State of Illinois
Illinois Department of Public Health

The Burden of Diabetes in Illinois

Prevalence, Mortality, and Risk Factors

2012

Illinois Department of PUBLIC HEALTH

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Executive Summary

In 2009, the Robert Wood Johnson Foundation reported that Illinois ranked fourth nationally with 20 percent of children meeting the definition of obesity and or overweight. In Illinois, the number of all ages diagnosed with diabetes has more than doubled, reaching approximately 800,000 in 2011 with an additional 500,000 people who are not aware they have the disease, according to the state's Behavior Risk Factor Surveillance System (BRFSS) data. The 2012 Burden of Diabetes in Illinois report attempts to quantify the impact of this disease by outlining the prevalence, risk factors, costs, mortality, prevention, quality of life, and projected future trends.

Type 1 diabetes (insulin dependent) and type 2 (non-insulin dependent) diabetes are a chronic disease that can harm other body organs and cause kidney failure, blindness, heart attacks and strokes, and amputations. According to the U.S. Centers for Disease Control and Prevention (CDC), diabetes is the seventh leading cause of death in the United States. Approximately, 8.3 percent of the U.S. population, or 25.8 million people (all ages), have diabetes. Of these, approximately 7 million people do not know they have diabetes; making them at risk to develop other health complications due to their unmanaged diabetes.

The prevalence of diabetes increases with age according to the 2010 BRFSS. Of Illinois adults with diabetes, 11.4 percent are between 45-64 years of age; 19.8 percent are 65 years of age or older. The prevalence of diabetes is higher among females than males. Diabetes is more prevalent in certain population sub-groups. In 2010, the prevalence of diagnosed diabetes was higher among non-whites, as compared to whites. Hispanics/Latinos have a higher prevalence than non Hispanics/Latinos. In addition, people with a disability have a higher prevalence of diagnosed diabetes than those without a disability.

The major risk factors for pre-diabetes or developing diabetes include being overweight or obese; physically inactive; unhealthy diet; tobacco use; age; ethnicity; chronic conditions, such as high cholesterol; hypertension; and family history. Approximately 10 percent of Illinois adults over the age of 65 years have prediabetes. The risk for developing prediabetes also is higher for non-whites compared to whites, females compared to males, and non-Hispanics/Latinos compared to Hispanics/Latinos.

Health care disparities include persons with diabetes who are uninsured or underinsured, especially in Illinois rural communities. Diabetes increases the risk for additional chronic diseases. For example, the highest risk is high blood pressure at 71 percent in adults with diabetes versus 23 percent of adults without diabetes and high cholesterol at 61 percent in adults with diabetes versus 36 percent without diabetes. The American Diabetes Association (ADA) estimates medical expenses for people with diabetes are more than two times higher than for people without diabetes. In the United States in 2007, direct medical costs for diabetes were $116 billion, with $58 billion attributed to disability, work loss, and premature mortality. Hospitalization rates in Illinois show that ketoacidosis, which is preventable with blood sugar management, is the single most major complication of both type 1 and type 2 diabetes.

The adult mortality rate for diabetes in 2007 (the most recent available data) was 23.7 per 100,000 compared to the U.S. rate of 22.2 per 100,000. African Americans with diabetes have the highest mortality rate for both females (33.2 per 100,000) and males (30.2 per 100,000), according to the Illinois Department of Public Health's Center for Health Statistics. Death rates also vary by sex and race.

It is estimated that by 2020 the number of adults with diabetes will increase 43 percent nationally and 25 percent for Illinois. These projections emphasize the importance of access to medical care, developing a healthy lifestyle, and the importance of self-management of diabetes and other chronic diseases. Many complications of diabetes can be prevented or delayed by controlling blood glucose, blood pressure, and high cholesterol through lifestyle changes.

Introduction

In Illinois, according to the Illinois Behavior Risk Factor Surveillance System (BRFSS) data, over the past 20 years, the number of people with diagnosed diabetes has more than doubled to approximately 800,000 in 2011 and an additional 500,000 people who are not aware that they have the disease. Diabetes is the seventh leading cause of death in the United States. The U.S. Centers for Disease Control and Prevention (CDC) estimates that 8.3 percent of the U.S. population or 25.8 million people (all ages) have diabetes. Of these approximately 7 million people do not know they have diabetes; making them at risk to develop other health complications due to their unmanaged diabetes.

Diabetes is a chronic, progressive condition. The term diabetes refers either to a deficiency of insulin or to the body's decreased ability to use insulin. Insulin, a hormone secreted by the pancreas, allows glucose (sugar) to enter body cells and be converted to energy. Insulin also is needed to synthesize protein and to store fats. In uncontrolled diabetes, glucose and lipids (fats) remain in the bloodstream and, in time, damage the body's vital organs and contribute to heart disease, stroke, vision loss, kidney disease and nerve damage.

Diabetes complications are preventable. The American Diabetes Association (ADA) estimates that medical expenses for people with diabetes are more than two times higher than for people without diabetes. ADA estimated that the total direct and indirect costs of diabetes in the United States in 2007 was approximately $174 billion; of which $116 billion was the direct medical expenditures and $58 billion was attributable to disability, work loss and premature mortality. In Illinois, the cost of diabetes in 2006 was an estimated $7.3 billion, which includes excess medical costs of $4.8 billion attributed to diabetes, and lost productivity valued at $2.5 billion.

Types of Diabetes

Type 1 Diabetes

Type 1 diabetes is sometimes called insulin-dependent, immune-mediated, or juvenile-onset diabetes and accounts for 10 percent of diabetes cases. It is caused by an autoimmune reaction where the body's defense system attacks the insulin-producing cells. People with type 1 diabetes produce very little or no insulin. The disease can affect people of any age, but usually occurs in children or young adults. People with this form of diabetes need injections of insulin every day in order to control their blood glucose levels.

Type 2 Diabetes

Type 2 diabetes accounts for at least 90 percent of diabetes cases. Type 2 diabetes is called non-insulin dependent diabetes or adult-onset diabetes and is characterized by insulin resistance and relative insulin deficiency. The diagnosis of type 2 diabetes usually occurs after the age of 40, but can occur earlier, especially in populations with high diabetes prevalence. Type 2 diabetes can remain undetected for many years and the diagnosis is often made from associated complications or incidentally through an abnormal blood or urine glucose test. It is often, but not always, associated with obesity, which itself can cause insulin resistance and lead to elevated blood glucose levels. Type 2 diabetes is preventable by managing risk factors. Thirty minutes of moderate physical activity five-days-a-week and eating a variety of foods that are low in fat along with reducing the amount of calorie intake each day are recommended by the CDC and the American Diabetes Association.

Gestational Diabetes

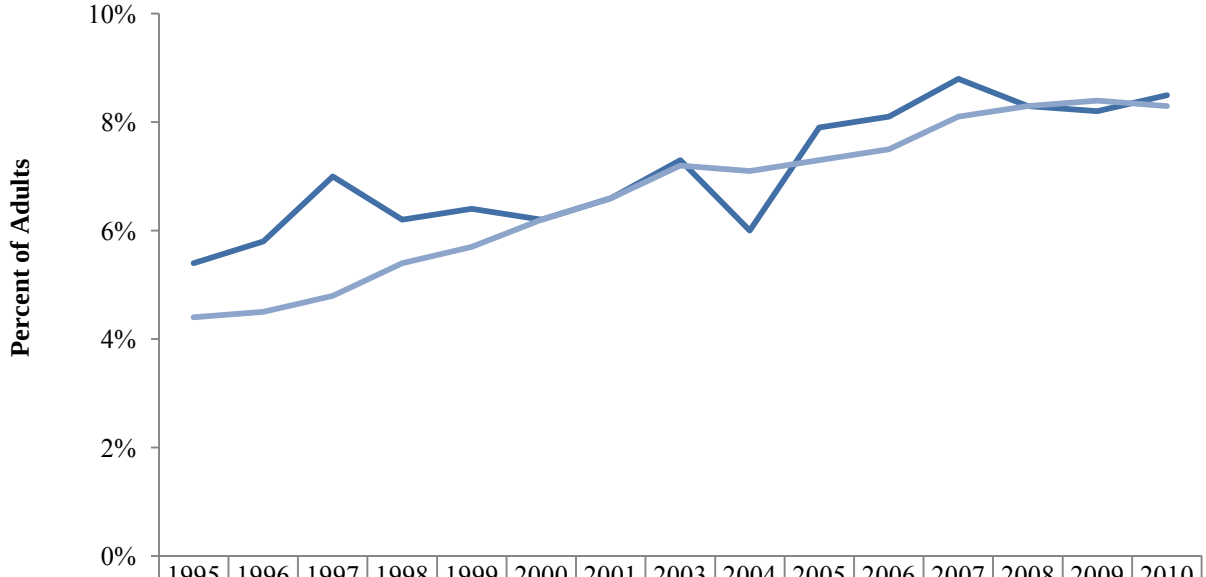
Gestational diabetes mellitus (GDM) is a form of diabetes consisting of high blood glucose levels during pregnancy. GDM affects the mother in late pregnancy, after the baby's body has been formed, but while the baby is busy growing. One in 25 pregnancies develops GDM, which usually disappears after pregnancy. Untreated or poorly controlled GDM can have a negative impact on the baby and lead to Macrosomia, also known as big baby syndrome. Macrosomia is defined as a fetus or infant that weighs more than 4,000 grams (8 lb 13 oz) to 4,500 grams (9 lb 15 oz) regardless of gestational age. Women with GDM and their offspring are at an increased

risk of developing type 2 diabetes later in life. Approximately half of women with a history of GDM develop type 2 diabetes within five to 10 years after delivery.

Prevalence of Diabetes in Illinois

The percentage of adult Illinoisans with diagnosed diabetes rose from 5.4 percent in 1995 to 8.5 percent in 2010, an increase of nearly 60 percent in the last 15 years. Nationwide the diabetes prevalence has nearly doubled during the same time period from 4.4 percent to 8.3 percent. An additional 464,520 Illinois adults (5.2%) have been told they have pre-diabetes.

