Collaborating with Community Pharmacists to Improve the Quality of Diabetes Care in an IPA-model HMO

OBJECTIVE: To assess the ability of community pharmacists to identify managed care patients with diabetes who are not achieving therapeutic goals.

SETTING: A network of independent community pharmacists in West Virginia and southeastern Ohio in collaboration with The Health Plan of the Upper Ohio Valley.

METHODS: Pharmacists conducted assessments of patients' glycemic control (HbA1c), blood pressure (BP), lipid levels (total cholesterol, low-density lipoprotein [LDL], high-density lipoprotein [HDL], triglycerides), and body mass index (BMI). The therapeutic goals were: HbA1c less than 7%, BP less than 130/85 mmHg, total cholesterol under 200 mg/dl, LDL less than 100 mg/dl, HDL higher than 45 mg/dl, triglycerides under 200 mg/dl, and BMI lower than 30. These indices were measured during scheduled appointments in the pharmacy by pharmacists who had completed a certificate program in diabetes care. Reports on each patient's status, along with recommendations, were sent to the patient's physician.

RESULTS: Fifty-four persons were enrolled in the pharmacist program and complete clinical data were obtained for 47 patients. The following percentages of patients were identified as not achieving the therapeutic goal for a particular measure: HbA1c: 63.9%, BP: 56.3%, total cholesterol: 38.3%, LDL: 69.8%, HDL: 76.5%, triglycerides: 57.4%, BMI: 61.9%. Patients who were not reaching the therapeutic target were referred to their physicians for additional evaluation.

CONCLUSION: Pharmacists can identify a substantial number of persons with diabetes who are not achieving the goals for HbA1c, blood pressure, lipids, and weight. This approach can facilitate the continuous assessment and improvement of care for managed care enrollees with diabetes.

KEYWORDS: Diabetes, quality improvement

J Managed Care Pharm 2001: 292–96

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The treatment of persons with diabetes is often expensive and inadequate. In 1992, 14.2% of direct health care expenditures was used to treat patients with diabetes who make up less than 5% of the population. This represents an average annual expenditure on medical care for persons with diabetes of $9,493, compared to $2,604 for patients in general. Many of these costs are associated with the management of the complications of diabetes, such as myocardial infarction or end-stage renal disease (ESRD). The cost of treating an acute myocardial infarction in a person with Type-2 diabetes is estimated at $27,630, while ESRD costs have been estimated at $53,659 per year.

The American Diabetes Association (ADA) estimates that the complications of diabetes could be reduced dramatically if patients maintained adequate control of their diabetes. Results from the Diabetes Control and Complications Trial (DCCT) suggest that intensive treatment and monitoring could reduce the risk of retinopathy (76%), nephropathy (50%), neuropathy (60%), dyslipidemia (34%), and cardiovascular disease (41%).

To decrease the risk of diabetes complications, the ADA recommends that patients receive annual assessments of lipids and microalbumin, and that glycosylated hemoglobin (HbA1c) be measured two to four times per year, depending upon the patient's glycemic control. Numerous studies have shown that these assessments frequently are not done. A recent study of Medicare claims from three states found that only 16% of Medicare recipients with diabetes received at least one HbA1c test over the course of one year, 46% saw an ophthalmologist, and 55% were screened for high cholesterol. Managed care organizations tend to fare better than fee-for-service providers, but are far from meeting the ADA guidelines. A large health maintenance organization (HMO) in California reported that HbA1c tests were done for 44% of its patients with diabetes and United HealthCare Corporation recently reported rates of about 60% for HbA1c testing in its enrollees.

As part of the Health Plan Employer Data and Information Set (HEDIS) 2000, the National Committee for Quality Assurance (NCQA) requires managed care organizations (MCOs) to track key indicators of the quality of care for persons with diabetes. The frequency of glycosylated hemoglobin and lipid tests for this population are such indicators. MCOs strive to implement mechanisms to continuously improve their performance in monitoring the care provided to their members with diabetes. Pharmacists could potentially increase the number of persons who receive these tests by conducting the assessments in the pharmacy.
Increasingly, health care organizations are using pharmacists or nurses to assist in the monitoring and management of patients with diabetes. The Veterans Affairs (VA) Medical Center in Pittsburgh found that persons with Type-2 diabetes who were enrolled in its pharmacist-based program experienced significant improvements in glycemic control within six months. After adjusting for the costs of the program, they estimated that net savings to the VA Medical Center for 15 of their most severely ill patients was more than $103,000 per year. In 1997, Fincham and Lofholm suggested that community pharmacists could reduce health expenditures for diabetes by $4,295 per patient. A network of community pharmacists saved the city of Asheville, North Carolina, more than $900 per patient per year on diabetes care, while a pharmacy in Virginia documented significant improvements in their patients’ glycemic control after enrollment in a diabetes care program.

