

# The Impact of Planned Visits on Patients with Type 2 Diabetes Mellitus

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**Objectives:** To investigate whether planned visits improve glycemic, blood pressure and lipid control among patients with type 2 diabetes mellitus (DM).

**Methods:** The study was conducted from July 2007 to February 2008 at a primary care clinic in Rancho Cordova, California. One hundred eighty-three patients were invited to come to a planned visit. On the day of the visit, they were provided a copy of their most recent test results and information on American Diabetes Association recommendations for A1C, lipid, and blood pressure control. Afterwards, they met with their physician for a 15-minute focused appointment. Finally, they met with a diabetic nurse educator. There was no subsequent contact with the nurse educator after the planned visit. We compared the baseline measurements to those from a follow-up visit with the primary care provider at a follow-up over a 6 month period. The comparison group in this study were those who did not accept the invitation for a planned visit. Their outcomes were monitored over the same time horizon.

**Results:** One hundred eighty-three patients attended one of a total of five planned visit sessions. There were 212 patients in the comparison group. There were no significant differences for the measured baseline characteristics. There were significant improvements in A1C, LDL-C, and diastolic blood pressure control in the planned visit group. The mean A1C change was  $-0.61\%$  (95% confidence interval,  $-0.28$ ,  $-0.70$ );  $P < 0.001$ . The mean LDL-C change was  $-8.8$  mg/dL (95% confidence interval,  $-12.2$ ,  $6.1$ );  $P < 0.05$ . The mean diastolic blood pressure change was  $-2.0$  mmHg (95% confidence interval,  $-4.7$ ,  $6.7$ );  $P < 0.05$ . Patients who participated in a planned visit also reported a significantly higher frequency of self-care behaviors and greater understanding about diabetes care.

**Discussion:** Planned visits led to improvements in glycemic, lipid and blood pressure control over a 6 month observation period. Patients attending planned visits also reported improvements in self-care behaviors and a greater understanding about diabetes care.

## Introduction

Many patients with type 2 diabetes mellitus (DM) fail to receive care consistent with published guidelines.<sup>1</sup> Many of these patients have poor glycemic control and poor control of comorbid hypertension and hyperlipidemia. Primary care providers face many challenges in finding ways to deliver more effective care to these patients. What often gets in the way of focusing on optimal diabetes care has been called the “tyranny of the urgent.”<sup>2</sup> Specifically, multiple competing agendas of the patient and provider impair chronic care efforts. As stated by Bodenheimer, “given the demands of acute, chronic, and preventive services, the provision of consistent, high-quality, guideline-compliant care in a 15-minute visit is beyond the reach of most primary care physicians, however, well trained and well intentioned they may be.”<sup>3</sup> One method to deal with these competing agendas is the planned visit.<sup>4</sup> The planned visit is an appointment with one agenda; the management of the patient’s chronic condition. This study investigated the impact of planned visits in a primary care practice.

## Patients and Methods

### Subjects

The study was conducted from July 2007 to February 2008 at the UC Davis Health System Primary Care Clinic in Rancho Cordova, California. The Rancho Cordova Clinic is one of eleven primary care

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practice sites within the UC Davis Health System. There are six primary care physicians at this facility who provide approximately 15,000 office visits each year. One hundred eighty-three patients with DM were identified from an electronic registry. Eligible participants were 35 to 77 years old, had type 2 DM, were designated as receiving their primary care at this facility, and had not had a specific appointment for their DM in the previous year. Patients who had transferred their care to a primary care provider at another facility were excluded.

## Study design

The patients were invited by a letter from their primary care provider to come to a planned visit to discuss their DM care. The clinic staff instructed the patients who called for an appointment to obtain a baseline glycosylated hemoglobin (A1C) and lipid profile prior to the planned visit. On the day of the planned visit, the staff provided the physician with a copy of these test results which were to be handed to each patient. The results included information on the American Diabetes Association (ADA) recommendations for A1C, blood pressure, and lipid control. Patients then met with their physician for a 15-minute focused appointment for diabetes. The physicians were not prompted to follow any specific guideline for medication therapy or asked to consider a more intensive regimen. After the encounter was concluded, the patients met with a diabetic nurse educator. This encounter lasted approximately 45 minutes. The nurse educator reinforced the ADA recommendations, discussed healthy eating, stress reduction, and led a discussion on how to develop an action plan for a health behavior change. There was no subsequent contact with the diabetic nurse educator after the planned visit. Physicians followed-up with their patients in their usual course of practice. The practice standard was to recommend a follow-up appointment in 3 to 6 months. We collected baseline data on A1C, blood pressure, and lipid profile, at the time of the planned visit. We extracted this information from follow-up visits with the primary care provider from the electronic medical record over a 6 month time span.

