MICHIGAN DIABETES OUTREACH NETWORKS: A PUBLIC HEALTH APPROACH TO STRENGTHENING DIABETES CARE

Sarah L. Krein, PhD, RN; Mandi L. Klamerus, MPH

ABSTRACT: This study describes a statewide public health approach to strengthen diabetes care; evaluates diabetes-related processes of care for individuals enrolled in the Michigan Diabetes Outreach Network (MDON) program; and, examines MDON in the context of priorities for diabetes care and public health policy. Organizational information was obtained through semi-structured interviews. Program outcomes are examined using data from client intake and follow-up assessment forms. We report percentages and mean values overall and across networks. Logistic regression is used to identify factors associated with clients receiving recommended diabetes care. Within two years, five of the networks recruited 125 providers and collected information on over 8,000 individuals with diabetes. The percentage of enrollees with a glycosylated hemoglobin measure, eye exam, and dietician visit is greater at follow-up than at intake and an intake "referral" is strongly associated with clients being treated for high blood pressure at follow-up. The MDON model is a promising public health approach for improving diabetes care but it is necessary to identify program elements that are most effective.

KEY WORDS: diabetes outreach; diabetes networks.

INTRODUCTION

From primary to tertiary prevention, the management of diabetes is an important public health challenge.[1] Over 10 million people in the

United States report they have been diagnosed with diabetes; estimates suggest there may be another 5–6 million who remain undiagnosed; and, both the incidence and prevalence of diabetes continue to increase.[2-4] Diabetes is a complex disorder associated with several potentially preventable complications, such as blindness, kidney disease, and amputation. Diabetes-related morbidity and premature mortality impose a sizable burden on individuals with diabetes and on society.[3,4] In 1997, medical expenditures for the care of people with diabetes totaled over $77 billion.[4]

Most diabetes care is delivered by physicians, and other providers, based on an acute-illness model of care. However, the concept of treating diabetes, as well as other chronic illnesses, using a population-based public health approach is becoming increasingly popular.[1,3,5] Glasgow et al. suggest that a public health approach includes identifying the extent of the disease, understanding the disease burden across different sub-populations, and creating an integrated system that enables providers to deliver care more efficiently.[1] Likewise, Roman and Harris argue that the ideal system for diabetes care is one that is proactive, emphasizes prevention and health education, and focuses on the community as a whole.[3] Nonetheless, a model using such an approach has yet to be fully developed, implemented and evaluated.

In 1974 Congress passed the National Diabetes Mellitus Research and Education Act, acknowledging the importance of diabetes as a public health issue.[6] This led to the establishment of a diabetes division within the Centers for Disease Control and Prevention, and the development of state-based diabetes control programs.[6,7] In 1994, Michigan was one of two states to receive funding to establish comprehensive diabetes programs intended for statewide implementation.[8] In 1995, the Michigan Diabetes Control Program awarded grants to five agencies to develop regional diabetes outreach networks modeled after the Upper Peninsula Diabetes Outreach Network, which had been in operation since 1985.[9]

The primary charge of the Michigan Diabetes Outreach Networks (MDONs) is "to reduce the burden of diabetes on the individual, their family, their community, and the health care system."[10] To meet this objective, networks are expected to (a) identify diabetes care, education, and support resources within the local community; (b) establish a regional advisory council to advise on planning, operation, and evaluation; (c) develop collaborative partnerships with health care providers to promote the delivery of diabetes care according to current clinical recommendations, research and standards; (d) sponsor and provide professional education and public awareness activities; and, (e) collect, analyze, and report data on the services provided by the network and their partner agencies.[10]

The purpose of this study is threefold: first, to describe a model of a public health approach to diabetes care that has been implemented throughout one state; second, to evaluate important diabetes-related process of care measures for individuals enrolled in this statewide program; and third, to examine the MDON program in the context of priorities for diabetes care and public health policy in the new millennium.

