

## Reducing Patient Drug Acquisition Costs Can Lower Diabetes Health Claims

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### Abstract

Concerned about rising prevalence and costs of diabetes among its employees, Pitney Bowes Inc recently revamped its drug benefit design to synergize with ongoing efforts in its disease management and patient education programs. Specifically, based on a predictive model showing that low medication adherence was linked to subsequent increases in healthcare costs in patients with diabetes, the company shifted all diabetes drugs and devices from tier 2 or 3 formulary status to tier 1. The rationale was that reducing patient out-of-pocket costs would eliminate financial barriers to preventive care, and thereby increase adherence, reduce costly complications, and slow the overall rate of rising healthcare costs. This single change in pharmaceutical benefit design immediately made critical brand-name drugs available to most Pitney Bowes employees and their covered dependents for 10% coinsurance, the same coinsurance level as for generic drugs, versus the previous cost share of 25% to 50%. After 2 to 3 years, preliminary results in plan participants with diabetes indicate that medication possession rates have increased significantly, use of fixed-combination drugs has increased (possibly related to easier adherence), average total pharmacy costs have decreased by 7%, and emergency department visits have decreased by 26%. Hospital admission rates, although increasing slightly, remain below the demographically adjusted Medstat benchmark. Overall direct healthcare costs per plan participant with diabetes decreased by 6%. In addition, the rate of increase in overall per-plan-participant health costs at Pitney Bowes has slowed markedly, with net per-plan-participant costs in 2003 at about \$4000 per year versus \$6500 for the industry benchmark. This recent moderation in overall corporate health costs may be related to these strategic changes in drug benefit design for diabetes, asthma, and hypertension and also to ongoing enhancements in the company's disease management and wellness programs.

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**D**irect medical costs for diabetes and related complications are notoriously high. The Centers for Disease Control and Prevention estimates the cost at \$92 bil-

lion per year,<sup>1</sup> and health insurance expenditures for the individual with diabetes are triple those of the average consumer.<sup>2</sup> From the US employers' perspective, the burden of diabetes extends even further to include the \$40-billion annual cost for indirect expenditures because of disability, work loss, and premature mortality.<sup>1,3,4</sup> In fact, disease-related work absences and disability account for about one third of the total cost per employee with diabetes.<sup>5</sup>

Fortunately, investing in aggressive diabetes control not only improves blood glucose levels but reduces medical complications and costs<sup>6-8</sup> and may also boost productivity and lower absenteeism.<sup>3,9,10</sup> Although optimized use of medications is essential to improved diabetes control,<sup>9</sup> the trend in pharmaceutical benefit design has been to pass higher portions of drug costs to members to slow the growth of the healthcare budget. But employers must balance this need for employee cost-sharing and "demand management" with the desire to increase access to optimal care for costly conditions like diabetes.<sup>11</sup> If not managed judiciously, the high copays and coinsurance may become a financial barrier to proper diabetes care. The short-term savings may actually impede the opportunity for longer-term health budget savings and productivity gains.

At Pitney Bowes, the escalating cost of healthcare hit home most recently in the year 2000, when per-employee claims jumped by 13% versus an increase of just 3% in the benchmark of similar companies (as measured by the Hewitt Health Value Index). Although the company's average per-participant cost of approximately \$3300 per year remained well below the benchmark average, the double-digit increase was cause for alarm. Some of the increase was attributed to managed care companies cutting back on utilization man-

agement programs and some to an average employee age slightly above the benchmark, thus increasing prevalence of chronic medical conditions. Perhaps related to this demographics issue was the additional fact that more extremely high-cost (>\$100 000) cases of end-stage long-term disease were being treated. But these were only guesses about the real sources of the cost spike.

As described in this article, the company's concerns led it to tap its own considerable information resources to identify its true cost drivers for several long-term diseases. After evaluating these drivers, management then altered its prescription drug plan in an attempt to boost plan participant (ie, employee and covered dependents) access to medications required for the treatment of key chronic conditions such as asthma, diabetes, and hypertension. Key findings related to diabetes are presented in this report because the details of employer-initiated efforts may be relevant to any health-care manager dealing with rising costs for long-term diseases.