## Comparison group

The comparison group in this study were those who did not accept the invitation for the planned

visit. Members of this group met the same eligibility criteria as those who attended a planned visit and had outcomes available over the study's longitudinal horizon.

## Outcomes

The primary outcomes were glycemic control, blood pressure, and LDL-cholesterol (LDL-C) measured during the 6 month period after the planned visit. Patient's DM medication regimens were catalogued during the study period. We also assessed patient's reporting of self-care activities and knowledge of DM through the use of a survey (Appendix A).

## Survey overview

A Diabetes Care Survey (Appendix A) was mailed to all patients with a diagnosis of diabetes who were being seen by a primary care physician in the Rancho Cordova Clinic in the planned visit or within the previous calendar year. This survey was based on the Patient Assessment of Chronic Illness Care (PACIC), developed and validated by the MacColl Institute for Healthcare Innovation.<sup>5</sup> There were three primary sections to the survey. In Section 1 there were six questions related to the frequency of self-care behaviors. Each question was prefaced by the phrase "How many of the last 7 days did you." Numeric responses ranged from 0–7. In Section 2 there were eight questions related to patient's understanding of self-care activities. Each question was prefaced by the phrase "How well do you understand each of the following?" Responses ranged from 1 = "I don't understand at all" to 4 = "I understand completely." In Section 3 there were six questions related to patient's perception of care coordination and teamwork. Each question was prefaced by the phrase "In the last six months when you received care for your diabetes, were you?" Responses ranged from 1 = "Never" to 5 = "Always." We compared the survey responses of patients who had attended a planned visit compared to those patients who had not.

## Statistical analysis

Statistical analysis was performed using the STATA software, version 8.2 (StataCorp, College Station, Texas). Pre and post planned visit means of A1C, LDL-C, blood pressure, the change from baseline for these measures, the differences between the

treatment and comparison groups, and survey results were assessed using t-tests, with significance set at 0.05.

## Results

Baseline demographics of the 183 patients with DM who attended one planned visits are presented in Table 1. The mean age was 59 years. Nearly 58% were women. More than two-thirds of the group had hypertension and hyperlipidemia in addition to their DM. There were 212 patients in the comparison group; those who did not accept the invitation for a planned visit. There were no significant differences between these two groups for age or gender or other characteristics such as percentage with hypertension, dyslipidemia, or smoking. There were also no significant differences between these two groups for medication regimens

or number of office visits in the prior 12 month period.

Changes in key outcomes before and after the planned visits are presented in Table 2. There were significant improvements in A1C, diastolic blood pressure, and lipid control. There was no significant change in systolic blood pressure. There was no significant change in medication regimen after the planned visit. The results for the comparison group are presented in Table 3. There were no significant changes in A1C, blood pressure, lipid control, or medication regimen during the observation period. The changes from baseline in these outcome measures between the planned visit and comparison groups are presented in Table 4. There were significant improvements in A1C, lipid control, and diastolic blood pressure. There was no significant change in systolic blood pressure. The results from the Diabetes Self-Care Survey are presented in

**Table 1.** Characteristics of study population.

		Attended Planned Visits	Did Not Attend Planned Visits	P
N		183	212	
Gender	Male	77	81	NS
	Female	106	131	NS
Age	Mean	59.1	56.9	NS
	SD	14.2	16.3	NS
Hypertensive %		81.8	84.5	NS
Dyslipidemic %		74.7	69.8	NS
Smokers %		16.0	14.7	NS
Medications %				
No medication		12.0	12.3	NS
Metformin		32.8	35.4	NS
Any Sulfonylurea		41.5	39.2	NS
Any Insulin		10.4	9.9	NS
Any Thiazolidinedione		4.6	3.2	NS
Medication Regimens %				
Oral Agents				
Single Agent		16.7	15.1	NS
Two Agents		35.5	37.9	NS
Three Agents		28.7	30.1	NS
Insulin and Single Agent		17.3	14.1	NS
Insulin Alone		1.8	2.8	NS
Office Visits in Prior 12 months				
Mean		2.7	1.9	NS