Figure 1: Diabetes Prevalence in Adults, Illinois and the United States, 1995-2010



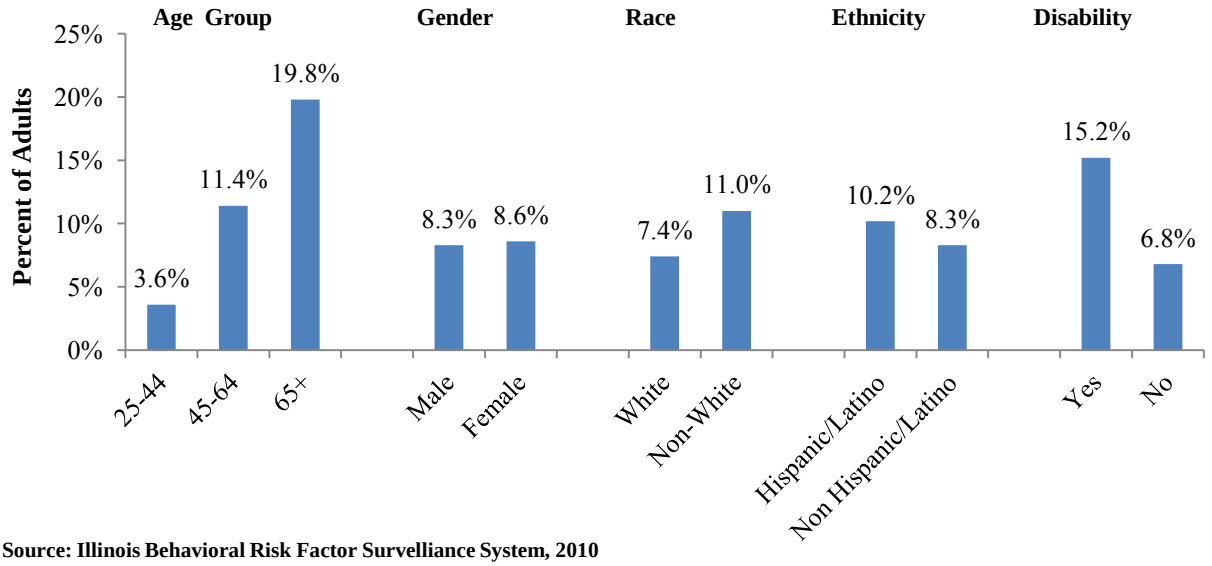
	1995	1996	1997	1998	1999	2000	2001	2003	2004	2005	2006	2007	2008	2009	2010
Illinois	5.4%	5.8%	7.0%	6.2%	6.4%	6.2%	6.6%	7.3%	6.0%	7.9%	8.1%	8.8%	8.3%	8.2%	8.5%
United States	4.4%	4.5%	4.8%	5.4%	5.7%	6.2%	6.6%	7.2%	7.1%	7.3%	7.5%	8.1%	8.3%	8.4%	8.3%

Source: Behavioral Risk Factor Surveillance System, 1995-2010

Prevalence by Demographics

The prevalence of diabetes increases with age. Of Illinois adults with diabetes, 11.4 percent are between 45-64 years of age and 19.8 percent are 65 years of age or older. The prevalence of diabetes is higher among females (8.6%) than males (8.3%). Diabetes is more prevalent in certain population sub-groups. In 2010, the prevalence of diagnosed diabetes was higher among non-whites (11.0%), as compared to whites (7.4%). Hispanics/Latinos (10.2%) also had higher prevalence than non Hispanics/Latinos (8.3%). People with a disability have a higher prevalence of diagnosed diabetes than those without a disability (15.2% vs 6.8%, respectively).

Figure 2: Percentage of Adults with Diabetes by Demographics, Illinois, 2010

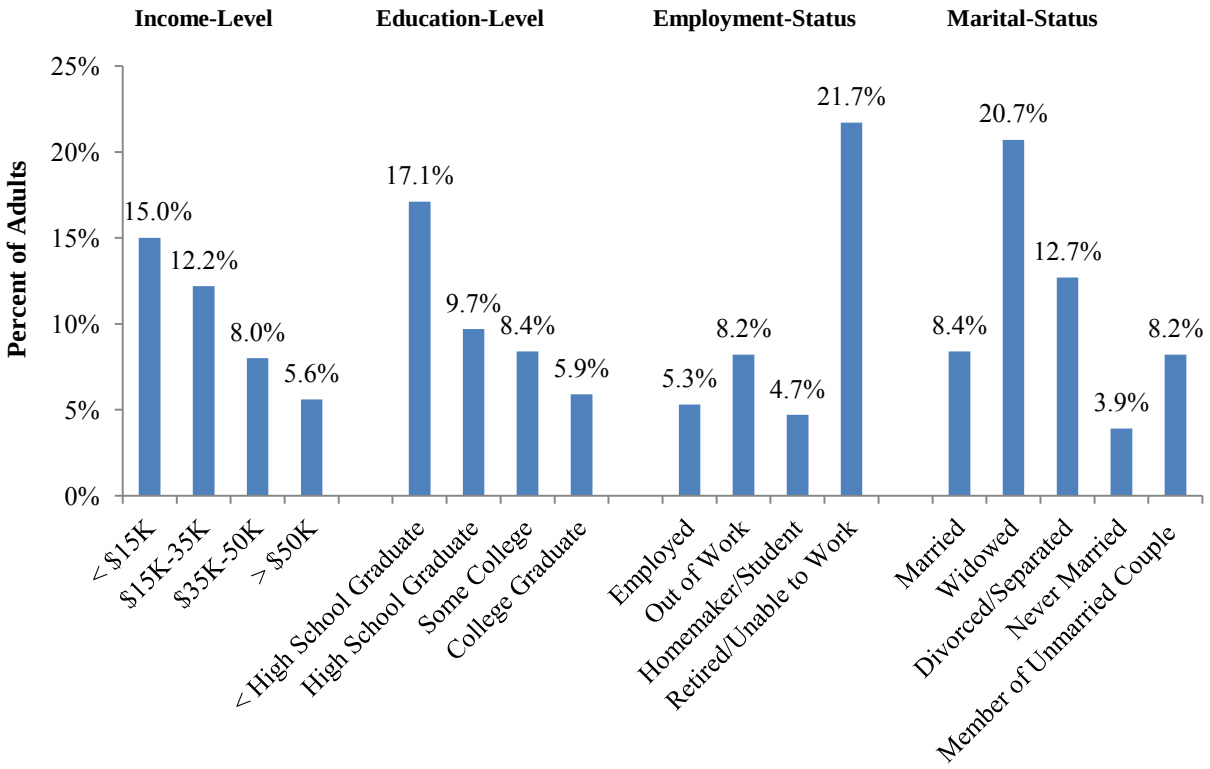


Source: Illinois Behavioral Risk Factor Survelliance System, 2010

Prevalence by Socioeconomic Status and Other Status

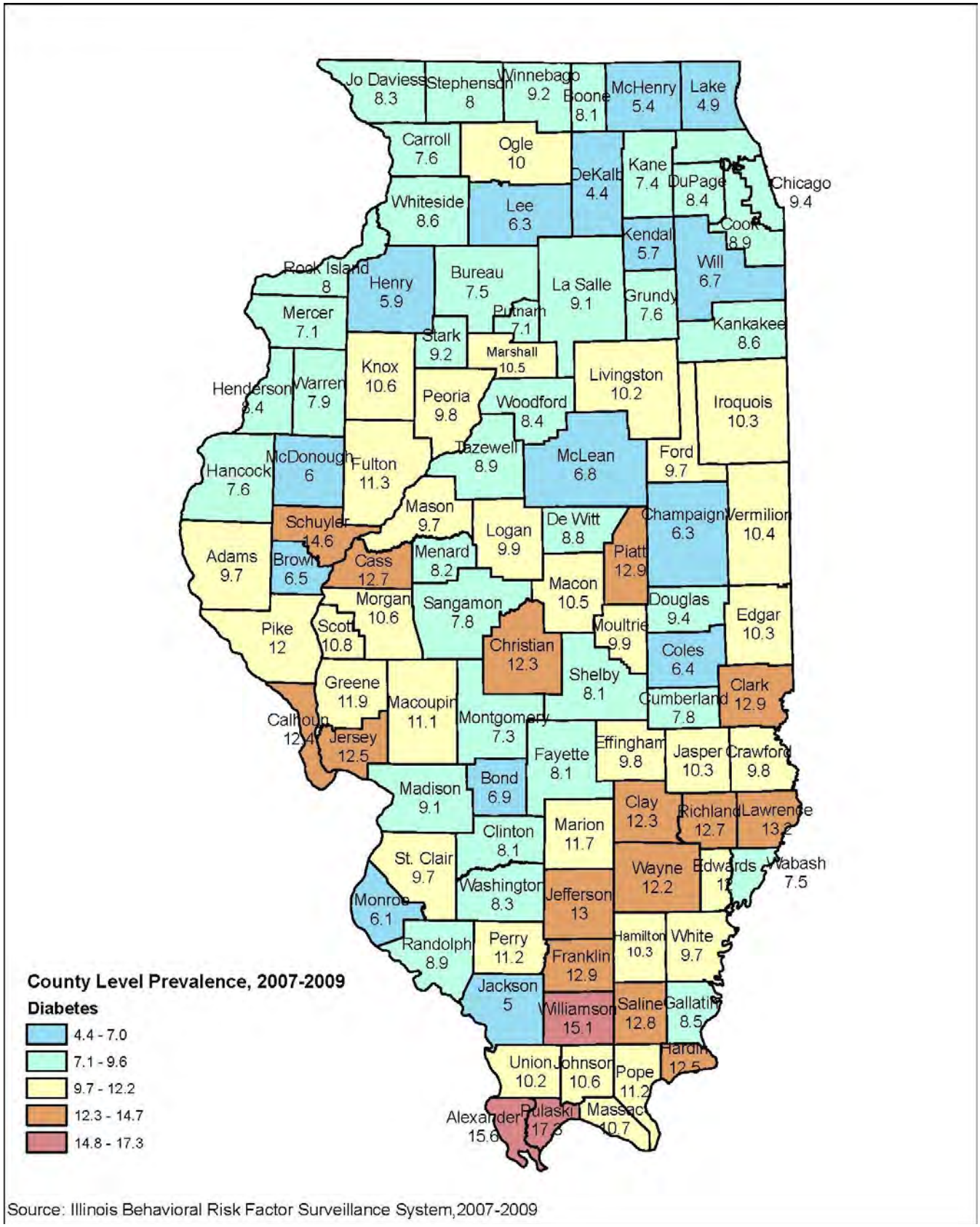
The prevalence of diabetes also is associated with socioeconomic factors, such as income and education. Of Illinois adults with household income less than $15,000, 15 percent have diabetes compared to 5.6 percent who have an income higher than $50,000. The prevalence of diabetes is higher for adult Illinoisans with less than a high school degree (17.1%) compared to those who have graduated from college (5.9%). More retired adults have diabetes (21.7%) compared to those who are employed (5.3%). The prevalence is highest for widowed adults (20.7%) compared to the ones who are married (8.4%).

Figure 3: Percentage of Adults with Diabetes by Socioeconomic Status and Other Status, Illinois, 2010



Source: Illinois Behavior Risk Factor Survelliance System, 2010

Figure 4: Percentage of Illinois Adults with Diabetes by County, Illinois, 2007-2009



Source: Illinois Behavioral Risk Factor Surveillance System, 2007-2009

Diabetes in Children

SEARCH for Diabetes in Youth is a multicenter study funded by CDC and the National Institutes of Health to examine diabetes (type 1 and type 2) among children and adolescents in the United States. SEARCH findings for 2002-2005 (the most recent data available) include:

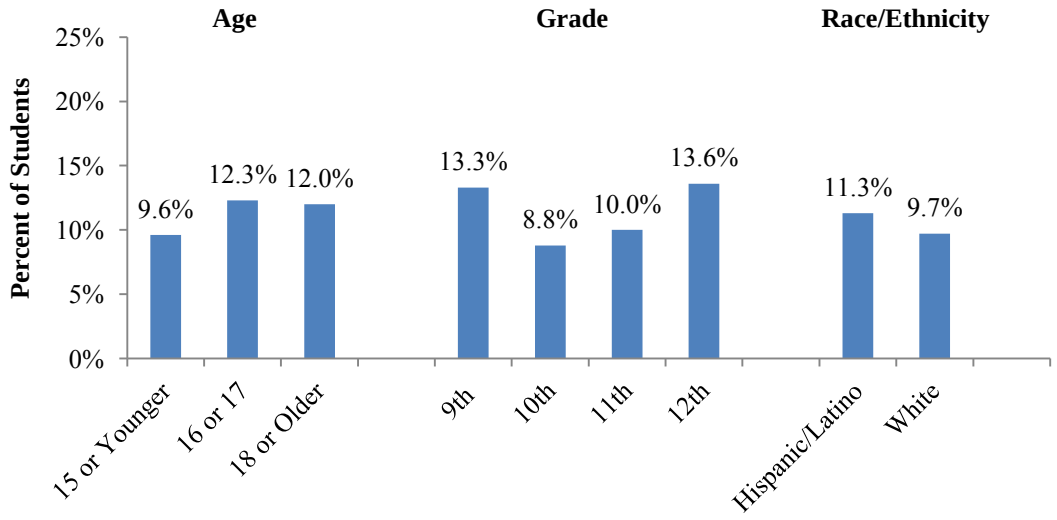
- Among youth aged 10 years or older, the rate of new cases was 18.6 per 100,000 each year for type 1 diabetes and 8.5 per 100,000 for type 2 diabetes.
- Non-Hispanic white youth had the highest rate of new cases of type 1 diabetes (24.8 per 100,000 per year among those younger than 10 years and 22.6 per 100,000 per year among those aged 10 to19 years). Among non-Hispanic white youth aged 10 to 19 years, the rate of new cases was higher for type 1 than for type 2 diabetes.
- For Asian/Pacific Islander and American Indian youth aged 10 to 19 years, the rate of new cases was greater for type 2 than for type 1 diabetes. Among non-Hispanic black and Hispanic youth aged 10 to 19 years, the rates of new cases of type 1 and type 2 diabetes were similar.

