Health plans are increasingly offering payment incentives to motivate providers to strive for improving the quality of patient care based on established criteria such as those set forth by the National Committee for Quality Assurance (NCQA).\(^1\)\(^2\) The NCQA accredits healthcare organizations and manages the Health Plan Employer Data and Information Set, a tool for measuring performance in key areas, including diabetes management.\(^3\) In partnership with the American Diabetes Association (ADA),\(^4\) which has

**Background:** The National Committee for Quality Assurance supports high-quality care for patients through the Diabetes Recognition Program (DRP). The DRP recognizes physicians and practices that are providing high-quality diabetes care as determined by 10 key measures.

**Objective:** To examine the impact of treatment by DRP-certified physicians compared with non–DRP-certified physicians on patient outcomes.

**Methods:** This retrospective claims analysis was conducted from January 1, 2007, through November 30, 2007, using a large US database of approximately 14 million commercially insured members. Physicians with DRP certification (N = 1188) were identified and matched 1:1 to physicians without DRP certification based on physician specialty, location (state) of practice, size of potential patient population, and number of patients with type 2 diabetes treated by the physician. Patients were included if they had type 2 diabetes and had been treated by a physician in the DRP group (N = 3836) or in the comparison group (N = 4175).

Primary outcomes were medication use, medical resource utilization, and expenditures. Per-patient per-year (PPPY) medical and pharmacy utilization measures were analyzed using Poisson regression; PPPY expenditures were estimated using a generalized linear model with gamma distribution.

**Results:** Multivariate analysis showed that patients treated by DRP-certified physicians had more postindex diabetes-related office visits (mean PPPY, 4.69 vs 4.44, respectively; \(P < .001\)) and outpatient visits (mean PPPY, 0.93 vs 0.85, respectively; \(P < .001\)) than patients treated by non–DRP-certified physicians, but fewer emergency department visits (mean PPPY, 0.04 vs 0.07, respectively; \(P < .001\)) and inpatient visits (mean PPPY, 0.08 vs 0.10, respectively; \(P = .02\)). Prescribing rates for oral antihyperglycemic drugs and statins were higher among DRP-certified physicians than non–DRP-certified physicians. Total diabetes-related healthcare expenditures were lower for patients with type 2 diabetes managed by DRP-certified physicians compared with those managed by non–DRP-certified physicians (mean PPPY, $3424 vs $4097, respectively; \(P = .03\)).

**Conclusion:** Significant differences in oral antihyperglycemic and statin drug use, and diabetes-related emergency department and inpatient visits and expenditures, were observed in this study between DRP-certified and non–DRP-certified physicians, showing overall improved outcomes for patients managed by DRP-certified physicians.

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**Stakeholder Perspective**, page 438


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Disclosures are at end of text
The national Diabetes Recognition Program (DRP) certifies physicians and practices that provide high-quality diabetes care as determined by 10 key measures.

In this retrospective analysis using a large database with approximately 14 million members, patients with type 2 diabetes who were treated by DRP-certified physicians (N = 3836) had significantly more diabetes-related office visits and outpatient visits than patients treated by non–DRP-certified physicians (N = 4175).

However, those treated by DRP-certified physicians also had significantly fewer emergency department visits and inpatient visits.

Furthermore, prescribing rates for oral antihyperglycemic drugs and statins were higher among DRP-certified physicians than non–DRP-certified physicians.

Total diabetes-related healthcare expenditures were lower for those managed by DRP-certified physicians compared with those managed by non–DRP-certified physicians (mean cost per patient per year, $3424 vs $4097, respectively).

established specific treatment targets for long-term glycemic control in patients with diabetes, the NCQA supports high-quality care for patients through the Diabetes Recognition Program (DRP). The DRP recognizes physicians and practices that are providing high-quality diabetes care as determined by 10 key measures, which include hemoglobin (Hb)A1c control, blood pressure (BP) control, low-density lipoprotein cholesterol (LDL-C) control, eye examinations, foot examinations, nephropathy assessment, and smoking cessation advice or treatment. For a physician to achieve DRP recognition, ≥40% of patients must meet the recommended HbA1c goal, ≥36% of patients must meet the recommended LDL-C goal, and ≥35% of patients must meet the recommended BP goal.

Building on previous research, the present study was designed to examine the relationship between treatment by a DRP-certified physician and health-related outcomes for diabetic patients, including prescription utilization, medical resource use, and healthcare expenditures, and to compare the impact of treatment by DRP-certified physicians versus non–DRP-certified physicians on patient outcomes.

