Diabetes: Half the state at risk; Preventable with diet and exercise

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Disabling and costly, diabetes is a drain on Kentucky's people, its health care system and its economy. What's worse, efforts to contain this chronic disease aren't working: Diabetes is 50 percent more prevalent in Kentucky today than it was in 1994 (3, 6).

Diabetes is also on the rise in other states, but fully *half* of adult Kentuckians are at risk for the disease (6). Among the reasons:

■ Kentucky leads the nation in the percentage of people who lead sedentary lifestyles, a major risk factor for diabetes.

■ Kentucky ranks among the top 10 states for obesity, another of the major risk factors.

■ Older people are at higher risk for diabetes, especially when other risk factors are present, and Kentucky is projected to be among the top five oldest states by 2020.

■ Kentucky leads the nation in smoking, which worsens complications of diabetes, including heart disease.

■ Diabetes is more common in people with less education and lower incomes; Kentucky ranks 48th in the nation in the percentage of people who have graduated from high school and 12 percent of Kentuckians live in poverty.

Already the human and financial toll of diabetes in Kentucky is staggering: It contributes to nearly 3,000 deaths in Kentucky each year, or about 7 percent of all deaths. It also costs the state about $1.9 billion a year in medical care, lost economic productivity and premature mortality (based on 1997 figures) (6).

All this is to say that Kentucky, like the rest of the nation, must get a handle on this complex disease, which contributes to many other health problems including blindness, kidney failure, amputations, nerve damage, heart disease and stroke.

Fortunately, there's new information available that offers encouragement about controlling diabetes. Recent scientific studies have shown:

■ That strict control of blood sugar can lessen the risk of complications from diabetes (8, 15);

■ That diabetes can actually be prevented if people at risk for the disease develop a healthier lifestyle including moderate exercise and weight loss, or by oral medication (2, 8, 13); and

■ That rigid treatment plans and patient monitoring are effective ways to help people with health illiteracy improve the way they manage their disease (5, 12).

While these findings suggest that lifestyle changes can make a significant difference for diabetics and those at risk for diabetes, such changes are particularly hard to sustain. They require education and intensive support (4, 5, 11), particularly in Kentucky, where 40 percent of the working-age population have modest, minimal or no functional literacy skills, according to the Kentucky Adult Literacy Survey of 1997 (7).

However, Kentucky is a largely rural state and rural communities are chronically short of certified diabetes educators (CDEs) who are trained to work with diabetics on self-care. On the other hand, Kentucky has developed in-home lay worker health

programs to fill the gap which could be replicated or expanded to help educate and treat diabetics and people at high risk for developing the disease.

This analysis will explore what changes the state might make in its approach to the disease to help control it, based on what the latest and most reliable science says about the causes and effective treatments for diabetes. It will deal primarily with Type 2 diabetes, the diagnosis for 90 percent of diabetics.

Types of Diabetes

Type 1: The pancreas is unable to produce insulin because the beta cells have been destroyed. The body is then not able to use the glucose (blood sugar) for energy. This form of diabetes is rare, and is sometimes known as juvenile-onset diabetes.
Type 2: The body does not produce enough insulin or resists the action of insulin. This is the most common form of diabetes and is sometimes known as adult-onset diabetes.
Gestational: During pregnancy, a woman may have higher-than-normal blood sugar. After pregnancy, glucose levels return to normal in most cases.
Impaired Glucose Tolerance: A pre-diabetes condition in which blood sugar levels are higher than normal. People with IGT might or might not develop diabetes.

The Diabetes Monitor, http://www.diabetesmonitor.com/DX-class.htm

Risk factors

Obesity

Recent data indicate that, in general, 80 percent of diabetics are overweight or obese (3, 6, 10). In Kentucky, there is a direct correlation between the rising percentage of diabetes in Kentucky between 1995 and 2000 and the rising percentage of Kentuckians who were obese (see Table 1). About 38 percent of Kentuckians are now overweight, which means they are more likely to become obese; 23 percent are obese.

(Based on the standard measure of obesity, the Body Mass Index (BMI), a person who is 5 feet 6 inches tall would be overweight at 155 to 179 pounds, obese from 186 to 241 pounds, and extremely obese at 247-334 pounds.)

