

# Redefining Boundaries in the Financing and Care of Diabetes: The Maryland Experience

MARY E. STUART

*Maryland Department of Health and Mental Hygiene*

**H**EALTH CARE POLICY MAKERS, CONCERNED WITH the high cost of caring for the chronically ill, are focusing on chronic disease prevention and case management as potential cost-containment strategies (Fox 1989). These strategies are especially appropriate for diabetes because Medicare, Medicaid, and other third-party payers expend substantial resources on its treatment and complications. With proper management of the disease, these complications and their accompanying costs can be prevented, lessened, or delayed.

In this article I will describe the goals of the Maryland Medicaid Diabetes Care Program and tell how a Medicaid budget crisis presented opportunities for financing new and expanded preventive services in chronic disease. I will also describe how the Maryland Medicaid program redefined its financing boundaries in an effort to overcome finance-induced fragmentation in health care delivery for recipients with diabetes. In addition, I will discuss the difficulties inherent in one payer moving unilaterally to alter health care practices.

## Diabetes: Scope of the Problem

Diabetes is a disease characterized by elevated blood glucose levels resulting from the body's inadequate production or utilization of insulin.

---

The Milbank Quarterly, Vol. 72, No. 4, 1994  
© 1994 Milbank Memorial Fund. Published by Blackwell Publishers,  
238 Main Street, Cambridge, MA 02142, USA, and 108 Cowley Road,  
Oxford OX4 1JF, UK.

The estimated prevalence of diagnosed diabetes in the United States, based on data from the 1987 National Health Interview Survey, is 6,510,937 people (Center for Economic Studies of Medicine 1988). Approximately 10 percent of these individuals are estimated to have insulin-dependent diabetes mellitus (IDDM) and 90 percent, non-insulin-dependent diabetes mellitus (NIDDM). In patients with IDDM, failure to receive exogenous insulin results in ketoacidosis or diabetic coma. Patients with NIDDM are ketoacidosis resistant and do not depend on exogenous insulin for survival. Generally, diet, exercise, and/or oral drugs are sufficient to control their blood glucose levels, although some NIDDM patients do take insulin to maintain adequate glycemic control (American Diabetes Association 1993).

Poor glycemic control is associated with a number of serious acute and chronic complications. The acute complication, ketoacidosis, commonly and almost exclusively occurs among patients with IDDM. Tissue-damaging chronic complications, classified as either microvascular or macrovascular, occur in both IDDM and NIDDM patients. Microvascular complications include those associated with eye (retinopathy), kidney (nephropathy), or nerve (neuropathy) damage; they may lead, respectively, to the chronic complications of blindness, kidney failure, and sensation abnormalities. This latter condition may result in foot ulcers, infections, and amputations. Macrovascular complications, which are partly caused by hyperglycemia-induced atherosclerosis of blood vessels that slows blood flow to tissues, include amputation, angina, stroke, and heart attack (American Diabetes Association 1993).

Another devastating complication of diabetes is the birth of infants with major congenital malformations to mothers with pregestational diabetes. These mothers have a three- to fourfold higher risk of such births than women in the general population (Willhoite et al. 1993).

Diabetes complications are not only disabling, they are also costly. In 1987, estimated direct and indirect costs of all diabetes care in the United States were \$9.6 billion and \$10.8 billion, respectively. The vast majority (\$7.9 billion) of the direct expenditures were for hospital and nursing-home inpatient treatment of diabetes complications (Center for Economic Studies in Medicine 1988). The costly toll of specific complications is reflected in the following sampling of statistics: the estimated annual direct hospital cost of treating diabetes ketoacidosis is \$225 million (Fishbein 1985); for Medicare patients alone, the estimated annual treatment cost for diabetic end stage renal disease (ESRD) is more than \$300 million (Herman and Teutsch 1985); and the estimated lost income and public

assistance cost of diabetes-related blindness is \$75 million per year (Klein and Klein 1985).

