

THE BUSINESS CASE FOR DIABETES DISEASE MANAGEMENT AT TWO MANAGED CARE ORGANIZATIONS¹

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ABSTRACT

Diabetes is the most common and costly of all chronic diseases. There is broad-based agreement on how to manage the disease, yet less than 40% of diabetics receive guideline levels of medical care. The authors investigate the reasons for this phenomenon by examining the business case for improved diabetes care from the perspective of a health plan. They consider diabetes programs offered by two health plans: HealthPartners, based in Minneapolis, Minnesota, and Independent Health Association, based in Buffalo, New York. The authors find that, while improved care for diabetics has large potential net benefits for society as a whole, the net return to health plans and providers is negative in the first few years and zero over a decade interval. The causes of this problem are discussed and potential solutions offered.

¹ This research could not have been conducted without the enthusiastic cooperation and assistance of many individuals at HealthPartners and Independent Health Association. We are incapable here of thanking all those people at HealthPartners and Independent Health who generously provided us their time and their ideas. However, the leadership of Dennis Horrigan at Independent Health and George Isham at HealthPartners were instrumental in completing this study.

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OVERVIEW AND SUMMARY

Diabetes is one of the most common and costly of all chronic diseases. In 1997, 10.3 million Americans reported being treated for diabetes, according to the Centers for Disease Control and Prevention, and an additional 5.4 million are believed to have had undiagnosed diabetes. Diabetes is the seventh leading cause of death in the United States and is a big contributor to other diseases such as cardiovascular disease and stroke. Diabetes-related illness led to 13.9 million hospital days and 30.3 million physician office visits in 1997. In comparison to many other diseases, diabetes is relatively well understood medically, and there is broad-based agreement on how to manage the disease. Despite this professional knowledge, diabetes is often poorly managed. Less than 40% of diabetics receive guideline levels of medical care³.

For this reason, and because we believe the lessons learned from the diabetes example may be applicable to other chronic diseases, we examine the business case for improved diabetes care from the perspective of a health plan. We consider the diabetes programs offered by two health plans recognized as among the best in the field: HealthPartners, an HMO based in Minneapolis, Minnesota, and Independent Health Association (IHA), an HMO based in Buffalo, New York. Although the programs of these two health plans are somewhat different, both use patient and physician education, feedback of clinical performance data, clinical guidelines, and nurse case management to more effectively manage diabetic patients.

Existing research has established that improved care for diabetics has large potential net benefits for society as a whole. The health complications of diabetes, combined with the high cost of treating these complications, means that society would be much better off were diabetes better controlled. In contrast to these social benefits, however, our analysis of the business case for diabetes management suggests very meager net benefits for health plans. We find that the net return to health plans and providers of improved diabetes care is negative in the first few years and zero over a decade interval. We

³ CDC analysis of data from the 1997-1999 Behavioral Risk Factor Surveillance System (BRFSS).

discuss why this is the case and offer some *potential solutions* to the problem in this paper. We begin with a description of diabetes, common treatments, quality of care, cost-effectiveness of diabetes care, and diabetes management programs.

DIABETES – THE DISEASE AND TREATMENTS

Description of the disease and health consequences

Diabetes is a disease in which the body fails to produce or properly use insulin and therefore cannot adequately break down sugars and starches. Its cause is unknown, although both genetics and environmental factors such as obesity and lack of exercise predispose individuals to the disease. There are two major types of diabetes. Type 1 diabetes, a disease in which the body does not produce any insulin, occurs most frequently in children and young adults. It accounts for between 5 and 10% of diabetes. Type 2 diabetes is a metabolic disorder resulting from the body's inability to make enough, or properly use, insulin. It accounts for 90-95% of all cases of diabetes and is rising rapidly as the population becomes older and obesity increases.

Diabetes is the leading cause of blindness in people aged 20-74 (between 12,000 and 24,000 cases of blindness annually due to diabetes, according to the ADA) and the leading cause of end-stage renal disease, accounting for around 40% of new cases. In addition, about 60-70 percent of people with diabetes have mild to severe forms of diabetic nerve damage; in severe cases this can lead to lower limb amputations. Each year, more than 56,000 amputations are performed on people with diabetes. Finally, people with diabetes are 2 to 4 times more likely to have heart disease or suffer a stroke than individuals without diabetes. Heart disease is present in 75 percent of diabetes-related deaths (77,000 deaths among diabetics due to heart disease annually).

Treatment programs

In most cases diabetes care is coordinated and controlled by the patient's primary care physician (PCP). The diabetic patient visits his or her PCP once each year; the PCP orders the recommended tests and examinations (e.g. HbA1c, eye exams), and counsels patients on diet and exercise regimens that will delay the onset of more severe disease. Patients with more severe cases of the disease may be prescribed

oral medication or injections of insulin. Foot exams, HbA1c tests and tests for kidney disease are typically performed at the PCP's office. An annual retinal exam is generally performed by a specialist at a separate location. Ideally, the patient self-monitors his or her insulin and/or blood glucose level on a daily basis and contacts the PCP if changes occur. When necessary, the PCP refers the patient to a specialist (e.g. an endocrinologist or a podiatrist) and/or admits the patient to the hospital. Complications can lead to hospitalization or an emergency room visit.

Quality of Diabetes Care

The set of measures commonly used to assess quality of care for diabetics was designed by the Centers for Medicare and Medicaid Services (formerly HCFA)/NCQA Diabetes Quality Improvement Project (DQIP). The six key measures, which were incorporated into NCQA's Health Plan Employer Data and Information Set (HEDIS) in 2000, are the percentage of the diabetic population with:

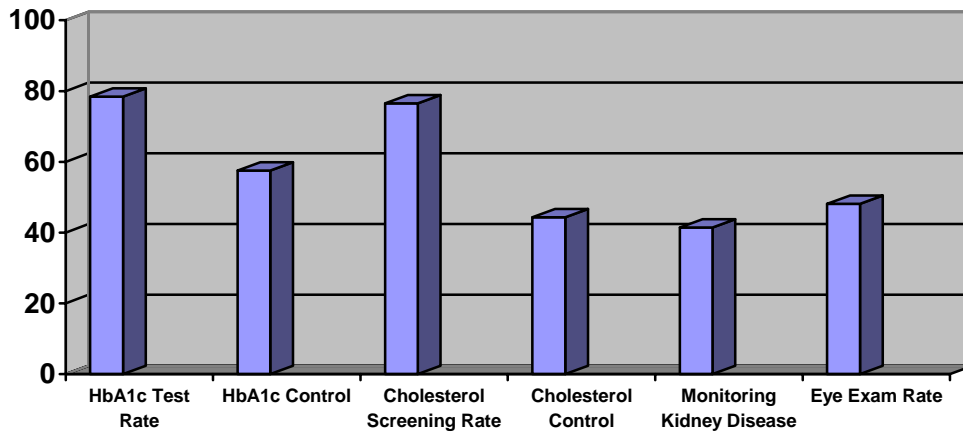
- HbA1c tested in the last year;
- Poor HbA1c control (HbA1c > 9.5%);
- Eye exam performed in the last year;
- Lipid profile performed in the last year;
- Lipids controlled (LDL-C < 130 mg/dL);
- Monitoring for diabetic nephropathy (kidney disease) at least once in the past year.