Table 1: Rising Rate of Diabetes, Obesity in Kentucky Population

Year	Percent population with diabetes	Percent population overweight	Percent population obese
1995	3.5	35.7	16.9
1996	4.5	35.7	19.2
1997	5.3	34.6	21.8
1998	5.6	37.7	20.4
1999	6.4	36.9	21.7
2000	6.5	38.0	23.0

Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Data, 1995-2000* (includes gestational diabetes).

Age and sedentary lifestyle

Being elderly is a major risk factor for diabetes and often is accompanied by other risk factors such as physical inactivity. Some 64.5 percent of Kentuckians have a sedentary lifestyle, making Kentucky the most physically inactive state in the nation. In addition, Kentucky's population is aging, and the incidence of diabetes increases with age (Table 2).

Paradoxically, a sedentary lifestyle is also a risk factor for the youngest Kentuckians. Type 2 diabetes is on the rise across the nation among children because of physical activity and obesity (1). A major concern is that undiagnosed diabetes or pre-diabetes in children could cause them to develop serious complications, such as blindness or amputation, at an earlier age.

Table 2: Diagnosed Diabetes by Age in Kentucky Population, 2000

Age	Percent with Diabetes
18-44	4.9
45-54	8.7
55-64	12.7
65+	14.1

Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Data, 2000* (includes gestational diabetes).

Complications

While diabetes in itself is potentially disabling, it also contributes to other serious diseases:

■ **Heart disease.** People with diabetes are two to four times more likely to develop cardiovascular disease, especially coronary heart disease (3). Data show that 73 percent of hospital treatment for diabetes is for some form of cardiovascular disease. In addition, 75 percent to 80 percent of diabetics die of cardiovascular disease.

■ **Periodontal disease.** Diabetics have a higher risk of periodontal disease and other mouth problems, particularly if they smoke, and there is mounting evidence that dental disease and decay can affect a person's general health. Kentucky ranks second nationally in the percentage of adults (30.1 percent) who have lost six or more teeth to decay or gum disease.

■ **Diabetes in children of smokers.** Nearly a fourth of Kentucky women smoke during pregnancy (compared to an average of 11.6 women nationally); children of these women are much more likely to develop diabetes. One longitudinal study found that the children of women who smoked 10 or more cigarettes per day during pregnancy were 4 ½ times more likely to develop diabetes (9). Even if the women smoked less, their children were four times more likely to develop the disease.

Preventing diabetes

Some of the most encouraging news about diabetes came recently from a study from the Diabetes Prevention Program (DPP), the first major random clinical trial to demonstrate that intensive lifestyle changes of diet, exercise and weight loss can prevent or delay the onset of Type 2 diabetes (2, 8, 13).

The study involved 3,200 adults who were 25 or older and at increased risk of developing Type 2 diabetes (because of being overweight or obese and/or a family history of the disease).

Participants reduced their risk of getting diabetes by more than half (58 percent) by engaging in moderate exercise an average of 30 minutes per day, five days a week, and losing 5 percent to 7 percent of their weight. In addition, participants in another group reduced their risk by 31 percent by taking an oral medication, metformin.

Because of the study's findings, the Centers for Disease Control developed recommendations for how to use the findings to help people at risk of diabetes (14). Those most relevant to rural populations include:

- Determining who is at high risk for diabetes and delivering interventions to them in the most efficient and cost-effective way;
- Identifying community programs that have culturally relevant ways to reach people with messages of hope and support for lifestyle modifications that are consistent with community strengths and values; and
- Adding primary prevention activities to programs that currently serve people with diabetes

Treating diabetes

In a recent study two researchers reported that diabetics' health improved most when they completely adhered to their treatment plan. And better educated people were more likely to adhere to their plan (5).

However, the researchers also found that diabetics with less education could do as well as those with more education with the help of a rigid treatment plan and intensive patient monitoring.

Other research has shown that people with poor health literacy skills have a hard time conceptualizing the risk of unhealthy behaviors and that this is especially significant in regard to chronic diseases such as Type 2 diabetes (12). They also may have trouble reading labels on pill bottles, interpreting blood sugar levels and comprehending written and verbally communicated health information.