METHODS

Data Collection

Information about the organizational characteristics of the diabetes outreach networks were obtained through semi-structured interviews with the network directors and other key informants. During the interviews, respondents were asked to describe the development and composition of their network. Interview questions focused on (1) the types of participating agencies, which for the most part consist of home health providers, diabetes education programs, and others such as private practitioners and clinics; (2) the process used to recruit agencies and the reasons providers refuse to participate; (3) other network resources; and, (4) factors that facilitate or inhibit network development. Additional information was obtained from the Michigan Department of Community Health.

Program outcomes are examined using data from client intake and follow-up assessment forms. Participating agencies are encouraged to enroll all clients with diabetes. Agency staff, usually nurses, discuss the program with the client. If the client chooses to enroll they must sign a consent form and an intake assessment is completed. The intake assessment form, developed by the Michigan Department of Community Health, collects information on demographics, recommended procedures (e.g., dilated eye exam), physiologic measures (e.g., blood pressure), and resource use (e.g., number of hospitalizations). The data collection process is designed to gather information and to prompt the data collector to make recommendations based on client responses. For example, if the client reports their last dilated eye exam was over one year ago, the data collector is prompted to inform the client's primary provider or make a referral. Follow-up assessments, the first of which is to be completed after six months, are similarly structured but also ask about why a client did not receive recommended care if they were referred (e.g., the service was not available).

Enrollment in MDON is ongoing, with over 15,000 clients enrolled to date. This analysis uses intake data collected between April 1995 and December 1997. During this time, more than 12,600 clients were enrolled in MDON. However, some enrollees are excluded because demographic data only were collected for approximately 1,700, others were enrolled through health department programs with different data collection requirements (n = 962), and individuals with gestational diabetes or under 18 years of age have different care requirements. Follow-up data were collected for 53% (n = 5,030) of the remaining 9,572 enrollees between December 1995 and October 1998, with an average follow-up time of eight months. Some of the reasons for no follow-up information include client death, agency drop out, and the inability to locate clients after enrollment. The following analyses are based on the 5,030 clients with both intake data and a first follow-up.

Statistical Analysis

Evaluation of the client assessment data includes univariate and multivariable analyses. We report percentages and mean values for the program overall and across networks. Logistic regression was used to identify factors associated with the likelihood of clients receiving recommended diabetes care. Independent variables include: (1) whether a client received a referral at intake, which suggests that some action was taken by the provider conducting the intake assessment to promote optimal care; (2) insurance status, which is used as a proxy for access to care; and, (3) the type of agency through which a client is enrolled (e.g., home health vs. education program). This analysis also allows us to control for other factors that might influence the care received, such as client age, insulin use, the number of years since diagnosis, ethnicity, the number of health provider visits and hospitalizations in the previous 12 months, and the number of months between the intake and follow-up assessments.

Because of the potential correlation between clients enrolled by the same agency, the standard errors from the logistic model are adjusted using the Huber/White heteroskedastic consistent estimator of the variance-covariance matrix[11,12] with cluster correction, as found in the Stata statistical package.[13] This procedure adjusts the variance-covariance matrix to produce robust standard errors while the cluster correction accounts for constant correlation within groups. The statistical significance of individual parameter estimates is assessed using z tests and 95% confidence intervals.[14] All quantitative analyses were conducted using Stata release 6.0.[13]

RESULTS

The general organizational structure of each network includes the following elements: (1) a parent agency to act as fiduciary and provide support to network staff; (2) an office and staff that at minimum includes a director, who is either a registered nurse or registered dietician and is hired by the parent agency, a diabetes educator, an office manager, and a data analyst; (3) a flexible program plan with measurable goals; (4) a regional advisory council, which includes people with diabetes, health professionals, and community organization and business representatives, that participate in program planning; (5) healthcare partners that subcontract with the network; and, (6) partners who provide other resources (e.g., eye care specialists). Subcontracting partners (or participating partners) agree to establish policies for delivering quality diabetes care based on current standards and MDON program requirements, have provider staff educated by MDON, and complete MDON data collection forms. In return, the network agrees to provide professional education and reference material, educational materials for patients, data analysis and feedback, and a nominal payment for completing the data collection forms.

