

The Burden of Diabetes in Delaware

2014 Update



DELAWARE HEALTH AND SOCIAL SERVICES

Division of Public Health

Health Promotion and Disease Prevention

Introduction

Diabetes, also known as hyperglycemia, is a chronic disease in which levels of glucose in the blood are above normal. There are three types of diabetes: Type 1, Type 2, and gestational diabetes. It is estimated that only about 5 percent of all diagnosed cases of diabetes are type 1, where the pancreas is unable to produce insulin. Type 2 diabetes is where the pancreas cannot produce enough insulin, known as insulin resistance. Approximately 90 percent to 95 percent of diagnosed diabetes cases are diagnosed as type 2. Gestational diabetes is a type of diabetes that occurs in pregnant women who did not have diabetes prior to pregnancy, and it is usually diagnosed between weeks 24 and 28. Gestational diabetes will resolve after delivery for most women. However, approximately half of all women who had gestational diabetes will develop type 2 diabetes later in their life. Pre-diabetes, sometimes referred to as impaired fasting glucose (IFG), is a condition where blood glucose levels are above normal but not high enough to be diagnosed with diabetes. People with pre-diabetes are at an increased risk for developing type 2 diabetes.¹

According to the Centers for Disease Control and Prevention (CDC) as of 2012, approximately 20.9 million Americans are diagnosed with diabetes. Non-Hispanic blacks (18.7 percent) are disproportionately affected by diabetes when compared to non-Hispanic whites (10.2 percent) among adults 20 years and older. The majority of new adult cases are diagnosed between the ages of 45 and 64, although diabetes can be diagnosed at any age.

In Delaware, the prevalence of diabetes has almost doubled since 1991. In 1991, the estimated prevalence of diabetes was 4.9 percent; and by 2012 the prevalence had grown to 9.6 percent -- meaning more than 68,000 Delaware adults have diabetes. Diabetes in Delaware is more prevalent among black adults (12.6 percent) than among non-Hispanic white adults (9.5 percent).

The American Diabetes Association estimates the total cost of diagnosed diabetes in 2012 to be \$245 billion, a 41 percent increase since its 2007 estimate. Those with diabetes have medical expenditures 2.3 times higher than those without diabetes. Diabetes-associated chronic complications such as neurological, cardiovascular, and renal complications are disproportionately high, accounting for as much as 30 percent of total expenditures for the total population.

Although diabetes is the seventh leading cause of death in the United States, there was marked improvement in mortality for those with diabetes. Delaware's overall age-adjusted mortality rates decreased among people with diabetes from 31.6 per 100,000 in 1988-1992 to 20.6 per 100,000 in 2006-2010. Despite this decrease, mortality rates of black Delawareans with diabetes are twice as high as mortality rates of white Delawareans with diabetes.