Figure 1, which displays HEDIS data for the year 2000, provides evidence of failure at ensuring control of diabetes among populations at health plans submitting data to NCQA. The percentages given in the figure are un-weighted averages of individual plan values; this approach provides the best information available about the "average" health plan. While most plans had reasonable testing rates for HbA1c and cholesterol levels (over 70% of patients tested within the last year on average), the proportions of patients with acceptable HbA1c control or Cholesterol control (as defined by HEDIS⁴) or with a kidney or eye

⁴ The HEDIS measures set fairly low standards for diabetes management: for example, they define acceptable HbA1c control as "HbA1c level below 9.5%". The ADA targets are more stringent: in order to receive ADA Provider Recognition, physician groups have to ensure that 55% of adult patients have HbA1c levels below 8%. The goal at HealthPartners is to test HbA1c levels every 3-6 months and to keep HbA1c levels under 7%.

exam in the past year were only around 50 percent. Even these are probably overestimates of the true rate of control in the U.S. population, since they reflect only the health plans that chose to collect and report data to NCQA. In the most recent multi-state survey (1997-99) for example, between 17% and 42% of diabetics aged over 18 had received an HbA1c test in the last year⁵.

Figure 1: HEDIS Comprehensive Diabetes Care Rates: Un-weighted Plan Averages, 2000



Disease Management Programs

Over the last 5-10 years, a number of new types of care management strategies have emerged for chronic disease and, in particular, for diabetes. We refer to them collectively as disease management. Disease management arose in response to two factors: 1) the increase in the incidence of chronic disease and 2) the recognition of a mismatch between the types of care management strategies effective for treating chronic disease and the existing health care delivery system. Numerous research studies document the rise of chronic disease in terms of its share of morbidity and mortality and the share of resources devoted to the treatment of chronic disease and its complications (examples include Burke et al 1999; Newacheck and Halfon 2000; and Mokdad et al 2001). Less attention has been paid to the ways in which our health care financing and delivery systems are less than optimally organized to efficiently care

⁵ CDC analysis of data from the 1997-1999 Behavioral Risk Factor Surveillance system (BRFSS), conducted in 50 states, the District of Columbia, Puerto Rico, Guam and the U.S. Virgin Islands.

for patients with chronic disease. For example, effective chronic disease management requires coordination between providers working in different organizational settings and responding to different incentive systems. The fee for service payment system that predominates contractual agreements between payers/insurers and providers could be viewed as a carry over from a time period when physicians responded reactively to patients' acute illnesses instead of proactively designing treatment programs for ongoing chronic disease management. Finally, the professional culture of medicine is one that sets up the physician as the expert telling the patient what to do in contrast with a culture that supports a more collaborative partnership between physician and patient, involving patients more deeply in the management of their own health. This last point is particularly important for chronic disease management where lifestyle and behavioral changes are required for effective long-term control of the disease.

Different disease management programs offer different services, but all are based on the same fundamental idea: that diabetic patients' long-term health can be improved and medical care costs potentially saved if patients learn about their disease and become better managers of their health. The focus of disease management is on prevention and control rather than on acute care. The key elements of these programs are therefore educational services to help the patient understand and manage his or her disease, interventions to encourage physicians to support this process, a comprehensive monitoring system, and a process to feedback clinical test data to physicians and patients. The program is generally coordinated at the health plan level rather than at the physician level, largely because the plan is in the best position to pull together all the information needed to track the patient's health status (from laboratories, specialists, PCPs, and pharmacies). Also, from a financial point of view, there are likely to be scale economies in the creation of information systems required to collect and benchmark the various clinical and cost data. And because health plans often receive a fixed per member payment (premium) from a payer and thus bear the financial risk, the health plan may have the most clear financial incentive to keep diabetic patients healthy.

Review of cost-effectiveness literature

There is considerable literature suggesting that diabetes and other chronic disease management

programs can generate net cost savings within 6-10 years. For example, several papers (Trento et al 2001; Wagner, Sandhu et al 2001; Sidorov et al 2000; Aubert et al 1988) provide evidence that diabetes management programs lead to reductions in blood glucose levels. The Diabetes Control and Complications Trial (1993), which tracked patients over 6.5 years, produced evidence that these reduced blood glucose levels effectively delayed the onset and slowed the progression of complications in Type 1 diabetic patients, thereby significantly reducing costs of care. The UK Prospective Diabetes Study Group (1998) tracked Type 2 diabetics over 10 years and found similar results.

However, the evidence on benefits in the short- to medium-term is mixed. Two papers (Sadur et al 1999, Ketner 1999) give evidence that diabetes programs have the potential to reduce costs within one year, not through reductions in complications but through lower utilization. At least one carve-out disease management vendor has provided similar evidence (Rubin et al 1998). Two other studies (Wagner et al 2001, Testa et al 1998) suggest that reduced HbA1c levels result in reduced health care utilization costs within 1-2 years. But at least two more studies (Wagner et al 2001, Klonoff and Schwartz 2000) contradict these findings: they find that the programs either may not, or do not, improve HbA1c levels or reduce costs. No published papers to our knowledge have tracked the economic effects of a diabetes management program in a single health plan over time, to find out whether the economic benefits actually outweighed the costs for that organization.

DIABETES DISEASE MANAGEMENT AT INDEPENDENT HEALTH

Independent Health

Independent Health (IHA) was founded in February 1980 as a not-for-profit independent practice association (IPA) model HMO. It was one of the first health plans in Western New York to become federally qualified. IHA currently offers a prepaid commercial group product, a Medicaid product, and a Medicare risk product; a for-profit subsidiary serves as a third party administrator for self-insured companies. It enrolls roughly 380,000 members in all its products and contracts with 2,800 physicians.

IHA is comprised of two organizations: the health plan and the IPA. Through the IPA,

Independent Health contracts with 90% of the physicians in Western New York. These physicians practice in university-affiliated groups (200 physicians), large private groups (350 physicians), hospital IPA-owned groups (800 physicians), and small group practices. Roughly one third of primary care physicians are paid through a capitated contract, one third are paid according to a fee for service schedule with global budgets, and one-third are paid fee for service with global risk. Specialty care physicians are paid on a fee for service basis.