Development

Although the six networks have a common blueprint, each has some unique features including the strategies used to develop a regional network for diabetes care, the types of participating agencies, and the enrolled population. Select network characteristics are shown in Table 1. Some of the unique characteristics are related to the diverse geographic composition of the network service area, while others appear to reflect the philosophy of the network staff and the regional advisory council. For example, four of the networks were developed by recruiting home health agencies and then expanding to include other types of providers. The expansion strategy used by one network involved recruiting home health providers in year 1, clinics that serve minority populations in year 2, physician offices in year 3, and managed care plans in year 4. The composition of most of the networks reflects their original development strategy. However, change is also evident as more providers join the network and others withdraw. In addition to home health and diabetes education programs, MDON participating providers include health departments, Rural Health Clinics, physicians and nurse practitioners, Native American clinics and a VA hospital outpatient clinic.

TABLE 1

Organizational Characteristics of the Six Michigan Diabetes
Outreach Networks (April 1995–December 1997)

| Characteristics[1] | Network | | | | | |
	1	2	3	4	5	6
Number of enrollees	1384	1371	1377	1252	1176	3012
Number of participating agencies by type[2]						
Home Health	13	18	6	16	7	21
Education Program	7	6	8	3	8	5
Other	6	2	4	8	2	10
Percent of enrollees by agency type						
Home Health	38	62	30	71	21	57
Education Program	22	31	63	7	76	21
Other	41	7	7	22	4	22
Percent of enrollees from rural areas[3]	87	72	40	11	24	4
Number of counties in network service area	15	28	13	10	10	7

[1]Based on the 9,572 clients with intake assessments between April 1995 and December 1997.
[2]Education programs are primarily diabetes outpatient education programs; other agencies include hospitals, physician practices, nursing homes, rural health clinics, migrant clinics and health departments (excluding home care divisions of health departments which are classified as home health).
[3]Rural residence is based on the definition used by the Office of Management and Budget.

Key factors that facilitate network development appear to be: (1) establishing the network as an independent (i.e., non-competing) entity; (2) having a committed network director; and, (3) demonstrating to the community that the network is a valuable educational and quality improvement resource. The primary reason for providers choosing not to participate in the network is the paperwork/data collection component of the program. Most of the networks reimburse the provider agency a nominal amount for each completed data form. Nonetheless, the paperwork requirements are time intensive and may be beyond the resources of some providers, especially those with a small staff. Changes in Medicare reimbursement guidelines [Balanced Budget Act of 1997, P.L. 105-33] have also resulted in the withdrawal of some home health agencies due to orga-

nizational changes (e.g., agency closure) or the inability to commit staff time for collecting data.

Most of the networks have assembled other resources to promote diabetes care within their service area. Some have identified ophthalmologists who provide free eye exams or accept non-insured and low-income patients in return for referrals of insured or self-pay patients. Others have stimulated participating providers to devise innovative strategies for ensuring their clients receive recommended services, such as collaborating with a foot care provider to hold a free clinic. Several networks have compiled lists of providers, such as podiatrists, that are given to patients and participating agencies to assist in the referral process. Establishment of the network has also facilitated "networking" among various providers (e.g., endocrinologists, podiatrists) within the region. This networking is important for promoting a multidisciplinary dialogue about diabetes care, for sharing information on new techniques, and for comparing data.

Education

While the networking process is certainly valuable, a more tangible product is the educational programs provided by MDON. As part of their contract with a participating provider, the network agrees to provide educational resources for both patients and providers. Diabetes educators employed by the networks have created approximately 25 educational programs. These programs are shared by all the networks and most have been approved through the Michigan Nurses Association. The networks are also actively promoting public awareness about diabetes through health fairs and other community activities, such as presentations on cable television and faith-based diabetes awareness/prevention campaigns.

