcare to communities in South Los Angeles since 1954 when it was part of St. John's Episcopal Church. With the changing demographics of South Los Angeles since that time, SJWCFC presently services the needs of many uninsured Spanish-speaking Latino immigrants and their children. Despite the changes made to healthcare insurance via the implementation of the Affordable Care Act of 2010, many patients that SJWCFC services will remain uninsured. In spite of all this, SJWCFC continues to strive for healthcare excellence within these communities.

As a large percentage of their adult Latino patients have been diagnosed with Type II Diabetes, a few years ago a group care diabetes class was established. During the early stages of

the class's development, it was primarily run by a well-known and respected emergency medicine and internal medicine physician in the community, Dr. Louis C. Frayser. As a result of his long-standing work within the South Los Angeles community, SJWCFC named one of their clinic sites in his honor. Unfortunately, after playing an integral part of the group care diabetes class model at SJWCFC, Dr. Frayser passed away in September 2013. Since his passing, the group care class has been run in the same manner via the assistance of a few select physicians, yet no ongoing evaluation of the effectiveness of the class has taken place.

Thus, this study seeks to utilize previous and ongoing data collected concerning patients attending the group care diabetes class to determine its effectiveness in managing their low-income Latino adult Type II diabetes patients. Additionally, this study seeks to utilize the clinic's cost breakdown of visits, laboratory tests, and diabetic screenings to determine the cost-effectiveness in providing these group care classes. Based on the data analyzed in the study, the hope is to obtain information that can educate and guide the future direction and structure of the group care diabetes class at SJWCFC to better manage the health of this select population of Type II diabetics.

## **Methodology**

### **A. Establishing the Treatment Group (Group Care + Standard Care)**

*Goal: To conduct a retrospective review of data collected on group care diabetes class patients since the inception of the program to determine the program's effectiveness in managing the health of Type II Diabetes patients.*

As much of the previous data concerning the group care diabetes class was not available, a retrospective review was only able to be conducted for data gathered during the group care diabetes class from 05/07/14 – 07/02/14. However, there was

also some discontinuous data collected on the group care Diabetes Class held on 02/05/14, 02/26/14, 04/02/14, 04/09/14, and 04/16/14. This data was utilized only for those patients who were in attendance during the 05/07/14-07/02/14 time span as this information was not made available until the project was already partly underway.

With the limited amount of previous data, this study developed into one that seeks to begin an ongoing evaluation of the group care diabetes class rather than a retrospective evaluation.

*Revised Goal: A part of a longitudinal analysis, data concerning these patients will continue to be followed through the remainder of 2014 and beyond to gain greater insight into the lifestyle changes made in their long-term management of Type II Diabetes.*

**1. Established a set of inclusion criteria.**

- √ Ethnicity: Hispanic or Latino descent
- √ Income: Low-income
- √ Diagnosis: Type II Diabetes
- √ Home Clinic: St. John's Well Child and Family Center Williams Clinic
- √ Age: Adult aged 18+

**2. Established a set of exclusion criteria.**

- √ No HbA1c lab value reading since Jan. 2014

**B. Collect Relevant Data in the Care of Type II Diabetics**

I utilized the recorded and collected vitals including: weight, blood pressure, and fasting blood glucose (FBG) or non-fasting blood glucose (NFBG) from group care Diabetes Class from 05/07/14 – 07/02/14 at the Williams Clinic.

√ **Fasting/Non-Fasting Blood Glucose Reading, Blood Pressure, and Weight:**

- Patients presently included in the study were those who had a FBG/NFBG, BP, and Weight on record during the Diabetes Class group care that occurred from 05/07/14 – 07/02/14 at Williams Clinic.
- Patients lacking a FBG/NFBG, or BP, or Weight during this time period were excluded from the study.

√ **Utilize the Electronic Medical Records System to Determine HbA1c of Diabetes Class Group Care Participants**

√ **Utilize the Electronic Medical Records System to Determine Advanced Stage Diabetes**

**(Nephropathy, Neuropathy, Retinopathy, or Diabetic Amputation)**

√ **Utilize the Electronic Medical Records System to Determine Referrals and Hospitalization Rates (Future)**

- From 05/07/14, track the number and types of referrals and hospitalizations both control patients and treatment group patients have related to their diabetic care.

**C. Collect Data Concerning the Inputs (Costs/Investments) and Outputs (Outcomes)**

**Measurable in the Care of Diabetic Patients (Future)**

Utilize the financial records and resources of the Financial Department at SJWCFC to delineate the costs associated with caring for their Type II Diabetes patients.