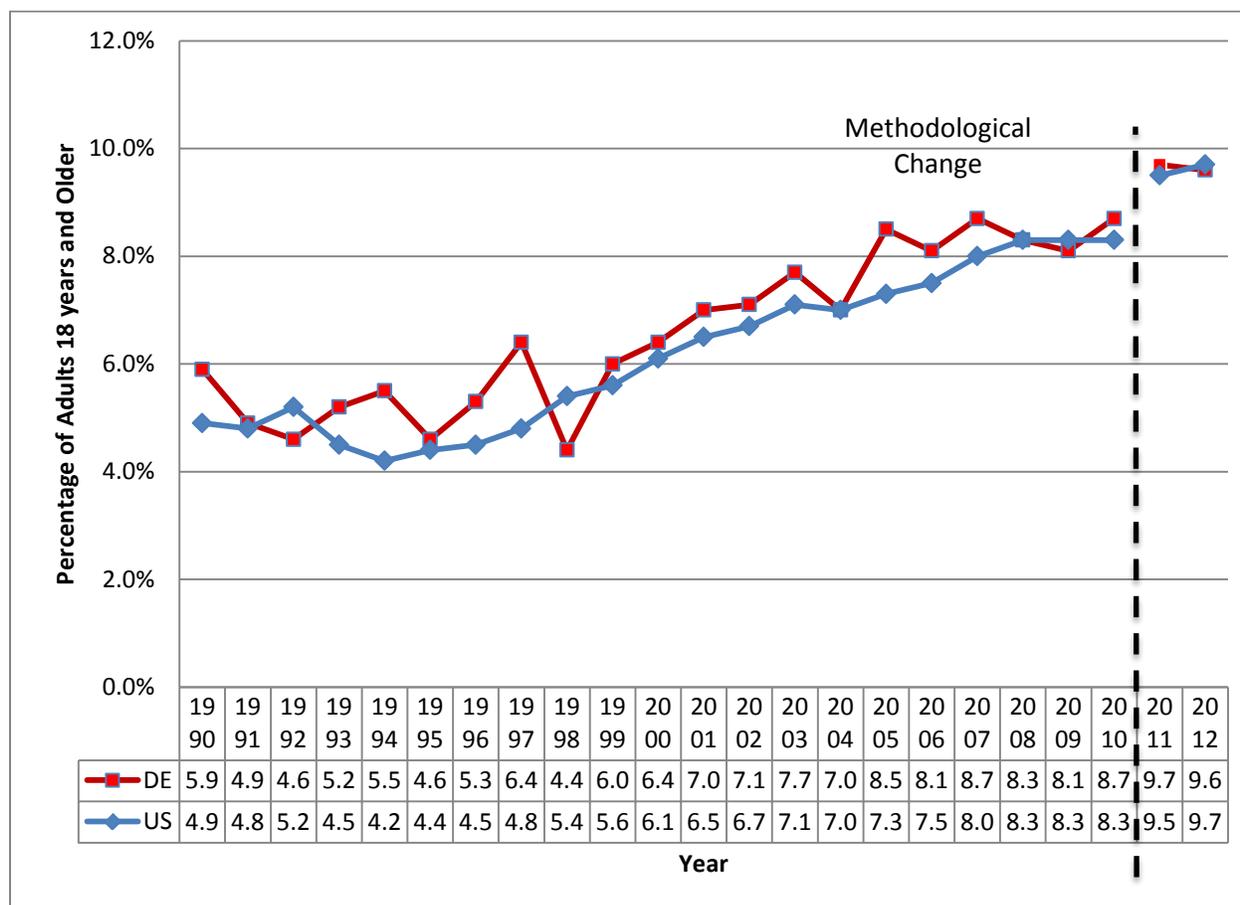
State Demographics

According to the Delaware Population Consortium, approximately 920,000 people live in Delaware. The adult population accounts for slightly more than 75 percent of the total population². The majority (60 percent) of the population lives in the northern-most county, New Castle. The other two counties, Kent and Sussex, account for the remaining 18 percent and 22 percent, respectively. Gender is split almost evenly: 49 percent male and 51 percent female. Delaware's population is 64 percent white, 21 percent black, 9 percent Hispanic, and 6 percent representing other racial or ethnic populations.

Prevalence

The CDC reports 9.7 percent of the United States' adult population has diabetes. This percentage increased 97.9 percent from 1990 to 2012. According to the 2012 Delaware Behavioral Risk Factor Survey (BRFS), about the same percentage (9.6 percent) of Delaware's adult population (18 years and older) were diagnosed with diabetes. Figure 1 illustrates the national and state level diabetes prevalence trends over more than a decade. However, trend lines must be broken between 2010 and 2011 due to a BRFS methodological change.