Weight Status of Children

In Illinois, there has been an unprecedented growth in the weight of the children in recent years. Illinois currently ranks fourth in the U.S. with 20 percent of the state's children meeting the definition for obese, defined as having a Body Mass Index (BMI) above 95 percent, according to the Robert Wood Johnson Foundation: Obesity 2009 report. Only Mississippi, Georgia and Kentucky have higher rates of childhood obesity.

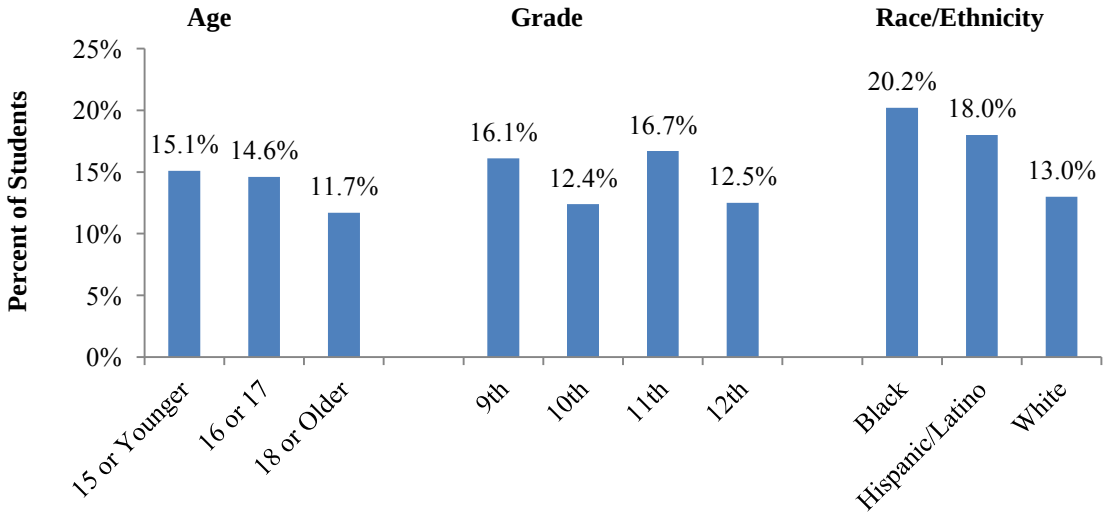
According to the Illinois 2009 Youth Risk Behavior Survey (YRBS), 35 percent of Illinois children are overweight or obese. Black students have the highest rates of obesity (20.5%) and overweight (20.2%). More obese students are found in 12th grade (13.6%) than in lower grades, while the greatest percent of overweight children (16.1%) are in 11th grade. The greatest percentage of students that are overweight are those that are age 15 or younger (15.1%). This same group also has the smallest percentage of students that are obese (9.6%).

Figure 5: Percentage of Illinois School Students Who Are Obese, Illinois, 2009



Source: Illinois Youth Risk Behavior Survey, 2009

Figure 6: Percentage of Illinois School Students Who Are Overweight, Illinois, 2009

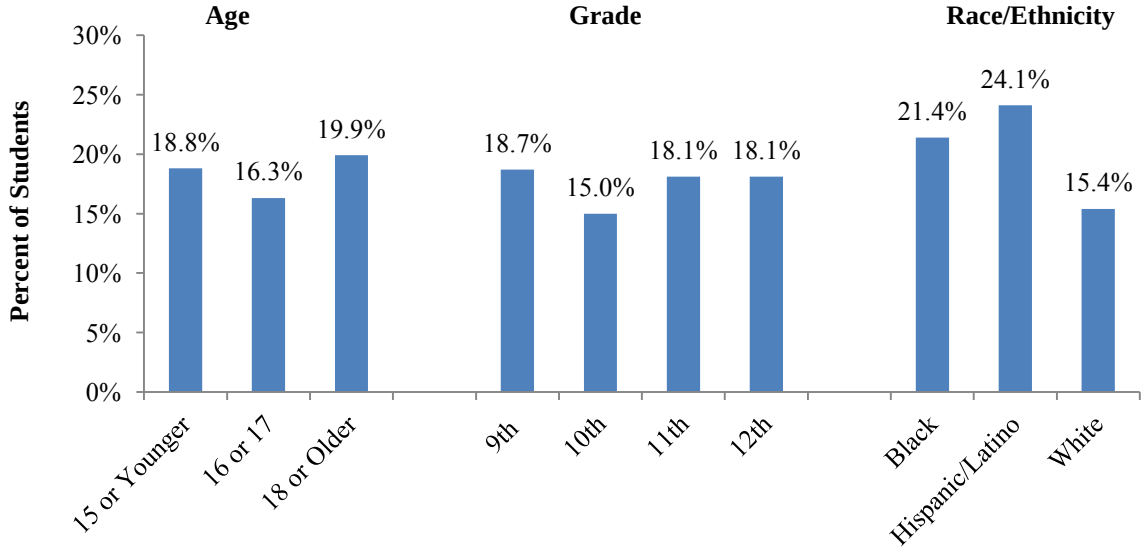


Source: Illinois Youth Risk Behavior Survey, 2009

Nutrition and Physical Activity Status of Children

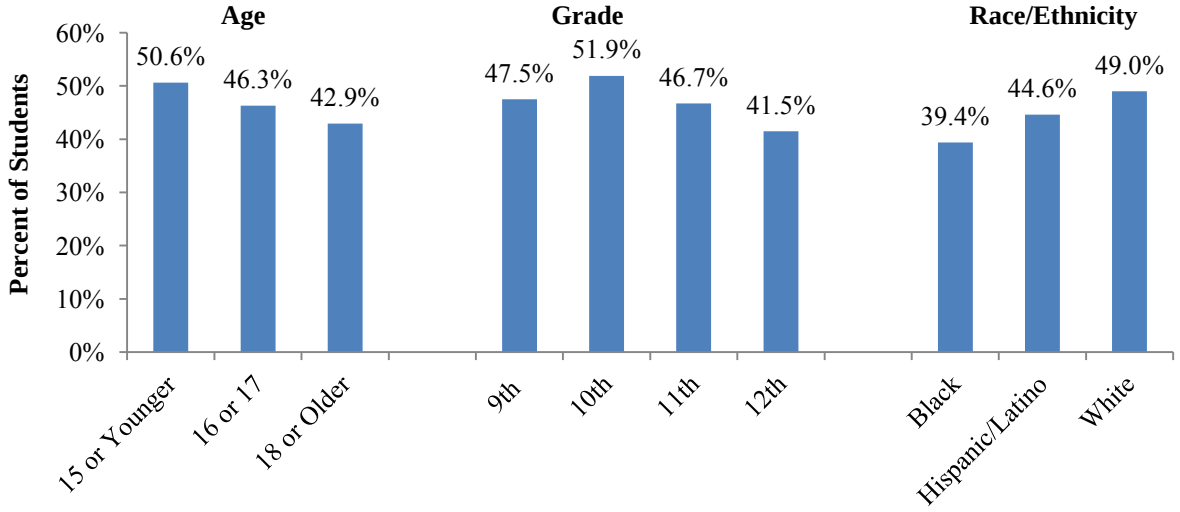
About 17.7 percent of Illinois middle and high school students ate fruits and vegetables five or more times per day during the past seven days and 47.2 percent engaged in some form of physical activity for more than 60 minutes per day during the last seven days.

Figure 7: Percentage of Illinois School Students Who Ate Fruits and Vegetables Five or More Times in the Past Seven Days, Illinois, 2009



Illinois Youth Risk Behavior Survey, 2009

Figure 8: Percentage of Students Who Were Physically Active for a Total of at Least 60 Minutes per Day on Five or More of the Past Seven Days, Illinois, 2009

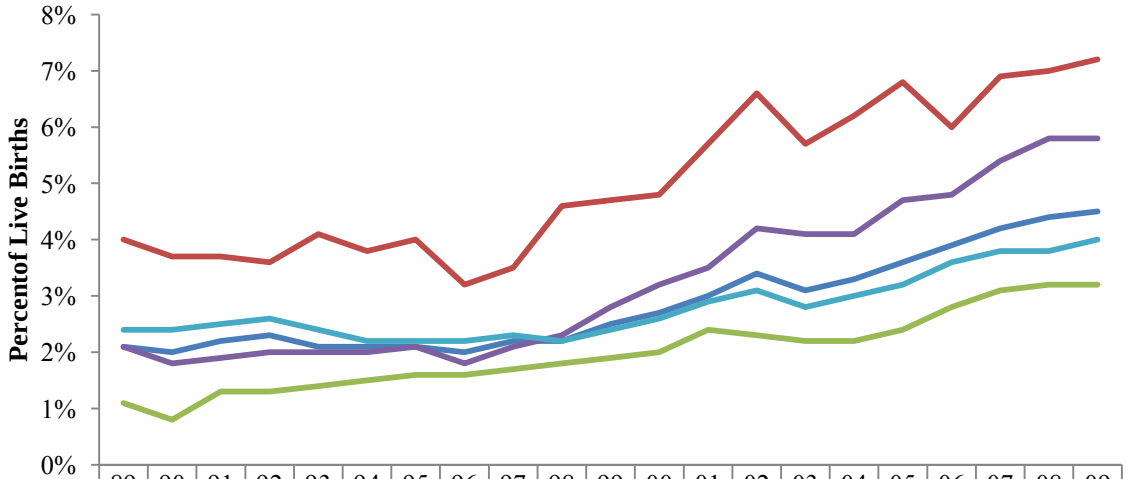


Source: Illinois Youth Risk Behavior Survey, 2009

Gestational Diabetes

The rate of gestational diabetes in Illinois has increased from 2.1 percent in 1989 to 4.5 percent in 2009, according to birth certificate data from the Illinois Adverse Pregnancy Outcomes Reporting System, doubling over this 20 year time period. Gestational diabetes is more common among groups with a higher prevalence of diabetes overall. The prevalence rates, over this time period, were highest for Asians and Hispanics with each population group showing an increase of 80 percent and 176 percent respectively.