**Practice Innovation**

The Ohio Valley Pharmacist Care Network (OVPCN) is a group of independent community pharmacists located in the northern panhandle of West Virginia and southeastern Ohio. This network was formed in 1998 with the goal of establishing common pharmaceutical care programs to meet the needs of patients, physicians, and payors in the region. At the time of this publication, the membership of OVPCN consisted of thirteen pharmacists at seven pharmacies.

Representatives of OVPCN met with the Director of Pharmacy and Director of Quality Improvement at The Health Plan of the Upper Ohio Valley to identify the needs of this independent practice association (IPA)-model HMO. In addition, faculty from West Virginia University (WVU) School of Pharmacy were asked to help identify opportunities for quality improvement and to develop training programs for the pharmacists. A collaborative effort was initiated to assess and improve the quality of diabetes care for the HMO’s enrollees.

The goals of the collaborative effort were to:

- Increase the percentage of patients with HbA1c lower than 8% (ideally lower than 7%);
- Increase the percentage of patients with low-density lipoprotein (LDL) cholesterol less than 130 mg/dl (ideally less than 100 mg/dl);
- Increase the percentage of patients whose blood pressure is lower than 130/85 mmHg;
- Decrease diabetes-related ER visits, hospitalizations, and unscheduled physician visits;
- Increase treatment guideline adherence (regular eye exams, foot exams, immunizations, microalbumin, HbA1c, fasting blood glucose [FBG], lipids, blood pressure [BP], weight);
- Enhance health-related quality of life; and
- Optimize the flow of information between patient, pharmacist, and physician.

Standardized diabetes care services were established at the network pharmacies to ensure the consistency of The Health Plan member benefits. Equipment such as the Bayer Diagnostics DCA2000+ and the Cholestech LDX Analyzer were purchased by each pharmacy to facilitate the collection of data at each site. The services consist of an initial assessment and education program, as well as follow-up visits with the patients. These services are provided through scheduled appointments that last between 30 and 60 minutes. The initial assessment of the patients includes the following:

- Collection of baseline data: weight, blood pressure, blood glucose, lipid panel, HbA1c;
- Assessment of guideline adherence: primary care physician (PCP) visit, eye/foot exams, immunizations;
- Review of medication regimen and patient adherence to regimen; and
- Patient education (three sessions of one hour each). The documentation and recommendations are forwarded to the patient’s primary care physician.

Follow-up visits are scheduled every three months and generally last less than 30 minutes. The pharmacists collect monitoring data (weight, BP, blood glucose diary); perform a lipid panel and microalbumin testing on an annual basis; perform HbA1c testing every three to six months based on HbA1c levels; assess guideline compliance (PCP visit, eye/foot exam, immunizations); re-evaluate medication regimen and patient adherence; re-educate patient if necessary; and forward documentation to the PCP.

Additionally, the pharmacists agreed to work with the WVU faculty to develop a continuous-quality-improvement process for the care they provided. This entails monthly meetings to discuss cases, as well as periodic reviews of the pharmacists’ documentation by the WVU faculty. Feedback is provided by the faculty to both the pharmacists and The Health Plan.

The Health Plan agreed to compensate the pharmacists for diabetes services provided that the pharmacists:

- Were registered pharmacists;
- Completed an approved certification program in diabetes-related pharmaceutical care from a national organization (APhA, NIPCO, or AADE Comprehensive Review Program);
- Completed the WVU certificate program in Pharmaceutical Care for Persons with Diabetes;
- Possessed and were trained in the proper use of DCA2000+ (HbA1c), Cholestech LDX or equivalent (lipid profiles), blood pressure monitoring equipment, and glucose meters;
- Obtained Clinical Laboratory Improvement Act waivers for all equipment requiring this waiver;
- Demonstrated competence in using the OVPCN diabetes education materials;
- Had a private area in which to meet with patients; and
- Maintained appropriate patient care records.