Continuous Quality Improvement

Another premier feature of the MDON program is the data collection and feedback component to promote continuous quality improvement. In years one and two, the MDON intake assessment focused on collecting information about glycosylated hemoglobin testing, dilated eye exams, blood pressure, dietitian visits, foot exams, current diabetes management, and provider contacts. However, this aspect of the program continues to be refined and soon additional laboratory data (e.g., lipids) and risk factor information will be available. The data collection forms are also being streamlined, to minimize the time required for data collection, and are being revised to allow comparisons with others (e.g., the Diabetes

Quality Improvement Project). These changes, along with the development of an electronic data collection system, should produce a more functional clinical database, which may be especially important as the networks are more aggressive in recruiting physician practices.

Characteristics of MDON enrollees with both intake and follow-up data are shown in Table 2. The intake characteristics of enrollees without follow-up information are similar. In general, enrollees are in their mid-60s, have type 2 diabetes, are predominately white, and are somewhat more likely to be female. Most clients have insurance, with approximately ½ indicating they receive Medicare benefits. The average number of years since diagnosis is 11, and only 9% of enrollees reported having not visited a physician in the previous 12 months. The percentage of enrollees using insulin ranges from 39% to 54% across networks. Among those on insulin, approximately 77% reported using glucose monitoring. For enrollees not on insulin, the use of glucose monitoring varied from 28% to 51% across the networks.

Figure 1 shows the status of MDON enrollees at intake and follow-up for several recommended diabetes care practices. Only 1/3 of clients had a reported glycosylated hemoglobin or hemoglobin A1c (HbA1c) measure in the 12 months prior to intake. A little more than half the enrollees reported they had a dilated eye exam in the previous 12 months, and a similar proportion had visited a registered dietitian. At intake, 87% of clients had their feet examined, and almost all had their blood pressure measured. Of those clients with no reported HbA1c measure at intake, 16% had a reported value at follow-up. For enrollees with no eye exam, 66% were given a referral and 40% of those referred reported having an exam at follow-up. Nearly 700 clients with no dietitian visit at intake reported a visit at follow-up, 64% of which had been given a referral. Of the clients with an elevated blood pressure reading (> 140mmHg systolic or > 90 mmHg diastolic), 40% were given a referral, including over 200 clients who were not currently being treated for high blood pressure. At follow-up, 65% of those enrollees who had not been receiving treatment indicated they were now receiving care for high blood pressure.

Logistic regression was used to identify factors associated with the receipt of recommended care, as reported during the follow-up assessment. Separate models were estimated for eye care visits and visits to a registered dietitian between intake and follow-up, for clients who did not report having these services prior to the intake assessment. A model was also developed to assess treatment for high blood pressure, while controlling for reported treatment status at intake. Odds ratios and 95% confidence intervals for the three models are presented in Table 3. The odds

ratio represents the estimated multiplicative change in the odds for a one-unit increase in the explanatory variable, holding all other variables constant.[15]

The results indicate that for clients with no reported eye exam in the past 12 months at intake, receiving a referral had no association with having an exam between intake and follow-up. There also appears to be no association between having insurance and reporting an eye care visit between intake and follow-up. Clients enrolled through home health agencies were the least likely to have an eye exam, but this association was not statistically significant. Insulin use on the other hand increased the odds of a client reporting an eye care visit by 30%.

Clients who had not seen a registered dietitian in the past 12 months and were referred during the intake assessment were 1.3 times more likely to see a dietitian between intake and follow-up. Although this result is not statistically significant at the .05 level, the relationship between the referral variable and visits to a registered dietitian cannot be completely dismissed. Individuals with more visits to a physician prior to the intake assessment were also more likely to see a registered dietitian between intake and follow-up, and those enrolled through diabetes education programs were 2.2 times more likely to report seeing a dietitian compared to clients enrolled through other types of agencies.

Unlike the previous models, the association between intake referral and treatment for high blood pressure is statistically significant even after controlling for whether the patient was being treated at intake. Clients who were given a referral, or whose physician was notified, because of a high blood pressure reading, were 50% more likely to be receiving treatment for high blood pressure at follow-up. Clients with any type of insurance were also more likely to be treated for high blood pressure at follow-up. Enrollment through a diabetes education program appears to be negatively associated with treatment for high blood pressure, although the confidence interval for this variable is quite wide and the relationship is not statistically significant.