## The Case for Complication Prevention

Although numerous studies indicate that these costly and devastating complications can be prevented, lessened, or delayed by controlling blood glucose levels, the most definitive supporting evidence is the recently released findings of the Diabetes Control and Complication Trial. This long-term trial of patients with IDDM demonstrated that intensive treatment aimed at maintaining normal or near-normal blood glucose levels markedly and significantly delayed the onset and progression of retinopathy and nephropathy and decreased the prevalence of neuropathy (Reichard, Nilsson, and Rosenqvist 1993). The degree to which these findings apply to the 90 percent of the diabetes population with NIDDM is not known. This issue is currently being investigated by a patient outcomes research team funded by the Agency for Health Care Policy and Research.

Adequate blood glucose control is also important in preventing the acute complication, ketoacidosis. Studies have found that noncompliance with blood glucose control regimes and infection account for over 50 percent of hospital admissions for diabetes-related ketoacidosis (Fishbein 1985).

In addition to blood glucose control, the timely diagnosis and treatment of diabetes complications is an important component of preventive care. For example, adequate foot care reduces diabetes-related amputations by anywhere from 44 to 85 percent (Bild et al. 1989), and prompt laser therapy is beneficial for diabetes patients with proliferative retinopathy or macular edema (Nathan 1993).

## Care System Requirements for Effective Prevention

To derive the maximum benefit from preventive strategies, the health care system must help patients comply with treatment regimes, assure access to comprehensive preventive services, and coordinate the delivery of these services. Diabetes is one of several chronic diseases for which successful management requires a high level of patient self-care. The effectiveness of outpatient education has been demonstrated in numerous

studies. For example, a 1983 study of the Maine Ambulatory Diabetes Education and Follow-Up program, which promotes accessibility to state-recognized outpatient education and nutritional counseling programs for the general population, reported a 32.2 percent decrease in hospital admissions and an average per patient cost savings of \$293 among program participants (Maine Diabetes Control Project 1983). The results of a number of these studies have been summarized by the Task Force on Financing Quality Health Care for Persons with Diabetes (1986) and by Sinnock (1986).

In addition to outpatient education and nutritional counseling, effective diabetes management requires access to medical supplies and equipment, pharmaceutical products, therapeutic footwear, and both primary and specialty care, including ophthalmology and podiatry.

Finally, these services should be delivered within the context of a coherent health care system that assures patient-oriented, continuous care with appropriate and timely referrals. The effectiveness of delivering coordinated, comprehensive preventive services has been documented in the literature for almost two decades. Coordinated programs include the neighborhood clinic-based program developed by the health department of Memphis and Shelby counties in Tennessee, which was associated with a 49.4 percent reduction in hospitalizations (Runyan 1975), and Atlanta's centralized Grady Memorial Hospital Diabetes Program, which witnessed declines of 47 percent and 22 percent, respectively, in admissions for both amputation and severe diabetic ketoacidosis (Davidson, Delcher, and Englund 1979; Davidson et al. 1981; Davidson 1983).

The methodological rigor of many studies reporting cost savings and/or improved health status outcomes for programs incorporating diabetes-related preventive strategies has been questioned (Kaplan and Davis 1986; Elixhauser 1989). However, administrators of the Maryland Medicaid program believed that the findings were sufficient to warrant promotion of coordinated comprehensive preventive care for its recipients with diabetes.

### Current Financing of Diabetes Preventive Care

As in most other states, a major factor impeding the delivery of preventive care in Maryland is inadequate and fragmented financing. From the

patient's perspective, the negative impact of fragmented financing is apparent in three areas:

*Coordination.* Patients served by fee-for-service (FFS) plans often fail to receive the continuous, coordinated care they require. Under these plans, patients generally must find and coordinate their own sources of care (Wilensky and Rossiter 1991). For patients with diabetes this can be a serious problem because effective management of the disease often requires the timely and coordinated delivery of services, including care from specialists like ophthalmologists and podiatrists.

*Financial Access.* Patients with diabetes may be unable to obtain needed preventive services simply because their insurers do not cover the services (Bransome 1992). For example, in 1989 the Centers for Disease Control reported that outpatient education programs were reimbursed by Medicaid in only 13 states, by Medicare in only 31 states, by Blue Cross/Blue Shield in only 21 states, and by private insurers and HMOs in only 28 states. Few paid for patient education services rendered in free-standing programs (Peddicord et al. 1990).