### **The Opportunity at Pitney Bowes**

Pitney Bowes, a Fortune 500 company providing integrated mail and document management systems services and solutions, has 35 000 employees worldwide and a revenue of \$5 billion per year. Within the United States, the company's 23 000 employees are 58% male with an average age of 41 years and an average length of service of 8.1 years. Twenty-five percent of employees are located in the New York, New Jersey, and Connecticut tristate area, with wide dispersal across the remaining states.

The company has an integrated health, wellness, and disability strategy with databases providing timely feedback on each. For example, cost data are available on all plan participant medical and pharmacy expenditures. Also available for scrutiny are employee disability rates, absence data, worker compensation costs, and demographic information along with employee risk factors and behaviors, productivity information, and selected survey results. All data are available in aggregated, deidentified format that is fully compliant with the

Health Insurance Portability and Accountability Act of 1996 (HIPAA).

The medical benefits at Pitney Bowes are available through self-insured or fully-insured plans and share a common benefit design. About 80% of plan participants opt for a self-insured plan. There are 46 local and national health maintenance organization carriers and 4 national preferred provider organizations. In all of the self-funded plans and a few of the others, the drug benefits are provided by a carve-out pharmacy benefit manager. This coverage of approximately 90% of all employees under 1 common pharmaceutical plan provides a potentially powerful single point of entry for studying—and for leveraging—long-term disease outcomes in the Pitney Bowes population.

Typically, disease management programs are the logical solution for measuring and manipulating health in areas such as asthma, cardiovascular disease, and diabetes. Although disease management is part of the integrated effort of long-term disease care at Pitney Bowes—in fact, such programs remain a condition for bidding on company business—the presence of close to 50 separate health plan vendors precluded any easy opportunity to have an impact on diabetes care with a single employer-driven program change. The company had already introduced an Internet-based health portal for employees and an opt-in voluntary disease management program, and modified their existing wellness program to encourage more long-term disease awareness and treatment. These existing disease management and patient education/wellness programs helped form a broad base of a sensible benefits package aimed at improving care and limiting total costs. Still, company management was looking for a new catalyst to change health behaviors and limit costs. Specifically, they wanted to get ahead of the cost curve by quickly shifting more plan participants with expensive long-term diseases into prevention compliance.

In this situation, the drug benefit design suggested itself as a logical tool for employer-driven population management. The potential value of this common denominator of employee health became even more striking after the company's health benefits man-

agers realized, as discussed next, that low medication adherence was linked to high-cost claims.

### **The Predictive Model: What Causes High-cost Claims?**

Shortly after the 13% cost surge of 2000, the company commissioned an analysis to determine what population-based factors caused plan participants to migrate from “normal-cost” (\$400-\$700 per year) to “high-cost” status (>\$10 000 per year). A consulting company called Medical Scientists Inc (recently acquired by LifeMasters Supported SelfCare, Inc) worked with Pitney Bowes to develop a hybrid artificial intelligence program that defined the end point in question—in this case, the transition to high costs—and then identified the population-level variables associated with that end point. The program was unique in the way that it scoured the database for any employee variable linked to increased costs—not just the preconceived variables such as age, concomitant disease, or hemoglobin A<sub>1C</sub> level. Notably, the predictive model also considered the total cost of care for employees, including not only direct medical costs, such as medical claims, pharmacy, and behavioral health, but also indirect costs related to absenteeism and disability. The database and cost assumptions for the predictive modeling were set up and are still maintained by Medstat, a division of the Thomson Corporation.

The model results quickly confirmed the relationship between long-term conditions and future high total healthcare costs. A key actionable finding was that illness burden and costs were driven by a lack of pharmaceutical adherence. In diabetes, those plan participants with 9 or fewer 30-day prescription fills for their diabetic medications were most likely to transition into the high-cost group. In other words, the patients with diabetes who were refilling their insulin and oral medications only two thirds of the time or less were likely to become the costliest. Similar findings were identified for asthma and hypertension. Again, lack of adherence to treatment has been known for decades to contribute to diabetes complications.<sup>12,13</sup> But reading about nonadherence in a dry journal article and seeing a low possession rate

linked directly to next-year per-patient costs in a printout from your own health plan database are 2 quite different experiences. As described next, this stark evidence of nonadherence as a cost driver led to questioning of fundamental assumptions about cost sharing, price elasticity, and drug accessibility in the Pitney Bowes prescription benefit plan.