Methods

This was a retrospective claims-based analysis using medical, pharmacy, and enrollment information from a large US database of commercially insured patients. This administrative healthcare claims database included electronic pharmacy and medical claims and enrollment data for commercially insured patients identified between January 1, 2004, and December 31, 2007 (identification period), from a large US managed care provider affiliated with OptumInsight. For 2007, data were available relating to approximately 14 million individuals with medical and pharmacy benefit coverage. The plan provides fully insured coverage for professional (eg, physician), facility (eg, hospital), and outpatient prescription medication services. Because this study involved analysis of preexisting, deidentified data, it was exempt from Institutional Review Board approval.

Physician Samples

All physicians in the database between January 1, 2007, and November 30, 2007, who were treating adult patients with type 2 diabetes (Appendix A, page 437) whose claims data were also included in the database were identified for inclusion in this analysis. Treating physicians included family physicians, internists, and endocrinologists identified from a large and diverse group of physician specialties at the primary, secondary, and tertiary care levels. Our rationale in selecting physicians was based on identifying physician specialties that were most likely to be in charge of managing our target patient population. The identification process revealed that the majority of the physicians were either family practice physicians or internists. To be included in the study sample, physicians in the database were required to be either DRP-certified by the NCQA or not DRP-certified by the NCQA in any of the existing recognition programs as of May 2009 (see http://recognition.ncqa.org/index.aspx).

Each of the DRP-certified physicians was matched directly in a 1:1 ratio to a non–DRP-certified physician based on 4 variables: physician specialty, state of physician practice, size of potential patient population (defined as the population density of the postal zip code in which the physician practices), and number of nonpediatric patients with type 2 diabetes (similar number ± 3 patients) in the analytic period.

Patient Samples

Study patients were commercial enrollees with evidence of type 2 diabetes treated by a DRP-certified or non–DRP-certified physician identified in the database (8011 patients; 3836 treated by a DRP-certified physician and 4175 treated by a non–DRP-certified physician). The index date was defined as the date of the patient’s first claim for an outpatient diagnosis of dia-
Impact of Treatment by NCQA-Certified Physicians

Diabetes (International Classification of Diseases, Ninth Revision [ICD-9]: 249.xx, 250.xx, 357.2, 362.0x, 366.41, 648.xx, 996.57, V43.85, V53.91, V58.67) by a DRP-certified or non–DRP-certified physician (ie, index physician) during the study period.

Patients were included if they were continuously eligible during the 6-month preindex and 12-month postindex periods. Furthermore, patients could not have had any visits with an index physician or with any DRP-certified physician during the preindex period. Patients with evidence of gestational diabetes or polycystic ovarian syndrome were excluded from the analysis.

Medication Use

Medication use was defined as the number of prescriptions per patient for oral antihyperglycemic, statin, or antihypertensive medications. These medication classes were selected because of their impact on the biometric measures that are included in the DRP certification requirements.

Medical Resource Utilization

The numbers of diabetes-related office visits, outpatient visits, emergency department visits, and inpatient admissions per patient were calculated. Diabetes-related visits were defined as visits with evidence of diabetes or diabetes-related complications (see Appendix B for ICD-9 codes, www.AHDBonline/node/867.com), such as hypertension, dyslipidemia, ischemic heart disease, atherosclerosis, peripheral vascular disease, aortic aneurysm, congestive heart failure, myocardial infarction, stroke (with and without transient ischemic attack), coronary artery bypass graft surgery, angioplasty, nephropathy, neuropathy, retinopathy, foot ulcers, ketoacidosis, skin infection/skin ulcers, and lower-extremity amputations.

Expenditures

Expenditures were defined as combined health plan–paid and patient-paid dollar amounts per patient for medical, pharmacy, ambulatory, emergency, outpatient, and inpatient utilization that were diabetes-related, and all-cause total expenditures. Diabetes-related pharmacy utilization included oral and injectable hypoglycemic drugs. Expenditures (based on annualized US dollar estimates from 2006-2008) were adjusted using the annual medical care component of the Consumer Price Index to adjust for inflation between 2006 and 2008.

Statistical Analyses

All study variables, including preindex and postindex utilization, clinical, and expenditure measures, were first analyzed descriptively. Per-patient per-month (PPPM) measures were used to assist with the interpretation of within-group utilization and expenditure changes resulting from the difference in follow-up for the preindex (6 months) and postindex (12 months) periods.