DISCUSSION

The MDON program is one example of a statewide public health approach to strengthen diabetes care through education, improvements in care delivery, and the promotion of self-management. Although each of the networks has had to adapt to meet the unique characteristics of the region that it serves, successful network development consists of three

TABLE 2

Description of Michigan Diabetes Outreach Network Enrollees at the Intake Assessment, by Network

Enrollee Characteristics[1]	Overall	Network 1 (n = 745)	2 (n = 802)	3 (n = 706)	4 (n = 415)	5 (n = 803)	6 (n = 1559)
Age by category (%)							
18–34	4	2	3	4	4	4	7
35–44	8	4	6	6	7	11	10
45–64	34	31	30	35	25	42	35
65 or older	54	63	61	55	64	42	48
mean (sd)	64 (15)	67 (13)	66 (14)	64 (15)	66 (15)	60 (14)	62 (15)
% white[2]	85	92	87	86	87	91	75
% female	59	40	64	62	70	61	60
% insured	84	75	77	98	52	94	90
Diabetes Classification[3]							
%Type 1	7	2	4	4	10	6	11
%Type 2, use insulin	41	39	46	35	40	36	43
%Type 2, no insulin	50	58	46	58	39	58	45
%Unable to classify	2	1	3	2	11	<1	2
Mean # of years since diagnosis (sd)	11 (12)	11 (10)	12 (13)	10 (11)	14 (12)	9 (10)	11 (13)

|							
Mean # of doctor visits in past 12 months (sd)	9 (11)	8 (9)	8 (10)	9 (10)	9 (11)	9 (11)	10 (13)
Mean # of nurse visits in past 12 months (sd)	10 (18)	10 (17)	12 (21)	10 (18)	11 (21)	9 (16)	9 (18)
Mean # of hospital admits in past 12 months (sd)	.91 (1.6)	.61 (.92)	.86 (1.3)	.98 (1.7)	1.5 (2.5)	.67 (1.4)	1.0 (1.8)
% on insulin	47	41	51	39	50	42	54
% who use glucose monitoring	66	69	63	57	58	68	70
% who use diet planning	78	88	77	72	63	85	77
% with an exercise program	38	46	31	38	21	57	33

[1]Based on the 5,030 enrollees with both intake data and a first follow-up.

[2]Estimates for 1995, which corresponds with the beginning of the MDON data collection period, show that approximately 84% of Michigan residents are white. (ST-98-27) Population estimates for states by race and Hispanic Origin: July 1, 1995. Population Estimates Program, Population Division, U.S. Census Bureau, Washington, DC. Internet Release date: September 15, 1999.

[3]Early versions of the intake forms used the NIDDM and IDDM terminology to specify diabetes diagnosis. However, following the work of others (e.g., Beckles et al., 1998) we have re-classified all enrollees as type 1 and type 2 based on their current age, age at diagnosis and whether or not they use insulin. If age at diagnosis was < 30 years and they are currently using insulin they are classified as having type 1 diabetes. If age at diagnosis was > 30 years or if age at diagnosis was < 30 years and they are not using insulin they are classified as having type 2 diabetes.

