Utilization of Health Care Quality Markers in a Family Medicine Outpatient Setting

K. Ahmed Hussain, MD; Gaylen M. Kelton, MD

Background and Objectives: There is a growing demand for quality improvement in the health care system. This study sought to generate “report cards” for primary care resident physicians on their use of quality markers related to diabetes care. Methods: Electronic medical records [electronic health records] were reviewed for the care provided to diabetics by resident physicians. Results: We were able to generate a report card for each resident physician. We found that compliance rates and mean values improved with increased frequency of visits for the following parameters: (1) HgbA1c testing and mean values, (2) lipid profile screening and mean values of low density lipoproteins, (3) administration of pneumococcal vaccine, and (4) prescription of angiotensin converting enzyme inhibitor or angiotensin receptor blockers. Conclusions: It is possible to generate report cards for resident physicians to evaluate their performance related to diabetes care. There was a correlation between increased frequency of visits and better performance.

We generated report cards for resident physicians based on the quality of care provided to patients with diabetes. Our primary objective was to determine the feasibility of generating such report cards using an electronic medical records (EMR) [or electronic health record (EHR)] system as the source of data.

Methods
Setting
This study was conducted in an academic family medicine office located in Indianapolis. The study methods were reviewed and approved by the Indiana University School of Medicine Institutional Review Board.

Patient Selection
There are approximately 12,000 active patient records in our EHR system. We identified patients with diabetes mellitus by first querying the EHR system for patients with a diagnosis of diabetes (International Classification of Diseases, Ninth Edition [ICD-9] codes 250.00, 250.01, 250.02, or 250.03) who were seen during calendar year 2004. From the initial list of patients identified, we selected those patients assigned to any of our 16 resident physicians, with the resident designated...
as the patient’s primary care provider and who had at least one visit with that designated physician. A total of 138 patients matched these inclusion criteria.

Medical Record Review
Medical records were reviewed, and a report card was generated for each resident, according to the following parameters selected from the American Diabetes Association’s standards of care (Table 1).\(^2\) The performance of our residency on each of the parameters was benchmarked against national averages obtained from the 2004 HEDIS measures for insurance plans.

Data Analysis
We computed descriptive statistics for the rate of compliance with recommendations and the mean scores for HgbA\(_1c\) and low density lipoprotein (LDL), including comparisons to national data. Each patient’s most recent tests results were used for these calculations.

We then stratified patient records into two groups depending on the number of visits with the designated physician. One group was patients who had one or two visits with the designated physician. The second group was patients with three or more visits. We performed \(t\) tests to determine if there were statistically significant differences between the groups in any of the parameters shown in Table 1. We used the SAS system and defined statistical significance as a \(P\) value of less than .05.

**Results**

**Rates of Compliance With Guidelines**

Of the 138 patients, 103 (74.6%) patients had an HgbA\(_1c\) tested at least once during the study period, and the average last test value was 7.65%. Only 85 (61.6%) patients had at least one lipid profile screening performed during the period. The average LDL score on the latest measurement was 107 mg/dl. Pneumococcal vaccines were administered to eight of the 75 patients over the age of 55 (10.7%). Prescriptions for angiotensin converting enzyme inhibitors or angiotension receptor blockers (ACE-I/ARB) were given to 110 patients (79.7%). These results are summarized in Table 1.

**Differences Between Groups**

Forty-four patients were in the first group (one or two visits to assigned primary provider), and 94 were in the second group (three or more visits). Differences between the groups are shown in Table 2.

**Report Card Comparisons**

The performance of all the residents was tabulated. A report card was then generated for each resident that compared the resident’s performance to the average of his/her peers in the program and to the performance of physicians nationally (Figure 1).

**Discussion**

There are two key findings to our study. First, we found that the availability of an EHR made it logistically feasible to generate performance report cards

---

**Table 1**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Goal</th>
<th>Percent Meeting Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>HgbA(_1c) testing at least once during the study period</td>
<td>100%</td>
<td>74.6</td>
</tr>
<tr>
<td>Proportion of patients in the target range (&lt;6.5%) for HgbA(_1c)</td>
<td>100%</td>
<td>27.5</td>
</tr>
<tr>
<td>Lipid profile screening at least once during the study period</td>
<td>100%</td>
<td>61.6</td>
</tr>
<tr>
<td>Proportion of patients in the target range (&lt;100mg/dl) for LDL</td>
<td>100%</td>
<td>26.8</td>
</tr>
<tr>
<td>Proportion of patients meeting goal for both HgbA(_1c) and LDL</td>
<td>100%</td>
<td>13.0</td>
</tr>
<tr>
<td>Administration of pneumococcal vaccine to patients above 55 years of age</td>
<td>100%</td>
<td>10.7</td>
</tr>
<tr>
<td>Prescription of angiotensin converting enzyme inhibitor or angiotension receptor blocker</td>
<td>100%</td>
<td>79.7</td>
</tr>
<tr>
<td>Mean value of the latest HgbA(_1c) for residents’ panel of patients</td>
<td>Less than 6.5%</td>
<td>7.65</td>
</tr>
<tr>
<td>Mean value of the latest LDL score for residents’ panel of patients</td>
<td>&lt;100 mg/dl</td>
<td>107 mg/dl</td>
</tr>
</tbody>
</table>