The Buffalo-Niagara Falls Health Care Market

Though the plan has a small presence in the Jamestown and Rochester markets, most of IHA's membership (95%) is located in the Buffalo-Niagara Falls market. There are two other health plans that, together with IHA, accounted for 99% of HMO enrollment in 1998: Univera (25%) and Blue Cross Blue Shield of Western New York (24%) (Independent Health Association had 50% of HMO enrollment in the market). All three health plans have operated in the market for over 15 years. Univera is an independent, not-for-profit, mixed model HMO; its membership is split evenly between a network model and a group model, and it contracted with 2300 physicians in 1999. The BCBS plan is a not-for-profit IPA model HMO; it contracted with approximately 3000 physicians in 1999. IHA reports 90-95% overlap in physician networks for the 3 health plans. Buffalo Medical Group and Promedicus Medical Group are the only large physician medical groups operating in this market with roughly 120 physicians each.

Diabetes Disease Management Program

IHA initiated their diabetes management program in June of 1997 with the distribution to PCPs of revised clinical practice guidelines for the care of diabetic patients. The basic objectives of the program are to improve self-care management among diabetic patients, to educate and engage PCPs so that they fully support patients in this process, and to monitor patient progress.

Patient mailings, a web page and a medical call center are used to educate diabetic members about their disease and effective self-management strategies. Mailings are sometimes combined with incentives for members to obtain the tests. For example, a 20 minute-long-distance card was offered as an incentive to encourage diabetic members to obtain an annual eye exam. The web page includes

educational information on diabetes, a listing of diabetes-related seminars and programs, direct links to additional diabetes-related internet sites and to local community and national organizations.

Claims data are used to assess whether each physician's patients are obtaining the necessary tests. Individual physicians receive an annual quality profiler mailing that includes a synopsis of the service rate and risk stratification of each PCP's patients and an annual care report providing a list of diabetic patients, their diabetic pharmacy utilization, and whether they have been seen in the office in the past year.

Because claims data do not include test results, IHA has had to use chart reviews to assess physician performance on clinically meaningful outcome measures. For example, a medical record self-review was conducted in 1997 to document physician adherence to Diabetes Clinical Practice Guidelines. In 2001 a disease management quality initiative was begun with a medical group comprised of 6 physicians responsible for care to 190 diabetics. Physicians received feedback from the health plan on adherence to diabetes clinical practice guidelines according to chart review.

IHA has a limited case management program to help with patient monitoring. Diabetic members are identified and assigned to risk categories using claims data⁶. Physicians or nurses can refer individual high-risk patients into case management for a well-defined period of time (2 weeks on average). IHA employs a single nurse case manager who telephones each high risk patient on a monthly basis; keeps records of medication, laboratory tests, exams, and compliance; and helps the patient access other health professionals and community resources. In 1998-99 there were 438 high-risk diabetic members; 363 of them were case managed at some point during the year. Approximately 60 patients are active with the diabetes case manager at a point in time, requiring the case manager to coordinate care with roughly 40 different physicians. This fairly limited program has had positive effects on both process and outcomes measures. For example, 47% of patients entering case management in 2000 had received two HbA1c tests in the previous year; by the end of the year 69% of the group had received two tests. The proportion of

⁶ The highest risk category is defined by 2 inpatient admissions with diabetes as a primary diagnosis or 2 emergency room claims in the past year.

this group compliant with diet modifications increased from 46% to 71% after case management; and the proportion with glucose levels controlled increased from 40% to 77%. Other measures such as obtaining annual retinal exams and exercise modification also showed positive (but not significant) results.

Diabetes Prevention

IHA is unable to use claims analysis to identify members who are at-risk but not yet diagnosed with diabetes, since this would require tracking clinical data that are available only in the medical record. Other initiatives have been employed since 1998 to help screen undiagnosed members. IHA sponsors an annual senior health education and awareness seminar that includes a free health screen for diabetes, and a thyroid and diabetes screening program to IHA members. Preventative diabetes education has also been provided to targeted employer groups.

Other

IHA recently collaborated with other area health plans and approved the use of a single Diabetes Clinical Practice Guideline for all people with diabetes in Western New York. There are plans to provide quality improvement incentives to encourage physicians to work more closely with the health plan to promote 'best practice' diabetes care, and to improve coordination between individual components of the disease management program (for example through simultaneous mailing to physicians regarding members in need of services and to members with test reminders). Other programs aim to coordinate disease management efforts across chronic illnesses and across functional departments of IHA.

Results – Health and Economic Impact

IHA does not yet have the information systems in place to assess whether its diabetes program is improving clinical outcomes (e.g. HbA1c rates) among the same diabetic members over time. However, the plan has documented improvements in process measures of care as measured by claims and medical record data.

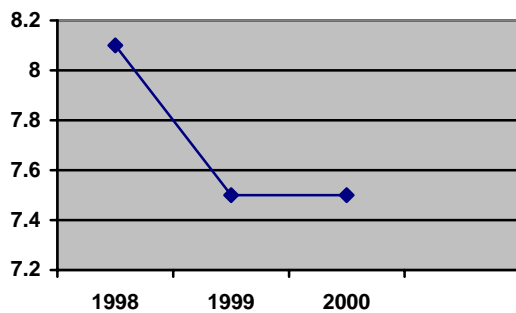
For each year 1998-2000, IHA collected medical record data for a sample of diabetics in each of three lines of business: commercial, Medicare, and Medicaid. The data indicate whether the diabetic

member had each of four tests (HbA1c, LDL, Microalbumin and diabetic retinal exam), the results of these tests, and whether or not the member was insulin dependent. These medical record data were merged with claims data (both prescription and non-prescription claims) for the years 1998-2000.

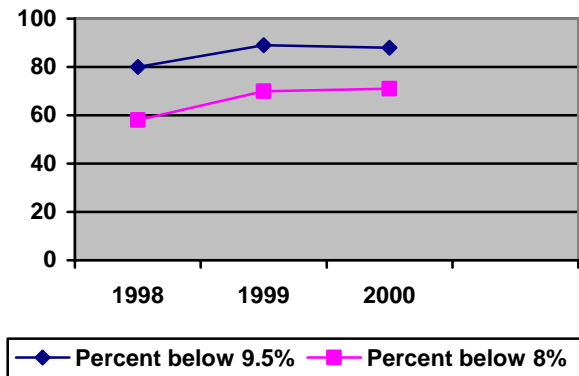
The percent of commercial diabetic patients with an HbA1c test in the last year increased from 64% in 1998 to 76% in 2000. There were similar improvements in test rates in the other lines of business. Many of the test results also improved over time. Perhaps most importantly from a population health perspective, average HbA1c levels in the commercial diabetic population fell from 8.1% to 7.5% in 2 years.