**1. Determine the measurable inputs for the control group and treatment group.**

- Number of Visits & Visit costs
- Number of Labs & Laboratory costs
- Screening costs
- Medication costs

**2. Determine the measureable outputs for the control group and treatment group.**

- HbA1c values
- Number of Referrals & Referral costs
- Number of Hospitalizations & Hospitalization costs

**Results**

1. Based on a review of data collected for the group care diabetes class from 05/07/14-Present:
  - 55 low-income Latino Type II Diabetes patients aged 18 and older with a home clinic of Williams’ Clinic had attended at least 1 group care class.
2. Based on review of the electronic medical record of the 55 patients who attended the group care diabetes class from 05/07/14 – Present:
  - 15 patients did not have a HbA1c lab value on record since Jan. 2014 and thus were excluded from the study.

**Study Participant Results**

- Data collected thus far on patients who have attended the group care Diabetes Class since 05/07/14.

- Data for these patients, from prior group care Diabetes Classes held on 02/05/14, 02/26/14, 04/02/14, 04/09/14, and 04/16/14, if found were included in these results.

	Control Group	Treatment Group
<b>Demographics</b>		
# of Study Participants	40	40
Females; Males	32 females; 8 males	32 females; 8 males
Age	57 years old ; Range: 39-79	57 years old ; Range: 38-77
<b>HbA1c</b>		
Most Recent HbA1c > 7	30 patients (23 females, 7 males)	19 patients (15 females, 4 males)
<b>Blood Sugar Levels</b>		
FBS $\geq$ 130	7/12	25/34
NFBS $\geq$ 180	20/32	12/28
<b>Types of Complications</b>		
Neuropathy	8	7
Nephropathy	2	4
Retinopathy	1	4
Ulcer/Amputation	1 (Ulcer)	0
<b>Number of Complications</b>		
0-1 Complications	12	15
$\geq$ 2 Complications	0	3

### **Utilize the Electronic Medical Records System to Determine Referrals and Hospitalization Rates**

- A greater in-depth review of the electronic medical records of these patients will need to proceed on an ongoing basis.

### **Collect Data Concerning the Inputs (Costs/Investments) and Outputs (Outcomes)**

#### **Measurable in the Care of Diabetic Patients**

- The cost effectiveness analysis portion of this project will proceed after the evaluation of the management of study participants has been ongoing for 12-24 months.

### **Discussion**

This study began as part of my GE-NMF Primary Care Leadership Scholar placed at St. John's Well Child and Family Center from June 9, 2014 – July 18, 2014. As part of this 6-week

placement, I was expected to develop and implement an independent service learning project. Thus, in the first two weeks of the internship placement, I spent time getting to know the operations and programs of the organization. A program of the organization that was presented to me as having opportunities for evaluation was the group care diabetes class.

The group care diabetes class has had a presence at SJWCFC for at least the past two years. Since its initiation, longitudinal evaluation of the program has not taken place. However, this class continues to require utilization of many of the organization's resources. As maintaining funding for programs and operations of FQHCs and similar non-profit organizations is often challenging, it is important to ensure that financial resources are utilized in the most effective way possible. Additionally, with the economic costs of healthcare to this nation under deep scrutiny, these organizations are being expected to do more and more with less and less financial support. Thus, I saw this project as the perfect opportunity to begin an evaluation of this program's cost-effectiveness in the care of its low-income Type II Diabetic Latino population.

Upon witnessing the general structure of the group care Diabetes class, I sought out resources that could assist in this project. At the beginning of each group care class, patients' vitals are recorded in a paper log. I was informed by much of the staff that these logs had been kept since the early stages of the class and that I would be able to have access to them. However, due to recent staff turnover, many of these earlier records have been unable to be located. Thus, while my initial project hoped to perform a retrospective analysis of the data collected since the initiation of this class, the records could only be located from 05/07/14. This placed a drastic limitation on the present outcomes of the project as other research has shown that more long-term analyses are needed to show significant benefits in the management of chronic disease. Thus, based on the present data the effectiveness of the group care diabetes class cannot be

determined and a more long-term evaluation needs to take place prior to determining the class' effectiveness.

Another detriment of the present study is that relying on the past data collection methods have limited the scope of measurements to be evaluated. As much of the data collected from the class was only collected on paper logs, information concerning attendance prior to 05/07/14 cannot be determined. Although some of the present patients have been attending the class for a long time, it cannot be established with certainty the exact duration. Thus, their progress, which may be partly contributable to their participation in the class, can neither be determined nor compared to their baseline data prior to the group care diabetes class. Therefore, a major limitation of this study is that it cannot take into account any of the previous changes made in the management of these diabetic patients' conditions. Additionally, as only individual patient visits can be billed, the only data from the group care diabetes class that is entered in the electronic medical records system relates to those patients who had an in-class appointment with the physician.