**Methods**

**Study Population**

Adults over 18 years of age with Type-2 diabetes were eligible for...
inclusion. It was anticipated that the majority of participants would be members of The Health Plan of the Upper Ohio Valley because this HMO is paying for the educational component of the pharmacists’ services. However, the assessments were available to all patients with Type-2 diabetes who attended the OVPCN pharmacies. The pharmacists solicited the involvement of their current patients and also accepted referrals from physicians. Nearly all health plan patients who were offered the opportunity to participate chose to enroll in the pharmacy-based program (54 out of 60 enrolled).

Clinical Data Collection
The clinical data are collected and recorded by the pharmacists as part of their standard care program during 1999 and 2000. The $\text{HbA}_1c$ levels are determined by analyzing blood samples in the Bayer DCA2000+ machine; these tests can be performed in the pharmacy by trained personnel. The $\text{HbA}_1c$ reagent cartridge requires only one microliter of blood from a fingerstick and takes only five minutes to obtain results.

The lipid profile is conducted through the use of the Cholestech LDX analyzer using a fingerstick sample of blood. This test provides estimates of the total cholesterol, HDL, LDL, and triglyceride and glucose levels. All samples were drawn from patients in a fasting state. The pharmacists also monitor the patients’ blood pressure at each visit. Two blood pressure readings were taken with the patient in the sitting position over the course of the assessment visit. The mean of the two blood pressures was used for analyses. The body mass index (BMI) for each patient was estimated using the height and weight in the following formula: (pounds $\times 703)/(\text{inches} \times \text{inches})$. Thus, a 200-pound, 72-inch person would have a BMI of $(200 \times 703)/(72 \times 72) = 27.1$. All measurements were obtained in the pharmacy.

Results

Patient Characteristics
The pharmacists enrolled 54 patients in the clinical program, of which 32 (59%) were female. The average age of the participants was approximately 60 years (range: 35–81 years).

Clinical Assessment
Usable clinical data were obtained for 47 patients. The baseline assessment revealed that a considerable number of persons were not “at goal” for the clinical indicators (see Table 1, this page). For $\text{HbA}_1c$, 63.9% of persons had not reached the desired goal of $\text{HbA}_1c$ lower than 7%, and 36.2% were above 8%.

Blood pressure was also elevated for about half of the patients, with only 44.7% reaching the ADA recommended target of 130/85 mmHg. Approximately 15% of patients could be categorized as having Stage 2 or 3 hypertension.

Lipid levels also were not ideal for many of the patients. Almost seven out of ten (69.8%) patients had LDL levels above the recommended target of 100 mg/dl, and 57.4% of patients had LDL levels greater than 130 mg/dl, putting them in the high-risk level for coronary heart disease.13

HDL levels were also elevated in a substantial number of patients. Over three-fourths (76.5%) of patients had HDL levels below the target of 45 mg/dl, and 40.4% of patients had HDL levels below 35 mg/dl, which places them in the high-risk level for coronary heart disease.13 Total cholesterol was elevated in 38.3% of patients, while triglyceride levels were above 200 mg/dl in 57.4% of patients. Fourteen percent of patients had triglyceride levels above 400 mg/dl.

Approximately 85.7% of persons were above the ideal BMI of 25, and nearly 62% were obese (BMI over 30).

Discussion
For persons with diabetes, glycemic control is an important

### Table 1

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Percentage of Patients Not Achieving Goal</th>
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<tbody>
<tr>
<td>$\text{HbA}_1c$</td>
<td></td>
</tr>
<tr>
<td>7–8%</td>
<td>27.7%</td>
</tr>
<tr>
<td>&gt;8%</td>
<td>36.2%</td>
</tr>
<tr>
<td>Total above goal</td>
<td>63.9%</td>
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<tr>
<td>Blood Pressure&lt;br&gt;&lt;sup&gt;b,c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Stage 1 hypertension</td>
<td>31.9%</td>
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<tr>
<td>Stage 2 hypertension</td>
<td>8.5%</td>
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<tr>
<td>Stage 3 hypertension</td>
<td>6.4%</td>
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<tr>
<td>Total</td>
<td>46.8%</td>
</tr>
<tr>
<td>Lipids</td>
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<td>HDL &lt;45</td>
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<tr>
<td>Triglycerides &gt;200</td>
<td>57.4%</td>
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<tr>
<td>Body Mass Index (BMI)&lt;br&gt;&lt;sup&gt;d&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>25–30</td>
<td>23.8%</td>
</tr>
<tr>
<td>&gt;30</td>
<td>61.9%</td>
</tr>
</tbody>
</table>