**Table 2.** Key outcomes before and after planned visits.

	PRE	POST	P
Mean HA1C (%)	8.11	7.50	<0.001
Mean LDL-Cholesterol (mg/dL)	112.2	103.4	<0.05
Mean SBP (mm Hg)	129.2	127.9	NS
Mean DBP (mm Hg)	76.4	74.4	<0.05
Medications %:			
No medication	12.0	11.1	NS
Metformin	32.8	34.6	NS
Any Sulfonylurea	41.5	40.2	NS
Any Insulin	10.4	10.8	NS
Any Thiazolidinedione	4.6	3.9	NS
Medication Regimens %:			
Oral Agents			
Single Agent	16.7	17.5	NS
Two Agents	35.5	36.6	NS
Three Agents	28.7	29.4	NS
Insulin and Single Agent	17.3	16.5	NS
Insulin Alone	1.8	2.5	NS

Table 5. Of the approximately 850 surveys mailed out, 206 completed surveys were returned. There were 85 respondents who had been to a planned visit and 121 respondents who had not been to a planned visit. Patients who attended planned visits self-reported an increased frequency of self-care behaviors, an increased understanding of self-care activities, and an increased acknowledgment of care coordination and teamwork.

## Discussion

The main finding of our study is that patients with type 2 DM who received care at a planned visit experienced improved outcomes in measures of glycemic, blood pressure, and lipid control. Patients also reported more efforts toward self-care behaviors, understanding of self-care, and acknowledgement

of care coordination and teamwork in the practice. The methodology of this study as a before and after assessment does not carry the strength of a randomized trial; therefore, biases among the patient population may have influenced outcomes. For example, there may have been a selection bias in that those who participated in planned visits were more activated towards changes that influenced their glycemic, lipid or blood pressure control. Also, those who completed the survey's may reflect the same selection bias.

There are other plausible explanations for this study's findings. It is possible that planned visits served to re-engaged patients in the care of their diabetes. This is a reasonable conclusion if there was little evidence for any care in the previous year. However, both the study and comparison groups had a similar number of documented

**Table 3.** Key outcomes for comparison group.

	Initial Value	Follow-Up Value	P
Mean HA1c	8.33	8.58	NS
Mean LDL-Cholesterol (mg/dL)	118.4	116.9	NS
Mean SBP (mm Hg)	131.2	129.8	NS
Mean DBP (mm Hg)	80.1	82.3	NS

**Table 4.** Outcome differences between planned visit and comparison groups; change from baseline.

	Planned Visit Group	Comparison Group	P
Mean HA1c Change	-0.61	0.25	<0.001
95% Confidence Interval	-0.28, -0.70	-0.03, 0.51	
Mean LDL-C Change	-8.8	-1.5	<0.05
95% Confidence Interval	-12.2, 6.1	-2.9, 3.4	
Mean SBP Change	-1.3	-1.4	NS
95% Confidence Interval	-4.8, 6.7	-5.6, 8.8	
Mean DBP Change	-2.0	2.2	<0.05
95% Confidence Interval	-4.7, -0.2	-0.5, 5.5	

encounters for primary care in the previous year. It is also possible that planned visits led to medication intensification thereby improving these outcome measures. There was no detectable increase in the number of oral agents or in the use of insulin during this study period.

The findings of this study are similar to others involving the use of planned visits. Sadur and associates performed a randomized controlled trial of 97 patients with poor glycemic control; A1C > 8.5%.<sup>6</sup> Their intervention included a large, multidisciplinary team (dietitian, psychologist, pharmacist, and nurse educator in a 2-hour cluster visit. Between monthly meetings a diabetes educator reviewed diabetes management with each patient by telephone twice monthly. The pharmacist reviewed computer-based medication profiles, contacted patients to verify the medications and alerted patients to any potential drug interactions. A1C levels declined by 1.3% from baseline at 6 months and self-reported changes in self-care practices improved from baseline.

In a study involving the Harvard Vanguard Medical Associates Kimura and associates described a delivery system redesign of their primary care practice including: population management, systems-based practice, and planned

chronic illness care.<sup>7</sup> Over a 2-year period in a multispecialty ambulatory physician group practice they found improvement in overall DM composite quality measures for screening and improvement in intermediate outcomes A1C < 7, LDL-C < 100, and systolic blood pressure < 130.