FIGURE 1

Michigan Diabetes Outreach Network enrollees reporting
recommended diabetes care in the 12 months prior to intake and
12 months prior to follow-up.
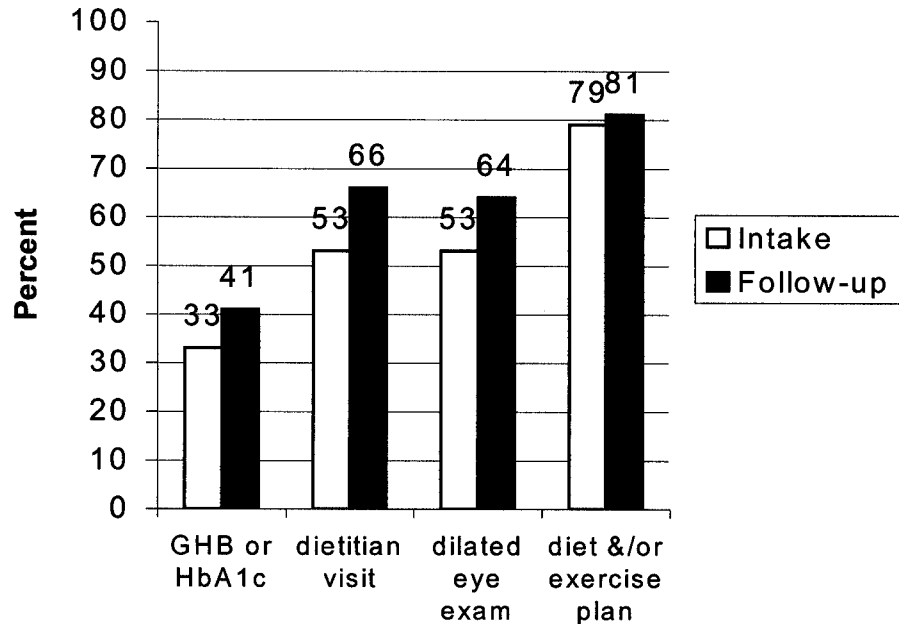
common elements. First, the network must not be perceived as a competitor by other health care providers. Second, the network must have a dedicated staff, especially a committed director. Third, the community must view the network as a valuable educational and quality improvement resource.

Within a two year period, and with a modest amount of financial resources, the five newly formed networks (UPDON has been operating since the mid-1980s) recruited almost 125 provider agencies and collected information on over 8,000 individuals with diabetes. Moreover, MDON affiliated diabetes educators created at least 25 educational programs, regional advisory councils were established to facilitate the sharing of ideas and information, and all of the networks participated in community awareness activities. These accomplishments demonstrate that a "networking" approach can be used to establish functional partnerships to promote diabetes care. Whether these partnerships can be sustained, the amount of

TABLE 3

Logistic Regression Models to Assess Dilated Eye Exams, Visits to a Registered Dietitian
and Treatment for High Blood Pressure

Variable	Dilated Eye Exam		Visit to Registered Dietitian		Treatment for High Blood Pressure	
	Odds Ratio	95% Conf. Interval	Odds Ratio	95% Conf. Interval	Odds Ratio	95% Conf. Interval
Referral at intake	1.0	.84,1.23	1.3	.96,1.84	1.5*	1.05,2.28
On insulin	1.3**	1.12,1.61	1.1	.83,1.37	.90	.64,1.27
Have insurance	.97	.75,1.25	1.0	.74,1.42	1.5*	1.05,2.04
# of doctor visits 12 months prior to intake	1.0	.99,1.01	1.0*	1.00,1.03	1.0	.99,1.01
# of nurse visits 12 months prior to intake	1.0**	.98,1.00	1.0	.99,1.00	1.0	.99,1.00
Enrolled through home health agency vs. other agency type	.76	.57,1.02	.98	.51,1.87	1.1	.71,1.59
Enrolled through diabetes education program vs. other agency type	.85	.55,1.31	2.2*	1.09,4.56	.78	.55,1.10
Treatment for blood pressure at intake	NA	NA	NA	NA	4.3***	2.99,6.03

Note: Variables included in the models but did not achieve statistical significance are age at intake, years since diagnosis, ethnicity, number of hospital admits 12 months prior to intake, and number of months between the intake and follow-up assessment.

*p < .05; **p < .01; ***p < .001.

resources required to maintain network operations, and how the networks might change over time all remain to be seen.

The ultimate goal of MDON is to decrease the burden of diabetes, especially the serious complications associated with this disease. The mechanism for accomplishing this objective is the development of partnerships, and the use of education and structured data collection to improve diabetes care. A simple comparison of recommended care processes shows that the percentage of enrollees who have received recommended care in the prior 12 months is greater at follow-up than at intake. However, with pre/post data alone, it is not possible to determine how much of this apparent increase is related to MDON. Moreover, MDON is a heterogeneous mix of activities, which makes it difficult to identify the features most effective in promoting optimal diabetes care.