*Availability.* Patients may find that the services they require are not available in their communities. The development of needed services, such as nutritional counseling and outpatient education, may be hampered when the major payers in the community fail to guarantee uniform coverage for specific services.

## The Maryland Medicaid Diabetes Care Program

### *Program Development*

Under this program, financing boundaries were redefined to provide recipients with the services they need to manage their diabetes successfully. The program was based on a comprehensive diabetes management model developed earlier by the Office of Chronic Disease, the public health arm of the Maryland Department of Health and Mental Hygiene. In 1984, the Office of Chronic Disease, to further its goal of preventing death and disability from chronic disease among all Marylanders, established a Diabetes Care Program (DCP). By 1988, DCP staff had developed a management model for diabetes prevention in which primary care gatekeepers functioned as case managers and referred patients to ap-

propriate special services as needed. The model emphasized complication prevention and the delivery of continuous rather than episodic care, while recognizing the value of nontraditional services like patient education and nutritional counseling. It required certain health care system changes: physician education in diabetes management, outpatient educational programs in self-management in all localities, and increased accessibility of specialty services and nutritional counseling.

DCP staff realized that these changes could be leveraged only if third-party payers expanded coverage for preventive care. DCP staff hoped that Medicaid, as a major third-party payer in the state, would lead the way in expanding coverage. They presented Medicaid with findings based on an analysis of 1987 Maryland hospital discharge data routinely collected by the Maryland Health Services Cost Review Commission. The findings suggested that improving preventive care for the diabetes population on Medicaid would lower health care expenditures for these recipients.

Several factors contributed to the receptivity of Medicaid policy makers to the overtures from DCP. One factor may best be characterized as organizational happenstance. In Maryland, both Medicaid and the Office of Chronic Disease are administered by the Department of Health and Mental Hygiene, and both are situated in the same building. Administrative unity and physical proximity promoted communication between the staff of the two units and facilitated mutual recognition of complementary goals.

Another factor was the growing commitment by the Medicaid staff to primary care case management as the key to maintaining quality while reducing costs. They believed that this approach, in addition to guaranteeing recipients an access point to the health care system, would enhance both continuity and preventive aspects of care. Medicaid managers were further convinced of the feasibility of this approach by cost savings achieved in an earlier small-scale managed care program.

The final, and perhaps most compelling, factor contributing to the appeal of the DCP proposal was that, in 1989, the Maryland Medicaid program was projecting a \$13 million deficit. The deficit, although troubling, created an opportunity for innovation. Medicaid administrators knew from their own data that the recipient population contained a significant number of people with diabetes and that many of these people were high-cost users of medical services. A subsequent, and more intensive, examination of this issue, using data derived from the system's annually generated person-based analysis files, found that (1) the average

annual cost per person was three times higher for recipients with diabetes than for Medicaid recipients in general, and that (2) recipients with diabetes were two-and-a-half times more likely to be hospitalized than those without diabetes (Maryland Department of Health and Mental Hygiene 1990). These data convinced the Medicaid administration that diabetes-related complications were costing the program enough to justify the effort and expense of creating a new program focused on complication prevention.

Working together, Medicaid and DCP staff members devised a program that would extend coverage to previously unreimbursed preventive services. Although these services would be offered in an FFS context, program elements were specially designed to promote coordinated, managed care and to overcome the fragmentation of health care customarily associated with this form of payment. After designing the program, Medicaid and DCP prepared a budget initiative for it. The initiative required approval by the state's budget department, the governor, and the state legislature. Maryland's Secretary of Health and Mental Hygiene played a major role in securing the initiative's acceptance. Secretary Sabatini's commitment to use Medicaid's funding authority to improve the quality of care for recipients was a major enabling factor. Armed with the results of the analyses of both hospital discharge and Medicaid data, as well as with cost-savings projections, he presented the program to legislators and other officials. Legislators, convinced that the program made sense, approved the initiative during the 1990 session, and in June 1991 the program was implemented.

### *Program Description: Financing Coordinated and Comprehensive Care*

The goal of the Maryland Medicaid Diabetes Program<sup>1</sup> is to decrease hospitalization by investing in and delivering preventive care. Any Medicaid recipient in Maryland who has been hospitalized for a diabetes-related illness may elect to enroll in this program in lieu of required enrollment in Maryland Access to Care (MAC), the state's managed care program for its general Medicaid population, or in any of Medicaid's

---

<sup>1</sup> Annotated Code of Maryland. Maryland Medicaid Regulations 10.09.43 Diabetes Care Program.

other specialized managed care programs. Table 1 compares the features of MAC and the Diabetes Care Program.