As many of these obstacles were not foreseen by the staff and were present throughout the duration of my placement, this project rather than reviewing and evaluating the past impact of the group care diabetes class, developed into one that lays the groundwork for potential future evaluation. Despite this short time frame, I was still able to see some positive trends. Amongst the group care treatment group, there was a decreased number of patients with HbA1c readings > 7 and a reduced percentage of non-fasting blood glucose readings from 62.5% to 43% for those in the group care treatment group. Through either my ongoing involvement in the project or involvement of a future intern, this project could develop into one that shows significant benefits in group care and provides great insight as to how to better structure and monitor the impact of

the group care diabetes class. This is significant research as it has the potential to influence the development of a more structured and monitored group care diabetes class that can be more impactful for a larger proportion of the organization's diabetic patients.

### **Recommendations**

Based on my observations and experiences working with this group care Diabetes Class, there are both positive benefits and opportunities for improvement. However, because many of the positive outcomes have not been continuously measured, much of the perspective of the group care diabetes class has remained subjective. Thus, my recommendation is to establish ongoing evaluation procedures that will make obtaining objective information concerning the outcomes of this class more feasible. By having a measurement system in place throughout this class, SJWCFC will be better informed of the effectiveness this class provides to the long-term management of their Type II Diabetic patients. These ongoing measurements can then be utilized to leverage further financial support that can lead to opportunities to provide beneficial services to a larger percentage of their patients.

In this short time frame that I have been involved, I have a few suggestions to offer concerning the structure of the class. The general structure of the class is certainly well-organized. However, I believe there needs to be a time-frame in which a cohort of patients can attend the class in order to prevent the class from becoming primarily a place of social gathering rather than education and health management. It is evident that many of the patients who have attended this class have established a social support network amongst themselves and the staff, however, for the duration of their time, it is uncertain if the class continues to provide valuable benefits in the management of their disease. Thus, I suggest establishing a long-term, potentially 1-2 year educational curriculum that covers all of the important topics related to the care of

diabetic patients and in which upon completion, patients graduate from the class. This decreases the amount of unnecessary overlap in the educational component and ensures that patients only remain in the class so long as it may provide an added benefit to them. If patients are properly managing their disease without the assistance of the class, there is no need to continue to offer these services to them, but rather better utilize these class resources to assist patients that are having trouble managing their disease on their own.

Another recommendation may be to change the frequency of the classes. If the curriculum is developed to take place over a long period of time, it would be important to balance the duration of the class with the frequency of the classes to encourage patients to become more self-motivated in their care. I think that if the more frequently you have the class, the more dependent patients become on the class to make the necessary changes for them, rather than actively engaging in the changes themselves. One idea is to have the classes more frequently in the beginning and then tailor off the frequency of the class towards the end of the curriculum. Thus, patients become less and less reliant on the class and more self-reliant to maintain the changes that can prove beneficial to their health.

Lastly, it may also be beneficial for the class to have a binder with dietary logs, exercise logs, and goal setting worksheets for class participants to complete. This will provide an avenue for staff to build further upon the knowledge gained by participants in a more streamlined fashion. It will also provide an opportunity for staff to understand areas of opportunity for further educational development.

Nonetheless, the consistent weekly voluntary participation of some patients in the group care diabetes class is evidence of the value they find in attending. It is clear that this class is a resource that they respect and enjoy being involved with. With this knowledge, it is important to

delineate what specific factors or components of the class most successfully engage these patients in the ongoing management of their diabetes and utilize that information to create a more effective group care diabetes class.

### **Conclusion**

The work of administrators and clinicians at FQHCs is highly demanding, yet necessary. To maintain organizational operations and move the mission of the organization forward, many staff members wear a variety of hats. As a result of this, there is often very little time to dedicate to the ongoing oversight of individual programs as opposed to the entirety of organization operations. It is often through additional staffing support and voluntary services that these projects can be completed. This however, does not diminish the value in providing these kinds of services. Rather, it is through these services and projects that ongoing changes leading to vast improvements in the care of patients and better utilization of organizational resources take place.

Through this experience I have learned that research takes much more than short-term dedication and individual involvement. Rather, in short-term research experiences when embarking on new projects, it is essential to establish a solid framework and foundation as to which the research can build upon. Without this solid working foundation in which to gather and collect data, the research is often left with holes that can be to its detriment. Additionally, it is important to not set out to complete the entirety of a project during this short time frame, but assess what can be done with the presently available resources. As resources are constantly changing, it is important to be prepared to develop creative solutions to overcome obstacles that present throughout the development of the project.

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