Figure 9: Percentage of Live Births with Diabetic Mothers by Race and Ethnicity, Illinois, 1989-2009



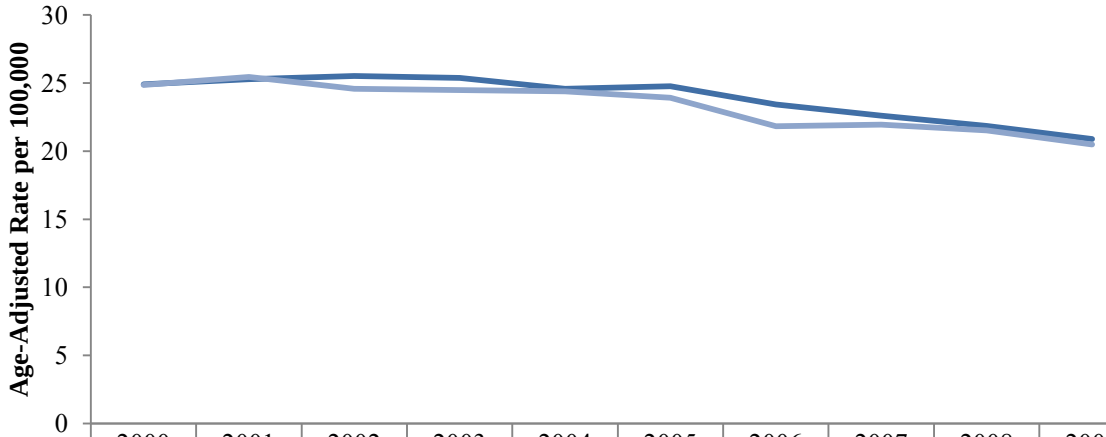
	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09
All	2.1	2.0	2.2	2.3	2.1	2.1	2.1	2.0	2.2	2.2	2.5	2.7	3.0	3.4	3.1	3.3	3.6	3.9	4.2	4.4	4.5
Asian	4.0	3.7	3.7	3.6	4.1	3.8	4.0	3.2	3.5	4.6	4.7	4.8	5.7	6.6	5.7	6.2	6.8	6.0	6.9	7.0	7.2
Black	1.1	0.8	1.3	1.3	1.4	1.5	1.6	1.6	1.7	1.8	1.9	2.0	2.4	2.3	2.2	2.2	2.4	2.8	3.1	3.2	3.2
Hispanic	2.1	1.8	1.9	2.0	2.0	2.0	2.1	1.8	2.1	2.3	2.8	3.2	3.5	4.2	4.1	4.1	4.7	4.8	5.4	5.8	5.8
White	2.4	2.4	2.5	2.6	2.4	2.2	2.2	2.2	2.3	2.2	2.4	2.6	2.9	3.1	2.8	3.0	3.2	3.6	3.8	3.8	4.0

Source: Adverse Pregnancy Outcomes Reporting System, Division of Epidemiological Studies, 1989-2009

Diabetes Mortality

In 2009, the diabetes mortality rate was 20.5 per 100,000 for Illinois compared to the national rate of 20.9 per 100,000, according to the National Center for Health Statistics. In the ten year time period, 2000-2009, diabetes was the 5th leading cause of death and responsible for almost 3 percent of all deaths in Illinois and the U.S. Over this same time period, diabetes mortality rates significantly decreased in Illinois (2.3 percent) and nationally (2.1 percent).

Figure 10: Age-Adjusted Diabetes Mortality Rate per 100,000, Illinois and United States, 2000-2009

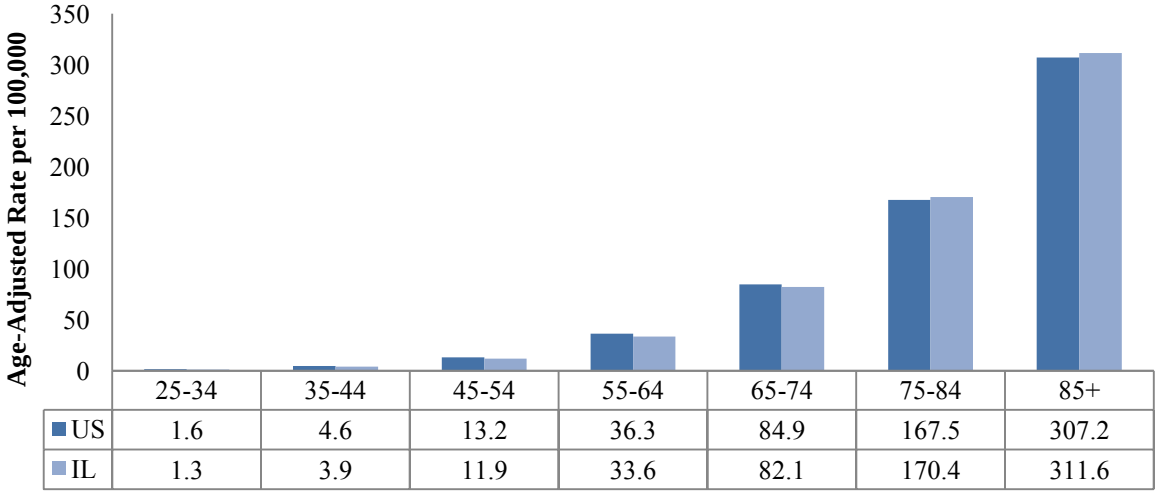


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
US	24.9	25.3	25.5	25.4	24.6	24.8	23.4	22.6	21.9	20.9
Illinois	24.9	25.5	24.6	24.5	24.4	23.9	21.8	22.0	21.5	20.5

Source: National Center for Health Statistics, Data Release April 2012

Diabetes mortality rates increase with age. The National Center for Health Statistics data indicates adults over the age of 85 years have the highest mortality rate for diabetes in Illinois (311.6 per 100,000) and the U.S. (307.2 per 100,000). The number of diabetes deaths for the 75-84 age group was higher for Illinois (170.4 per 100,000) compared to the U.S. (167.5 per 100,000). Diabetes mortality for all other age groups in Illinois was lower compared to the U.S.

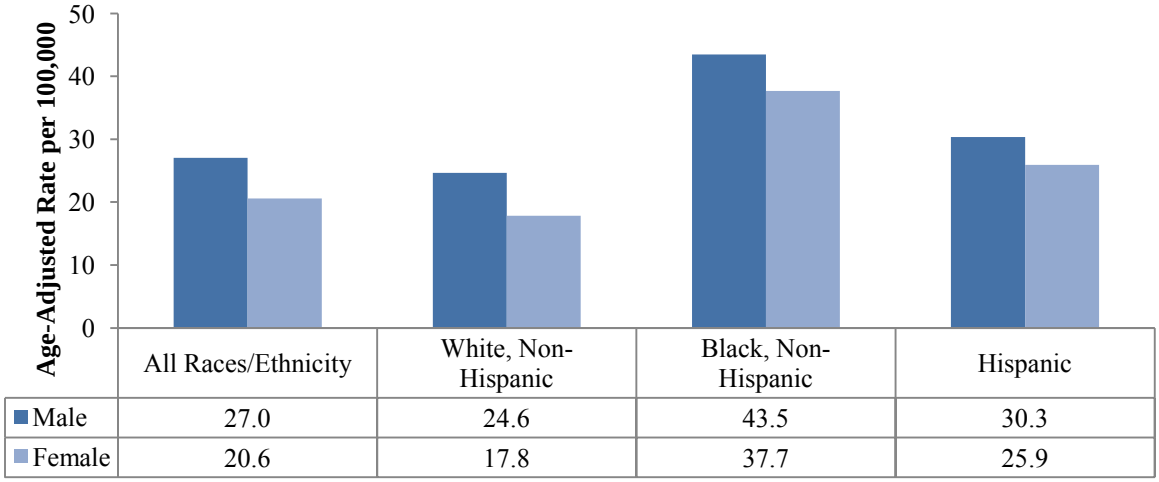
Figure 11: Age-Adjusted Diabetes Mortality Rate per 100,000 by Age, Illinois and United States, 2000-2009



Source: National Center for Health Statistics, Data Release April 2012

Diabetes mortality rates also vary by sex and race/ethnicity. Males (27.0 per 100,000) have a higher mortality rate than females (20.6 per 100,000). By race/ethnicity, black, non-Hispanics have the highest mortality rate for both males (43.5 per 100,000) and females (37.7 per 100,000). This is followed by Hispanic males (30.3 per 100,000) and females (25.9 per 100,000) and white, non-Hispanic males (24.6 per 100,000) and females (17.8 per 100,000).

Figure 12: Age-Adjusted Diabetes Mortality Rate per 100,000 by Sex and Race/Ethnicity, Illinois, 2000-2009



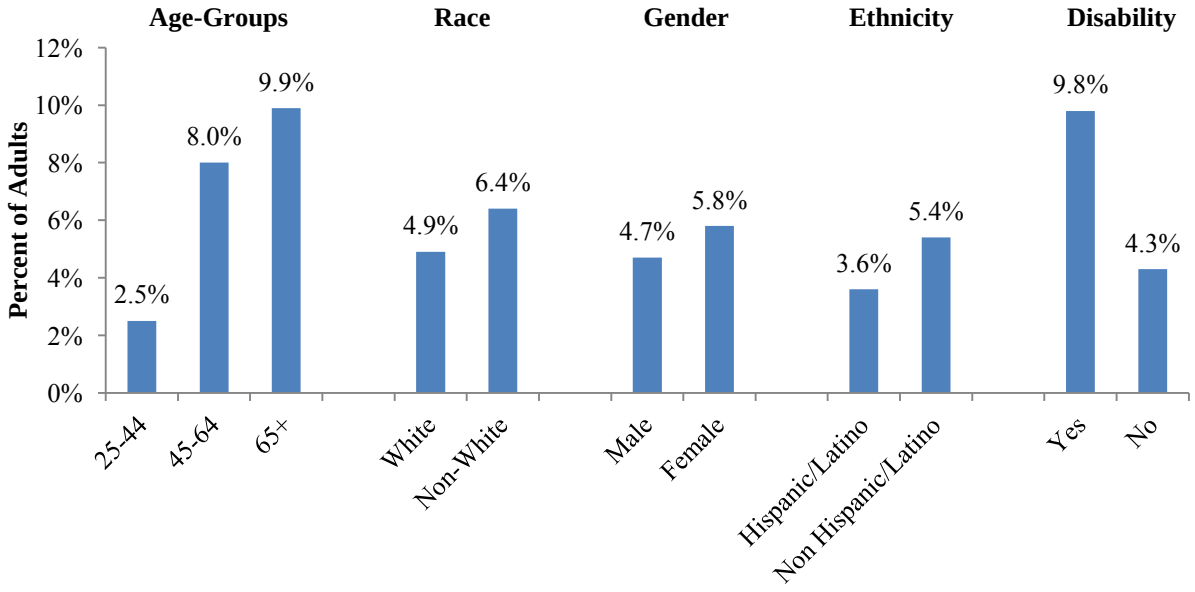
Source: National Center for Health Statistics, Data Release April 2012

Risk Factors for Diabetes

Prediabetes

People with impaired glucose tolerance (IGT) and/or impaired fasting glucose (IFG) are known as prediabetic and have an increased risk of developing diabetes. People with prediabetes have glucose levels that are higher than normal but not high enough to indicate diabetes. Most people with prediabetes are at a high risk of developing type 2 diabetes, heart diseases, and stroke. About 79 million American adults aged 20 years and above had prediabetes in 2010. According to the 2010 BRFSS, prediabetes increases with age and approximately about 10 percent of Illinois adults over the age of 65 years have prediabetes. The risk for developing prediabetes also is higher for non-whites (6.4%) compared to whites (4.9%), females (5.8%) compared to males (4.7%), and non-Hispanics/Latinos (5.4%) compared to Hispanics/Latinos (3.6%). About 9.8 percent of adults with a disability have prediabetes.