Finally, Kirsh and associates did a quasi-experimental trial involving a shared medical visit within a primary care practice.<sup>8</sup> They found that A1C, LDL-C, and SBP all decreased; A1C decreased 1.4% (95% CI 0.8, 2.1), LDL-C decreased 14.8 (95% CI 2.3, 27.4), and SBP decreased 16.0 (95% CI 9.7, 22.3).

While the interventions in these three studies were somewhat different, they were all more effort intensive than our program. Further, the outcomes of these studies compared to ours are similar. The implication from our study is that the level of effort to achieve improved outcomes in patients with DM may not require the use of a large multidisciplinary team. Focused planned visits using the addition of a diabetic educator may achieve similar outcomes. A randomized trial comparing elements of these programs will be important to perform to better understand the level of intervention needed to obtain maximum benefit, balancing costs, and staffing requirements.

**Table 5.** Diabetes survey results.

Planned visits	Yes (n = 85)	No (n = 121)	P
Mean (SD) of Section 1: Self-care Behaviors	5.3 (1.2)	4.6 (1.4)	<0.001
% did not smoke within past week	90.6	92.1	NS
Mean (SD) of Section 2: Self-care Activities	3.5 (0.6)	3.2 (0.7)	<0.001
Mean (SD) of Section 3: Perception of Care Coordination and Teamwork	3.7 (1.0)	2.6 (1.2)	<0.001

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## Disclosure

The author reports no conflicts of interest.

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## Appendix A

### Diabetes Self-Care Survey

\*Question: During the past month, how often were you able to take care of your diabetes the way you think that you should? Was it: 1 = None of the time, 5 = All of the time.



## Diabetes Care Survey

*The information we gather from this survey will help us understand how we can improve the care we provide to our patients with diabetes. Your participation is voluntary. If you choose to participate, your responses will be kept confidential and included only in groups of responses.*

- The first set of questions asks about how you have cared for your diabetes during the past 7 days. (If you were sick during this time, please think back to the last 7 days when you were not sick). Please circle one number for each statement.

How many of the last 7 days did you:

1. Follow a health eating plan? (low in fat and high in fiber).	0	1	2	3	4	5	6	7
2. Exercise for at least 30 minutes of continuous activity, including walking?	0	1	2	3	4	5	6	7
3. Test your blood sugar?	0	1	2	3	4	5	6	7
4. Check your feet?	0	1	2	3	4	5	6	7
5. Take your recommended diabetes pills? <input type="checkbox"/> I don't take pills.	0	1	2	3	4	5	6	7
6. Take your recommended insulin injections? <input type="checkbox"/> I don't use insulin.	0	1	2	3	4	5	6	7

- We would like to learn how well you understand how to care for your diabetes.

How well do you understand each of the following? (Check 1 box for each question)

	I understand completely	I understand pretty well	I'm still a little confused	No, I don't understand at all
1. How to care for my feet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. How to take my medications.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. What to do for symptoms of low blood sugar.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. How to make appropriate food choices.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. How and when to test my blood sugar.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. What the complications of diabetes are.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. How to exercise appropriately.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. What my target blood sugar values should be.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- We would like to learn about the type of help you get from your diabetes health care team. This team includes doctors, nurses, dietitians, diabetes educators and clinic staff.

In the last six months when you received care for your diabetes, were you ....

	Never	A little of the time	Some of the time	Most of the time	Always
1. Asked about your ideas about caring for your diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Given a Diabetes Summary Sheet showing your personal numbers compared to recommended goals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Satisfied that your care was well organized by the clinic team.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Helped to set specific goals in caring for your diabetes, such as improving your diet or exercise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Encouraged to go to a specific group or class to help you take care of your diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Asked how well you're coping with living with diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. During the last 6–8 months, did you participate in a Planned Visit for your diabetes? (Office visit with your doctor where educators were also available).					
	Yes <input type="checkbox"/>	No <input type="checkbox"/>			
8. If Yes, what Month did you participate?	November '06	<input type="checkbox"/>			
	January '07	<input type="checkbox"/>			
	April '07	<input type="checkbox"/>			

Thank you for your help!  
Please return survey in enclosed, stamped envelope