### **Redesigning the Pharmacy Benefits for Diabetes**

The drug plan at Pitney Bowes is not dissimilar from that used by many other large corporations. The 2 main options are the Regular Rx Plan and the “buy-up” Extra Rx Plan with a slightly lower coinsurance and copays, and an annual out-of-pocket maximum of \$500 (Table 1). About 1 of every 4 employees elects the Extra Rx Plan. The plan is built on a traditional 3-tier formulary but has several consumer-centric elements, including limited prior authorization (only 6 drugs require it, all because of safety concerns) and no policies calling for mandatory generics, step therapy, or therapeutic substitution. Overall, the plan achieves a 75%/25% cost sharing with employees and is considered to be performing well in terms of standard pharmacy benefit measures, with an 11% rate of mail service prescriptions, an overall 48% generic drug utilization, and a generic drug fill efficiency rate of 91%.

In January of 2002, however, the company radically modified the pharmacy plan for participants with diabetes, asthma, or hypertension, allowing them to pay for brand-name medications at the tier 1 rates (eg, 10% coinsurance) and thus reducing a potential barrier to care for long-term disease (Figure 1). These changes were initiated despite the inevitable financial loss because of lower coinsurance payments and copays as well as foregone supplier rebates, an annual hit estimated at \$1 million. Of course, the whole purpose in limiting out-of-pocket payments was to eliminate a potential reason that employees discontinue taking their medications and thereby to keep more of them on therapy and out of the hospital or emergency department (ED). So such a change could save money too.

**Table 1.** Overview of Pitney Bowes Prescription Drug Plan Design

	Deductibles	Coinsurance Limit	Coinsurance or Copayment Amount		
			Tier 1	Tier 2	Tier 3
Prescription drug plan	No deductibles	Limit for extra Rx for mail service	Generic drugs + some brand-name drugs	Preferred brand-name drugs	Nonpreferred brand-name drugs
<b>Retail</b>					
Regular Rx plan	–	None	10% of cost	30% of cost	50% of cost
Extra Rx plan	–	None	10% of cost	25% of cost	35% of cost
<b>Mail service</b>					
Regular Rx plan	–	None	\$10	\$30	\$50
Extra Rx plan	–	Yes	\$7	\$20	\$40

Rx indicates prescription; HMO, health maintenance organization.

Note: Members in the HMO plans were provided prescription drug coverage through the HMO plan (ie, drugs carved in). However, in 2003, members in the HMO plans no longer had prescription drug coverage through the HMO plan (ie, drugs carved out). In 2001, there were 656 members in 42 different HMO plan options who had a condition of interest—more than 40% of the total eligible population were included in the study.

But will it? There is ample literature to support the concept that excessive copays cause suboptimal use of essential medications.<sup>11,14,15</sup> One recent study, for example, found that doubling the copay for diabetes drugs led to a 23% decrease in per-member per-year drug days supplied.<sup>15</sup> The American Diabetes Association also warns explicitly about the short-sightedness of erecting cost barriers to diabetes medications (see **Side-bar**, “Tight Cost Controls May Be Barrier to Diabetes Management”).<sup>12</sup> Still, the actual return on investment from lowered copays is less well documented and would, anyway, vary considerably from plan to plan and company to company. Thus, the polestar for this effort at Pitney Bowes remains the internal company evidence linking low prescription fill rates to high subsequent costs.

For diabetes, the major benefit design change involved moving a number of tier 2 and 3 drugs to tier 1. These included insulin products such as Humalog, Humulin, Lantus, Novolin, and NovoLog as well as oral agents such as Actos (pioglitazone), Amaryl (glimepiride), Avandia (rosiglitazone), Avandamet (rosiglitazone/metformin), Glucotrol XL (glipizide extended release), Glucovance (glyburide/metformin), Prandin (repaglinide), Precose (acarbose), and Starlix (nateglinide). No judgments were

