

# Does Having a Personal Physician Improve Quality of Care in Diabetes?

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**Purpose:** Although having a continuous relationship with a physician is a defining feature of primary care, few studies have evaluated the effect of this on chronic disease management. This aim of this study was to examine whether having a regular physician is associated with improvements in reaching treatment goals for patients with diabetes.

**Methods:** Through the use of a diabetes registry, patients diagnosed with diabetes mellitus for a minimum of 6 months cared for in a large, single academic family medicine practice were compared based on whether they had a regular physician or not. The 2 groups were compared in the frequency in which they achieved goals for management of glycated hemoglobin, blood pressure, low-density lipoprotein cholesterol, and other aspects of diabetes care.

**Results:** Patients with a regular provider were slightly older than those without a provider (57.5 years vs. 50.9 years;  $P = .002$ ), but the gender distribution and percent who were smokers was the same. In assessing diabetes quality measures, patients with a regular provider had lower average levels of glycated hemoglobin (7.70 vs 8.53;  $P = .01$ ), but no difference was noted in the percentage achieving a goal of  $\leq 7.0$ . No differences were noted between the groups in either the average systolic or diastolic blood pressures or low-density lipoprotein cholesterol or in the percentages of patients achieving recognized goals for these measures. When examining other preventive services, patients with a regular provider were more likely to receive an influenza immunization within the last year (51.8% vs 35.6%;  $P = .02$ ) but no more likely to receive a pneumococcal vaccine or take an aspirin each day.

**Conclusion:** This study suggests that there are few benefits for patients with diabetes in having an established regular provider over having a regular place of service. (J Am Board Fam Med 2010;23:82–87.)

Along with first contact, comprehensiveness, and coordination of care, continuity is considered one of the 4 cornerstones of primary care.<sup>1</sup> The belief in the value of patient continuity with a regular provider who can develop intimate knowledge of the patient's clinical condition and establish a trusting, healing relationship with the patient is widely accepted among primary care providers and health

policy experts. Having a regular physician has been shown to have a beneficial effect on a large range of health care services, including preventive services in children<sup>2,3</sup> and reductions in hospital and emergency department use among patients with chronic health problems.<sup>4,5</sup>

The effects of having a regular physician would seem to have the greatest benefit for patients who have complex chronic diseases for which the frequency of care and the necessity of multiple therapeutic interventions would be enhanced by an ongoing relationship with a single physician. However, there is conflicting evidence that having a regular physician makes a difference in the management of diabetes, a highly complex chronic medical illness. In an analysis of diabetes intermediate outcomes among a small sample of patients from 19 inner city practices in England, Gulliford and colleagues<sup>5</sup> found no association between increasing levels of continuity and diabetes quality measures. Similarly, a large cross-sectional study using an administrative da-

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tabase failed to find a relationship between individual physician continuity and the performance of recommended testing.<sup>6</sup> Finally, a study of participants in the National Health and Nutrition Examination Survey did not find any association between having a personal physician and glycemic control.<sup>7</sup> However, this study did find an association between having a regular location of care and glycemic control.<sup>7</sup>

In contrast, other evidence suggests some benefits of continuity on the management of patients with diabetes. In a group of patients from a health maintenance organization, O'Connor et al<sup>8</sup> found that those who had a regular provider were more likely to follow a diabetic diet, monitor their sugars at home, and receive recommended preventive services examinations. A smaller study at a training site also showed that, as continuity with a resident physician improved, so did glycemic control.<sup>9</sup>

A drawback of all these studies was the definition of what having a regular physician meant. In some cases, investigators relied on patients to state whether they had a personal physician without inquiring whether the physician was aware of this. In other studies, authors did not define whether the provider was the patient's regular physician but instead focused on continuity, which was represented by who a patient saw most often.

Another drawback of previous studies is that continuity may not have been synonymous with a personal physician-patient relationship. If a physician does not view a particular patient as her or his patient, the care they render for patients may differ from that provided to a patient who the physician considers "theirs." One study conducted in a network of 18 practices found that physicians designated only 68% of patients they saw as "their patients."<sup>10</sup> This implies that physicians often care for individuals with whom they do not feel they have a continuous relationship. It is unclear whether this lack of connection has any detrimental impact on the quality of care that patients receive over time.

The purpose of this study was to examine, from the physician perspective, the impact of having a regular physician on the management of diabetes in a single large practice. Because this study utilizes data from a single practice it allowed for the assessment of having a regular physician while controlling for the overall practice environment. Put another way, this study sought to determine whether having a physician identify patients as their own

improves care more than when the same group of physicians manage patients but do not acknowledge any ongoing personal relationship with the patient.