Figure 2: Outcomes for Commercial Diabetic Patients, IHA

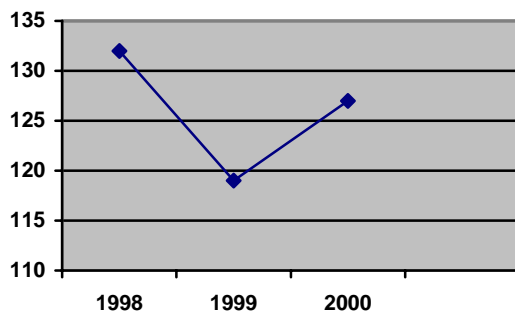
(a) Mean HbA1c Levels



(b) Percent of Tested Diabetic Patients by HbA1c Level



(c) Mean LDL Levels

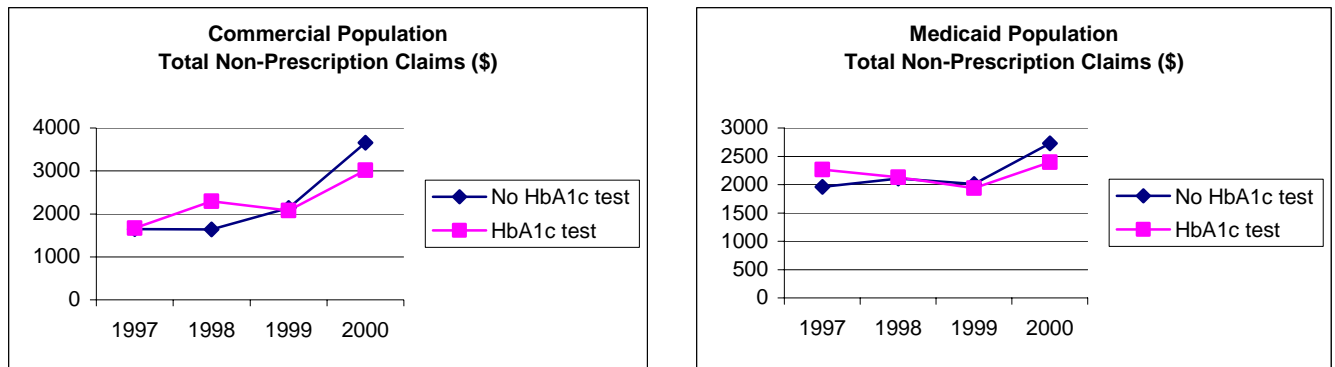


The Business Case for Quality at IHA

The incremental staff costs for diabetes management at IHA (the cost of the single case manager) were \$147,000. Human resources are needed to compile educational materials sent to members, to chart and review progress of the program, to answer calls on the telephone helpline, and to assemble the quality management profile reports sent to PCPs. One nurse operates the case management program (not including administrative costs). The resources needed to operate a diabetic screening event include staffing, site costs and numerous volunteers. Finally, specific mailings (physician and patient reminders and educational material) cost the plan approximately \$6,433 on an annual basis.

To examine whether there are cost savings from improved care, we compare claims expenses in the years before and after the member has an HbA1c test. Data for this longitudinal comparison are presented in the figures below. For these analyses we use samples of commercial and Medicaid members for whom we have medical chart data in 1998. Total non-prescription claims expenses increase almost uniformly for both those with and those without an HbA1c test, suggesting no cost saving by two years after the HbA1c test. Additional data from subsequent years are needed to test for savings in the longer term.

Figure 3: Claims data for Commercial and Medicaid Diabetic Populations, IHA



DIABETES DISEASE MANAGEMENT AT HEALTHPARTNERS

HealthPartners

HealthPartners is an independent, not-for-profit, mixed-model HMO created through the 1992 merger of Group Health Inc (a traditional staff model HMO) and MedCenters Health Plan (a network model HMO). In 2001, approximately 40 percent of HealthPartners' total enrollment (675,000) was served by the staff model HMO (HealthPartners Medical Group, HPMG) and the remaining 60 percent were treated by affiliated medical groups (contracted clinics). HealthPartners offers a full-range of health insurance products including traditional HMO insurance, point of service products, Medicare and Medicaid managed care products, a preferred provider organization (PPO), and a large self-insured product. The health plan is governed by a consumer-elected board of directors.

The HealthPartners network includes approximately 3,700 primary care physicians and 4,500 specialists organized into clinic groups that include hospitals and represent integrated systems of care. Each enrollee selects a clinic group within which to receive his or her care. Clinic groups are also the units in HealthPartners' performance measurement system. Since 1993, HealthPartners has collected performance data at the provider group level and published them on the HealthPartners website to facilitate member choice of clinic group. The data are also fed back to individual physician groups to support learning and quality improvement (Bohmer and Beaulieu, 1999). In the past, HealthPartners reimbursed provider groups primarily through capitation; clinic groups were at risk for specialist fees, hospital admissions and pharmacy charges. In recent years, HealthPartners has moved away from these arrangements and now bears roughly 70% of the risk for medical and pharmacy costs.

Minneapolis Market

The health insurance market in Minneapolis underwent considerable consolidation during the early 1990s. Today there are three major HMOs in the Minneapolis market: HealthPartners, Medica, and Blue Cross Blue Shield. By state law, all health maintenance organizations are not-for-profit.

For several decades in Minnesota, physicians have practiced in groups or worked in clinics. Indigenous group practice has affected the manner in which the market has evolved. In particular, this

organization facilitated the early introduction of capitated reimbursement systems; it also facilitated the formation of the care systems or clinic groups on which the HealthPartners model is based. The provider market in Minneapolis is also characterized by substantial network overlap; most physicians contract with all the major health insurers, although one exception to this is HealthPartners' tightly integrated staff model HMO (HealthPartners Medical Group – HPMG).

In 1992, shortly following the merger that created HealthPartners, the Institute for Clinical Systems Improvement (ICSI) was formed with funding from HealthPartners. ICSI's purpose is to bring physicians together to generate clinical practice guidelines, to help physicians implement these guidelines in their medical groups, and to collaborate on processes to improve the quality of care for the entire community.

Diabetes Disease Management Programs

The diabetes management program at HealthPartners was initiated in 1992 when ICSI introduced a renewed focus on quality. Individual components of the program have been phased in over the last decade. The core components of the diabetes management program mirror those of other disease management programs: education and counseling to help patients manage their disease; guidance to PCPs to help them support patients in this process; and comprehensive monitoring to keep track of patient progress. Education is provided by PCPs and by Certified Diabetes Educators (CDEs) (newly instated by HealthPartners to act as liaisons between PCP and endocrinologist) and through patient mailings. In addition, the Center for Health Promotion offers a phone line to assist with self-management of diabetes and other chronic disease programs.