Multivariate analyses were performed to compare the impact of specified independent variables between the DRP-certified and non–DRP-certified physician groups on utilization and expenditure measures on a per-patient per-year (PPPY) basis. PPPY was selected because the multivariate analysis focused on the 12-month postindex period only.

Differences in oral antihyperglycemic, antihypertensive, and statin drug use, as well as diabetes-related medical utilization between the DRP-certified and non–DRP-certified physicians were determined using Poisson regression. Predicted means for medication use and healthcare utilization counts were calculated using the parameters from the Poisson model and the mean of the independent variables.

Expenditures were examined using a generalized linear model (GLM) with a gamma distribution, with log link used to assess the incremental costs associated with DRP designation. The gamma distribution and log link account for the skewed distribution of costs. For dichotomous independent variables (eg, preindex hypertension), coefficients from the GLM specification for patients with nonzero costs represent the ratio of expected costs in one cohort versus another. For continuous independent variables (eg, age), coefficients from the GLM specification for patients with nonzero costs represent the ratio of expected costs for each unit increase (ie, per year of age). This method avoids potential difficulties introduced by transformation (eg, calculating the log of the costs) and retransformation of the dependent variable. Predicted costs were calculated using the parameters from the GLM model and the mean of the independent variables.

All utilization and expenditure models were adjusted for age, gender, and preindex Deyo-Charlson-Quan comorbidity score. Preindex oral and injectable antihyperglycemic agent use, preindex diabetes diagnosis, and preindex all-cause total expenditures were also included in the models for postindex oral antihyperglycemic agent use.

Similar preindex disease-specific covariates and preindex all-cause total expenditures were also added to the models for postindex antihypertensive and statin drug use. Preindex all-cause total healthcare expenditures were also included in the diabetes-related postindex medical utilization models for office visits, outpatient visits, emergency department visits, and inpatient visits. Preindex diabetes-related office visits, emergency department visits, and inpatient visits were also included...
in the diabetes-related expenditure model, whereas preindex oral antihyperglycemic agent use, as well as preindex all-cause office visits, emergency department visits, and inpatient visits were also included in the all-cause total expenditure model.

**Results**

**Demographic Characteristics**

The study sample consisted of 8011 patients (3836 treated by a DRP-certified physician and 4175 treated by a non–DRP-certified physician). Most of the patients resided in either the Midwest (44.26%) or South (41.60%). Males outnumbered females (53.5% vs 46.5%), and the mean (± standard deviation [SD]) age of the study population was 54.6 (± 11.05) years. The prevalence of comorbidities was high: 45% of patients had hypertension; 46% had diabetes (ie, they were newly diagnosed with diabetes at the time of study initiation and had not been diagnosed with diabetes during the preindex period); and 43% had dyslipidemia in the preindex period. The Deyo-Charlson-Quan comorbidity score (mean ± SD) was significantly (P = .01) higher for patients treated by the non–DRP-certified group (0.98 ± 1.36) than for those treated by the DRP-certified group (0.91 ± 1.24; Table 1).