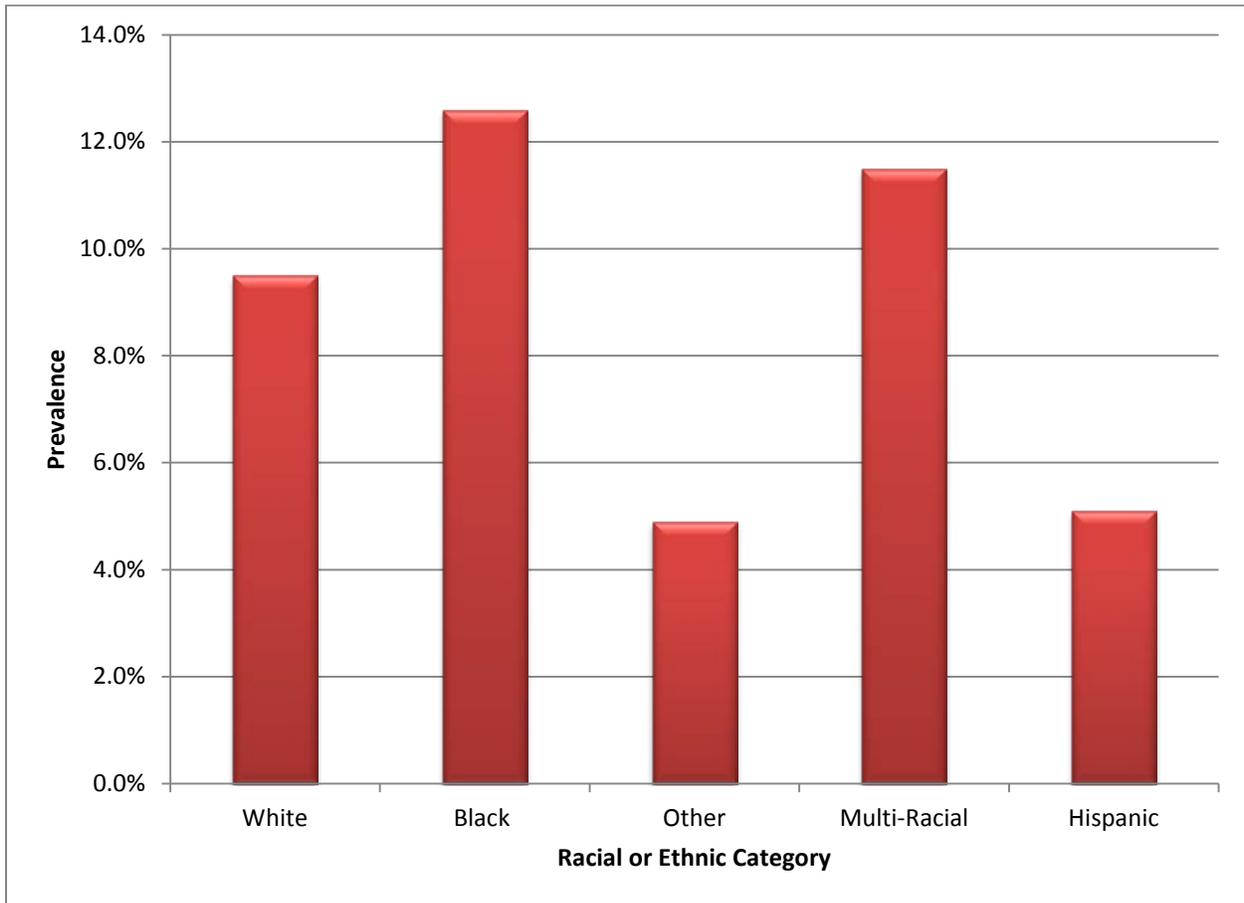
Figure 1. Prevalence trends of diagnosed diabetes in the United States and Delaware, 1990-2012.



Data Source: Centers for Disease Control and Prevention and Delaware Division of Public Health, Behavioral Risk Factor Surveillance System, 1990-2012.

In 2012, about 9.6 percent of Delaware residents age 18 and older reported they were diagnosed with diabetes. That means more than 68,000 Delaware adults know they have diabetes, according to the BRFSS. This prevalence rate does not include gestational diabetes. Although the BRFSS question does not distinguish between type 1 and type 2 diabetes, the CDC estimates that between 90 percent and 95 percent of people with diabetes in the United States have type 2.¹ In 2012, diabetes in Delaware was more prevalent among black adults (12.6 percent) than among non-Hispanic white adults (9.5 percent). About 5.1 percent of Hispanic adults and 11.5 percent of multi-racial adults report being diagnosed with diabetes (Figure 2).