ICSI Diabetes Guidelines, which were first approved in December 1995 and were distributed to all participating medical groups, identify outcome targets for diabetic patients (one example is “keep HbA1c levels under 8%”) and back them up with evidence from the academic literature. The guidelines are detailed when supported by evidence (e.g. specifying recommended medications), and leave flexibility to individual medical groups where compelling evidence does not exist.

Patient monitoring is the third key component of the program. HealthPartners compiles at-risk

lists to assist medical groups in meeting the outcome targets specified in the guidelines. The lists are compiled twice a year and sent to contracted clinics; they include the names of patients with diabetes, the dates of recent HbA1c tests, LDL tests, comorbidities and other exams. For HPMG, the lists include the test results as well as dates of the most recent HbA1c and LDL tests (the HPMG computer system is more advanced).

Along with the at-risk lists, HPMG sends out a “diabetes performance profile” to each individual physician, giving the physician’s patients’ test rates and levels compared to the average in the clinic and in the medical group. This inspires competition between physicians to improve the outcomes of their patients. HealthPartners also disseminates a Clinical Indicators Report (CIR) to all primary care medical groups, showing comparative data on test rates and on HbA1c and LDL levels⁷.

In HPMG, the at-risk lists lead to proactive contact with patients. Around 55 Diabetes Resource Nurses (DRNs) work across the HPMG clinics, of whom 7 see patients with diabetes. The nurses contact those patients who have missed tests or appointments, deliver diabetes education and self-management support in the clinics, and work with the PCP to decide which patients with poor test results should be contacted⁸.

Quality of care management is more variable in the contracted clinics. The at-risk lists the contracted clinics receive are less detailed than that for HPMG physicians (test results are not available) and do not cover all of the physicians’ patients (only those from HealthPartners). Around one third of the clinics use the at-risk lists as tools for proactive contact with patients; some clinics use it to check the details in their own registries; and others do not use it at all, preferring to pull data from their own systems. In addition, HPMG uses a diabetes management algorithm that guides the use of different therapies; not all clinics use this algorithm.

In addition to patient education, ICSI guidelines and at-risk lists, HealthPartners uses a PCP

⁷ For the contracted clinics the test data are obtained by sampling individual medical records.

⁸ The DRN program is now being replaced with the Certified Diabetes Educator (CDE) program; 5.9 CDE FTEs will be available across HPMG. The CDE program will provide fewer nurses who are more highly trained to deliver education and care specifically to diabetics.

bonus program to encourage physicians to focus on diabetes management. The Outcomes Recognition Program pays a potential bonus of between \$75,000 and \$250,000 (< 0.5% of premiums) to contracted medical groups that hit “stretch” targets in 5 areas including diabetes management. The total payment is roughly \$500,000 annually⁹. Because the aim of the program is to reward stretch performance rather than average performance, the targets change as the performance of the clinics as a whole improves. PCPs have commented that the bonus payments from the Outcomes Recognition Program are not large enough to provide significant extra margin to the medical group, but that they provide support to pay for administrative costs of the quality efforts.

Diabetes Prevention

The Center for Health Promotion (CHP) at HealthPartners provides services to medical groups to identify and care for at-risk, but not identified, diabetics. Members can complete a voluntary Health Risk Assessment (HRA) to aid in recommendations. Members considered to be at risk of becoming diabetic receive a phone call from the CHP’s telephone bank to discuss how to manage their risk. There are also formal programs to help with lifestyle modification.

Other

There have been a number of other diabetes-related initiatives. The Diabetes Action Project (began in 1995) connected clinical care to support services for lifestyle and behavior change. Other projects have focused on raising awareness of the issue of diabetes.

Results – Health and Economic Impact

HealthPartners has tracked the health outcomes of a cohort of diabetic patients identified in 1994¹⁰. The impact of the program on patient health is striking. Mean HbA1c levels fell from 8.7% to 7.7% in 6 years. The share of diabetic patients with HbA1c levels below 9.5% (the HEDIS definition of good HbA1c control) and below 8% (the ADA definition) is also improving. By both definitions, HbA1c

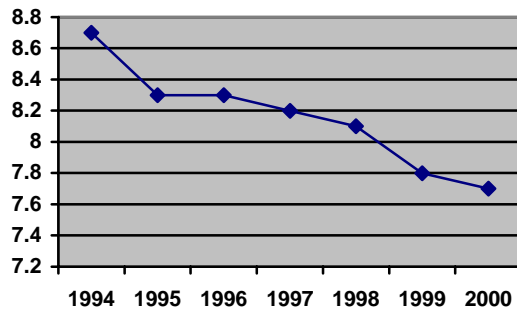
⁹ 30% of the bonus is assigned to patient satisfaction; the rest is divided equally (17.5% each) between the 4 quality indicators. The data are gathered through audits.

¹⁰ Attrition reduced the size of this cohort from 6292 enrollees in 1994 to 3535 enrollees in 2000.

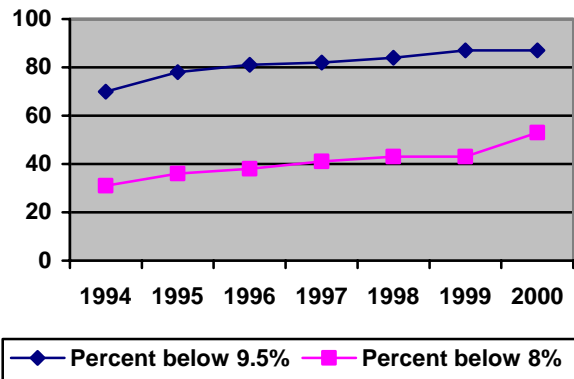
control improved steadily over the time period we are considering. Average LDL levels are falling as well, from 130mg/dL to below 100mg/dL. By any metric, these are enormous changes.

Figure 4: Outcomes for Diabetic Patients, HealthPartners

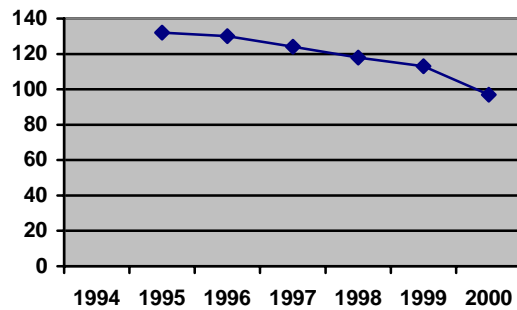
(a) Mean HbA1c Levels



(b) Percent of Tested Diabetic Patients by HbA1c Level



(c) Mean LDL Level



It is not possible to identify which elements of the diabetes management program caused the health improvements. For example, the large decrease in HbA1c levels from 1998-99 could have been a delayed reaction to the measures introduced at the start of the diabetes management program in 1997, or even to the introduction of at-risk lists in 1995. However, it is clear from these graphs that the program as a whole has had a positive effect on patients' health.