No significant differences existed between patients

---

**Table 1 Demographic Characteristics**

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Total (N = 8011) N (%)</th>
<th>Patients managed by DRP-certified physicians (N = 3836) N (%)</th>
<th>Patients treated by non–DRP-certified physicians (N = 4175) N (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>4283 (53.46)</td>
<td>2046 (53.34)</td>
<td>2237 (53.58)</td>
<td>.83</td>
</tr>
<tr>
<td>Age, yr, mean (± SD)</td>
<td>54.59 (± 11.05)</td>
<td>54.62 (± 11.01)</td>
<td>54.56 (± 11.09)</td>
<td>.80</td>
</tr>
<tr>
<td>Age-group, yr</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-24</td>
<td>34 (0.42)</td>
<td>18 (0.47)</td>
<td>16 (0.38)</td>
<td>.36</td>
</tr>
<tr>
<td>25-34</td>
<td>260 (3.25)</td>
<td>132 (3.44)</td>
<td>128 (3.07)</td>
<td>.36</td>
</tr>
<tr>
<td>35-44</td>
<td>1087 (13.57)</td>
<td>516 (13.45)</td>
<td>571 (13.68)</td>
<td>.36</td>
</tr>
<tr>
<td>45-54</td>
<td>2520 (31.46)</td>
<td>1175 (30.63)</td>
<td>1345 (32.22)</td>
<td>.36</td>
</tr>
<tr>
<td>55-64</td>
<td>2915 (36.39)</td>
<td>1440 (37.54)</td>
<td>1475 (35.33)</td>
<td>.36</td>
</tr>
<tr>
<td>65-74</td>
<td>816 (10.19)</td>
<td>379 (9.88)</td>
<td>437 (10.47)</td>
<td>.36</td>
</tr>
<tr>
<td>≥75</td>
<td>379 (4.73)</td>
<td>176 (4.59)</td>
<td>203 (4.86)</td>
<td>.36</td>
</tr>
<tr>
<td>Geographic region</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwest</td>
<td>3333 (41.61)</td>
<td>1634 (42.6)</td>
<td>1699 (40.69)</td>
<td>.14</td>
</tr>
<tr>
<td>South</td>
<td>3518 (43.91)</td>
<td>1633 (42.57)</td>
<td>1885 (45.15)</td>
<td>.14</td>
</tr>
<tr>
<td>West</td>
<td>648 (8.09)</td>
<td>318 (8.29)</td>
<td>330 (7.90)</td>
<td>.14</td>
</tr>
<tr>
<td>Northeast</td>
<td>512 (6.39)</td>
<td>251 (6.54)</td>
<td>261 (6.25)</td>
<td>.14</td>
</tr>
<tr>
<td>Diabetes-related complication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preindex hypertension</td>
<td>3592 (44.8)</td>
<td>1706 (44.5)</td>
<td>1886 (45.2)</td>
<td>.53</td>
</tr>
<tr>
<td>Preindex diabetes</td>
<td>3673 (45.9)</td>
<td>1732 (45.2)</td>
<td>1941 (46.5)</td>
<td>.23</td>
</tr>
<tr>
<td>Preindex dyslipidemia</td>
<td>3472 (43.3)</td>
<td>1636 (42.7)</td>
<td>1836 (44.0)</td>
<td>.23</td>
</tr>
<tr>
<td>Deyo-Charlson-Quan comorbidity score, mean ± SD</td>
<td>0.95 (± 1.31)</td>
<td>0.91 (± 1.24)</td>
<td>0.98 (± 1.36)</td>
<td>.01</td>
</tr>
</tbody>
</table>

DRP indicates Diabetes Recognition Program; SD, standard deviation.
treated by DRP-certified physicians and those treated by non–DRP-certified physicians with regard to gender, age, geographic distribution, or presence of preindex hypertension, diabetes, or dyslipidemia (Table 1).

Medication Use

Although there were no significant differences in preindex use of oral antihyperglycemic agents, antihypertensive agents, and statin medications (Table 2), univariate analysis showed that patients managed by DRP-certified physicians were more likely to receive prescriptions for oral antihyperglycemic agents than those managed by non–DRP-certified physicians (mean PPPM, 0.34 vs 0.34, respectively; P = .98) and statins (mean PPPM, 0.17 vs 0.18, respectively; P = .07) in the postindex period.

Medical Resource Utilization

Univariate analysis showed that the 2 cohorts did not significantly differ with regard to diabetes-related office visits, outpatient visits, emergency department visits, or inpatient visits during the preindex period (Table 2). However, the DRP-certified cohort had fewer emergency department visits (Table 3; mean PPPM, 0.006 vs 0.007, respectively; P = .27) and greater use of office visits (mean PPPM, 0.010 vs 0.010, respectively; P = .40) in the postindex period.

Expenditures

Preindex expenditures did not differ significantly between the 2 cohorts (Table 2), but the postindex diabetes-related expenditures and all-cause total expenditures were significantly higher for the non–DRP-certified cohort (mean PPPM, 0.003 vs 0.006, respectively; P < .001) and inpatient visits than the non–DRP-certified cohort (mean PPPM, 0.007 vs 0.008, respectively; P = .008), and greater use of office visits (mean PPPM, 0.388 vs 0.372, respectively; P = .03) during the postindex period.