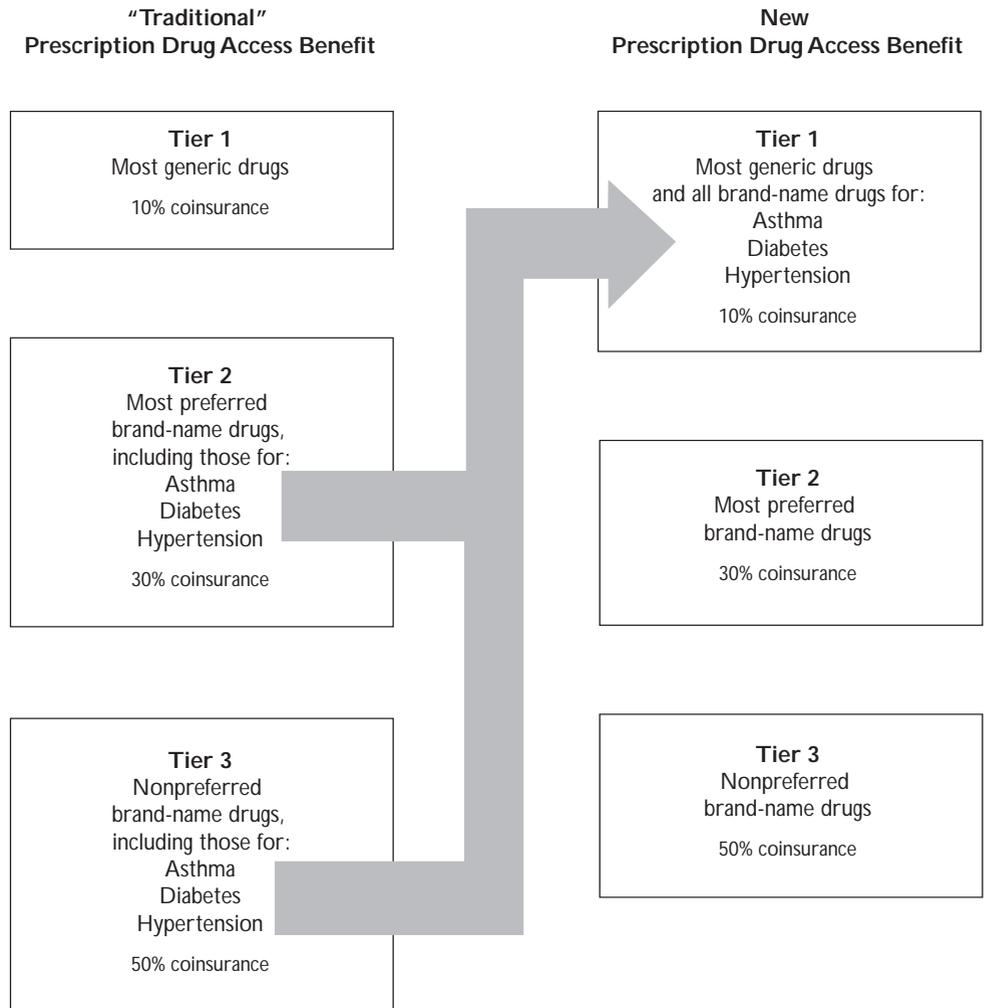
made about the relative efficacies of these agents, the weight of clinical evidence or value-based arguments supporting their use, or about the manufacturer. Additionally, any test strips that were in tier 2 or 3 (eg, Accu-Chek, OneTouch Ultra) were also shifted to tier 1. Although the company was also enhancing its diabetes disease management and wellness efforts in parallel with these pharmacy benefit changes—for

**Tight Cost Controls May Be Barrier to Diabetes Management**

“Though it can seem appropriate for controls to restrict perceived items of convenience in chronic disease management, particularly with a complex disorder such as diabetes, it should be recognized that adherence is a major barrier to achieving targets. Any controls should take into account the huge burden of intensive insulin management on patients, particularly in the management of type 1 diabetes. Protections should ensure that patients with diabetes can comply with therapy in the widely variable circumstances encountered in daily life. These protections should guarantee access to an acceptable range and all classes of antidiabetic medications, equipment, and supplies.”

—American Diabetes Association, 2005<sup>12</sup>

**Figure 1.** Prescription Drug Access Benefit Design



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example, glucometers were supplied free of charge to employees with diabetes—the truly novel element within this evolving integrated approach was the new benefit design.

**Results in Diabetes: Better Adherence, Lower Costs**

For the typical plan participant with diabetes, the formulary change had the immediate desired financial impact, with the average cost of a 30-day fill dropping by 50%. Many patients were paying 80% less than their previous drug costs—ie, a 10% coinsurance payment rather than a 50% payment.

