by Frank Vinicor, MD, MPH

The facts are devastating. Diabetes is the number one cause of nontraumatic amputations among Americans, with over 86,000 lower-extremity amputations occurring each year. That is about 236 lower-extremity amputations every day!

The good news is that we can do a lot to prevent the complications of diabetes, such as nerve and foot disorders that might lead to amputations; and when complications are present, we can do a lot to prevent them from getting worse. While providing helpful and sophisticated rehabilitation and prosthetic limbs is both gratifying and important, we must do a better job initially to prevent amputations among people with diabetes.

Reliable and simple risk factors can identify those among the estimated 16 million Americans with diabetes who are at special risk for foot ulcers and amputations, and, with proper care, about 50 percent of lower-extremity amputations in people with diabetes can be prevented.

The role of the Centers for Disease Control and Prevention (CDC) is to make sure that all the important knowledge, science, and information is available to patients, their families, the public, healthcare professionals, insurance companies, policy makers, health maintenance organizations, and others.

Scientific studies indicate that if people with diabetes tightly control their blood glucose, blood pressure, and blood fat levels, their chances of developing nerve, vascular, and foot problems can be significantly decreased. We have also learned that detecting changes in foot shape, sensation, and blood flow, with three relatively simple and inexpensive office tests, allows us to predict those who are at greater risk to develop ulcers and amputations.

Facts About Lower-Extremity Amputations
- More than half occur in people with diagnosed diabetes, who represent only 3 percent of the U.S. population.
- They are a significant complication for people with diabetes, and blacks and the elderly are disproportionately affected.
- Almost 60 percent occur among people age 65 or older.
- Between 1983 and 1996, the rates increased 24 percent.

Living with diabetes is a daily challenge. Many things people take for granted, such as eating any time and exercising freely, become real problems for people with diabetes, who must carefully balance food, physical activity, and medication to prevent acute complications of diabetes like severe hypoglycemia or low blood sugars.

Diabetes also poses problems for us as a nation. First, the prevalence of diabetes has increased dramatically over the past decade in the U.S. and throughout the world. By the year 2025, the five countries with the greatest incidence of diabetes will be India, China, the U.S., Pakistan, and Indonesia. In the U.S., there has been a 33% increase in the frequency of diabetes over the last eight years; at the same time, there has been an increase in weight gain and physical inactivity. This increase in the number of people with diabetes represents new cases, not just better detection of those with diabetes.

Secondly, the onset of diabetes, especially Type 2 diabetes, seems to be happening at younger ages. In the past, people were typically in their 50s when they were diagnosed with Type 2 diabetes. Now we are seeing a greater increase in diabetes among people ages 30 to 39, which means that people will have the condition for a longer time.

Finally, we are concerned that with more cases of diabetes of longer duration, we will see more of the potentially devastating complications, including nerve and foot disease, and, ultimately, more lower-extremity amputations.

Facing these scientific data and concerns, we must ask ourselves what the public health community is doing about these problems.

Are We Close to Finding a Cure?
Recently, there has been a lot of media coverage around the possibility of a “cure” for Type 1 diabetes. In an important study from Canada, several patients with longstanding Type 1 diabetes received injections of isolated beta cells (insulin-producing cells obtained...
from recently deceased individuals). These patients also received special experimental medicines to prevent rejection of these “foreign cells,” and after about a year, they were able to control their blood sugars without insulin injections. A much larger study is now in progress where people with Type 1 diabetes are receiving the so-called “Edmonton protocol.” The results of this study should give us important information about how effective this approach is.

There are, unfortunately, no promising long-term scientific studies supporting a “cure” for Type 2 diabetes, which has a very different basic disease process from Type 1.

Educating the Public

Government agencies and the private sector have different responsibilities to address the challenges of diabetes and its complications by preventing the onset of diabetes or curing it after it starts. This type of research on primary prevention falls within the purview of the National Institutes of Health (NIH). Important and exciting clinical trials are underway to determine how both types of diabetes can be prevented, and results are expected in a couple of years.

Once reliable scientific studies are published and discussed, it becomes primarily the responsibility of the CDC to “translate” the findings into communities through programs that will improve the daily management of diabetes. The CDC supports 59 Diabetes Control Programs (DCPs) in all states and territories. These DCPs, in cooperation with many partners—such as the American Diabetes Association (ADA) and the American Association of Diabetes Educators (AADE) —work through community education projects to help people keep abnormal metabolism in check. Today we know that complications do not have to develop if blood glucose, lipids and blood pressure are controlled.