Logistic regression was used to identify program and patient specific factors associated with certain care practices. This analysis shows that a "referral" at intake appears to be associated with clients reporting a visit with a registered dietitian between intake and follow-up and more importantly is strongly associated with clients with high blood pressure reporting they were being treated for this condition at follow-up (controlling for treatment status at intake). This finding supports a proactive approach to diabetes care as advocated by Roman and Harris.[3] However, it is not entirely clear as to what type of action was taken to promote the care received. The referral may have consisted of the individual conducting the intake assessment informing the client that they should have a particular procedure or they may have scheduled an appointment for the client or informed the client's primary provider that additional care was needed. Nonetheless, considering the importance of good blood pressure control for individuals with diabetes,[16,17] the association between the intake "referral" and treatment for high blood pressure suggests that this aspect of the MDON program should be examined further as a possible mechanism for achieving substantial improvements in outcomes for many people with diabetes.

Likewise, we need to look more closely at areas where this "referral" seems not to work. For example, of those clients who did not have an eye care visit at intake, the reasons cited for not having a visit between intake and follow-up include: the patient did not make an appointment (58%), the patient refused to go (17%), the patient had limited financial resources (12%), the patient did not have transportation (7%), and the service was not available (1%). This suggests that for certain aspects of care more active measures might be required to ensure that services are received.

Other studies have found that health insurance coverage is positively associated with preventive practices such as foot inspections and eye exams.[18] In this analysis, clients with insurance were more likely to be treated for high blood pressure at follow-up but did not appear any more likely to have a dilated eye exam or a visit with a registered dietitian between intake and follow-up. This result is rather troubling since it suggests that financial barriers may prevent some patients from receiving treatment for high blood pressure, which has been shown to reduce the risk of diabetes related death, decrease the risk of other diabetes related complications, and is cost-effective.[16]

Finally, of interest to the Michigan Diabetes Control Program and network directors is differences in care associated with the type of agency through which a client is enrolled. This information is important for network development and for program decision-making. The results indicate that clients enrolled through diabetes education programs are more than twice as likely to have visited a registered dietitian between intake and follow-up compared with clients enrolled by other types of agencies. This is not surprising since nutrition counseling has long been a key element in diabetes self-management education programs and the national standards for becoming an ADA recognized program require that the advisory committee and program staff include a registered dietitian. The results also show that clients enrolled through diabetes education programs were the least likely to be receiving treatment for high blood pressure at follow-up. Although this relationship is not statistically significant, this may require additional investigation. In particular, diabetes education programs (as well as all health care providers), which have traditionally focused primarily on glycemic control, need to understand the importance of controlling high blood pressure for individuals with diabetes.

However, this assessment must be interpreted in context. First, there are many different types of participating providers, which for this analysis have been combined into three general categories: home health, diabetes education programs, and all other. Second, different types of providers tend to serve different types of clients and the results may be determined as much by client characteristics as by provider characteristics. Third, other limitations with this study include the lack of control for, or assessment of, "network" specific effects and problems related to missing data.

In conclusion, the MDON model is a promising public health approach for strengthening the care of some individuals with diabetes. This analysis suggests that MDON has had a generally positive effect on promoting diabetes care and the Michigan Diabetes Control Program is confi-

dent that the quality improvement efforts stimulated by MDON will soon be even more evident in the care provided by participating agencies. MDON is an adaptable program that promotes a proactive approach to diabetes care, emphasizes preventive practices and health education, incorporates a process for identifying a population and collects information on relevant disease-specific measures, thereby encompassing many of the basic elements in the public health models previously proposed.[1,3] Programs based on this same framework may prove to be an effective way for states, and/or communities, to improve care for individuals with diabetes as well as persons with other chronic health conditions. However, to facilitate policy development and the wise use of resources, it is necessary to identify program elements that are most effective, and to give special thought to the targeting of conditions or aspects of care that are likely to result in the most significant improvement in health outcomes within our communities.

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