We asked several people the reasons for the program's success. One explanation was the involvement of ICSI: physicians got together to agree on the desired outcomes, then individual medical

groups were encouraged to find ways to reach those outcomes. A second reason is that the outcomes measures chosen were clear, could be measured in a credible way (so that there was no dispute over the Outcomes Recognition Program winners), and were backed by scientific/academic research. Finally, physician performance reports promoted professional competition between physicians and clinics to encourage better outcomes, benchmarking and learning.

The Business Case for Quality at HealthPartners

Significant health plan resources are required to implement and run the diabetes management program: for example, conducting chart reviews; preparing the at-risk lists; operating the Outcomes Recognition Program; putting together educational and wallet card mailings; and staffing the telephone banks. Additional resources are also needed at the Medical Group and clinic to remind patients of visit and test dates, conduct chart reviews, and (in contracted clinics) assemble physician flow sheets. (The costs do not include up-front investment in information systems because the organization already owned much of the technology needed to run the program.)

Our results concerning the overall economic impact of the program are set out in Table 1. The operating costs of the program are estimated at about \$330 per patient over a ten-year time horizon. We estimate the potential long-run cost savings to the plan from lower use of services over time by comparing the actual and projected costs of care for HealthPartners diabetic patients to the costs of care for the overall HealthPartners enrolled population. Over the 10-year time period, the plan is estimated to spend \$405 per patient less on care for diabetics than would have been spent without the program. Thus the net discounted value of the diabetes management program to the plan is a benefit of roughly \$75 per patient¹¹.

¹¹ Assuming a 7% discount rate.

Table 1: Costs and Benefits of HealthPartners Diabetes Management Program

	Benefits*	Costs*
Plan/Provider	Potential long-run cost savings due to lower use of acute services \$405 per patient Higher premium for DM program \$0 per patient	Operating costs \$330 per patient

*Dollar benefits and costs are total discounted values assuming the patient’s participation in the disease management program for ten years.

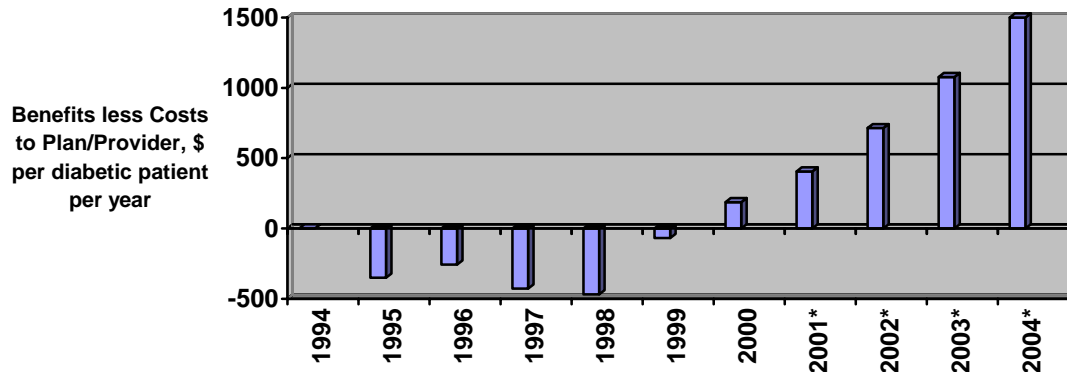
Our calculations are based on assumptions concerning medical care cost inflation for diabetic and non-diabetics in the later years of the program, for which we do not have data. We assume that costs of care for diabetic patients in HPMG will increase over time by around one third less than the costs of care for all patients in HPMG (7% compared to 12%). We believe this is reasonable given the HealthPartners data for 1997-2001 (7% compared to 10%) and their projections for the following few years. Our estimates of the value of the diabetes program to the plan/provider depend critically on this assumption. For example, an assumption that the costs of care for the overall patient population increase by 10% per year implies a 10-year discounted value of the program equal to a cost of \$310 per patient. A rate of cost increase of 14% per year implies discounted cost savings of \$467 per patient¹².

As shown in Figure 5, the net return to the health plan is initially negative and improves over time. The reason for this time pattern is that the cost savings due to lower use of acute services from avoided complications are manifest only over time. Indeed, some studies suggest that reductions in the incidence of amputations, blindness, and end-stage renal disease attributable to improved HbA1c control do not occur until 8-10 years after diagnosis of diabetes (Eastman et al 1997).^{13 14}

¹² Higher rates of overall medical cost inflation make the lower inflation level for diabetic care more valuable.

¹³ The study does not model the time pattern of cardiovascular complications. It is difficult to extrapolate the findings of this study to our calculations, primarily because of differences in the patient populations. The clinical trial data are based on an experimental group that continuously controlled HbA1c from the time of diagnosis. In the

Figure 5: Change in HealthPartners Net Benefits from Diabetes Program Over Time



*Data for 1994 and 2001-2004 are estimates formed in discussion with HealthPartners analysts

We can compare our cost-benefit estimates at HealthPartners to the evidence on reductions in complications in a number of published articles (Eastman et al 1997; the Diabetes Control and Complications Trial Research Group 1993 and 1996). The cost of treating a newly diagnosed diabetic patient is about \$1,000 per year, including additional visits and medication. Therefore if a complication costs \$10,000 to treat, the reduction in complications would have to be 33 percentage points for the program to break even in three years (not discounted). The estimates in the literature suggest that it takes 3 years for retinopathy to manifest (and hence to be avoided through diabetes management), and at least 7 years for the manifestation of more expensive complications such as end-stage renal disease (ESRD) or lower extremity amputation (which cost between \$30,000 and \$45,000 per patient to treat). It is therefore unlikely that a program can break even before 8 to 10 years.

case of HealthPartners, the members who enrolled in the diabetes management program were likely to have been diagnosed with the disease at various points in time prior to 1994. Some may have already been experiencing complications. However, papers such as this one do give us evidence that only a portion of the total cost savings from avoided complications, given timely enrollment in a diabetes management program, are included in our calculations using a ten year time frame.

¹⁴ There is another way to examine the effects on our quantitative estimates of the initial distribution of diabetics enrolled in the program. Had we looked solely at patient groups for whom treatment had immediate effects, such as those with very high initial HbA1c levels, we would almost certainly have observed cost savings within the first 1-3 years of treatment. Including all diabetics in the population gives a more complete picture of the business case for the program, but obscures our view of the specific benefits to particular subpopulations.