For the company overall, the preliminary results in the 2- to 3-year period after the change have also been promising. As tracked by Caremark Inc, Pitney Bowes’ pharmacy benefits manager, rates of adherence with all medications that shifted tiers increased significantly. Perhaps most important, the percentage of members with suboptimal adherence with insulins decreased by fully two thirds. Also, the percentage of members using fixed-combination oral hypoglycemics increased from 9% to 22%—and the increases in adherence rates were particularly high for these individuals taking combination therapy. Finally, among

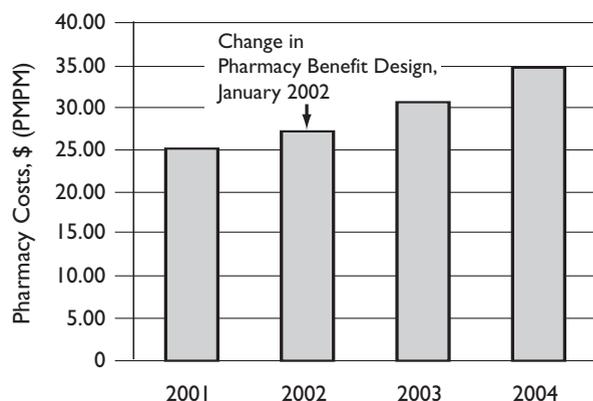
insulin-dependent diabetic plan participants, the shift to newer brands of test strips in tier 1 was associated with a doubling in the usage rate of these test strips on glucometers (from 28% usage to 55% usage).

Naturally, the company's pharmacy costs for the insulin, insulin stimulators, insulin sensitizers, and test strips increased during this time. But the surprise was that although the company's total annual pharmacy costs per covered person showed a mild increase, pharmacy costs for those with diabetes actually decreased by 7%. This overall decrease in pharmacy costs for employees with diabetes was thought to result from a reduction in complications and the avoided need for other even more expensive drugs. Further details of this shift will be explored in a subsequent analysis. In fact, the most recent data show that total per-member, per-month pharmacy cost increases for all participants in the Pitney Bowes active pharmacy benefits plan have remained relatively stable, with annual increases in the low double-digits, over the past 3 years (Figure 2) despite the extra company spending to increase access to medications for 3 major long-term diseases.

Medical utilization and costs for plan participants with diabetes also decreased between 2001 and 2003. The rate of ED visits dropped by 26% in absolute terms and further distanced itself from the benchmark rate (Table 2). Although it cannot be proved in this setting, this sharp decrease in ED visits is likely related to improved adherence with the oral hypoglycemia medications. The hospitalization rate increased slightly in participants with diabetes, a potential result of the aging of the workforce. But note that this rate also remained below the demographically adjusted benchmark rates derived from the Medstat database. Overall, the per-patient cost of care for Pitney Bowes plan participants with diabetes decreased by 6% from 2001 to 2003.

These reductions in per-participant cost of care for diabetes (and for asthma, for which reductions were also seen) likely contributed to the encouraging overall trend in net per-employee medical direct costs. As shown in Figure 3, the average annual increase in employee health cost from 2000 to 2003 was 8.1% versus composite annual

**Figure 2.** Pharmacy Costs Per Active Member Per Month for Total Covered Population



PMPM indicates per member per month.

increases of 12% to 15% for benchmark companies. Especially in light of the relatively short period of time since the benefit changes were implemented, this moderation in employee health cost increases is extremely promising. Based on these preliminary findings, the healthcare team at Pitney Bowes continues to track results—including the impact of improved care on indirect costs, another potential contributor to the company bottom line—and to consider similar access-driven benefit changes in additional long-term disease categories.

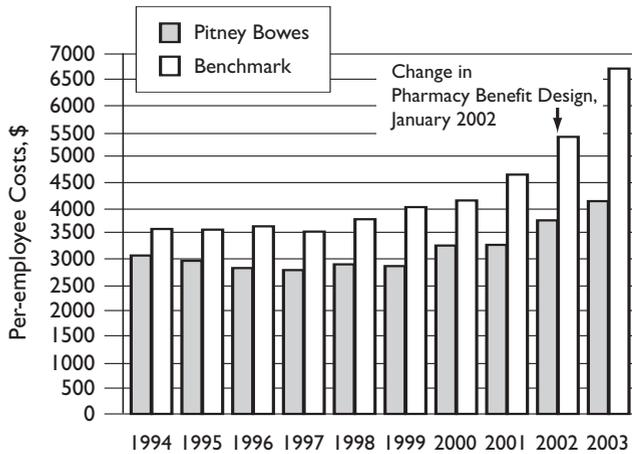
**Table 2.** Diabetes-related Utilization for Pitney Bowes Plan Participants Before (2001) and After (2003) Pharmacy Benefit Change