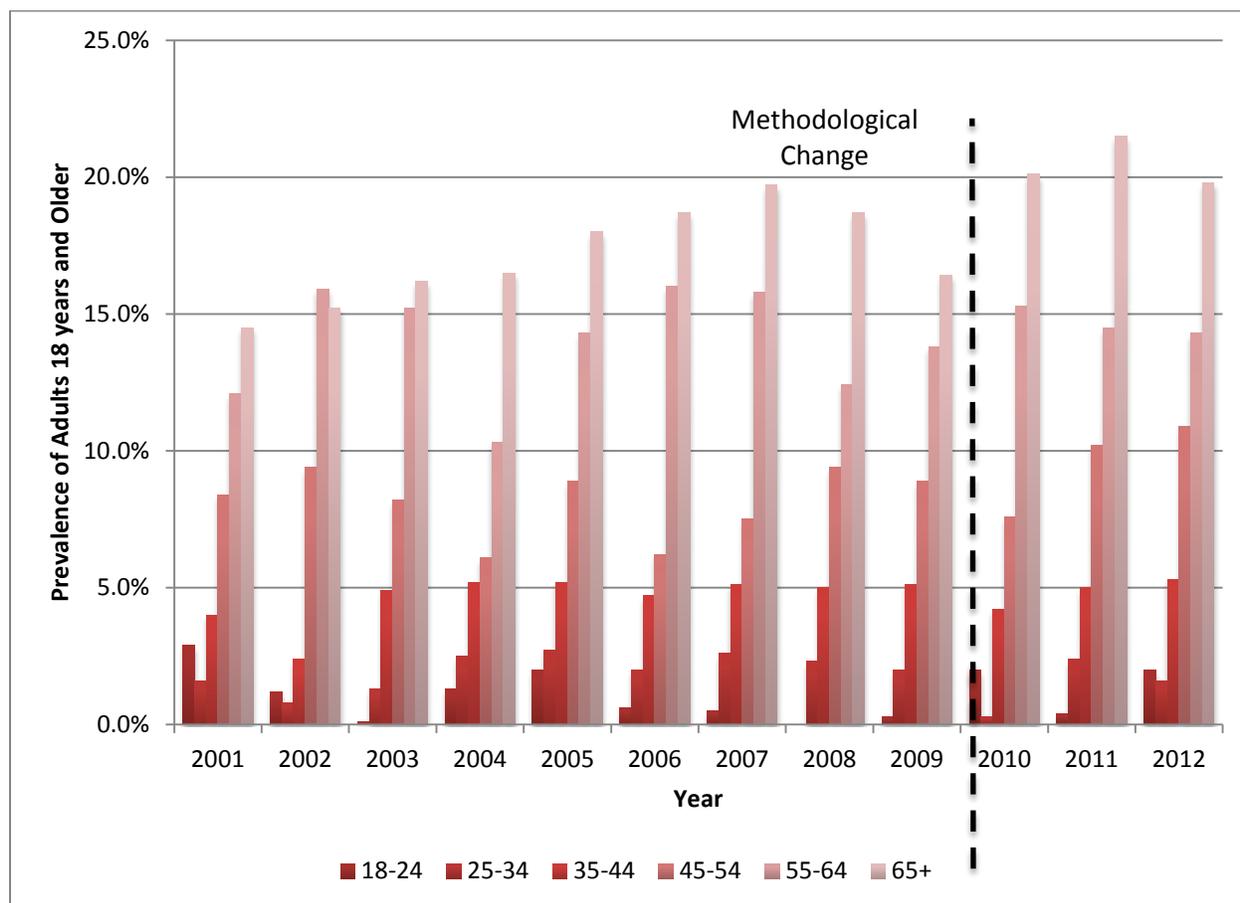
Figure 2. Delaware diabetes prevalence by race, 2012.



Source: Delaware Health and Social Services, Division of Public Health, Behavioral Risk Factor Survey (BRFS), 2012.

Diabetes also becomes more prevalent with age. In Delaware in 2012, only 1.6 percent of 25-34 year-olds have diabetes, but the prevalence rises to 10.9 percent among adults age 45-54; 14.3 percent among adults age 55-64; and 19.8 percent among those 65 and older (Figure 3).