<sup>a</sup>The ADA recommends a target $\text{HbA}_1c$ of 7% for persons with diabetes, and that additional clinical action be taken for patients with an $\text{HbA}_1c$ over 8%.

<sup>b</sup>The JNC-VI guidelines define hypertension using the following parameters: Stage 1 = systolic $>140$ or diastolic $>90$; Stage 2 = systolic $>160$ or diastolic $>100$; Stage 3 = systolic $>180$ or diastolic $>110$.

<sup>c</sup>The ADA recommends a target blood pressure of 130/85 mmHg; 56.3% of patients failed to meet this goal.

<sup>d</sup>The recommended BMI is 20–25; a BMI $>30$ is considered obesity.
predictor of micro- and macrovascular complications. Additionally, blood pressure and lipid levels are important markers for cardiovascular mortality in persons with diabetes. The ADA recommends frequent monitoring of HbA1c, blood pressure, and lipids to help ensure that patients are maintaining control of their condition. Regular eye, foot, and renal screenings are also recommended.

In this study, a novel approach was used to identify persons with diabetes who were not reaching the recommended therapeutic goals for HbA1c, lipids, and blood pressure, as well as to identify those who might benefit from weight-management programs. Community pharmacists collected information on their patients with diabetes, and sent reports to each patient’s physician. The pharmacists were able to identify a substantial number of persons who were not reaching the desired endpoints of therapy (see Table 1), and recommend adjustments to the drug regimen when appropriate. The patients and many of the physicians were quite appreciative of the pharmacists’ efforts.

Achieving control of diabetes is challenging. Behavioral changes in diet, exercise, and medication use are difficult to maintain, and patients often experience decline in their glycemic control over time. Consequently, close monitoring is essential, and a supportive pharmacist can be a great help in maintaining control of the diabetes and other health indicators. Pharmaceutical care espouses a closer relationship among patient, pharmacist, and physician. It is essential that all three participants in this relationship understand the goals for disease control, that they agree on a plan for monitoring, and that information flows smoothly among the participants to continually enhance the patient’s health outcomes.

Pharmacists are in an excellent position not only to provide information about drug therapy, but also to assess the patient’s progress toward therapeutic goals. In this study, pharmacists identified 36.2% of their patients as having an HbA1c above 8%. The ADA suggests that an HbA1c above 8% should prompt additional action by providers to enhance the patient’s glycemic control. The pharmacists notified the physicians that these patients were not “at goal” and suggested specific therapeutic options when requested. Although the long-term impact of these recommendations could not be assessed at this time, identifying the patients in need of additional help prevented more than one-third of the patients from “slipping through the cracks” and having their uncontrolled diabetes go undetected.

Many patients with Type-2 diabetes also have hypertension and/or dyslipidemia and often suffer complications such as heart attack or stroke. Thus, it is important to monitor blood pressure and lipid levels in these patients. The pharmacists in this network identified over half (55.3%) of the patients as not meeting the ADA recommend blood pressure goal of 130/85 mmHg. Additionally, about 15% of the patients had blood pressure readings that were consistent with Stage 2 or Stage 3 hypertension. Thus, at least 15% and perhaps as many as 55% of the patients could benefit from additional intervention.

The pharmacists also found that 57.4% of patients were within the high-risk category for coronary heart disease as predicted by LDL over 130 mg/dl. The LDL level is an important indicator of risk for cardiovascular mortality. Many patients (76.5%) had HDL levels below the recommended target, and 57.4% had elevated triglycerides. This seems consistent with the finding that 85.7% of patients were above their ideal body weight and about 62% of patients were considered obese. Clearly, many of the patients enrolled in the pharmacy-based program were in need of help in reducing their risk of macrovascular complications.