Table 2  Preindex Utilization Per Patient Per Month, Mean (± SD)*

| Medication use                  | Total (N = 8011) | Patients managed by DRP-certified physicians (N = 3836) | Patients managed by non–DRP-certified physicians (N = 4175) | P value  
|--------------------------------|------------------|---------------------------------------------------------|----------------------------------------------------------|---------  
| Oral antihyperglycemic useb     | 0.34 (± 0.56)    | 0.34 (± 0.56)                                           | 0.34 (± 0.55)                                             | .98      
| Antihypertensive usec          | 0.60 (± 0.81)    | 0.60 (± 0.81)                                           | 0.61 (± 0.81)                                             | .86      
| Statin use                     | 0.17 (± 0.31)    | 0.18 (± 0.31)                                           | 0.17 (± 0.30)                                             | .07      
| Diabetes-related medical utilization |                   |                                                        |                                                         |          
| Office visits                  | 0.203 (± 0.318)  | 0.200 (± 0.314)                                         | 0.207 (± 0.320)                                          | .33      
| Outpatient visits              | 0.058 (± 0.289)  | 0.055 (± 0.179)                                         | 0.061 (± 0.361)                                          | .30      
| Emergency department visits    | 0.006 (± 0.035)  | 0.005 (± 0.033)                                         | 0.006 (± 0.037)                                          | .27      
| Inpatient visits               | 0.010 (± 0.048)  | 0.010 (± 0.050)                                         | 0.010 (± 0.046)                                          | .64      
| Expenditures                   |                  |                                                        |                                                         |          
| Diabetes-related total expenditures | $310.89 (± 2405.28) | $307.76 (± 1907.54)                                      | $313.76 (± 2785.50)                                      | .91      
| All-cause total expenditures   | $819.54 (± 2870.95) | $791.74 (± 2325.93)                                     | $845.10 (± 3293.23)                                      | .40      

* Differences examined using univariate analysis.

b Antihyperglycemic agents included SU s, biguanides, TZDs, alpha-glucosidase inhibitors, meglitinide derivatives, DPP-4 inhibitors, SU/metformin, SU/TZD, TZD/metformin, and DPP-4/metformin.

c Antihypertensive agents included beta-blockers, calcium channel blockers, agents affecting the renin-angiotensin-aldosterone system, alpha-blockers, diuretics, and combination antihypertensives.

DPP-4 indicates dipeptidyl peptidase-4; DRP, Diabetes Recognition Program; SD, standard deviation; SU, sulfonylurea; TZD, thiazolidinedione.
antihyperglycemic agent use (mean prescriptions PPPY, 5.84 vs 5.52, respectively; \( P < .001 \)), lower antihypertensive agent use (mean PPPY, 7.46 vs 7.60, respectively; \( P = .02 \)), and greater statin drug use (mean PPPY, 2.81 vs 2.68, respectively; \( P = .003 \)) compared with the non–DRP-certified group. Patients treated by DRP-certified physicians had more diabetes-related office visits (mean PPPY, 4.69 vs 4.44, respectively; \( P < .001 \)) and outpatient visits (mean PPPY, 0.93 vs 0.85, respectively; \( P < .001 \)) visits. By contrast, patients treated by noncertified physicians had more diabetes-related emergency department visits (mean PPPY, 0.07 vs 0.04, respectively; \( P < .001 \)) and inpatient visits (mean PPPY, 0.10 vs 0.08, respectively; \( P = .02 \)).

Patients managed by non–DRP-certified physicians had greater diabetes-related expenditures than those managed by DRP-certified physicians (mean costs PPPY, $4097 vs $3424, respectively; \( P = .03 \)). The mean all-cause total expenditures for patients treated by DRP-certified physicians was not significantly lower (mean PPPY, $10,627 vs $11,221, respectively; \( P = .22 \)) than for patients treated by non–DRP-certified physicians.

### Discussion

Under pay-for-performance models in which financial incentives have been linked to the provision of care, healthcare quality has typically been measured using process-of-care and outcomes-based measures.\(^5\) Diabetes has been a target for payment reform models for primary care, because of its high prevalence among primary care patients, the presence of a recognized set of clinical practice guidelines, and the availability of clinical markers used to measure improved glycemic control.

The literature describing the use of retrospective claims analyses to study outcomes of care in pay-for-performance models for diabetes patients is limited. The goal of this study was to compare outcome measures between DRP-certified physicians and non–DRP-certified physicians.

The study revealed several key findings. First, differences in medication use were found between the DRP-certified and non–DRP-certified groups. Oral antihyperglycemic agent use and statin drug use were higher in the DRP-certified group compared with the noncertified group.