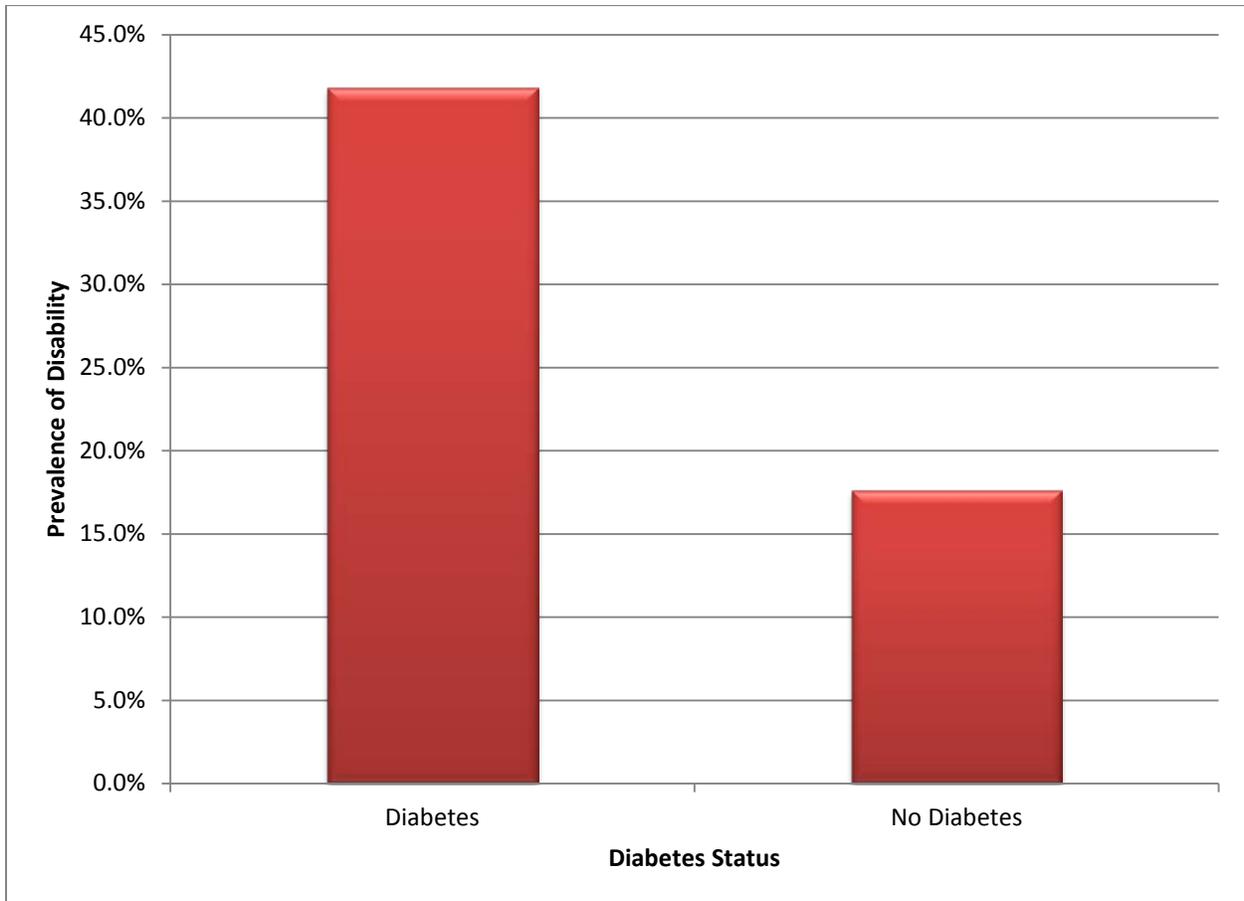
Figure 3. Delaware trends of prevalence of diagnosed diabetes by age, 2001-2012.



Source: Delaware Health and Social Services, Division of Public Health, Behavioral Risk Factor Survey (BRFS), 2001-2012.

There is no significant difference between the prevalence of disabilities of Delaware men with diabetes (10.8 percent) and Delaware women with diabetes (8.6 percent) in the 2012 survey results. However, almost 42 percent of Delawareans with diabetes also report having a disability. In comparison, only approximately 18 percent of the Delaware adult population without diabetes report having a disability (Figure 4).

Figure 4. Prevalence of disabilities by diabetes diagnosis, 2012.



