

Survey on Diabetes and Heart Disease

Physician Attitudes and Practices and Patient Awareness of the Cardiovascular Complications of Diabetes

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OBJECTIVES	Studies were conducted to: 1) assess physicians' attitudes and practices in managing cardiovascular disease (CVD) risks in diabetes; and 2) determine the awareness of CVD risks among diabetic patients.
BACKGROUND	Cardiovascular disease is the leading cause of premature death among diabetic patients. As diabetes is often seen as a "glucose-centric" disease, it is unclear whether diabetic patients are talking with their doctors about CVD and other key clinical parameters of diabetes care such as blood pressure and cholesterol.
METHODS	An online survey was completed by a nationally representative sample of 900 physicians. The 95% confidence interval is approximately $\pm 2.5\%$. Before this study, a telephone survey of 2,008 people with diabetes was conducted using random, direct-dial screenings of U.S. households.
RESULTS	Ninety-one percent of physicians believe that their patients with diabetes are "very" or "extremely" likely to have a cardiovascular event. Although physicians report discussing CVD risk factors with 88% of their diabetic patients, they perceive their diabetic patients as being only moderately knowledgeable about their increased CVD risks. Sixty-eight percent of the people with diabetes do not consider CVD to be a serious complication of diabetes; they are more likely to be aware of complications such as blindness (65%) or amputation (36%) rather than heart disease (17%), heart attack (14%), or stroke (5%). Physicians perceive "poor compliance" with behavioral modifications and medication regimens as the greatest barriers to the management of CVD risks in diabetic patients.
CONCLUSIONS	Materials should be made available to help facilitate communication about CVD risks, and strategies for improving compliance with life-style modifications and multiple drug therapies should be explored. Efforts should continue to promote a comprehensive approach to the management of diabetes to include aggressive control of blood glucose and other CVD risk factors. (J Am Coll Cardiol 2002;40:1877-81) © 2002 by the American College of Cardiology Foundation

Cardiovascular disease (CVD) is a major complication and the leading cause of premature death among people with diabetes. Adults with diabetes are two to four times more likely to have heart disease or suffer a stroke than people without diabetes. Cardiovascular disease claimed more than \$7 billion of the \$44.1 billion annual direct medical costs for diabetes in 1997, the most costly of all complications of type II diabetes (1).

While our nation has seen overall decreases in mortality due to CVD over the past 30 years, people with diabetes have not benefited from this decline. In fact, deaths due to CVD in women with diabetes have increased (2). Results

from a recent study showing that the prevalence of diabetes has increased by 49% from 1990 to 2000 are also troubling, and projections indicate an increase of 165% by the year 2050 (3). The diabetes epidemic underscores an urgent need for strategies to prevent CVD in people with diabetes.

To help reduce the morbidity and mortality associated with diabetic CVD, the American Diabetes Association (ADA) and the American College of Cardiology (ACC) recently launched an initiative called "Make the Link! Diabetes, Heart Disease and Stroke." The initiative's goals are to increase public awareness of CVD and diabetes, to decrease the incidence of CVD associated with diabetes, to educate health care providers about proper CVD diagnosis and treatment, and to inform patients of their risk and appropriate therapies.

As part of this initiative, the two organizations commissioned a survey to assess physicians' attitudes and practices in managing cardiovascular risk factors in patients with diabetes. The survey obtained baseline data on how seriously physicians view the cardiovascular risks of diabetes, how they discuss these risks with their patients, and what they

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Abbreviations and Acronyms

ADA = American Diabetes Association
ACC = American College of Cardiology
CDC = Centers for Disease Control and Prevention
CVD = cardiovascular disease

believe are the most significant barriers to the effective management these risks. Before this survey, a study of people with diabetes was performed to determine how much they knew about their increased risks of CVD and whether they were talking with their doctor about these risks. This report provides a summary of the findings and discusses implications for clinical care.

Survey methodologies. The physician survey was performed on a representative national sample of approximately 700 primary-care physicians, 100 cardiologists, and 100 endocrinologists. It was fielded online by a marketing information services company (TargetRx) in March 2002.