	Actual	Compared With Benchmark*
<b>Diabetes ED Visits (per 1000 members)</b>		
2001	0.65	+21%
2003	0.48	-16%
Change in ED utilization	-26%	
<b>Diabetes Hospital Admissions (per 1000 members)</b>		
2001	0.42	-40%
2003	0.50	-29%
Change in admissions	+19%	

ED indicates emergency department.

\*Benchmark provided by Thomson Medstat.

**Figure 3.** Net Per-employee Healthcare Costs: Pitney Bowes Versus Benchmark\*



\*All values for both Pitney Bowes and the benchmark are derived from the Hewitt Health Value Index.

**Conclusion**

Sharp increases in diabetes prevalence at Pitney Bowes during the past few years—the rate is now 36 episodes per 1000 employees, an increase of about 50% from 2001—makes the findings just presented all the more compelling. As more of the US population is diagnosed with diabetes and as the workforce continues to age, the pressures on the costs of diabetes and cardiovascular care will build. As indicated in this preliminary project, health managers may be able to improve care and limit overall costs for diabetes by selectively lowering barriers to appropriate pharmaceutical access. This simple change in benefit design can deliver an added spark to established disease management and wellness approaches in long-term care.

**REFERENCES**

- Centers for Disease Control and Prevention.** National diabetes fact sheet. Available online at: [www.cdc.gov/diabetes/pubs/estimates.htm](http://www.cdc.gov/diabetes/pubs/estimates.htm). Accessed April 21, 2005.
- Peele PB, Lave JR, Songer TJ.** Diabetes in employer-sponsored health insurance. *Diabetes Care.* 2002;25:1964-1968.
- Ng YC, Jacobs P, Johnson JA.** Productivity losses associated with diabetes in the US. *Diabetes Care.* 2001;24:257-261.
- Mayfield JA, Deb P, Whitecotton L.** Work disability and diabetes. *Diabetes Care.* 1999;22:1105-1109.
- Ramsey S, Summers KH, Leong SA, Birnbaum HG, Kemner JE, Greenberg P.** Productivity and medical costs of diabetes in a large employer population. *Diabetes Care.* 2002;25:23-29.
- The Diabetes Control and Complications Trial Research Group.** The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med.* 1993;329:977-986.
- UK Prospective Diabetes Study (UKPDS) Group.** Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet.* 1998;352:837-853.
- Gilmer TP, O'Connor PJ, Manning WG, Rush WA.** The cost to health plans of poor glycemic control. *Diabetes Care.* 1997;20:1847-1853.
- Testa MA, Simonson DC.** Health economic benefits and quality of life during improved glycemic control in patients with type 2 diabetes mellitus: a randomized, controlled, double-blind trial. *JAMA.* 1998;280:1490-1496.
- Rizzo JA, Abbott TA 3rd, Pashko S.** Labour productivity effects of prescribed medicines for chronically ill workers. *Health Econ.* 1996;5:249-265.
- Karter AJ, Stevens MR, Herman WH, et al; Translating Research Into Action for Diabetes Study Group.** Out-of-pocket costs and diabetes preventive services: the Translating Research Into Action for Diabetes (TRIAD) study. *Diabetes Care.* 2003;26:2294-2299.
- American Diabetes Association.** Third-party reimbursement for diabetes care, self-management education, and supplies. *Diabetes Care.* 2005;28(suppl 1):S62-S63.
- Pladevall M, Williams LK, Potts LA, Divine G, Xi H, Lafata JE.** Clinical outcomes and adherence to medications measured by claims data in patients with diabetes. *Diabetes Care.* 2004;27:2800-2805.
- Huskamp HA, Deverka PA, Epstein AM, Epstein RS, McGuigan KA, Frank RG.** The effect of incentive-based formularies on prescription-drug utilization and spending. *N Engl J Med.* 2003;349:2224-2232.
- Goldman DP, Joyce GF, Escarce JJ, et al.** Pharmacy benefits and the use of drugs by the chronically ill. *JAMA.* 2004;291:2344-2350.