Source: Delaware Health and Social Services, Division of Public Health, Behavioral Risk Factor Survey (BRFS), 2012.

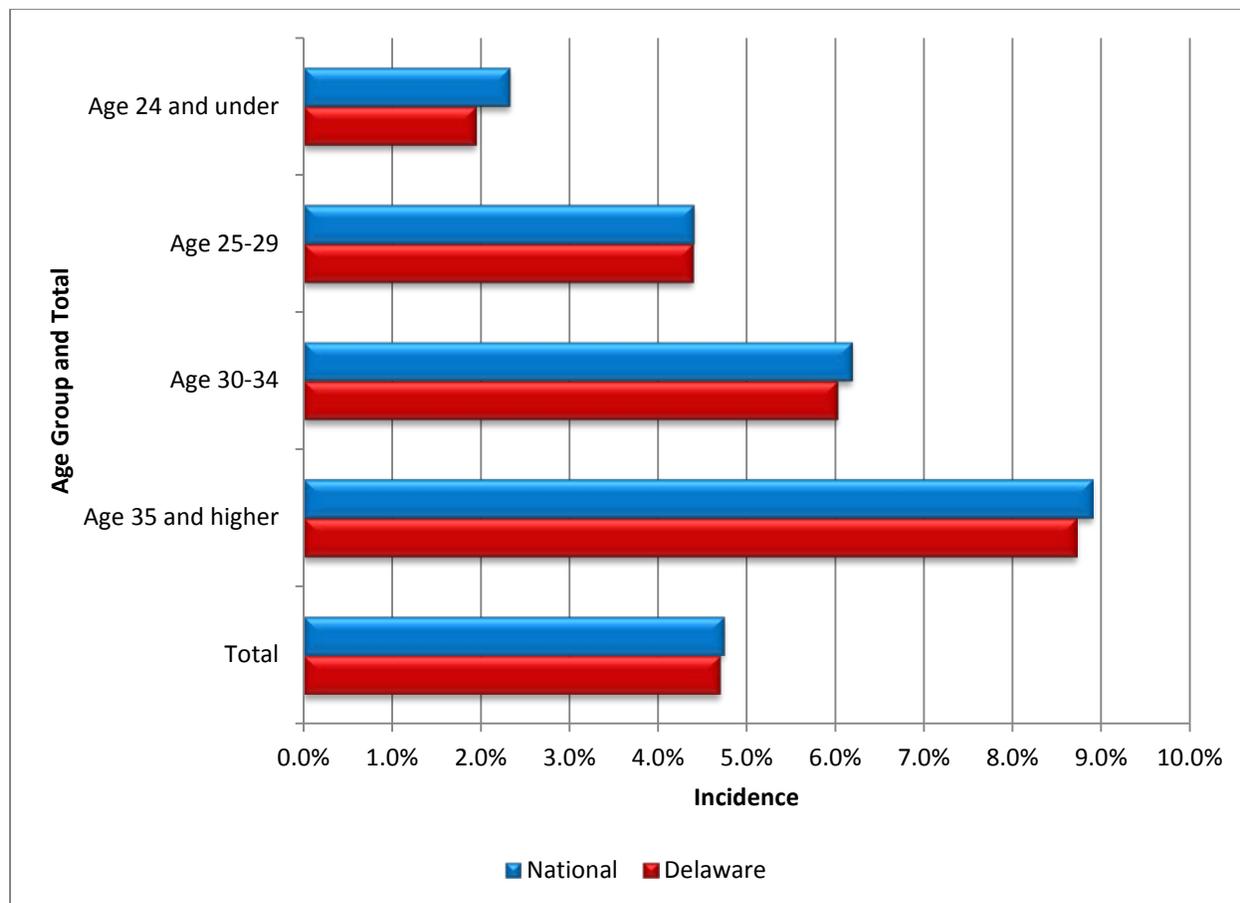
The survey asks about pre-diabetes. In 2012, 8.2 percent (or about 52,000) of Delaware adults who were not diagnosed with diabetes reported being told they have pre-diabetes. People with pre-diabetes are at risk for developing type 2 diabetes, but they can significantly reduce that risk by increasing physical activity and eating a healthier diet.