The survey of 2,008 people with diagnosed diabetes was conducted during the August to October 2001 period by the market research firm RoperASW, using random, direct-dial screenings of U.S. households. The results were weighted and projected to match the U.S.-diagnosed patient population of 10.7 million based on an extrapolation of estimates provided by the National Center for Health Statistics and Centers for Disease Control and Prevention (CDC).

Key findings—physicians' attitudes and practices. Results from the physician survey indicate a high level of awareness among physicians about the CVD risks associated

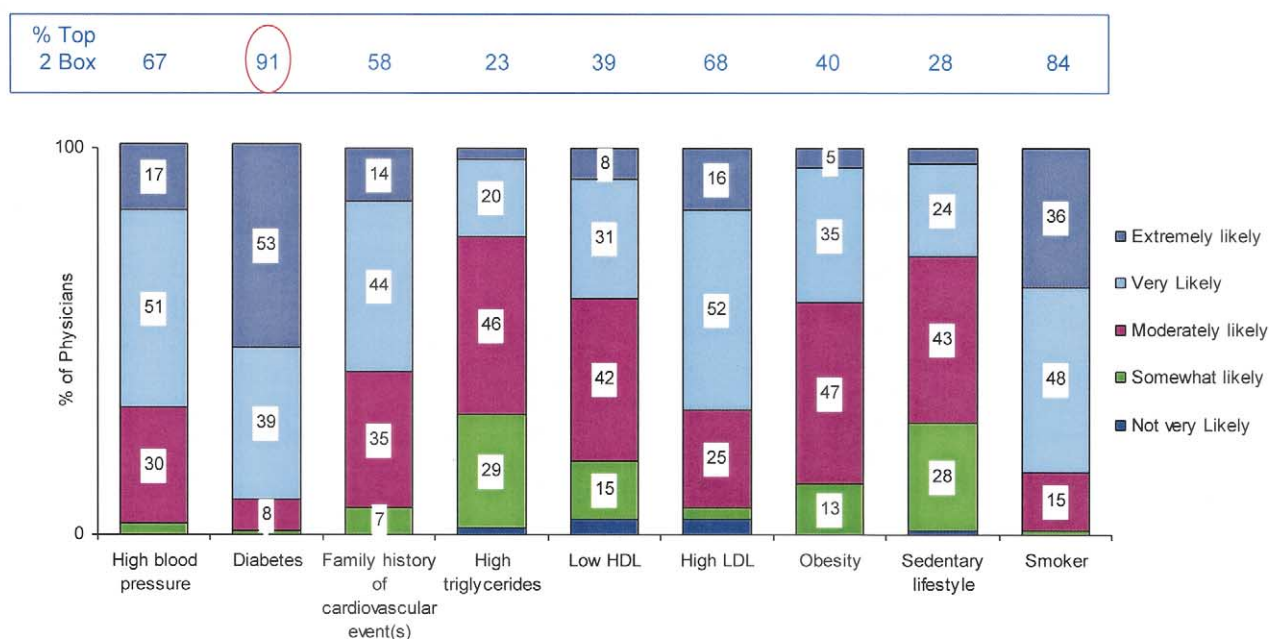
with diabetes. Ninety-one percent of the physicians believe that their patients with diabetes are "very" or "extremely" likely to have a cardiovascular event. This proportion is higher than that for any other CVD risk factor (Fig. 1), indicating that physicians recognize the extraordinary risk associated with diabetes.

When asked to prioritize the treatment of blood glucose, blood pressure, and low-density lipoprotein cholesterol, 63% of the physicians ranked the lowering of blood glucose as the highest treatment priority for reducing CVD risks in their patients with diabetes, with only 22% indicating that blood pressure treatment was the highest priority and only 7% identifying cholesterol management as the highest priority. When other factors such as smoking cessation and aspirin therapy were included, control of blood glucose remained the highest treatment priority for the majority of physicians (Fig. 2).