Figure 13: Percentage of Adults with Prediabetes by Demographics, Illinois, 2010

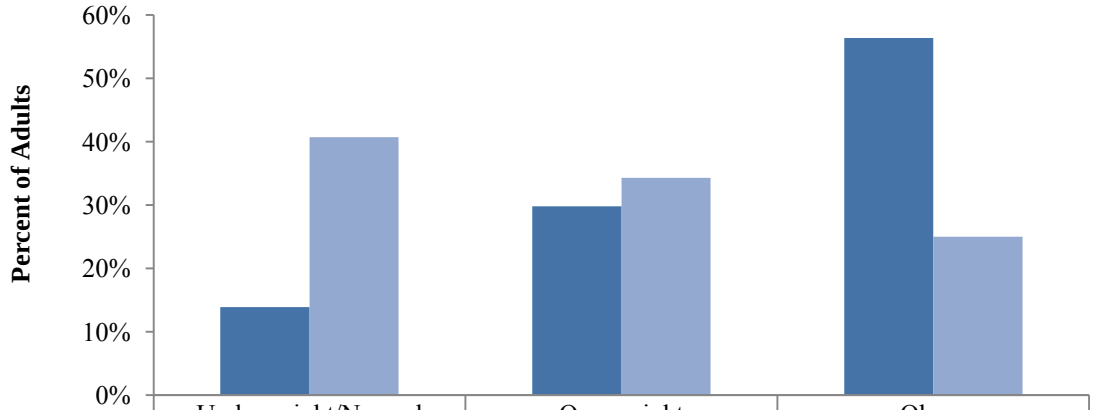


Source: Illinois Behavioral Risk Factor Survelliance System, 2010

Weight Status

People who are obese and/or do not exercise regularly are at an increased risk of developing diabetes. Comparing Illinois adults with and without diabetes among the BRFSS respondents, the obesity rate among adults with diabetes (56%) is higher than among adults without diabetes (25.5%). The overweight status is similar for adults with diabetes (30%) and without diabetes (34%). A smaller percentage of adults with diabetes are categorized as underweight or normal weight (14%) compared to adults without diabetes (41%).

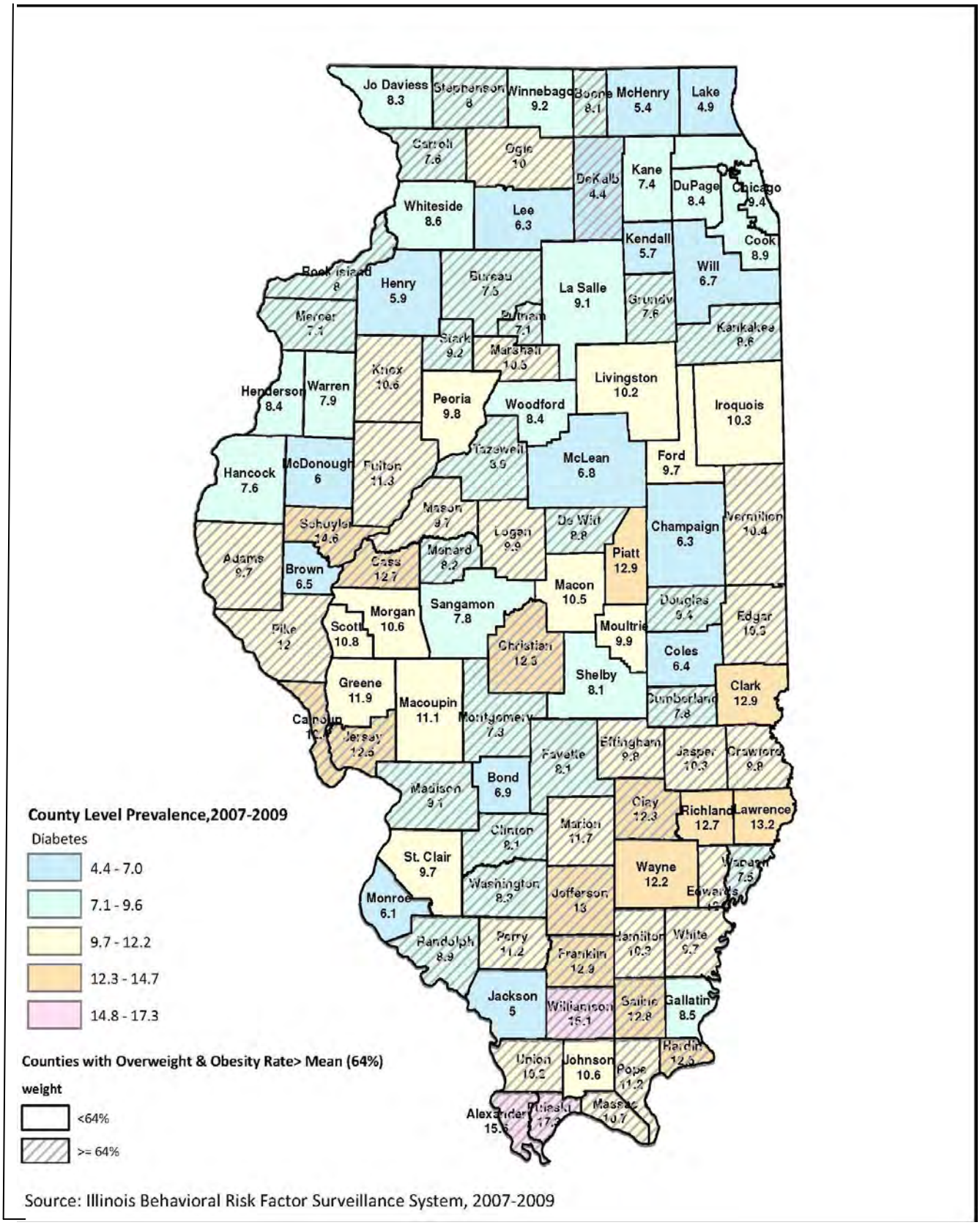
Figure 14: Weight Status of Adults With and Without Diabetes, Illinois, 2010



	Underweight/Normal	Overweight	Obese
Adults with diabetes	14%	30%	56%
Adults without diabetes	41%	34%	25%

Source: Illinois Behavioral Risk Factor Surveillance System, 2010

Figure 15: Percentage of Illinois Adults with Diabetes with Overweight and Obesity Status by County, Illinois, 2007-2009

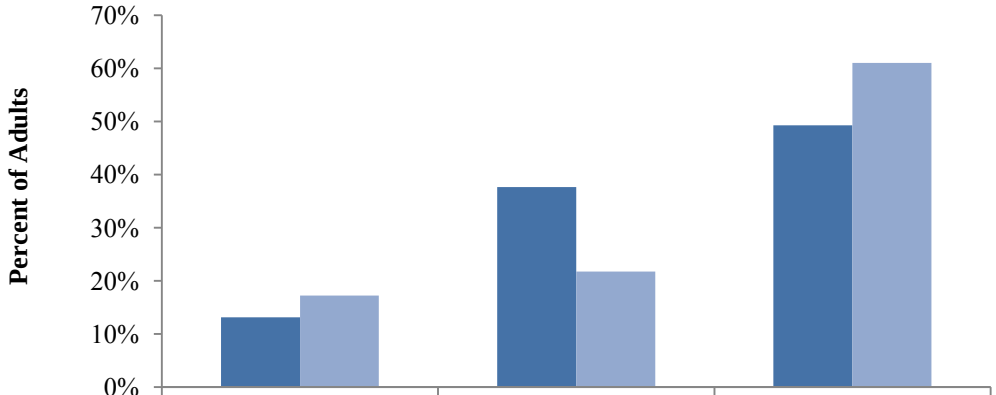


Source: Illinois Behavioral Risk Factor Surveillance System, 2007-2009

Tobacco Use

Tobacco usage increases the risk for developing diabetes, as it increases blood sugar levels that lead to insulin resistance and consequently diabetes. According to 2010 BRFSS data, 13 percent of Illinois adults with diabetes are current smokers and 38 percent are former smokers. The percentage of adults with diabetes who have never smoked (49%) are less than adults without diabetes (61%) who have never smoked.

Figure 16: Smoking Status of Adults With and Without Diabetes, Illinois, 2010



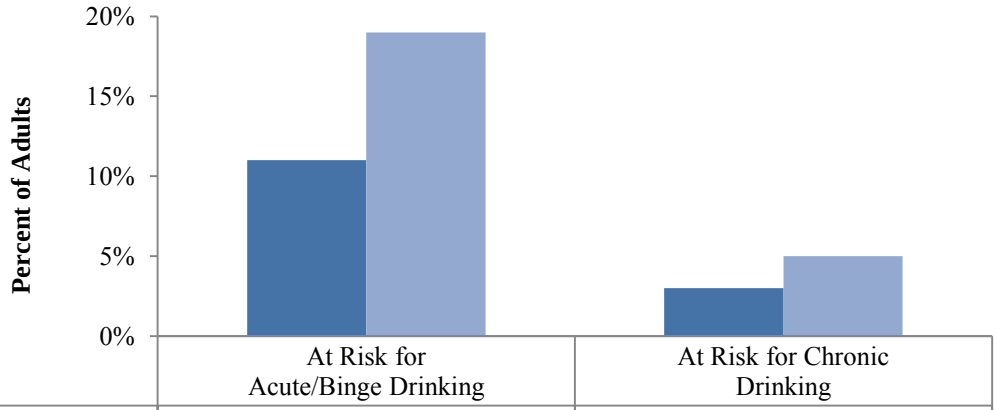
	Smoker	Former Smoker	Non-Smoker
Adults with diabetes	13%	38%	49%
Adults without diabetes	17%	22%	61%

Source: Illinois Behavioral Risk Factor Surveillance System, 2010

Alcohol Consumption

Chronic alcohol use causes chronic inflammation of the pancreas (pancreatitis), which impairs its ability to secrete insulin, resulting in diabetes. A lower percentage of Illinois adults with diabetes report acute/binge drinking (11%) when compared to adults without diabetes (19%).

Figure 17: Alcohol Consumption Status of Adults With and Without Diabetes, Illinois, 2010



	At Risk for Acute/Binge Drinking	At Risk for Chronic Drinking
Adults with diabetes	11%	3%
Adults without diabetes	19%	5%

Source: Illinois Behavioral Risk Factor Surveillance System, 2010

Other Chronic Conditions

People with high triglycerides, high blood pressure and high cholesterol are at an increased risk for developing diabetes. According to the 2010 Illinois BRFFS survey, adults with diabetes had a higher percentage of high blood pressure (71%) and high cholesterol (61%) compared to adults without diabetes. Similarly, there were relatively higher percentages of adults with diabetes who had a heart attack (14%), had chronic obstructive pulmonary disease-COPD (8%), and had a stroke (10%) compared to the adults without diabetes. A higher percentage of adults with diabetes had arthritis (47%) compared to adults without diabetes. Adults with diabetes also had marginally higher chances of having asthma (13%) and cancer (15%), when compared to adults without diabetes.

Table 1: Other Chronic Conditions of Adults With and Without Diabetes, Illinois, 2010

Chronic Conditions	Adults with Diabetes	Adults without Diabetes
Have High Blood Pressure	71%	23%
Have High Cholesterol	61%	36%
Have Chronic Obstructive Pulmonary Disease (COPD)	8%	4%
Had Heart Attack	14%	3%
Had Stroke	10%	2%
Currently have Asthma	13%	9%
Have Arthritis	47%	24%
Have Cancer	15%	7%

Source: Illinois Behavioral Risk Factor Surveillance System, 2010

Complications from Diabetes

Diabetes increases the risk for many serious health problems. Too much glucose in the blood can lead to serious irreversible health problems, including heart disease and damage to the nerves and kidneys. However, through early detection, improved delivery of care, better education, and other lifestyle changes, the onset of these conditions can be delayed. Some of the common complications and health risks of diabetes are highlighted below.

Diabetic Nephropathy/Ketoacidosis (Kidney Damage)

Diabetes can damage the blood vessels in the kidneys so they can no longer filter out waste. This damage is called diabetic nephropathy. Diabetes is the most common cause of kidney failure, accounting for nearly 44 percent of new cases. Nearly 26 million people in the United States have type 2 diabetes and nearly 180,000 people are living with kidney failure as a result of diabetes. People with kidney failure must undergo dialysis, an artificial blood-cleaning process, or transplantation to receive a healthy kidney from a donor. In 2005, care for patients with kidney failure cost the United States nearly $32 billion.