Pharmacists’ involvement with diabetes care is not a new concept. An increasing number of certified diabetes educators are pharmacists, and several studies have demonstrated the impact of a pharmacist’s care on diabetes outcomes. However, very few community pharmacists have conducted assessments of their patients with diabetes in a manner as comprehensive as the program described here. In addition to examining blood glucose meter readings, weight, and blood pressure, the pharmacists in this network obtained equipment to collect HbA1c and lipid levels within the pharmacy. Performing these tests while the patient was in the pharmacy allowed the pharmacist to give the patient immediate feedback on their disease control, and facilitated more timely modifications of drug therapy. Rather than the pharmacist waiting for the physician to order the test, and then hoping that the patient would go to the laboratory and that the physician would share the data and make appropriate changes in drug therapy, the pharmacist can more proactively identify problem areas and make informed, specific recommendations for drug therapy enhancement.

Having the pharmacist collect and report this information can be in the best interest of physicians and health plans. If physicians can rely on the pharmacist to coordinate the education and monitoring functions for diabetes care, then the physicians may be able to save time and be more efficient in providing care to their patients with diabetes. The pharmacist can perform the key monitoring tests recommended by the ADA and provide reports directly to the physician, along with recommendations for drug therapy modification. Additionally, the pharmacist can ensure that the patients are seeing their physicians on a regular basis and can promote positive health behaviors (e.g., regular eye and dental exams, flu shots, smoking cessation). By enhancing the frequency of regular exams and monitoring tests, a pharmacist can assist health plans in improving their diabetes indicator scores for HEDIS. Although an individual pharmacy may have little impact on the overall HEDIS score of a health plan, a network of pharmacies may be able to produce a measurable difference.

As a result of this project, The Health Plan is working with OVPCN to develop a multi-disciplinary diabetes education program that will be integrated with the monitoring component of the pharmacists’ services. In this model, the pharmacists help not only...
to monitor the patient's clinical progress, but also to ensure that the patient is attending the education classes and adhering to diet, exercise, and medication recommendations.

The costs of implementing the diabetes care program within the OVPCN were substantial. Pharmacists spent $5,000–$7,000 at each store to acquire the equipment, supplies, and training necessary to provide this service. Although this is not an insurmountable barrier to implementation, the compensation levels to the pharmacist by the health plan should be adjusted to offset these costs within an acceptable time frame. The pharmacists were able to offset some of these costs through small grants from pharmaceutical manufacturers and foundations; however, contracts with third-party payors are currently the primary source of revenue.

Paying pharmacists to identify patients with suboptimal glycemic control or undetected hypertension or dyslipidemia may be quite cost-effective for managed care plans. A recent study demonstrated that patients with poor glycemic control (HbA1c over 10%) were hospitalized with complications of diabetes at a far greater rate than those with fair (HbA1c 8%-10%) or good (HbA1c lower than 8%) glycemic control. The average inpatient charges over three years for a patient with good control was $970, versus $3,040 per person for patients with poor control. Another recent study found that improving glycemic control in managed care patients can reduce average total expenditures by $685–$950 per year within the first four years of improvement. These cost reductions are achieved not only through preventing the complications of diabetes, but also through the immediate impact on patients' functional ability. If a pharmacist were paid only $250 per patient, per year, to identify persons with diabetes who were failing to meet their treatment goals, helping just a few patients to achieve better control of their diabetes would offset the costs of the pharmacist-care program. Consequently, it appears that community pharmacists can produce savings to third-party payors and achieve better control of their diabetes; however, this service should be of great value to patients, physicians, and third-party payors.

References


†† Limitations

The percentage of persons who did not reach the therapeutic goal was based upon the total number of those who agreed to participate in the pharmacist-based program. It is not clear whether the persons enrolled in this monitoring program were different from the general population of persons with diabetes. Because very few persons declined participation in the program, the study population is believed to be fairly consistent with the general population of managed care enrollees with diabetes.

†† Conclusions

Community pharmacists can play an important role in diabetes care by identifying patients who are not achieving their therapeutic goals, and by working with physicians to make drug therapy modifications. Through identifying patients not “at goal,” the pharmacists have the opportunity to prevent the development of diabetes-related complications and reduce total health care expenditures. Implementing a diabetes-monitoring program may require a significant investment by a pharmacist; however, this service should be of great value to patients, physicians, and third-party payors.