Physicians perceive "poor compliance" with behavioral modifications and complex medication regimens as the two greatest barriers to the effective management of CVD risks in patients with diabetes. Only 24% of the physicians reported a lack of time to effectively counsel patients as being a barrier (Table 1).

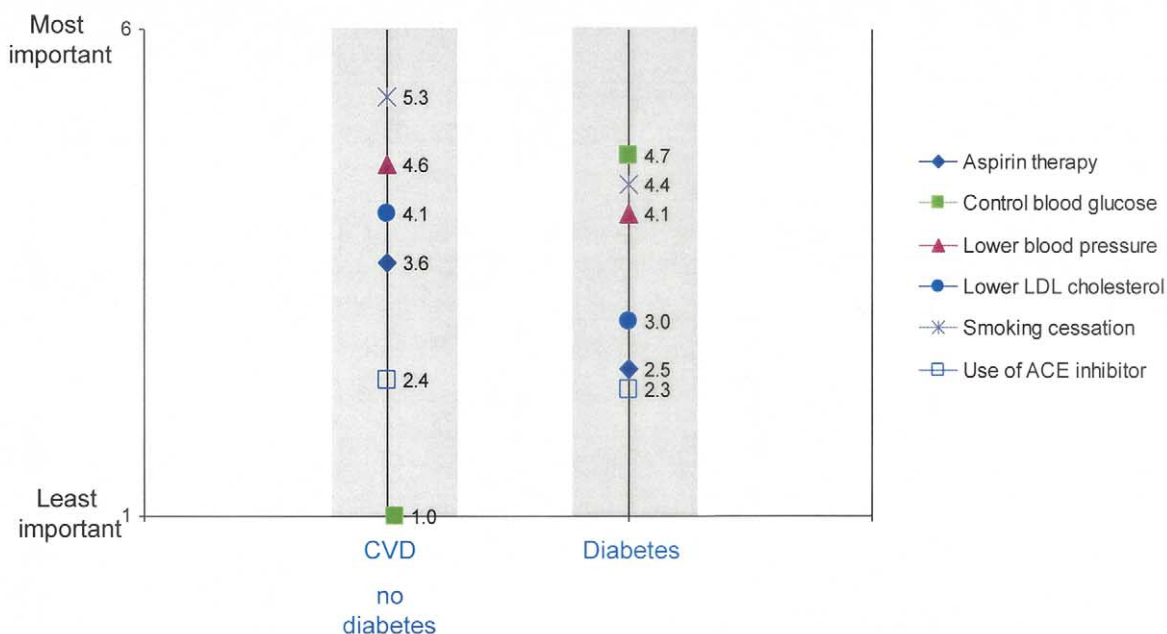
Physicians perceive that diabetic patients are significantly less likely than non-diabetic patients with CVD to have met treatment goals for blood pressure and lipids. Physicians reported that they discussed the management of cardiovascular risk factors with 88% of their diabetic patients, and almost all physicians (95%) reported that they initiated these discussions.

However, physicians believe their patients with diabetes



Q10
(n=900)

Figure 1. Association of conditions or attributes with physicians' perception of the risk for a cardiovascular event. HDL = high-density lipoprotein; LDL = low-density lipoprotein.



Q30, 160
(n=900)

Numbers are reversed from questionnaire
Based on a 6-point scale where 1 = "Most important" and 6 = "Least important"

Figure 2. Treatment prioritization by physicians to reduce risk of cardiovascular disease (CVD) events (diabetic vs. non-diabetic patients with CVD risk factors). ACE = angiotensin-converting enzyme; LDL = low-density lipoprotein.

are only moderately knowledgeable of their increased risk of a cardiovascular event. Primary-care physicians and endocrinologists believe that their patients with diabetes perceive amputation and blindness as being their greatest risks. Conversely, cardiologists report that the greatest risk as perceived by diabetic patients is heart attack, perhaps because diabetic patients in the care of cardiologists are likely to have already experienced cardiovascular complications.

Key findings—patient awareness of cardiovascular risks.