## Methods

### Design

This study was a retrospective review of records collected from an ongoing diabetes quality improvement project that has been in place since 2005. All data abstracted for the quality review were de-identified for the purpose of the study. This study was reviewed by the Human Subjects Committee at the Medical University of South Carolina and approved as exempt for the use of de-identified existing data.

### Patients

The population of patients included in the study were limited to adults aged 18 to 75 who had a diagnosis of type II diabetes mellitus and seen in the Family Medicine Center at the Medical University of South Carolina between 2005 and 2008 (inclusive). Only patients who had a minimum number of 2 visits for diabetes and who had a diagnosis of diabetes mellitus for more than 6 months were included in the analysis.

Individual patients to be included in the disease registry were identified through quarterly reviews of the billing records for the practice. Once a patient was identified with a diagnosis of diabetes, he or she was entered into the practice registry. After every new visit, which was identified by a new billed encounter, the patient's data were updated in the diabetes disease registry.

To identify the appropriate provider for each patient, a patient was assigned to a particular provider when he or she had seen the provider on more than 2 consecutive occasions. To assess the validity of these assignments, providers were provided with a roster of their assigned patients on a quarterly basis and asked to identify any patients who they considered to be their own patient and to identify patients who had died or moved away from town. Patients who had left or died were removed from all rosters. If a provider stated that a patient assigned to them was not their regular patient, this patient was removed from their individual roster and transferred to the list of patients who did not have a regular provider. Subsequently, the list of patients for whom no provider could clearly be

identified was sent to all providers asking them to identify any patient for whom they believed they were the primary provider. Patients claimed from this list were then moved to a provider's individual patient roster.

### Practice Description and Data Sources

The Family Medicine Center constitutes the faculty practice of the Department of Family Medicine at the Medical University of South Carolina. Twenty-four family medicine faculty physicians provide care on a part-time basis. Faculty members have their own patient panels but also see patients in an urgent care environment, where many patients with chronic medical problems choose to receive their ongoing care. Physicians receive quarterly patient registry data about all of their patients with diabetes. Patients who are seen exclusively in the urgent care clinic are not assigned to any physicians' registry and are reported separately. First-year resident physicians are involved in the care of patients seen in the urgent care clinic, but all resident continuity practices are located at another facility.

Patients with any diagnosis using the International Classification of Disease version 9 code 250 were identified from monthly billing records and entered into the registry by a single trained abstractor. As of December 31, 2008, the practice had 668 patients for whom an individual physician provided care and 68 patients for whom no regular provider could be identified. After excluding patients who received a diagnosis of diabetes within the previous 6 months, 649 patients remained in the group with a regular physician and 56 remained in the group with no regular physician.

Through ongoing reviews of diabetes patients' electronic medical records, the chart abstractor recorded clinical quality measures consistent with those recommended by the National Center for Quality Assurance. These data included the most recent glycated hemoglobin (HbA1C) measurement, systolic and diastolic blood pressures, and low-density lipoprotein (LDL) cholesterol. In addition, the patient's smoking status, whether aspirin was included on their medication list, and whether they had ever received a pneumococcal vaccine or were current with their influenza immunization was recorded. In all cases, the last

recorded measurement was used for these analyses.

In addition, the disease registry included the patient's date of birth and gender. Neither race nor insurance information is part of the patient record so were not available for analysis.

### Data Analyses

For comparisons of continuous variables of systolic and diastolic blood pressures and lipid values, Student's *t* test was used. Because HbA1C values were skewed toward higher values and not normally distributed, these data were analyzed using the Mann-Whitney *U* test. For categorical variables (eg, the use of aspirin),  $\chi^2$  was performed. A 2-tailed *P* < .05 was considered statistically significant.

### Results

The characteristics of patients who had no regular provider and those who had a regular provider are shown in Table 1. Those with no regular provider were younger than those with a provider but similar in their gender and their smoking status.

In examining quality of care measures for patients in the 2 groups, those who were identified as having a regular provider had lower average HbA1C values (7.7 vs 8.5 mg%; *z*, -2.55; *P* = .01). However, there was no difference in either the average systolic or diastolic blood pressures or in the average LDL cholesterol values between the 2 groups (Table 2).