Diabetic Neuropathy (Nerve Damage)

Diabetic neuropathies are a family of nerve disorders caused by diabetes. People with diabetes can, over time, develop nerve damage throughout the body. Symptoms may include pain, tingling, or numbness in the hands, arms, feet, and legs. Nerve problems can occur in every organ system, including the digestive tract, heart, and sex organs. About 60 to 70 percent of people with diabetes have some form of neuropathy. People with diabetes can develop nerve problems at any time, but risk rises with age and longer duration of diabetes.

Diabetic Retinopathy (Eye Problems)

Diabetes can damage and weaken the small blood vessels in the retina. This damage is called diabetic retinopathy. When the blood vessels of the retina are damaged, fluid can leak from them and cause swelling. The swelling and fluid can cause blurry vision and make it hard for you to see. If retinopathy gets worse, it may lead to blindness. People who have diabetes should have an eye exam once a year.

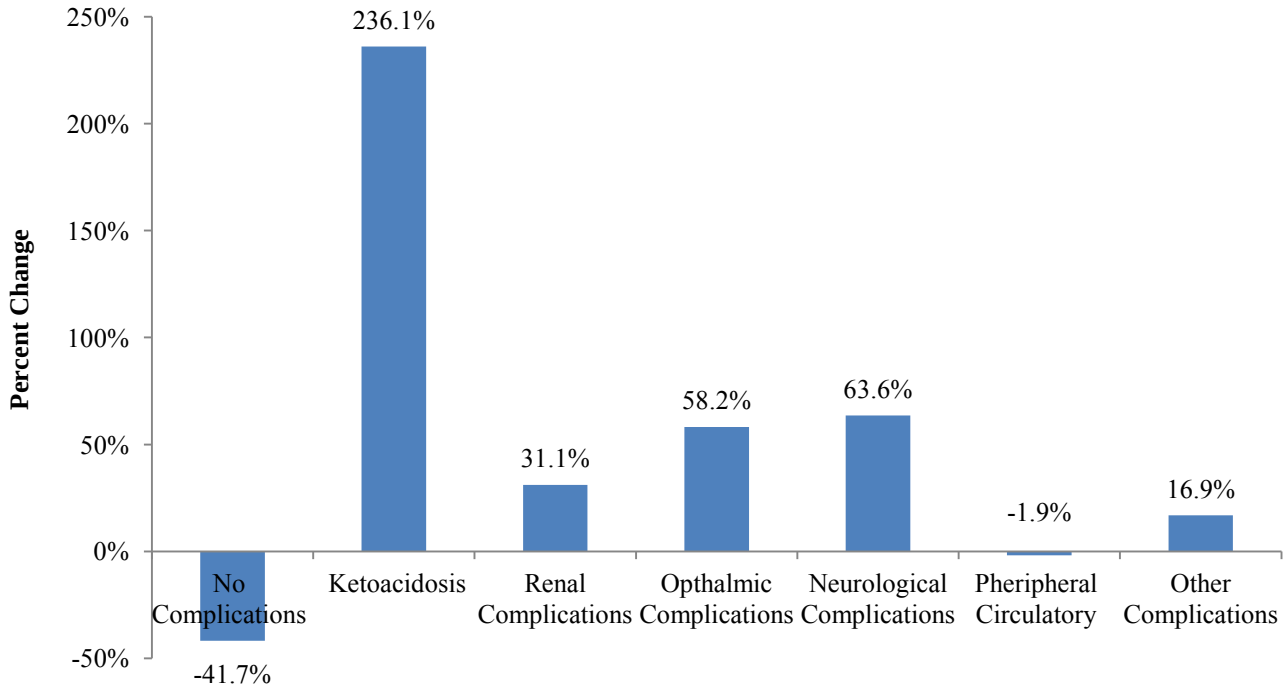
Heart Disease and Stroke

People who have diabetes are at greater risk for heart disease and stroke. The risk is even greater for people who have diabetes and smoke, have high blood pressure, have a family history of heart disease, or are overweight. Heart disease and stroke are the most common causes of morbidity and mortality among people with diabetes.

Illinois Hospital Discharge Data

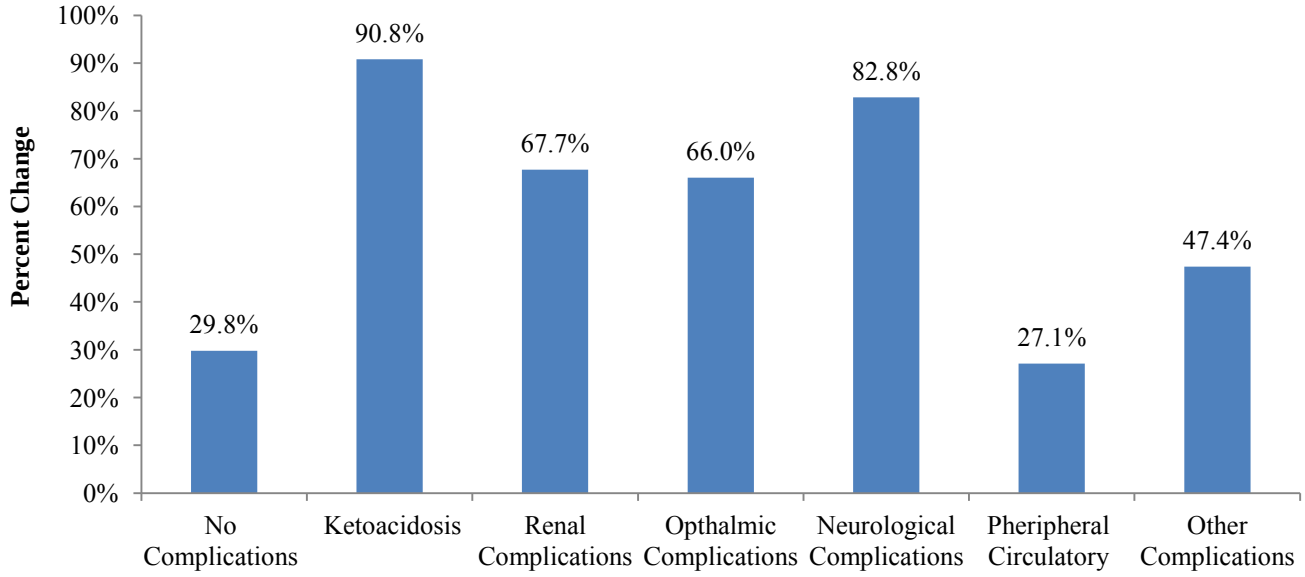
According to Illinois hospital discharge data, diabetes ketoacidosis is the single most major complication for both type 1 and type 2 diabetes. The incidence of diabetes ketoacidosis increased by 236.1 percent between 2005-2010 for uncontrolled type 1 diabetes and by 90.8 percent for type 2 diabetes in the same time range. The second major complication from diabetes is nerve damage and is called diabetes neuropathy. The incidence of diabetes neuropathy increased by 63.6 percent for type 1 diabetes and by 82.8 percent for type 2 diabetes between 2005-2010.

Figure 18: Percentage Change in Hospital Discharges for Type 1 Uncontrolled Diabetes Mellitus Codes, Illinois, 2005-2010



Source: Illinois Hospital Discharge Data, Division of Policy, Planning, Statistics, Department of Public Health, 2010

Figure 19: Percentage Change in Hospital Discharges for Type 2 Uncontrolled Diabetes Mellitus Codes, Illinois, 2005-2010



Source: Illinois Hospital Discharge Data, Division of Policy, Planning, Statistics, Department of Public Health, 2010

Economic Costs

The American Diabetes Association's (ADA) Diabetes Cost Calculator estimates the costs of diabetes at the national and state levels. People with diagnosed diabetes, on average, have medical expenditures that total approximately 2.3 times higher than the expenditures would be in the absence of diabetes. Direct costs pertain to the medical expenditures incurred with treating and controlling the symptoms and the complications of diabetes. Indirect costs include increased factors, such as absenteeism, reduced productivity, and lost productive capacity due to early mortality. According to the ADA, the estimated total cost of diabetes in 2007 for the United States was $174 billion, including $116 billion in excess medical expenditures and $58 billion in reduced national productivity. The total cost of diabetes for people in Illinois in 2006 was estimated at $7.3 billion. This estimate includes excess medical costs of $4.8 billion attributed to diabetes, and lost productivity valued at $2.5 billion.

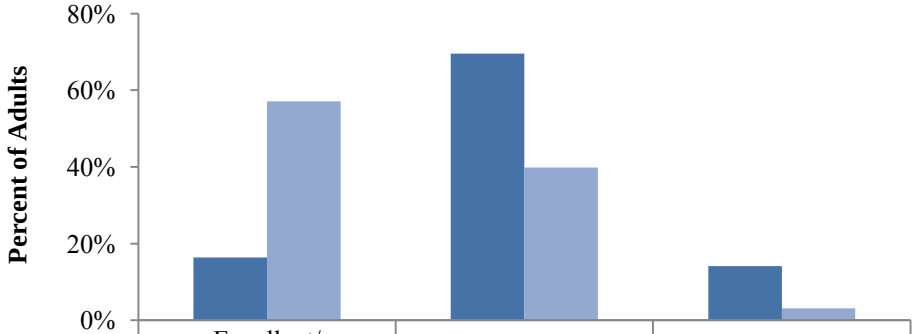
Quality of Life

Quality of life is an important consideration for people with diabetes. The Illinois BRFSS survey asked participants, people with and without diabetes, about their access to health care and their quality of life.

The estimated mean of healthy days last month was higher for adults without diabetes (24 days) compared to adults with diabetes (19 days), which indicates persons with diabetes had fewer healthy days each month due to their disease.

When compared to adults without diabetes, a lower percentage of adults with diabetes reported a general health status of excellent/very good health (16.4%). Furthermore, a higher percentage of adults with diabetes report fair health (69.5%) and poor health (14.1%) when compared to adults without diabetes.

Figure 20: General Health Status among Adults With and Without Diabetes, Illinois, 2010

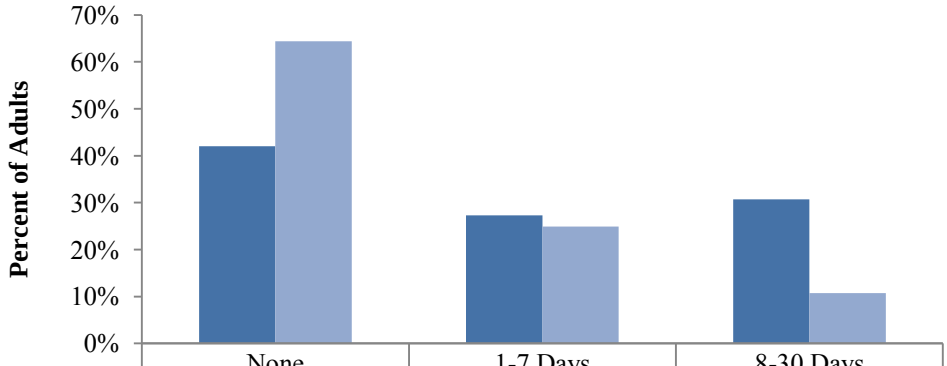


	Excellent/ Very Good	Good /Fair	Poor
Adults with diabetes	16.4%	69.5%	14.1%
Adults without diabetes	57.1%	39.8%	3.1%

Source: Illinois Behavioral Risk Factor Surveillance System, 2010

There is a difference between adults with and without diabetes, when asked about the number of days during the last month when their physical health was not good. Only 42 percent of the adults with diabetes said their physical health was good last month compared to 64.4 percent of the adults without diabetes. A higher percentage of adults with diabetes (30.7%) said their physical health was not good last month for 8-30 days compared to adults without diabetes (10.7%).