These queries of individuals with diabetes showed that more than two-thirds do not consider CVD to be a serious complication of diabetes. People with diabetes are more likely to be aware that diabetes may cause disabilities such as blindness (65%) or amputation (36%) than they are that diabetes may result in premature death from heart disease (17%), heart attack (14%), or stroke (5%). Awareness of CVD risks is lower among older adults and Hispanics,

Table 1. Physician Perceptions of the Barriers of Care in Managing Cardiovascular Disease Risk in Patients With Diabetes*

	Greatest Barrier (%)	Second Greatest Barrier (%)	Third Greatest Barrier (%)	Total for Three Greatest Barriers (%)
Poor compliance with behavioral modification recommendations	56	21	9	86
Poor compliance with multiple medication regimens	18	38	21	77
Cost/lack of reimbursement	12	14	23	49
Lack of patient awareness of CVD-related risks	5	10	17	33
Lack of time to sufficiently counsel patients	5	7	12	24
Side effects of medications	1	5	13	19
Lack of efficacy of available treatment options	2	4	4	10
Lack of physician identification of CVD risk factors	1	1	1	3

*From the American Diabetes Association/American College of Cardiology survey of 900 physicians, conducted by TargetRx in March 2002.

CVD = cardiovascular disease.

three-fourths of whom do not name any cardiovascular condition as a serious complication of diabetes.

According to the survey, the perception of personal cardiovascular risk is low. More than half of the people with diabetes do not feel at risk for a heart condition (52%) or stroke (53%). Nearly two-thirds (60%) do not feel at risk of either high blood pressure or high cholesterol.

People ≥ 65 years of age with diabetes feel the least at risk for CVD. Of these older adults, 65% do not feel at risk for a heart condition; 61% do not feel at risk for stroke, and nearly 70% feel little or no risk of high cholesterol or high blood pressure.

Few people with diabetes could name important methods of reducing their risk of heart attack or stroke, such as taking prescription medications (18%), lowering cholesterol (8%), quitting smoking (7%), reducing blood pressure (5%), and taking aspirin (1%). Sixteen percent of the survey respondents could not name any way to reduce their CVD risk.

People with diabetes report seeing their health care provider about five times a year, and almost 75% say they ask questions about managing their diabetes. Two-thirds of the people with diabetes report discussing blood sugar control at some or every visit. About half report that their health care provider never discussed lowering blood pressure (52%) or lowering cholesterol (45%).

Among smokers, more than one-third said quitting smoking was not discussed.

Conclusions. The results of the physician and patient surveys demonstrate a crucial need to improve communication between physicians and their patients about the link between diabetes and CVD.

Although there is a high level of awareness among physicians about the CVD risks associated with diabetes, patients with diabetes have limited knowledge of these risks. Cardiovascular disease is the leading cause of diabetes-related deaths, but the majority of people with diabetes are more fearful of complications such as blindness and amputation. Although three-quarters of patients surveyed self-reported a cardiovascular complication such as high blood pressure, high cholesterol, or stroke, they failed to link these problems with their diabetes.

Physicians say they are talking to their patients about their increased risk of cardiovascular complications, but those warnings do not seem to be resonating with the affected patient population. We may need to investigate and better understand what is happening. Are people with diabetes "hearing" about blood pressure and cholesterol but not linking these conditions to their diabetes? Do people with diabetes consider these to be separate diseases?

Diabetes is a complex disease that requires continuing medical care and life-long patient education. The survey results repeatedly reinforce this complexity and highlight treatment compliance challenges associated with behavioral changes and multiple medication regimens. The physicians' belief that diabetic patients are less likely to meet treatment goals than non-diabetic patients with CVD further under-

Table 2. Clinical Goals of the American Diabetes Association*

Key Clinical Goals	
A1C	<7%
Blood pressure	<130/<80 mm Hg
Lipid profile	
Cholesterol	<200 mg/dl
LDL cholesterol	<100 mg/dl
HDL cholesterol	>45 mg/dl (men) and >55 mg/dl (women)
Triglycerides	<150 mg/dl
Others	Stop smoking
	Take aspirin, 81 to 325 mg/day (over age 21 years)
	Consider ACE inhibitors for diabetic patients ≥ 55 years of age with at least one other CVD risk factor to reduce risk of CVD events

*Source: American Diabetes Association. Standards of medical care for patients with diabetes mellitus. Diabetes Care 2002;25 Suppl 1:S33-49. The full text of the American Diabetes Association's clinical practice recommendations is available online at www.diabetes.org.