HgbA\(_1c\)—Hemoglobin A-1-C
LDL—low-density lipoprotein
Table 2
Differences in Performance Based on Number of Visits

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Patients With One–Two Visits/Year</th>
<th>Patients With &gt;Three Visits/Year</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compliance with HgbA1c testing (%)</td>
<td>52.3%</td>
<td>85.1%</td>
<td>.0003</td>
</tr>
<tr>
<td>Latest HgbA1c value for residents’ panel of patients (mean)</td>
<td>8.23%</td>
<td>7.48%</td>
<td>.011</td>
</tr>
<tr>
<td>Patients in the target range (&lt;6.5%) for HgbA1c (%)</td>
<td>15.9%</td>
<td>33%</td>
<td>.47</td>
</tr>
<tr>
<td>Compliance with lipid profile screening (%)</td>
<td>38.6%</td>
<td>72.3%</td>
<td>.0002</td>
</tr>
<tr>
<td>Patients in the target range (&lt;100mg/dl) for LDL (%)</td>
<td>15.9%</td>
<td>31.9%</td>
<td>.32</td>
</tr>
<tr>
<td>Patients meeting goal for both HgbA1c and LDL (%)</td>
<td>4.5%</td>
<td>16%</td>
<td>.31</td>
</tr>
<tr>
<td>Administration of pneumonia vaccine (%)</td>
<td>9.5%</td>
<td>11%</td>
<td>.84</td>
</tr>
<tr>
<td>Prescription of angiotensin converting enzyme inhibitor or angiotensin receptor blocker (%)</td>
<td>72.7%</td>
<td>82.9%</td>
<td>.19</td>
</tr>
</tbody>
</table>

HgbA1c —hemoglobin A-1-C
LDL—low-density lipoprotein

Figure 1
Examples of Report Card Data Given to Residents

HgbA1c Testing Compliance  Lipid Testing Compliance

The left side of histograms portray each individual resident’s performance in terms of the percentage (vertical axis) of their patients for whom they obtained the recommended laboratory testing. The right side of the histogram shows the average performance for all residents in the program.

Feasibility of Report Cards
It sounds prescient that a call to create a theoretical basis for research on how medical education could adapt to an age of increasing accountability was made by Wartman more than a decade ago. But, little progress has been made toward this end. The quality movement

for residents. Second, we noted that residents’ performance, measured by compliance with diabetes care guidelines, improved as patients made more visits to their designated resident physician.
may, however, finally be driving the push toward individual physician accountability, with pressure to link physicians’ performance and compensation with patient outcomes. Chronic disease benchmarks are increasingly being used as measures of performance. It has been postulated that educational interventions using patient outcomes may be most useful during residency training, but we believe that current efforts to incorporate quality assessment measures during residency are inadequate. Though resident report cards have been used to evaluate and influence practice habits, we believe our approach is a novel effort in that we have used commonly referenced primary care benchmarks to assess the performance of resident physicians. There is literature to support the view that education of physicians with feedback on the performance helps improve quality, but this feedback needs to be reinforced by practice management systems to sustain the improvement in quality.

It should be noted, however, that while we have demonstrated that generation of report cards is feasible, our study provides no data to indicate that residents actually change their behaviors in response to the report cards, nor that patient outcomes improve. Additional research will be necessary to determine if, in the area of chronic disease management, report cards influence physician performance and patient outcomes.

If further research shows that report cards do, in fact, improve resident performance and patient outcomes, then we would recommend using report cards more widely in residency programs. Such an effort would be consistent with the recommendations of the Future of Family Medicine (FFM) project.

Variations in Compliance With Increasing Number of Visits

We found that patients who had more office visits with the same provider showed better compliance with guidelines and better mean values of the clinical indicators. At least one other study has shown improved glycemic control when there is a regular primary health care provider, and data suggest that missed appointments correlate well with poor glycemic control. We cannot tell from our data, however, whether increased contact with the primary physician resulted in better glycemic control or if patients predisposed to self care and better disease management made more visits to their physicians. This issue needs further investigation.

Acknowledgments: We acknowledge Michael Przybylaki, PhD, whose help with the statistical analysis was invaluable, and Nahida Islam, MD, whose help with the data collection, analysis, and tabulation was appreciated.

Corresponding Author: Address correspondence to Dr Kelton, Indiana University, Department of Family Medicine, 1520 North Senate Avenue, Indianapolis, IN 46202-2213. 317-962-1042. Fax: 317-962-6722. gkelton@iupui.edu.

REFERENCES