### Table 3: Postindex Utilization Per Patient Per Month, Mean (± SD)^a^  

<table>
<thead>
<tr>
<th></th>
<th>Total (N = 8011)</th>
<th>Patients managed by DRP-certified physicians</th>
<th>Patients managed by non–DRP-certified physicians</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medication use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral antihyperglycemic</td>
<td>0.47 (± 0.57)</td>
<td>0.49 (± 0.58)</td>
<td>0.46 (± 0.57)</td>
<td>.02</td>
</tr>
<tr>
<td>Antihypertensive agent</td>
<td>0.63 (± 0.80)</td>
<td>0.63 (± 0.78)</td>
<td>0.63 (± 0.81)</td>
<td>.89</td>
</tr>
<tr>
<td>Statin</td>
<td>0.23 (± 0.32)</td>
<td>0.24 (± 0.33)</td>
<td>0.22 (± 0.32)</td>
<td>.005</td>
</tr>
<tr>
<td><strong>Diabetes-related medical utilization</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office visits</td>
<td>0.380 (± 0.324)</td>
<td>0.388 (± 0.313)</td>
<td>0.372 (± 0.334)</td>
<td>.03</td>
</tr>
<tr>
<td>Outpatient visits</td>
<td>0.074 (± 0.259)</td>
<td>0.076 (± 0.225)</td>
<td>0.073 (± 0.287)</td>
<td>.62</td>
</tr>
<tr>
<td>Emergency department visits</td>
<td>0.005 (± 0.027)</td>
<td>0.003 (± 0.019)</td>
<td>0.006 (± 0.033)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Inpatient visits</td>
<td>0.007 (± 0.031)</td>
<td>0.007 (± 0.029)</td>
<td>0.008 (± 0.032)</td>
<td>.008</td>
</tr>
<tr>
<td><strong>Expenditures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes-related total expenditures</td>
<td>$279.78 (± 1391.75)</td>
<td>$241.40 (± 960.35)</td>
<td>$315.04 (± 1693.25)</td>
<td>.02</td>
</tr>
<tr>
<td>All-cause total expenditures</td>
<td>$875.03 (± 1986.84)</td>
<td>$821.77 (± 1620.19)</td>
<td>$923.98 (± 2271.25)</td>
<td>.02</td>
</tr>
</tbody>
</table>

\(^a^\)Differences examined using univariate analysis.

DRP indicates Diabetes Recognition Program; SD, standard deviation.
tified group. This finding suggests that DRP-certified physicians prescribe guideline-recommended medications more frequently than non–DRP-certified physicians. However, antihypertensive agent use was lower in the DRP-certified group, suggesting that this is an area where DRP-certified physicians must improve their adherence to ADA standards of care—specifically, the guideline recommending that individuals with diabetes be prescribed angiotensin-converting enzyme inhibitors or angiotensin II receptor blockers for their renal protective effects and to treat hypertension.4

Second, the most compelling finding was that medical utilization among patients managed by a DRP-certified physician was lower for emergency department visits and inpatient visits but higher for office and outpatient visits compared with patients managed by non–DRP-certified physicians.

Emergency department and inpatient visits are high cost drivers and have been a primary focus of outcome-based measures in pay-for-performance models.5 In a nationwide evaluation of pay-for-performance patient-centered medical home models among UnitedHealthcare members with diabetes and other health conditions, results showed a 29% reduction in emergency department visits, 11% fewer inpatient visits, and 6% fewer office visits at the end of the pilot programs.6

The direction of the results of the present study are similar with regard to emergency department and inpatient visits, and are encouraging. However, the finding that the Deyo-Charlson-Quan comorbidity score was significantly lower for patients managed by the DRP-certified group than for those managed by the non–DRP-certified group may suggest that patients in the latter group had greater severity of illness, which could have accounted for their higher healthcare resource utilization. Although the nature of the reductions in emergency department and inpatient visits is unclear (eg, some of these visits might have been avoided as a result

### Table 4: Multivariate Analyses of Postindex Overall Expected Mean Utilization and Costs Per Patient Per Year, 2006-2008