As in all of Maryland Medicaid's managed care programs, recipients enrolled in the Diabetes Care Program are required to select a primary care provider, who is then responsible for providing or preauthorizing all but emergency care. In this program, eligible recipients choose a primary care provider from a subset of managed care providers who have agreed to participate as diabetes managed care providers. As a condition of program participation, primary medical providers must agree to attend a five-hour diabetes management course for which they receive continuing medical education credit. The course has a comprehensive clinical diabetes education curriculum, is taught by a qualified endocrinologist, and uses a format and materials developed for the American Diabetes Association. Course instructors stress the importance of improving patient self-management and provide suggestions for encouraging patient compliance with treatment regimes (Maryland Department of Health and Mental Hygiene 1989).

Among those qualified to enroll as diabetes care providers are physicians in private practice, nurse practitioners, and certain clinics. All providers in this program are expected to follow patients, help them manage their disease, and refer them to other providers as needed.

To encourage provider participation in the diabetes program, Medicaid pays the provider \$20 per month per patient for case management whether or not the patient is seen that month. This fee is over and above any FFS payments for medical visits. Thus, within the context of an FFS plan, the program encourages coordinated care by requiring case-management training for enrolled providers and by reimbursing for case management.

The incentive for patients to enroll in the diabetes care program is access to preventive services not normally covered in Maryland Medicaid's other managed care programs. These services include structured outpatient diabetes education, nutrition counseling, and therapeutic footwear, as well as blood glucose monitors and supplies for NIDDM recipients. Coverage for monitors and supplies was and still is available for all Medicaid recipients with IDDM whether or not they are enrolled in the Diabetes Care Program.

Structured outpatient diabetes education courses are an important component of the program. The recommended course provides patients



TABLE 1  
Managed Care Program Characteristics

Maryland Access to Care (MAC)	Diabetes Care Program (DCP)
Managed care program for the general Medicaid population.	Managed care program for Medicaid's diabetes population.
Enrollment is <i>required</i> for all recipients unless they are enrolled in one of Maryland Medicaid's specialized managed care programs. Those enrolled in specialized managed care may not be enrolled concurrently in MAC.	Enrollment is <i>optional</i> . Any recipient who has been hospitalized with a diabetes-related diagnosis may enroll. Enrollment in DCP voids enrollment in MAC.
Patient selects a primary care provider from among practitioners who have agreed to participate in the Medicaid program.	Patient selects a primary care provider from among practitioners who have agreed to participate in the Medicaid program <i>and</i> attend a five-hour diabetes management course.
Recipient's selected primary care provider provides or preauthorizes all care including specialty care.	Recipient's selected primary care provider provides or preauthorizes all care including specialty care. <i>In addition</i> , provider serves as a diabetes case manager and develops a network for making diabetes specialty care referrals as needed.
Fee-for-service reimbursement.	Fee-for-service reimbursement. <i>Plus</i> a \$20/month case management fee for which the provider is expected to promote preventive strategies, including timely referrals for specialty care.
Comprehensive Maryland Medicaid benefit package.	Comprehensive Maryland Medicaid benefit package. <i>Plus</i> reimbursement for outpatient diabetes education, nutrition counseling, therapeutic footwear, blood glucose monitors, and supplies for non-insulin-dependent diabetes patients.

with information on diet, exercise, medication, daily monitoring, hygiene, the effects of illness on diabetes, and complication prevention. The course addresses psychological adjustment and family involvement issues and furnishes information on community resources. To be reimbursed by Medicaid, a diabetes health education program must be taught by a certified diabetes educator and be formally recognized by the state's Office of Chronic Disease Prevention. State recognition criteria, which are in accordance with generally recognized national standards, were developed by the Diabetes Control Program in consultation with certified diabetes educators (Maryland Department of Health and Mental Hygiene, n.d.).