Sometimes, however, in spite of valiant efforts by everyone, diabetes complications do develop. CDC programs also strive to identify diabetes complications early and treat them aggressively to prevent progression. A good example is looking in the eyes of someone with diabetes to see if their retinas have deteriorated; if the doctor finds damage, he or she can use special “photocoagulation” techniques to stop the progression of eye disease that can cause blindness.

These strategies have a strong scientific base, and we know they work to reduce the problems of diabetes and increase the chances for a better quality of life. With this strong base of scientific information, many government and private sector programs can then improve their delivery of care for people with diabetes and foster improved insurance coverage for these prevention programs.

Federal departments and agencies, such as the Indian Health Service, Veterans Affairs Health System, and Community Health Centers associated with the Health Resources and Services Administration, as well as many health-maintenance organizations and managed-care programs, use the new science and translated programs to improve care delivery. The Health Care Financing Administration, through Medicare and Medicaid, helps to improve the financial coverage for diabetes prevention programs and together with important nongovernmental organizations, such as the ADA and the AADE, works with the private sector to “get the word out” about what works in managing diabetes.

Types of Diabetes

Most people think of diabetes mellitus in two major forms: Type 1 or Type 2. Type 1 diabetes, previously called juvenile-onset or insulin-dependent diabetes, typically occurs in people under age 30 and it happens much more frequently in the white population than in minority communities. It seems to be caused by an autoimmune or “self-destructive” process involving the beta or insulin-producing cells in the pancreas. Because these cells are destroyed by the body’s own immune system, people with Type 1 diabetes have to take insulin to replace what the beta cells no longer make. Stopping insulin replacement in Type 1 diabetes results in a rapid breakdown in fat and muscle tissues, with severe acidosis (too much acid in the body) and coma.

Type 2 diabetes, previously called adult-onset or non-insulin-dependent diabetes, typically appears after age 40 and is closely associated with weight gain and physical inactivity. Type 2 diabetes in the U.S. accounts for at least 90 percent of all cases and is especially common in minority communities. Proper diet and activity, along with oral medications, can
often control the blood sugar in people with Type 2 diabetes; however, as the disease progresses, they might also need insulin treatment.

While the basic causes of these two common types of diabetes are different, they both result in abnormal body metabolism (especially high blood sugars), abnormal fat metabolism and often high blood pressure. If the abnormal metabolism cannot be brought under reasonable control with diet and medicine, people with both types of diabetes can develop complications, including eye, kidney, nerve, feet, and heart problems. All these problems can be devastating, but many can now be prevented.

We are all working for and anticipating the great day that we will find successful ways to prevent diabetes or find a cure. But today, we can do a better job in helping people with diabetes keep their limbs and lead satisfying, productive, and happy lives. To accomplish this, we must work together toward this goal every day. What can you do to help? If you have diabetes, get regular treatment and follow your health professional’s advice to prevent severe complications. Reach out to family and friends and encourage them to be physically active and pay attention to their nutritional needs to prevent obesity and maybe diabetes.

Frank Vinicor, MD, MPH, is Director, Division of Diabetes Translation, Centers for Disease Control and Prevention, Atlanta, Georgia.

RESOURCES
For more information about diabetes, the CDC, the National Diabetes Education Program, and other organizations committed to “treating diabetes differently,” contact the following:

· Call CDC’s Diabetes Inquiry Line toll-free at 1-877-CDC-DIAB or 232-3422 (English and Spanish) or visit the Web site at http://www.cdc.gov/diabetes

· For CDC’s statistics on nontraumatic lower-extremity amputations, visit the Web site at http://www.cdc.gov/diabetes/statistics/surv199/chap6/chapter6Intro.htm

· Visit the Web site for the CDC/NIH National Diabetes Education Program at http://ndep.nih.gov

· Call the National Diabetes Education Program toll-free at 1-800-438-5383 to order printed information in English and Spanish (automated line).

· Call NIH’s National Diabetes Information Clearinghouse toll-free at 1-800-860-8747 (English and Spanish) or visit the Web site: www.niddk.nih.gov/health/diabetes/ndic.htm