A1C = hemoglobin A_{1c}; ACE = angiotensin-converting enzyme; CVD = cardiovascular disease; HDL and LDL = high- and low-density lipoprotein, respectively.

scores the difficulty in managing diabetes-related cardiovascular risk factors. The effort required to self-manage diabetes on a daily basis may also negatively impact one's ability to effectively treat other risk factors such as high blood pressure and cholesterol. Strategies for improving patient compliance with life-style modifications and multiple drug therapies should be explored.

The majority of physicians surveyed identified the lowering of blood glucose as their highest priority in the effort to reduce cardiovascular events in patients with diabetes. Although a focus on glucose control is important in minimizing the risk of microvascular complications, many would argue that—because there are no definitive clinical trial data demonstrating that intensified glycemic control significantly reduces the risk of CVD—control of blood pressure and lipids, smoking cessation, and the use of aspirin may be more important in reducing life-threatening cardiovascular complications. In fact, the CDC's Cost-Effectiveness Group recently published an analysis suggesting that intensified blood pressure control would be a viable cost-saving measure (4). The ADA recommends a comprehensive approach to the management of diabetes that includes aggressive management of cardiovascular risk. Table 2 includes a summary of key clinical goals (5).

Physicians agree that materials intended to educate diabetic patients about their cardiovascular risks would be valuable tools to help them improve their patients' knowledge of the subject. To that point, the ADA and ACC, through the "Make the Link" initiative, will continue to develop, distribute, and promote tools to help facilitate the improvement of discussions between health care providers and diabetic patients.

There is much we can do. Health care providers need to talk with their patients more about the increased risk of a heart attack or stroke, with the message that risk reduction is possible. We need to stress that managing diabetes is more than managing just blood glucose. Rather, it is

managing the ABCs of diabetes: A1C, Blood pressure, and Cholesterol. We need to refer our patients to appropriate resources so that they get the education and support they need. Once we help our patients make the link between diabetes and CVD and empower them to take action, the outcomes of their diabetes are likely to improve.

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REFERENCES

1. American Diabetes Association. Economic consequences of diabetes mellitus in the U.S. in 1997. *Diabetes Care* 1998;21:296–309.
2. Gu K, Cowie CC, Harris MI. Diabetes and decline in heart disease mortality in U.S. adults. *JAMA* 1999;281:1291–7.
3. Boyle JP, Honeycutt AA, Narayan KMV, et al. Projection of diabetes burden through 2050: impact of changing demography and disease prevalence in the U.S.. *Diabetes Care* 2001;24:1936–40.

4. The CDC Cost-effectiveness Group. Cost-effectiveness of intensive glycemic control, intensified hypertension control, and serum cholesterol level reduction for type 2 diabetes. *JAMA* 2002;287:2542–51.
5. American Diabetes Association. Standards of medical care for patients with diabetes mellitus. *Diabetes Care* 2002;25 Suppl 1:S33–49.

APPENDIX

National Advisory Board for Diabetes: Eli Lilly & Co.; Takeda Pharmaceuticals America, Inc.; Cyngus; TheraSense; Amylin Pharmaceuticals; Aventis Pharmaceuticals; and Novo Nordisk. All were contracted directly through the University of North Carolina.

Consultancies: Amylin Pharmaceuticals; Eli Lilly & Co.; Fujisawa Research Institute of America, Inc.; Insulet Corp.; Instrumentation Metrics, Inc.; Novartis Pharmaceuticals; Takeda Pharmaceuticals America, Inc.; and TheraSense. All were contracted directly through the University of North Carolina.