Case management, as integrated into the program, is designed to improve the health status of recipients with diabetes. Its function is not to ration care but to increase access to preventive services. It addresses the issue of gatekeeper qualification through the physician education requirement and facilitates management through a patient reminder system. Appropriate management is further encouraged by three Medicaid case coordinators, who initiate and receive provider and patient calls. They help providers locate appropriate medical, social, and educational resources in the patient's community and encourage them to make needed referrals.

### *Program Implementation Statistics*

As of October 1993, 2,259 recipients were enrolled in the Diabetes Care Program. With regard to resource development, 489 primary care providers were enrolled and, of these, 73 percent completed the continuing education course in diabetes management. In addition, 15 patient education programs obtained DCP certification and were providing services for patients enrolled in the diabetes program.

### *Program Evaluation*

As access to preventive care improves, Medicaid expects claims to increase for laboratory, pharmacy, and ambulatory physician services as well as for therapeutic footwear and medical equipment. New costs resulting

from the monthly managed care fee of \$20 per patient, outpatient education programs, and nutritional counseling must also be added to the debit side of the program. However, net costs are eventually expected to decline as the overall health status of Medicaid's diabetes population improves. Hospitalizations related to ketoacidosis are expected to decrease soon after program implementation. A further decline in hospitalization rates is anticipated as a result of the program's strategies to prevent and postpone diabetes-related complications.

Given the anticipated delay in improved health status outcomes, it is too early to evaluate the program adequately. Furthermore, several key components of the prevention strategy, including outpatient education and nutritional counseling, were nonexistent during the first six months of the program. Even now, resource inadequacy remains a problem in some localities. In addition, physicians who enroll as primary care case managers in the Diabetes Care Program are given a year in which to complete the continuing education course in diabetes management.

Although time can overcome these problems, other evaluation issues are not as amenable to resolution. First, evaluation hurdles are often built into programs when they are designed to address recipient needs rather than to answer research questions. For instance, in this program statewide implementation precluded availability of a viable control group. Second, Medicaid managers, lacking extensive research resources, must rely heavily on existing claims data to evaluate programs. Although claims data analyses frequently provide useful program information, they do not yield the detailed clinical data required for complete evaluation. As an example, in the claims database, recipients are distinguishable neither by diabetes type nor by disease duration. Yet both are major determinants of health care costs and utilization.

The results of a preliminary analysis of claims data in the Maryland Medicaid Information System illustrate some of these difficulties. In the analysis, we constructed yearly average payment and utilization rates based upon services used by recipients during their Medicaid-eligible months both before and after they enrolled in the Diabetes Care Program. Payment and utilization data for the year prior to implementation and for the first nine months of program operation were used to develop the rates.

Separate rates were calculated for recipients in the aid categories of Aid to Families with Dependent Children (AFDC) and Supplemental Security Income (SSI). Medicaid's AFDC population is considerably

younger and healthier than its SSI population, which must be permanently and totally disabled in order to qualify for enrollment.

For the AFDC recipients enrolled in the Diabetes Care Program, total average annual Medicaid payments per person decreased from \$5,271 during the preprogram period to \$3,533 during the postprogram period. Marked decreases occurred in hospital admissions (35 percent), in length of hospital stay (42 percent), and in visits to emergency rooms (71 percent) and outpatient departments (66 percent). At the same time, visits to office-based physicians increased by 20 percent.

In contrast, for the SSI recipients enrolled in the Diabetes Care Program, total average annual Medicaid payments per patient increased from \$7,976 to \$9,123, hospital admissions increased by 8 percent, and length of hospital stay, by 28 percent. Like AFDC recipients, they experienced a decline in visits to emergency rooms (41 percent) and to outpatient departments (38 percent) and an increase in office-based physician visits (50 percent).

Tempting as it may be to draw conclusions from these numbers, it is too early to do so. The program has been in effect for too short a time to produce significant changes in the health status of recipients. In addition, key preventive components, such as diabetes health education programs, were not initially available and even now remain sparse in certain localities. However, we have included these findings to illustrate how provocative claims data can be and how difficult interpretation is without additional clinical data. For example, we cannot determine whether the increase in SSI hospitalization resulted from an intensification of medical supervision, a shift in the mix of care provided by generalists versus specialists, or the inevitable deterioration in the health of previously disabled SSI recipients. Medicaid managers have neither the data to answer these questions nor the research resources to collect it.