<table>
<thead>
<tr>
<th></th>
<th>Patients managed by DRP-certified physicians</th>
<th>Patients managed by non–DRP-certified physicians</th>
<th>Unadjusted difference</th>
<th>Parameter estimate (beta)/cost ratio</th>
<th>95% confidence interval</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medication use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral antihyperglycemic use</td>
<td>5.84</td>
<td>5.52</td>
<td>-0.365</td>
<td>-0.056</td>
<td>-0.074 - -0.037</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Antihypertensive use</td>
<td>7.46</td>
<td>7.60</td>
<td>0.028</td>
<td>0.019</td>
<td>0.003 - 0.035</td>
<td>.02</td>
</tr>
<tr>
<td>Statin use</td>
<td>2.81</td>
<td>2.68</td>
<td>-0.239</td>
<td>-0.049</td>
<td>-0.076 - -0.023</td>
<td>.003</td>
</tr>
<tr>
<td><strong>Diabetes-related medical utilization</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office visits</td>
<td>4.69</td>
<td>4.44</td>
<td>-0.189</td>
<td>-0.055</td>
<td>-0.076 - -0.035</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Outpatient visits</td>
<td>0.93</td>
<td>0.85</td>
<td>-0.034</td>
<td>-0.092</td>
<td>-0.139 - -0.046</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Emergency department visits</td>
<td>0.04</td>
<td>0.07</td>
<td>0.041</td>
<td>0.719</td>
<td>0.517 - 0.922</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Inpatient visits</td>
<td>0.08</td>
<td>0.10</td>
<td>0.021</td>
<td>0.176</td>
<td>0.028 - 0.325</td>
<td>.02</td>
</tr>
<tr>
<td><strong>Expenditures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes-related total expenditures</td>
<td>$3424</td>
<td>$4097</td>
<td>$883.65</td>
<td>1.20</td>
<td>1.01 - 1.42</td>
<td>.03</td>
</tr>
<tr>
<td>All-cause total expenditures</td>
<td>$10,627</td>
<td>$11,221</td>
<td>$1226.50</td>
<td>1.06</td>
<td>0.97 - 1.15</td>
<td>.22</td>
</tr>
</tbody>
</table>

DRP indicates Diabetes Recognition Program.
Diabetes-related expenditures were lower in the DRP-certified cohort than in the non–DRP-certified cohort. This finding is consistent with the reduction in emergency department and inpatient visits that was observed for the DRP-certified group.

Limitations

Although these results suggest that improvement in healthcare utilization can occur for patients managed by DRP-certified physicians, retrospective analyses are characterized by inherent limitations, namely, the uncontrolled structure of the investigation and the lack of clinical validation. Furthermore, interpretation of these findings must take into account some of the limitations associated with claims data, including coding variation between providers, time lag between receipt of service and claims processing, and missing data—especially in fields not relevant to reimbursement.

Claims are designed for purposes of payment, not research. The degree to which claims data can accurately capture an individual’s medical history is limited. Furthermore, the data are subject to possible coding errors, coding for the purpose of rule-out rather than actual disease, and undercoding. Although pharmacy claims provide information on prescriptions that were filled, medications may not have been taken as prescribed. Pharmacy claims also do not reflect prescriptions obtained outside of the plan (eg, physician samples). Most important, patients’ severity of disease and their individual clinical need for tests and treatment cannot be measured using claims data, and therefore, are not taken into account when using performance-based metrics.11

Other limitations specific to this study must also be considered. This study did not match patient between cohorts (only physician cohorts were matched). Although multivariate analyses were conducted, unobserved confounding factors were not accounted for, such as disease severity and length of time with illness (ie, the longer the duration of illness, the more likely patients are to experience diabetes-related complications, which have an obvious effect on outcomes).

In addition, our physician sample was diverse rather than uniform. The length of time physicians have been in practice could not be assessed from claims data or from the DRP registry; however, because the development of the DRP stemmed from the original Bridges to Excellence 2001 pilot program, there may be a greater likelihood that physicians who have been in practice longer are DRP-certified. Therefore, physician experience may affect outcomes.

It was not discernible from the claims data whether providers in either group used the services of a certified diabetes educator in their practice or whether patients made any visits to certified diabetes educators. Patient consultation with a certified diabetes educator would have had the potential to influence our results. Furthermore, multivariate analyses were not conducted for measures that involved small patient sample sizes.

Other variables that may have been better suited for inclusion than the ones used in this study, such as disease severity and medication adherence, may have offered more insight into the differences between the 2 patient groups. In addition, the data used for this study came from a commercially insured managed care population, and may not be applicable to patients in non–managed care settings or to Medicare and Medicaid populations.

Most important, misclassification of providers in the noncertified cohort may have occurred, because this study relied on matching lists of physicians in the health plan and corresponding NCQA recognition programs. Therefore, the noncertified cohort may have included physicians who were in the process of seeking DRP certification, which may explain some of the comparable clinical and resource use findings—although this would have biased against the significant cost and treatment findings between the groups. This was addressed by selecting physician cohorts in the database with the most recent data (2007-2008) to when the NCQA lists were obtained (beginning of 2009). Furthermore, it was not possible to classify physicians who provided quality care but did not have DRP certification. This would also have biased against demonstrating any differences.