When we looked at the percentage of patients in each group who had achieved the specified goal for their diabetes care, we found few differences between the groups (Table 3). Compared with those without a regular provider, patients with a regular

**Table 1. Characteristics of Patients With and Without a Regular Provider**

	Regular Provider (n = 649)	No Regular Provider (n = 56)	<i>P</i>
Age, mean years (SD)	57.5 (10.8)	50.9 (12.2)	.0002
Gender (%)			.24
Male	216 (33.3)	23 (41.0)	
Female	433 (66.7)	33 (59.0)	
Smoking status (%)			.67
Smoker	99 (15.3)	11 (19.6)	
Nonsmoker	521 (80.3)	43 (76.8)	
Unknown	29 (4.5)	2 (3.5)	

**Table 2. Diabetes Quality Data for Patients With and Without a Regular Provider**

	Regular Provider (n = 649)	No Regular Provider (n = 56)	P
Glycated hemoglobin	7.70 (2.17)	8.53 (2.42)	.01
Blood pressure (mm)			
Systolic	135.3 (22.6)	134.5 (22.3)	.73
Diastolic	74.7 (11.9)	77.6 (12.1)	.08
Low-density lipoprotein	100.2 (35.8)	107.3 (36.7)	.19

Data values provided as mean (SD).

provider were more likely to be at goal for diastolic blood pressure (73.2% vs 62.7%;  $P = .02$ ) and to have received an influenza immunization within the previous year (51.8% vs 35.6%). Having a regular provider was not associated with any difference in achieving goals in the management of HbA1C levels, systolic blood pressure, LDL cholesterol; the documentation of aspirin use; or being given a pneumococcal vaccine.

## Discussion

These results suggest that patients who have been diagnosed with diabetes for at least 6 months and are identified as having a continuous physician-patient relationship achieve only marginally better management for their diabetes than those who obtain care in the same location but have no established provider. Although there was a sizeable difference in the use of influenza vaccine among patients with a continuous relationship with a phy-

**Table 3. Associations of Having a Regular Provider and Achieving Diabetes Care Goals**

	Regular Provider (%) (n = 649)	No Regular Provider (%) (n = 56)	P*
HbA1C $\leq 7.0$	51.4	41.1	.10
Blood pressure			
Systolic $\leq 130$	49.2	50.8	.56
Diastolic $\leq 80$	73.2	62.7	.02
LDL $\leq 100$	52.2	53.7	.09
Using daily aspirin	70.7	64.4	.31
Received annual influenza immunization	51.8	35.6	.02
Received pneumococcal immunization	32.2	33.9	.79

\* $\chi^2$  test.

HbA1C, glycated hemoglobin; LDL, low-density lipoprotein.

sician (absolute difference of 16.2%; number needed to treat, 6.2), the benefit for diastolic blood pressure control was much smaller (5.5%) and indicated that nearly 18 patients would need a regular provider to result in one additional patient achieving the target level of control. These findings suggest that having a regular physician does add some additional benefit in achieving recommended quality measures for diabetes, but also show that practices that focus on achieving high quality in diabetes care can equal many of the outcomes achieved in patients with good continuity of care.

The value of interpersonal continuity in the management of chronic disease may have additional value beyond those seen in quality measures, however. In a review of studies examining the value of interpersonal continuity, some found consistent evidence that personal continuity is associated with increased patient satisfaction and improved adherence to preventive services.<sup>11,12</sup> The current study did not assess patient satisfaction but did examine some preventive services (pneumococcal and influenza vaccination) and found greater adherence with influenza recommendations among patients with a personal physician.

Other studies have assessed the impact of personal continuity on the quality of chronic disease management, with inconsistent findings. In their review of personal continuity and care outcomes, Saultz and Lochner<sup>12</sup> identified 4 studies that had been published before 2005, 3 of which specifically examined diabetes in the United States,<sup>8</sup> Finland,<sup>13</sup> and Australia.<sup>14</sup> An additional American study was published in 2009 that included diabetes quality measures as one of several outcomes in assessing personal physician-patient continuity, which the authors called "patient-physician connectedness."<sup>15</sup> In each of these studies, patients with greater continuity showed a higher frequency of HbA1C testing. However, in 2 of these studies<sup>8,14</sup> physician-patient continuity was not associated with any improvement in HbA1C control. The other 2 studies showed conflicting results; one study reported more patients with an HbA1C level under 8.0 in the group with personal continuity,<sup>15</sup> but the other actually showed higher HbA1C measures (8.9 vs 8.3 mg%) in the patients with higher levels of continuity.<sup>13</sup> A drawback of these studies, however, was that the investigators combined patients from multiple practices, which raised the possibility of clustering effects that could confound the findings.

In contrast, one of the strengths of this study is that the care was provided in a single location by the same set of physicians. By comparing patients with a continuous relationship with physicians to a set of patients who are cared for by the same group of physicians but without that relationship, this study controls for physician practice style and other aspects of the practice that can affect care patterns, such as the availability of records and access to quality programs. In this common environment, it seems that the continuous relationship offers only a small benefit to patients over routine care provided by whichever physician is available that day.