Figure 21: Physical Health Status among Adults With and Without Diabetes, Illinois, 2010

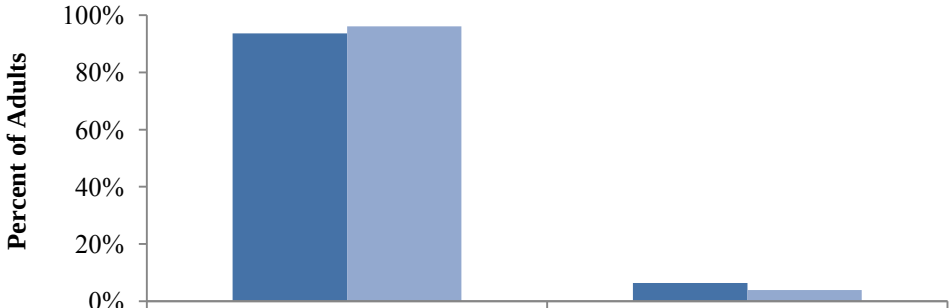


	None	1-7 Days	8-30 Days
Adults with diabetes	42.0%	27.3%	30.7%
Adults without diabetes	64.4%	24.9%	10.7%

Source: Illinois Behavioral Risk Factor Surveillance System, 2010

The percentage of adults with diabetes who said that they were satisfied with their life (93.6%) was lower than adults without diabetes (96.1%).

Figure 22: Life Satisfaction among Adults With and Without Diabetes, Illinois, 2010

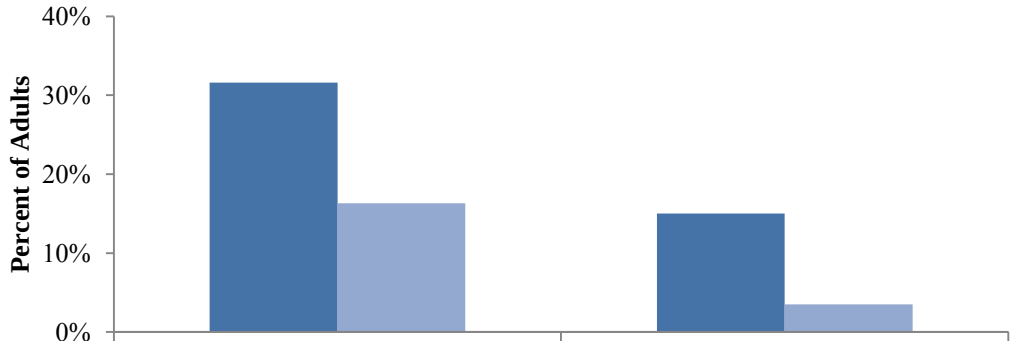


	Very Satisfied/Satisfied	Dissatisfied/Very Dissatisfied
Adults with diabetes	93.6%	6.4%
Adults without diabetes	96.1%	3.9%

Source: Illinois Behavioral Risk Factor Surveillance System, 2010

A higher percentage of adults with diabetes have a disability (15%) compared to adults without diabetes (3.5%). Additionally a higher percentage of adults with diabetes reported activity limitations due to any health problem (31.6%) compared to adults without diabetes (16.3%).

Figure 23: Disability, Activity Limitation among Adults With and Without Diabetes, Illinois, 2010



	Activity Limitation Due to Health Problems	Disability
Adults with diabetes	31.6%	15.0%
Adults without diabetes	16.3%	3.5%

Source: Illinois Behavioral Risk Factor Surveillance System, 2010

A higher percentage of adults with diabetes received both their flu vaccine (56%) and pneumonia vaccine (50%) when compared with adults without diabetes. A lower percentage of adults with diabetes reported no exercise in the past 30 days (65%) than adults without diabetes (75%). Consuming at least five servings of fruits/vegetables a day is similar for adults with diabetes (24%) and those without diabetes (22%). Similarly, only 65 percent of the adults with diabetes reported they engage in some form of exercise in the last 30 days compared to adults without diabetes (76%).

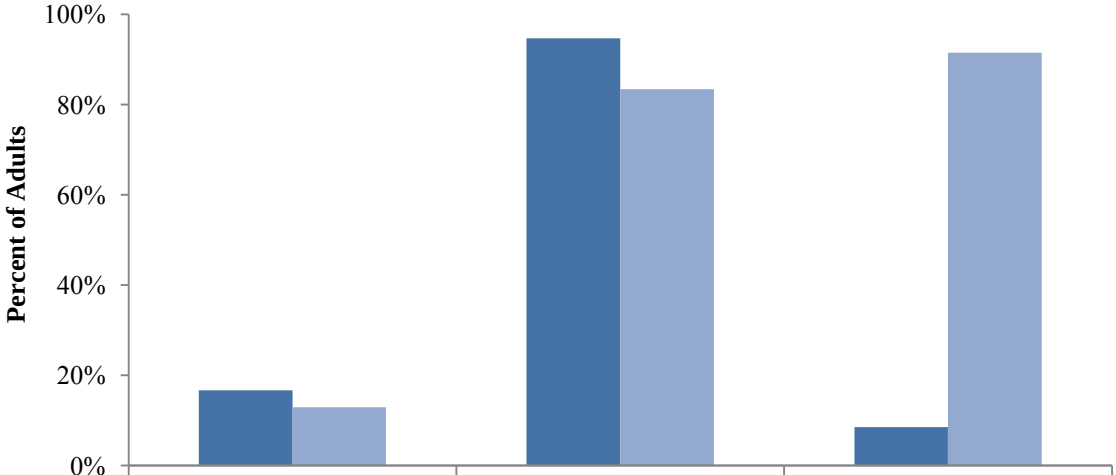
Table 2: Physical Activity, Immunization and Fruit/Vegetable Consumption among Adults with and Without Diabetes, Illinois, 2010

	Adults with diabetes	Adults without diabetes
Had any exercise in the past 30 days	65%	76%
Had flu vaccination in past 12 months	56%	37%
Had a pneumonia shot	50%	24%
Had at least five or more servings of fruits/vegetables	24%	22%

Access to Health Care

A higher percentage of adults with diabetes (16.7%) avoided medical care in the last 12 months due to costs, which makes it more difficult for them to get appropriate care and assistance with the management of their condition. A higher percentage of adults with diabetes said that they have a primary care physician (94.7%) compared to adults without diabetes (83.4%). However, a lower percentage of adults with diabetes (8.5%) had any health care coverage compared to adults without diabetes (91.5%). Proper access to health care for both diagnosed and undiagnosed diabetes will have a large impact on the ability to reduce the burden of diabetes in present and future years.

Figure 24: Health Care Access among Adults With and Without Diabetes, Illinois, 2010



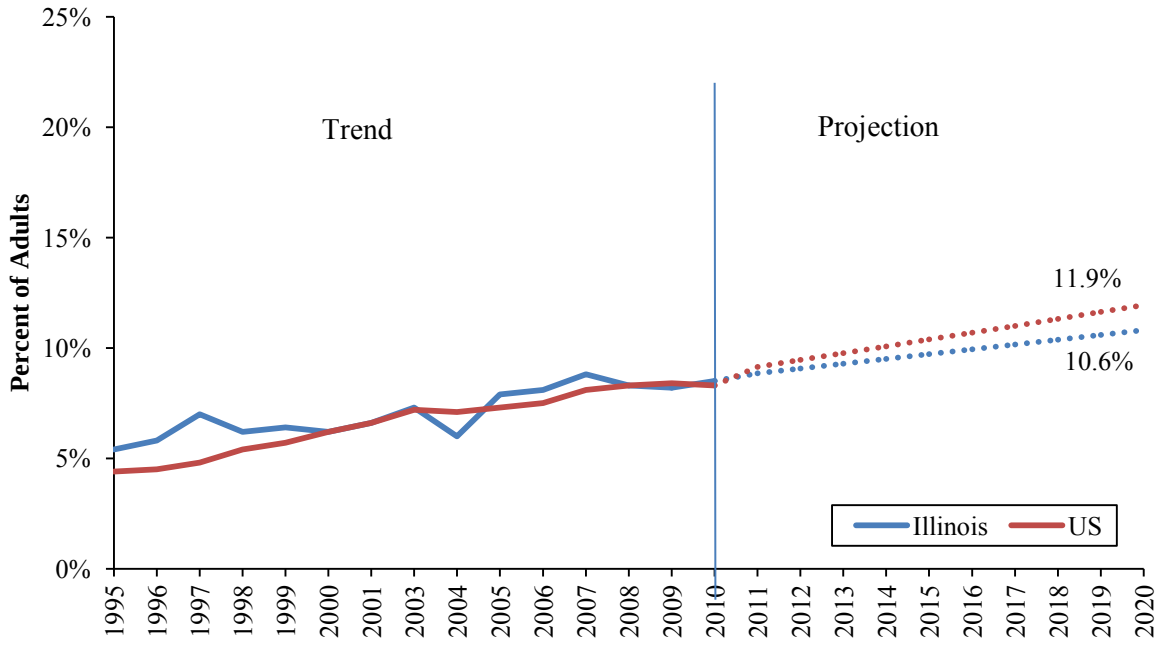
	12 Months: No Doctor Visit Due to Cost	Have a Primary Care Physician	Have Health Care Coverage
Adults with diabetes	16.7%	94.7%	8.5%
Adults without diabetes	12.9%	83.4%	91.5%

Source: Illinois Behavior Risk Facotr Surveillance System, 2010

Projected Prevalence and Trend

Using the current prevalence data from the CDC National Diabetes Fact Sheet 2011 and the Illinois BRFFS survey (1995-2010), the projected diabetes prevalence in 2020 will be 11.9 percent nationally and 10.6 percent for Illinois; an estimated increase of 43 percent nationally and 25 percent for Illinois. These forecasts underscore the importance of health promotion and prevention strategies at the state and local levels to better prevent and to control the prevalence of this disease and its associated complications.

Figure 25: Forecast: Percent of Adults with Diabetes, Illinois and the United States, 2010-2020



Source: Behavioral Risk Factor Surveillance System, 1995-2010; Forecasts Analysis in SAS 9.1 Version

Diabetes Commission

The Illinois State Diabetes Commission, created in 2006 by Illinois Public Act 094-0788 is mandated to:

- hold public hearings to gather information from the general public on issues pertaining to the prevention, treatment and control of diabetes;
- develop a strategy for the prevention, treatment and control of diabetes; and
- examine the needs of adults, children, racial and ethnic minorities, and medically underserved populations who have diabetes.

The Diabetes Commission consists of physicians board certified in endocrinology, including a physician with expertise and experience in the treatment of childhood diabetes and a physician with expertise and experience in the treatment of adult onset diabetes; health care professionals with expertise and experience in the prevention, treatment and control of diabetes; representatives of all organizations or groups that advocate on behalf of persons suffering from diabetes; and members of the public diagnosed with diabetes.

Data Sources

Behavioral Risk Factor Surveillance System (BRFSS)

The Behavioral Risk Factor Surveillance System (BRFSS) is a federally-funded surveillance system tracking health risks throughout the entire United States. The Illinois Behavioral Risk Factor Surveillance System (BRFSS) is conducted and administrated by the Illinois Department of Public Health in collaboration with the CDC. Illinois follows the CDC guidelines and standards by using a Disproportionate Stratified Sample (DSS) method to randomly select land-based telephone numbers in every county throughout the state of Illinois. For more information on BRFSS survey methodology, refer to http://www.cdc.gov/brfss/faqs.htm#2. In addition to the BRFSS, Illinois regularly conducts risk factor surveillance of each county. The county level data is used extensively at the sub-state/local governmental areas to formulate public health policies and prevention and health promotion programs.