Nevertheless, these questions must be addressed because they have significant quality and cost implications for health care policy.

## What We Have Learned

Several issues that arose during implementation suggest that the greatest potential for diabetes prevention rests with an all-payer approach to dia-

betes managed care. In Maryland, Medicaid is the only major payer providing managed care and comprehensive preventive services for persons with diabetes. Because Medicaid enrolls only 11 percent of Maryland's diabetes population, Medicaid by itself cannot overcome the negative impact of fragmented financing on diabetes preventive care delivery. Lack of other-payer support reduces the program's effectiveness on four fronts.

First, it is difficult, especially for Medicaid, to promote needed changes in physician attitudes and practices. Underscoring this issue is a controversy that emerged during implementation. The state's medical society received protests from physicians who claimed the continuing medical education course requirement for providers wanting to participate in the diabetes program was unreasonable given the small number of Medicaid patients seen in their practices. In response to the medical society's request to reduce course length, Medicaid agreed to shorten it from six to five hours. An all-payer training requirement would have reduced physician resistance.

Second, it is doubtful that Medicaid financing alone can provide sufficient impetus for the development of needed resources throughout the state, including patient education programs and nutritional counselors. In particular, all-payer financing is needed to facilitate resource development in the state's rural areas. Although Medicaid's Diabetes Care Program has stimulated interest in rural resource development, reimbursement uncertainty continues to impede progress in this area.

Third, in Maryland, inadequate financing also constrains the development of more tightly integrated, multidisciplinary systems of care like the comprehensive Grady Memorial Hospital program in Atlanta. The Grady program represents a "gold standard" for diabetes management, and it is financed by Medicaid and Medicare, by several grants and bequests, and by county, state, and federal taxes (Davidson et al. 1981). In Maryland, although similar care systems would be eligible for Medicaid reimbursement, without additional payer support they may be unable to attract enough patients to be financially viable.

Finally, the adverse impact of inadequate financing is demonstrated by preliminary program results showing the high costs of caring for SSI recipients. The potential for prevention and for cost savings is limited once an individual meets the disability standards for SSI qualification. Failure by other payers to encourage timely preventive care for persons

with diabetes has costly consequences for the state, which later must assume responsibility for many in this "sickest of the sick" population.

## Conclusion

Collaboration in Maryland between the Diabetes Control Program and the Medicaid program has allowed Medicaid to move beyond the traditional, largely passive role of payer into a more proactive role of fostering systems development. However, as the payer for only a small proportion of Maryland's diabetes population, Medicaid faces a major challenge in trying to reorient health care services toward the delivery of adequate preventive services.

## References

- American Diabetes Association. 1993. *American Diabetes Association Position Statement. Implications of the Diabetes Control and Complications Trial*. Alexandria, Va.
- Bild, D.E., J.V. Selby, P. Sinnock, W.S. Browner, P. Braveman, and J.A. Showstack. 1989. Lower-Extremity Amputation in People with Diabetes: Epidemiology and Prevention. *Diabetes Care* 12:24-31.
- Bransome, E.D. Jr. 1992. Financing the Care of Diabetes Mellitus in the U.S. *Diabetes Care* 15(suppl. 1):1-5.
- Center for Economic Studies of Medicine. 1988. *Direct and Indirect Costs of Diabetes in the United States in 1987*. Alexandria, Va.: American Diabetes Association.
- Davidson, J.K. 1983. The Grady Memorial Hospital Diabetes Programme. In *Diabetes in Epidemiological Perspective*, eds. J.I. Mann, K. Pyorala, and A. Teuscher, 223-41. New York: Churchill-Livingston.
- Davidson, J.K., M. Alogna, M. Goldsmith, and J. Borden. 1981. Assessment of Program Effectiveness at Grady Memorial Hospital-Atlanta. In *Educating Diabetic Patients*, eds. G. Steiner and P.A. Lawrence, 329-48. New York: Springer.
- Davidson, J.K., H.K. Delcher, and A. Englund. 1979. Spin-off Cost/Benefits of Expanded Nutritional Care. *Journal of the American Dietetic Association* 75:250-7.
- Elixhauser, A. 1989. Cost-effectiveness of Preventive Care for Diabetes Mellitus. *Diabetes Spectrum* 2:349-53.