THE COSTS AND BENEFITS OF DIABETES DISEASE MANAGEMENT

Our case study research at Independent Health and HealthPartners suggests a weak business case for improved diabetes care at the health plan level. Benefits are negative for some years, and cost savings occur only later. In this section, we explore why this is the case. We start by reviewing the costs and benefits of diabetes management at the societal level.

Costs of Diabetes Care

We consider the costs associated with implementing diabetes management programs for patients and plans/providers. We combine health plans and providers because the division of costs and benefits between these parties depends on the specific contracting arrangements in place.

For patients, the only direct costs paid will be those that the health plan passes on to them, either through increased premiums or through out-of-pocket costs such as co-payments.

Plans and providers together face three categories of costs: set-up (fixed) costs, direct operating (variable) costs, and indirect costs resulting from changes in enrollment and utilization of services. Set-up costs include investment in IT systems, often needed to track patients' test dates and the results of their tests. Staffing costs are also necessary to design and launch the program. Operating costs are primarily comprised of the human resources necessary to deliver services in a coordinated fashion. These include additional nurses and administrative staff to interact with patients and increased physician time to handle a rising number of patient visits. Greater use of medication will also raise operating costs. (Anecdotal evidence suggests that most of these operating costs would increase within a year of implementing the new program, probably some time before the benefits were realized.)

Finally, there may be an indirect increase in operating costs due to adverse selection: increases in plan enrollment of diabetics because of improved reputation of the plan. This adverse selection is a cost to any health plan, but not to society as a whole. When one plan enrolls more diabetic members, another plan enrolls fewer.

Table 2: Costs and Benefits of Diabetes Management Programs

	Benefits	Costs
Patient	Improved length/quality of life - Net of non-monetary costs of changing behaviors	Higher premium for health insurance - If the employer responds in this way Out of pocket expenses (e.g. copayments) Possible reduced wages due to greater employer payments for health insurance
Plan/Provider*	Lower use of acute services over time - If the patient stays in the plan Higher premium for DM program - If the health plan can charge for it	Setup costs (e.g. IT systems) Operating costs (e.g. nurses, drugs, PCPs) Adverse selection costs (to one plan, not the system)
Employer	Possible productivity gains - If the patient stays with the company Possible reduced wages in exchange for better health benefits	Higher premium paid for DM program - If the health plan can charge for it
Net to Society	Improved length/quality of life - Net of non-monetary costs of changing behaviors and indirect patient costs Potential long-run cost savings due to lower use of acute services over time Potential productivity gains	Setup costs Operating costs Adverse selection costs

*Note: the division of costs and savings between plan and providers depends on reimbursement arrangements and mobility of patients

Benefits of Diabetes Care

There are three primary benefits from improved diabetes management: improved quality of life (experienced by the patient), long term cost savings from avoided complications and reduced health care service utilization (experienced by the plan, its providers, and potentially employers), and workplace productivity gains (experienced by patients and their employers).

To estimate the societal value of disease management programs, we need to value the health improvement of diabetic patients. Eastman et al (1997) use a simulation model of diabetes to estimate the quality of life improvement from improved diabetes care. Using their estimates and a value for a year of

life of \$100,000 (Viscusi 1993), we estimate that the discounted value of an improvement in HbA1c levels consistent with the results we found at HealthPartners is around \$30,000 per patient.

As we have seen at HealthPartners, proper management of diabetes can result in avoided costs of care in the short- to medium-term. Over the longer term, a reduction in the incidence of co-morbidities among diabetic patients could lead to lower costs from managing blindness, heart attacks, amputations and cases of end-stage renal failure. The cost reductions here would be substantial even if only a few members per year were affected. However, the health plan/provider will reap these benefits only if the participating patients remain in the plan, possibly up to 10 years after entering the program. Thus the level of patient turnover is key. If the average tenure of patients enrolled in diabetes management is only about 18-24 months, as our interviews with experts at the AAHP, ADA and others suggest may often be the case, then much of the expected benefit will be lost to the plan implementing the program.¹⁵

The existing literature suggests potentially large benefits to employers (particularly self-insured employers) for effective care management of diabetic employees (Testa and Simonson 1998; Ng, Jacobs and Johnson 2001; Ramsey et al 2002). These benefits derive from a number of sources including reduced disability payments, reduced absenteeism, and enhanced productivity.

Three factors moderate the size of the employer's benefit from (and hence willingness to pay for) disease management. First, employers will only realize benefits from these programs if their employee turnover is low: complications prevented ten years in the future will not interest a firm whose employees move on after two or three years' employment. Second, the literature suggests that patients must remain in the program for a significant period of time to experience health benefits. If the patient switches plans – or even switches physicians within the plan, from one successfully implementing the diabetes program to another who is not – then his or her diabetes may not be effectively controlled. Third, there may be adverse selection at the employer level, just as there is adverse selection at the plan level.

¹⁵ Data from HealthPartners indicates that average tenure of diabetic patients may be higher for plans that provide higher-quality diabetes management programs. This would reduce the problems caused by high turnover but possibly aggravate problems caused by adverse selection.

Societal Cost-Benefit Analysis

Quantifying these costs and benefits yields an estimate of the net value that society gains from higher quality care for diabetics. With data from HealthPartners, we estimated that the total discounted operating cost of running a comprehensive diabetes management program for a ten-year period is roughly \$330 per patient. We do not have data on one-time start-up costs, but we suspect they are an order of magnitude smaller.

On the benefits side, we estimate the discounted value of health improvements to be \$30,000. The value of the cost savings from reduced utilization of medical services is around \$405 per patient. The value of increased workplace productivity depends on the proportion of diabetics who are working and the nature of the work that they do. We do not have the data to confidently estimate the value of enhanced workplace productivity, so we omit this term. Our calculations therefore indicate a net societal benefit of about \$30,000 per diabetic. These benefits are substantially greater than the \$330 cost.

Clearly these are not precise calculations, but this crude analysis illustrates a general point: at the societal level, comprehensive disease management programs are clearly worth the investment.

WHY IS THE BUSINESS CASE SO WEAK?

The contrast between the health plan's weak business case and the strong societal case for diabetes management exemplifies some of the problems inherent in our current systems for delivering and financing health care. Why does the health care system lead to such poor outcomes? The answer becomes evident when one examines the private benefits and costs of the various participants.

The largest difference between the business case and the societal case is the fact that the private benefits that diabetic patients receive from the improved care are not transferred to health plans and providers. Patients benefit greatly from improved diabetes care. One might expect they would be willing to pay an increased premium for disease management programs. However, to the best of our knowledge, such payments almost never occur. In interviews conducted for these case studies, we frequently heard the difficulty that health plans and providers face in charging more for higher quality. Charging higher

premiums to support disease management programs is simply not an option.