Hospital Discharge Data

The Department's Center for Health Statistics, maintains hospital discharge data. The data is based on ICD-9 codes for diabetes and associated chronic complications that could be attributed to diabetes mellitus. Hospitalization or hospital discharge refers to any discharge from a non-federal, short-stay, acute-care hospital in Illinois. Hospitalizations are expressed as numbers of discharges, not as unduplicated patients, which, as a result, means a single patient with multiple hospitalizations can be counted more than once. Illinois hospital discharge data are based upon inpatient hospitalizations and do not include outpatient data. The numbers supplied are individual discharge counts. No consideration is given to any type of rate calculation.

Mortality Data

Mortality data was obtained from the National Center for Health Statistics through SEER*Stat software developed by the National Cancer Institute. The mortality data available through SEER*Stat includes all causes of death, not just cancer deaths. Mortality data can be obtained from 1969-2009 at the national, state, and county level. Racial categories that can be selected are white, black, other, American Indian/Alaska Native, Asian or Pacific Islander, or unknown. Ethnicity categories were added to the data in 1990. There are 19 age categories that can be

selected. From SEER*Stat software the frequency, crude rate, age-adjusted rate, crude rate trend, and age-adjusted rate trend can be calculated for all causes of death. The standard error and confidence intervals are also calculated in this software to determine significance. For this report, the mortality all cause of death, aggregated with state, total U.S. 1990-2009 data was used. The data in this software was released in April 2012. For more information refer to http://www.seer.cancer.gov/mortality/.

The Adverse Pregnancy Outcomes Reporting System (APORS)

The Adverse Pregnancy Outcomes Reporting System (APORS) registry records the number of Illinois infants born with birth defects whose mothers had gestational diabetes in their pregnancies. Illinois infants born with adverse pregnancy outcome, including birth defects and congenital anomalies and other serious neonatal conditions, are recorded in the APORS registry. Each year in Illinois, APORS obtains information on thousands of such births throughout the state. APORS is the most complete source of data on birth defects that currently exists in Illinois. APORS is a component of the Illinois Health and Hazardous Substances Registry administered by the Illinois Department of Public Health Division of Epidemiologic Studies. All hospitals in Illinois, except federal and military hospitals, are mandated to participate.

The Illinois Youth Risk Behavior Survey

The Youth Risk Behavior Survey (YRBS) focuses on priority health-risk behaviors established during youth that result in the most significant mortality, disability, and social problems during both youth and adulthood. Topics include nutrition, tobacco use, alcohol and other drug use, physical activity, injuries, and sexual behavior resulting in sexually transmitted diseases and pregnancy. It uses a controlled sample design so data may be weighted for analysis. YRBS includes a national school-based survey conducted by CDC and state, territorial, and tribal as well as local surveys conducted by state, territorial, local education and health agencies, and tribal governments. In Illinois, the YRBS survey is administered by Childrens' Health Data Lab (CHDL), part of the Children Memorial Research Center, Northwestern Feinberg School of Medicine. For more information, refer to http://www.chdl.org/yrbs.htm

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Glossary of Terms

Acidosis - Acidosis is an increased acidity in the blood and other body tissue (e.g., an increased hydrogen ion concentration).

Blood glucose – Glucose is a simple sugar and the primary fuel for body cells. It is absorbed from some foods (or produced from starchy ones), absorbed into the cells (for about two thirds of cells, this is under control of insulin), stored temporarily in the liver as glycogen, made in starvation from the glycerin backbone of triglycerides, and from a few amino acids. Glucose metabolism anomalies are the cause of diabetes Mellitus.

Blood pressure – The pressure of the blood in the circulatory system, often measured for diagnosis since it is closely related to the force and rate of the heartbeat and the diameter and elasticity of the arterial walls.

Blood sugar – Another commonly used name for blood glucose.

Blood vessels – Tubes which carry blood around the body. They come in three types- arteries, veins, and capillaries. Capillaries are always tiny; the others vary from large (centimeters in diameter) to quite small (slightly smaller than the diameter of a red blood cell).

Cardiovascular – Pertaining to the heart and vascular system (blood vessels).

Cholesterol – A waxy substance related to the steroid chemicals that serve as a substrate for many things including cell membrane construction. It is also involved in the transport of fat (e.g., lipids) in the blood. Cholesterol is manufactured in the body and is absorbed from food in the diet. Furthermore, some diet elements seem to be connected with higher body production of cholesterol (e.g., saturated fat).

Chronic – Present over a long period of time. Diabetes and arthritis are examples of chronic diseases as there is yet no cure for either.

Complications of diabetes – Harmful effects that may happen when a person has diabetes. Some acute effects, such as hypoglycemia or hyperglycemia, can happen any time and usually can be resolved quickly. Others develop when a person has had diabetes for a time (often years, or even decades). These include damage to the retina of the eye (retinopathy), blood vessels (angiopathy), the nervous system (neuropathy), or the kidneys (nephropathy).

Coronary disease – Interference with the heart's blood supply, typically by clogging of coronary, or other, arteries. Ischemia means lack of oxygen that necessarily follows from one or more blocked arteries.

Diabetes Mellitus – A disease that occurs when the body is not able to use dietary carbohydrates (e.g., sugar, starch) as it should. Caused by lack of insulin, inability to respond to insulin, or both.

Diabetes Mellitus type 1 – A chronic condition in which the pancreas makes little or no insulin because the beta cells have been destroyed. About two-thirds of body cells require insulin to absorb glucose and in its absence, they will not be able to use the glucose (blood sugar) for energy. Type 1 diabetes usually comes on abruptly, although the damage to the beta cells may begin much earlier. Typical signs of type 1 diabetes are a great thirst, hunger, a need to urinate often, and loss of weight. To treat the disease, the person must inject insulin and test blood glucose frequently. Type 1 diabetes usually occurs in children and adults under age 30.

Diabetes Mellitus type 2 – The most common form of diabetes mellitus. About 90 to 95 percent of people who have diabetes in the developed world have Type 2 diabetes. Unlike type 1 diabetes, in which the pancreas makes no insulin, people with type 2 diabetes produce some insulin, sometimes even large amounts. However, either their bodies do not produce enough insulin or their body cells are resistant to insulin (see Insulin Resistance). People with type 2 diabetes can often control their condition by losing weight through diet and exercise. If not, they may need to combine insulin or a pill with diet and exercise. Generally, type 2 diabetes occurs in people who are over age 40. Most of the people who have this type of diabetes are overweight.

Diabetic ketoacidosis (DKA) – See acidosis

Diabetic nephropathy – See Nephropathy

Diabetic neuropathy – See Neuropathy

Diabetic retinopathy – Damage to the retina caused by growth of very small blood vessels. The proliferative variety is dangerous and often leads to blindness. It has been the leading non traumatic cause of blindness in adults in the developed world for much of the 20th century.

Diagnosis – A decision as to the cause of some symptoms or problem. In the case of diabetes, the tests are clear. If you do not have high blood glucose at times (e.g., when fasting), you shouldn't be diagnosed as diabetic, though perhaps as "prediabetic." Everyone has higher glucose levels for one or two hours after eating food that contains some types of carbohydrates.

Dialysis – Providing kidney function artificially. This requires an artificial kidney (a dialysis machine) and relatively long periods hooked up to the machine every few days. It is not equivalent to a working kidney, but is sufficient to maintain life, sometimes for extended periods.

Epidemiology – The study of the transmission of diseases.

Fats – Food substances that are the chief energy storage mechanism in organisms, such as plants and animals. Fat molecules are composed of fatty acid chains attached to a glycerol backbone, usually in threes.

Gestational diabetes mellitus (GDM) – A type of diabetes mellitus can occur when a woman is pregnant. During pregnancy (usually late term), the woman may have glucose (sugar) in her blood at a higher than normal level. When the pregnancy ends, the blood glucose levels return to normal in about 95 percent of cases. It must be treated carefully by a physician for it is dangerous to both mother and child. If treated properly, there are usually no lasting effects on either. Women who have had an episode of GDM are at higher risk of developing type 2 diabetes later on.

Glucose – A simple sugar that is the chief carbohydrate fuel in food. In the dextrose form isomer, it is the chief product of photosynthesis in plants.

Glucose tolerance test – A test to see if a person has diabetes. The test is usually given in a lab or doctor's office in the morning before the person has eaten. A first sample of blood is taken from the person. Then the person drinks a liquid that has a measured amount of glucose in it (typically 75 grams). After one hour, a second blood sample is drawn, and, after another hour, a third sample is taken. The object is to see how well the body deals with the glucose in the blood over time without interference from other foods. Depending on the laboratory, the number and spacing of samples may vary.

High blood pressure – The pressure of blood in the arteries has normal values in a population. Blood pressure in an individual which is characteristically higher than that value is called high blood pressure. Exercise, psychological state (including the mere presence of medical personnel in some cases), and disease, affect blood pressure, so the determination is a statistical one.

Hormone – A chemical released by one of the endocrine glands or tissues, that has effects on other tissues. Insulin is a hormone, as are glucagon, adrenaline, and angiotensin II.

Hypertension – A condition in which blood pressure is higher than normal. See high blood pressure.

Impaired glucose tolerance (IGT) – Blood glucose (e.g., 'sugar') levels higher than normal, but not high enough to cause a diabetes diagnosis. People with IGT may or may not proceed to develop diabetes.

Incidence – The rate of an occurrence of, for instance, an infection like measles or mumps or one of the types of diabetes.

Insulin – A hormone produced by the beta cells of the islets of Langerhans' of the pancreas. It is a very small protein and has effects all over the body, some connected with metabolism and others connected with arterial wall muscle tone, or electrolyte balances across cell membranes. It also is the chief control mechanism for body metabolism.

Insulin resistance – A condition in which a cell is resistant to insulin action, usually as a result of type 2 diabetes that is characterized by insulin resistance in about two-thirds of the body's cells (those which require insulin in order to absorb glucose from the blood). The result is the beta cells can no longer regulate body metabolism correctly.

Ketoacidosis – A kind of acidosis characteristic of uncontrolled diabetes. It is not uncommon among diabetics, especially type 1 diabetics. See also acidosis

Kidney disease – Any one of several chronic conditions caused by damage to the cells of the kidney. People who have had diabetes for a long time may have kidney damage. Also called nephropathy.

Kidneys – Organs that produce urine by excreting blood plasma and then resorbing important chemicals. Glucose and proteins are especially well resorbed, such that the presence of either is evidence of serious problems. The remainder is urine.

Mortality rate – The rate at which death occurs.

Nephropathy – Disease of the kidneys caused by damage to the small blood vessels or to the units in the kidneys that clean the blood. People who have had diabetes for a long time may have kidney damage.

Neuropathy – Any diseases of the nerve. In a diabetic context, a chronic complication of diabetes. Damage usually appears in the longest nerves, for reasons only dimly understand, resulting in loss of sensation to the feet and lower legs. The damage is almost always bilateral. Loss of reflexes also is common. Neuropathy also can affect the hands, motor nerves, and the autonomic system.

Obesity – An abnormal amount of fat in the body. It is the result of an imbalance between food eaten and energy expended, but the underlying cause is usually complex and difficult to diagnose and treat.

Prevalence – The number of cases of a disease present in a specific population at a given time.

Retinopathy – See diabetic retinopathy.

Risk factor – Anything that raises the chance a person will get a disease. With noninsulin-dependent diabetes, people have a greater risk of getting the disease if they weigh more (20 percent or more) than they should.

Self-monitoring of blood glucose – A way a person can test how much glucose (sugar) is in the blood.

Stroke – Interruption in the blood supply to an organ. It usually refers to such interruptions in the blood supply to the brain. There are two varieties, the bleeding sort in which a blood vessel leaks blood into tissues and an ischemic stroke in which the blood flow is interrupted, often because of vessel blockage by a clot or plaque. Both kill tissue and can cause considerable damage, including death.

Symptom – A sign of disease. Having to urinate often is a symptom of diabetes.

Triglyceride - Combinations of glycerol with three of five different fatty acids.