This study does, however, have a number of limitations. First, the number of patients in the group without a continuity provider was small ( $n = 59$ ). Although none of the differences observed in glycemic, lipid, or hypertension control were statistically significant, the study only had adequate power to detect fairly sizeable differences. A post hoc power analysis using the number of patients in our study and a 10:1 ratio of control to comparison group showed that the study had an 80% power to detect an absolute difference in glycemic control of 20%, given the baseline rate in the control group. Clearly, this would be a very clinically significant difference, but smaller differences such as those observed in this study may still be important but would not be statistically significant.

Second, the study assumed that patients in each group were similar. Other studies have noted that there are age differences in patients who seek care from a single provider and those who do not develop continuous relationships with physician.<sup>16</sup> It is also possible that there are other differences that we did not measure that would obscure the benefits of a personal physician-patient relationship. For example, it is possible that patients who did not have a continuous provider were less ill than those who had a regular provider. If this was the case, it may have been easier to achieve diabetic treatment goals.

Third, because the data were de-identified to protect patient confidentiality, the number of patient visits over time could not be obtained. Some of the differences found between patients with personal provider continuity and those without continuity could have reflected a longer duration of care for patients with a continuous provider. To attempt to mitigate this potential confounder, we limited the patients to those with an illness duration of 6

months or longer; this time frame was chosen was to give physicians time to implement treatment strategies with patients and exclude patients with very recently diagnosed illness.

Finally, the practice environment in which this study took place may not be representative of other practices. The practice in this study, for example, has been using electronic medical records for several decades and has a continuous electronic medical record for individual patients who have been with that system for 16 years. The ability to organize information in the electronic medical record and follow quality measures may have enabled physicians without continuity relationships with patients to have improved access to critical information that might be available in a paper chart. Similarly, the practice has been committed to quality improvement in diabetes care for several years. The focus in this practice on improving quality care for patients with diabetes mellitus may not be typical of other practices where personal patient-physician continuity may have a greater effect.

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## References

1. Starfield B. Primary care. New York: Oxford University Press; 1992.
2. Kasper JD. The importance of type of usual source of care for children's physician access and expenditures. *Med Care* 1987;25:386-98.
3. Christakis DA, Mell L, Wright J, Davis R, Connell RA. The associations between greater continuity of care and timely measles-mumps-rubella vaccination. *Am J Public Health* 2000;90:962-5.
4. Gill JM, Mainous AG. The role of provider continuity in preventing hospitalizations. *Arch Fam Med* 1998;7:352-7.
5. Gill JM, Mainous AG. The effect of continuity of care on emergency department use. *Arch Fam Med* 2000;9:333-8.
6. Gill JM, Mainous AG, Diamond JJ, Lenhard MJ. Impact of provider continuity on quality of care for persons with diabetes mellitus. *Ann Fam Med* 2003; 1:162-70.
7. Mainous AG, Koopman RJ, Baker R, Pearson WS. Relationship between continuity of care and diabetes control: evidence from the Third National Health and Nutrition Examination Survey. *Am J Public Health* 2004;94:66-70.
8. O'Connor PJ, Desai J, Rush WA, Cherney LM, Solberg LI, Bishop OB. Is having a regular provider

- of diabetes care related to intensity of care and glycemic control? *J Fam Pract* 1998;47:290–7.
9. Dearinger AT, Wilson JF, Griffith CH, Scutchfield FD. The effect of physician continuity on diabetic outcomes in a resident continuity clinic. *J Gen Intern Med* 2008;23:1116–7.
  10. Atlas SJ, Chang Y, Lasko T, Chueh HC, Grant RW, Barry MJ. Is this “my” patient? Development and validation of a predictive model to link patients to primary care providers. *J Gen Intern Med* 2006;21:973–8.
  11. Saultz JW, Alberdaiwi W. Interpersonal continuity of care and patient satisfaction: a critical review. *Ann Fam Med* 2004;2:445–51.
  12. Saultz JW, Lochner J. Interpersonal continuity of care and care outcomes: a critical review. *Ann Fam Med* 2005;3:159–66.
  13. Hanninen J, Takala J, Keinänen-Kiukkassniemi S. Good continuity of care may improve quality of life in type 2 diabetes. *Diabetes Res Clin Pract* 2001;51:21–7.
  14. Overland J, Yue DK, Mira M. Continuity of care: to whom does it matter? *Diabetes Res Clin Pract* 2001;52:55–61.
  15. Atlas SJ, Grant RW, Ferris TG, Chang Y, Barry MJ. Patient-physician connectedness and quality of primary care. *Ann Intern Med* 2009;150:325–35.
  16. Shani M, Taylor TR, Vinker S, et al. Characteristics of diabetics with poor glycemic control who achieve good control. *J Am Board Fam Med* 2008;21:490–6.