These findings are particularly relevant in Kentucky's rural communities. Often there are higher rates of elderly and less educated people in rural areas, and these people are more likely to have poor literacy skills (7).

Research-based solutions

Prevention

Identifying people who are at risk for developing diabetes is more critical now that it appears it can be prevented or delayed. "If we don't identify pre-diabetes and stop the

development of Type 2 diabetes, the health-care system is going to be completely overwhelmed," says Dr. Frank Vinicor, diabetes program director for the federal Centers for Disease Control (3). Effective options include:

■ Community and media campaigns to educate people about symptoms and risk factors so they'll be motivated to seek testing by a physician as soon as possible; and

■ School-based efforts to educate students and their parents about Type 2 diabetes among children and adolescents, as well as efforts to increase students' physical activities and nutritional education.

Treatment

The Centers for Disease Control Task Force on Community Preventive Services recommends disease and case management for diabetics as well as education about how to manage their illness (14). Where they get this education is also important. The Task Force concluded:

■ That community settings (such as community centers, libraries, religious institutions and other private facilities) may be more effective than a doctor's office or other clinical setting; and

■ That there are advantages of education in the home – the environment where disease management takes place. Home is considered the best place for addressing cultural concerns and educating people with disabilities who may have trouble participating in clinical settings.

What's happening now

There are ongoing efforts in Kentucky to educate the public and health professionals about the risk factors for diabetes as well as how to manage it. Among them:

■ The University of Kentucky Center for Rural Health, the Kentucky Diabetes Control Network and state and regional associations of Certified Diabetes Educators are cooperating to do research into diabetes education. These efforts are strongly encouraged by the federal Centers for Disease Control, which helps fund diabetes control programs around the country. One initiative has been to disseminate the latest scientific findings about diabetes prevention and control to health professionals, health care decision-makers and people at risk.

■ There are 150 Certified Diabetes Educators (CDEs) in Kentucky whose role is to organize and conduct self-management education. Rural Kentucky needs many more CDEs, however – 64 of the 150 are in two urban counties, and 76 of Kentucky's rural counties don't have a CDE at all (some CDEs cover more than one county).

■ The University of Kentucky Center for Rural Health sponsors two highly successful lay worker health programs, Kentucky Homeplace and the Southeast Kentucky Community Action Program (SKYCAP). The programs send lay workers into the homes of people with health problems to help them make whatever medical or life-style changes they need; SKYCAP specifically concentrates on helping health providers and patients with case management. Homeplace and SKYCAP have become national models for how to help people better manage chronic illnesses such as diabetes, but they serve, between them, only about a third of Kentucky's counties.

Recommendations for Kentucky

Kentucky has already set ambitious goals for reducing diabetes, adopting the goals of Healthy People 2010, which include:

- Increasing from 40% to 60% the proportion of diabetics who get formal self-management education. (KY = 46% in 2000.)
- Reducing lower-extremity amputations caused by diabetes by 50 percent. (This means reducing from an average of 1,000 per year to 500 per year for Kentucky.)
- Increasing the proportion of diabetics from 56% to 75% who have an annual eye exam. (KY = 72% in 2000.)
- Increasing proportion of diabetics from 55% to 75% ≥ 1 foot exam per year. (KY = 59% in 2000)
- Increasing the proportion of diabetics from 42% to 60% who perform blood glucose monitoring ≥ 1 time each day. (KY = 54% in 2000.)

To achieve these goals, the state must move aggressively and quickly. Options include:

- Increasing the number of the state's Certified Diabetes Educators by encouraging health-care employers to pay the approximately $1,500 needed for an employee to become a CDE.
- Implementing more lay worker programs or expanding those that already exist in counties that need them based on their number of high-risk patients. Such programs help low-income and less educated patients through culturally appropriate care and monitoring of their adherence to self-management plans.
- Taking these actions will help develop a more effective network of community-based diabetes self-management education (4, 11, 14) and health care interventions, such as case management, that can help these goals become reality, which will improve the quality of life for many Kentuckians and help the state meet the growing financial burden of diabetes.

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