- Fishbein, H.A. 1985. Diabetic Ketoacidosis, Hyperosmolar Nonketotic Coma, Lactic Acidosis, and Hypoglycemia. In *Diabetes in America*, eds. M.I. Harris and R.F. Hamman (vol. 12, 1-22). DHHS pub. no. (NIH) 85-1468. Bethesda, Md.
- Fox, D.M. 1989. Policy and Epidemiology: Financing Health Services for the Chronically Ill and Disabled. *Milbank Quarterly* 67(suppl. 2, pt. 2):257-87.
- Herman, W.H., and S.M. Teutsch. 1985. Kidney Diseases Associated with Diabetes. In *Diabetes in America*, eds. M.I. Harris and R.F. Hamman (vol. 14, 1-31). DHHS pub. no. (NIH) 85-1468.
- Kaplan, R.M., and W.K. Davis. 1986. Evaluating the Costs and Benefits of Outpatient Diabetes Education and Nutrition Counseling. *Diabetes Care* 9:81-6.
- Klein, R., and B.E.K. Klein. 1985. Vision Disorders in Diabetes. In *Diabetes in America*, eds. M.I. Harris and R.F. Hamman (vol. 13, 1-36). DHHS pub. no. (NIH) 85-1468. Bethesda, Md.
- Maine Diabetes Control Project. 1983. *Reimbursement Pilot Study for the Ambulatory Diabetic Education and Follow-Up (ADEF) Program: Final Report*. Augusta: Department of Human Services, Division of Health Promotion and Education. (Unpublished)
- Maryland Department of Health and Mental Hygiene. 1989. *Comprehensive Diabetes Management: A Workshop for Providers of Diabetes Care*. Baltimore: Division of Diabetes Control. (Unpublished)
- . 1990. *Medicaid Management Short Reports*. Baltimore: Division of Health Systems Analysis. (Unpublished)
- . n.d. *Diabetes Outpatient Education Recognition Program. Manual and Application*. Baltimore: Division of Diabetes Control. (Unpublished)
- Nathan, D.M. 1993. Long-term Complications of Diabetes Mellitus. *New England Journal of Medicine* 328:1676-85.
- Peddicord, M., A. Lyons, C. Tobin, and F. Vinicor. 1990. Third-party Reimbursement for Diabetes Mellitus. Outpatient Education: A Year's Progress. *Diabetes Spectrum* 3:9-12.
- Reichard, P., B. Nilsson, and U. Rosenqvist. 1993. The Effect of Long-term Intensified Insulin Treatment on the Development of Microvascular Complications of Diabetes Mellitus. *New England Journal of Medicine* 329:304-8.
- Runyan, J.W. 1975. The Memphis Chronic Disease Program. Comparisons in Outcome and the Nurse's Extended Role. *Journal of the American Medical Association* 231:264-7
- Sinnock, P. 1986. Reduced Hospital Utilization and Cost Savings Associated with Diabetes Patient Education. *Journal of Insurance Medicine* 17(summer):24-9.

- Task Force on Financing Quality Health Care for Persons with Diabetes. 1986. *Diabetes Outpatient Education: The Evidence of Cost Savings*. Alexandria, Va.: American Diabetes Association.
- Wilensky, G.R., and L.F. Rossiter. 1991. Coordinated Care and Public Programs. *Health Affairs* 10(4):62-77.
- Willhoite, M.B., H.W. Bennert, Jr., G.E. Palomaki, et al. 1993. The Impact of Preconception Counseling on Pregnancy Outcomes. *Diabetes Care* 16:450-5.

---

*Acknowledgments:* The preparation of this article was supported by the Milbank Memorial Fund and the Maryland Department of Health and Mental Hygiene, but the views presented are my own. I would like to thank Ruth E. Smith for her technical writing assistance in preparing the manuscript.

*Address correspondence to:* Mary E. Stuart, ScD, Director, Policy and Health Statistics Administration, Department of Health and Mental Hygiene, 201 West Preston Street-Room 225, Baltimore, MD 21201.