The reason for this is somewhat complex. In the first instance, insurers would charge employers more to pay for such programs. Employers would be willing to pay these amounts if they realized productivity benefits from such programs (which were not offset in higher wages), or if workers were willing to pay for them in the form of less rapid wage increases. This is the traditional way that employee health benefits have been paid for (Summers 1989; Gruber 1994). The large health benefits to consumers from disease management suggest that some such compensation could take place. For whatever reason, however, the necessary offsets do not occur. As a result, disease management programs need to be justified on their cost savings to the insurer alone.

Even these cost savings are frequently elusive, however. The timing of the programmatic cost outlays and the medical care cost savings is crucial. The establishment of a disease management program involves substantial start-up investments, to be followed by continuing operational costs. The benefits that accrue to the plan in terms of cost-savings from reduced utilization occur primarily in the future, if at all. Several people interviewed estimated the median length of enrollment in a health plan to be 18 to 24 months. As a result, insurers conduct cost-benefit analyses within the context of a short-term horizon. Programs with returns over five to 10 years, such as a diabetes management, do not have a rapid enough payoff to justify the costs.

Adverse selection is a related factor. Plans with high quality disease management programs are more likely to attract sick patients than plans with lower quality programs. Payments are not higher for these patients, however. As a result, plans may be reluctant to offer high quality disease management programs, fearing that a good reputation will lead to an increase in the proportion of high-cost enrollees.

Within the provider community, there are additional barriers to quality care. Changing physician practice is a critical step for implementing successful disease management. Physicians must practice in groups rather than individually, and reach out to patients rather than wait for them to arrive. Traditional reimbursement systems often generate insufficient incentives to support this change, however. Physicians do not in general receive special reimbursements from health plans for their diabetic patients. The

Resource Value Unit (RVU) payment system used as the basis for many fee-for-service fee schedules allows little or no reimbursement for many of the most valuable diabetes management services, such as reminders about appointments and medication usage; group management visits; and electronic follow-up and communication. In addition, the costs of start-up information systems are not reimbursed. Intuitively, one might think that capitation would allow providers the greatest flexibility in choosing the types of services to deliver to diabetic patients. However, if providers are paid on a capitation basis without adequate risk adjustment, as is common, they will be penalized financially from an increase in the number of diabetics on their panels. This generates disincentives for providers to deliver high quality care.

A final explanation for the divergence between the private business case and the societal case for disease management is organizational. Most health plans have non-exclusive contracts with their providers (staff-model HMOs being the exception). Furthermore, in response to consumer demand for broader access, many health plans have expanded their provider networks to include a majority of providers in the market. One consequence of these organizational arrangements is a high degree of overlap in health plan provider networks. This presents problems for making practice changes. When health plans consider making investments to improve quality of care, they consider how that investment is likely to affect the demand for their product in the marketplace. If quality improvements initiated by one health plan spill over to the care delivered to members of other health plans, as they do when physicians update their practice patterns, then the original health plan making the investment will not realize a significant return. A type of catch-22 may be at work. Employers may be unwilling to pay higher premiums because they know that physicians treat all their patients in the same way, whatever health plan they belong to. Thus, employers want to free-ride off the investments of others.

Overlapping provider networks have other implications as well. When physicians treat patients from multiple plans, they have to balance the interests of multiple payers. Changes encouraged by one plan may be muted because they affect only a share of a doctor's practice. Along these lines, it is interesting that truly comprehensive diabetes programs are predominantly offered by staff model HMOs or mixed-model HMOs that have their roots in a staff-model plan (such as HealthPartners). In these plans,

there is only one payer, and thus one set of incentives. Ironically, staff and group model HMOs are dying breeds in the United States.

EXTENSION OF FINDINGS TO OTHER CHRONIC CARE DISEASE MANAGEMENT PROGRAMS

The principles of disease management have been adapted for the care of many other chronic diseases. A number of health plans have initiated chronic disease management programs for conditions such as asthma, congestive heart failure, HIV/AIDS, cancer, and depression. The quantitative analyses presented in this case study apply only to the business case for diabetes management. The time pattern of the cost savings from averted complications will differ across conditions, and thus the business case will as well. However, the enumeration of the costs and benefits of disease management is quite general and likely to be pertinent to other conditions.

Of course, our detailed findings are particular to only these two case studies. The organizations we studied have been repeatedly recognized for excellence in health care delivery, and for their diabetes programs in particular. Thus, the challenges that the case study organizations faced in implementing their disease management programs may be only a subset of the implementation challenges that would face other organizations in implementing similar programs. That is a subject worthy of future research.

DISCUSSION AND POLICY IMPLICATIONS

The gap between the business case and the social case for disease management has a number of policy implications. Addressing the financing issues is one policy avenue. The reimbursement system could be changed to pay providers on the basis of the quality of the services they offer, rather than the number of services provided. This would reward high quality diabetes care over poorer quality care, but would require some risk-adjustment method. Another potential change is the revision of the fee-for-service payment schedule to add reimbursement for non-standard interactions such as group visits and electronic communication. Purchasers (private and public) could also pay health plans a quality premium.

Such a payment policy would begin to address the problems associated with member turnover and delayed cost-savings, since the payment would match as the plan's financial outlay on improved care.

Government insurance programs, particularly Medicare, have an interest in supporting high-quality diabetes programs, since the reduction in costs from complications will occur at least partly in the patient's old age, when he or she is enrolled in Medicare. So it seems reasonable to ask whether Medicare could be charged some amount to subsidize disease management programs.

Second, the absence of convincing research on the workplace productivity effects of healthier employers may partly explain the lack of employer financial support for disease management programs. Carefully constructed experiments conducted in the workplace could yield valuable information in this regard, and possibly encourage employers to push for quality improvements.

Third, cheaper access to clinical data would not only support health plans and providers in changing the way they deliver care to chronic patients, it would also enable the implementation of payment and reimbursement policies based on quality of care. To date, there are no industry standards for such records. The financial investment required to give providers access to the necessary hardware and software is also daunting. Still, it is hard to envision effective chronic disease management without patient and provider access to the clinical data required for monitoring patient health.

An important question is whether disease management should be provided by regular insurers or by carve-out disease management companies. These companies could act as contractual intermediaries between consumers and providers, and implement payment for quality outside of the scope of a traditional insurance policy. Adverse selection would not be a problem, and care could be portable across insurers. Such a solution has disadvantages, however, including the potential decrement in care coordination resulting from the separation of regular and diabetes care, and the possible duplication of infrastructure investment. Because there are private disease management companies currently in operation, it would be feasible to formally evaluate the relative efficiency of delivering care through these types of organizations.

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