Conclusions

This study builds on previous research evaluating the effect of offering incentives to providers—through payments or certified “recognition” of improvements in clinical quality—on patient outcomes. It represents an
Appendix A

Type 2 Diabetes Mellitus Classification Algorithm

Diabetes type (ie, type 1 or type 2) will be determined via a stepwise algorithm using pharmacy and medical claims in the preindex and follow-up periods. Although this algorithm will classify the large majority of patients, a small percentage will not be able to be classified and will be noted as having diabetes of unknown type.

- If evidence of any oral antihyperglycemic medications, classify patient as type 2.
- If no evidence of oral antihyperglycemic medications and no insulin therapy, classify patient as type 2.
- If no diagnosis code of 250.xx, classify patient as type 1. If 1 or more diagnosis codes of 250.x but none with a 5th digit specified, classify patient as having diabetes of unknown type.
- Remaining insulin monotherapy patients, all of whom have at least 1 diagnosis code on a medical claim with a specified 5th digit of 250.xx:
  - If the 5th digit is always 0 or 2, classify patient as type 2.
  - If the 5th digit is always 1 or 3, classify patient as type 1.
  - If the 5th digit is always 1 or 3, classify patient as type 1.
  - Patients receiving insulin monotherapy who have claims that include a mix of type 1 and type 2 diagnosis codes:
    - If the patient has < 4 claims with a mix of specified 5th digits, then the patient will be classified as having diabetes of unknown type.
    - If the patient has > 4 claims with a mix of specified 5th digits and the number of type 1 diagnosis claims exceeds the number with type 2, then the patient will be classified as type 1.
    - If the patient has > 4 claims with a mix of specified 5th digits and the number of type 2 diagnosis claims exceeds the number with type 1, then the patient will be classified as type 2.
    - If the patient has > 4 claims with a mix of specified 5th digits and the numbers of type 1 and type 2 claims are equal, then the patient will be classified as having diabetes of unknown type.

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Author Disclosure Statement

Mr Pinsky and Dr Samant are employees of OptumInsight, the company hired to conduct this study. Dr Hammet, Dr Paulose-Ram, and Dr Mardelien are employees of and own stocks of Pfizer. Dr Nair is a Consultant for Pfizer and Centocor Ortho Biotech and has received research grants from Novartis and Centocor Ortho Biotech.

References


Stakeholder perspective on page 438
What Certification Really Means for Physician Quality

PATIENTS: Consumers are always looking for the best physicians to help manage their health. The problem is how to determine who the best physician really is, whether based on a recommendation from family or friends or based on more public information, including academic credentials, hospital affiliation, or surgical death rates. Newly developed recognition programs such as the National Committee for Quality Assurance (NCQA) Diabetes Recognition Program (DRP)—which, as of April 2011, is managed solely by the NCQA, without American Diabetes Association involvement—provide consumers one way to judge provider competence.

From the patient’s perspective, however, such recognition programs raise 3 important problems:
1. Not all physicians who provide high-quality care will go through the process of obtaining NCQA recognition, since the program is voluntary; therefore, a lack of recognition does not mean poor quality.
2. Based on the relatively low bar set by the NCQA, as described in the article by Pinsky and colleagues—40% or more of patients must meet recommended hemoglobin (HbA1c) goal, and 35% or more must meet recommended blood pressure goals—recognition does not necessarily ensure high-quality care.
3. Finally, as any physician will attest, these quality measures reflect only one kind of quality care; they do not necessarily reflect how well a physician may listen, how astute he or she is in making new diagnoses, or how the physician performs when delivering bad news to a patient.

MEDICAL/PHARMACY DIRECTORS: Payers may have more to learn from these recognition programs than patients do. Although the small differences in medical utilization between DRP-certified and non–DRP-certified physicians shown in this article may not be clinically relevant, the differences in expenditures are quite important and should be of interest to payers. If these recognition programs are a marker of more efficient physicians (those who may obtain similar or better quality measures at lower cost), they are worthy of attention.

The problem for payers and physicians alike is that differences in patient characteristics across physician panels are never adequately adjusted for in these types of measures, as others have demonstrated. It is possible, or even likely, that important variables, such as diabetes severity and socioeconomic status, differ across DRP-certified and non–DRP-certified physicians, which in turn affect expenditures.

Payers also need to pay close attention to changing guidelines and research findings when considering these certification programs; as the NCQA is well aware, HbA1c and blood pressure goals that might have been the norm yesterday may not be the norm today.

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