Gestational Diabetes Incidence

According to the CDC, nationally reported rates of gestational diabetes range from 2 percent to 10 percent of pregnancies. Of those women who are diagnosed with gestational diabetes, approximately 5 percent to 10 percent of women will be diagnosed with type 2 diabetes immediately after pregnancy.¹ In 2009, 534 Delaware pregnant women (4.7 percent) were diagnosed with gestational diabetes,

according to the *Delaware Vital Statistics Annual Report*. The incidence of gestational diabetes increases by age group; those who are 24 years of age and younger only have an 1.9 percent incidence, compared to 8.7 percent of those aged 35 years and older. There is little difference between national and Delaware gestational diabetes incidence (Figure 5), both for total incidence and by maternal age group.

Figure 5. National and Delaware gestational diabetes incidence by age, 2009.



Source: Delaware Health Statistics Center. *Delaware Reported Pregnancies, 2009*; Delaware Division of Public Health, Office of Vital Statistics. Center for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, U.S. Department of Health and Human Services, 2009.

Risk Factors

There are several risk factors associated with Type 2 diabetes. Those risk factors can be categorized into two categories: (1) modifiable risk factors or (2) non-modifiable risk factors. Modifiable risk factors are those that each individual has some control over and include physical activity level, overweight/obesity

status, and smoking status. Non-modifiable risk factors for diabetes include family history of diabetes and advancing age.

Being overweight or obese, or having a body mass index (BMI) of 25.0 or higher, is a major contributing factor for developing diabetes.³ Obesity among Delaware adults doubled during nearly two decades from 1990 (14.4 percent obese) to 2007 (28.2 percent obese). However, there has been no measurable increase or decrease in Delaware's obesity prevalence since 2007. During approximately the same period, the prevalence of Delaware adults diagnosed with diabetes also doubled, from 4.9 percent in 1991 to 9.6 percent in 2012.

The diabetes epidemic and the obesity epidemic are closely related. In 2012, 9.3 percent of Delawareans with healthy weights (BMI under 25.0) reported being diagnosed with diabetes, compared to 27.5 percent of adults who had a BMI of 25.0 or above (overweight/obese). About 55 percent of all Delaware adults diagnosed with diabetes are obese, and almost 32 percent are overweight. Obesity is significantly higher among Delaware's black adults, and they have the highest rate of diabetes. Adults with lower educational levels and lower incomes are more likely to be obese, and more likely to have diabetes. Table 1 summarizes key risk factors and diabetes prevalence for Delaware and among the counties. Both diabetes and obesity prevalence are higher in Kent and Sussex counties, compared to New Castle County. Smoking prevalence is also higher in Kent and Sussex Counties compared to New Castle County.

Table 1. Diabetes and associated risk factors prevalence in Delaware by state and county level, 2012.

| | State | New Castle | Kent | Sussex |
|---------------------------------|-------|------------|-------|--------|
| Diabetes Prevalence | 9.6% | 8.2% | 11.1% | 12.2% |
| Obesity Prevalence | 26.9% | 25.2% | 29.3% | 29.3% |
| Current Smoking Prevalence | 19.7% | 18.5% | 21.2% | 21.8% |
| More than High School Education | 55.3% | 59.3% | 48.7% | 50.2% |

Source: Delaware Health and Social Services, Division of Public Health, Behavioral Risk Factor Survey (BRFS), 2012.

Physical inactivity is another key risk factor for developing diabetes. In 2011, of Delaware adults reporting sufficient physical activity, only 6.4 percent were diagnosed with diabetes. In contrast, 8.7 percent with insufficient physical activity and 14.6 percent who are inactive report having diabetes. Only 32 percent diagnosed with diabetes report having sufficient activity.

In Delaware, smoking and using tobacco products increases the risk of diabetes. Of Delaware adults who were diagnosed with diabetes, over half (53.4 percent) are either current or former smokers, compared to 46.5 percent of those with diabetes reporting never smoking. Of Delaware adults who have ever smoked, 20.9 percent were diagnosed with diabetes, compared to only 8.4 percent of those who have never smoked.

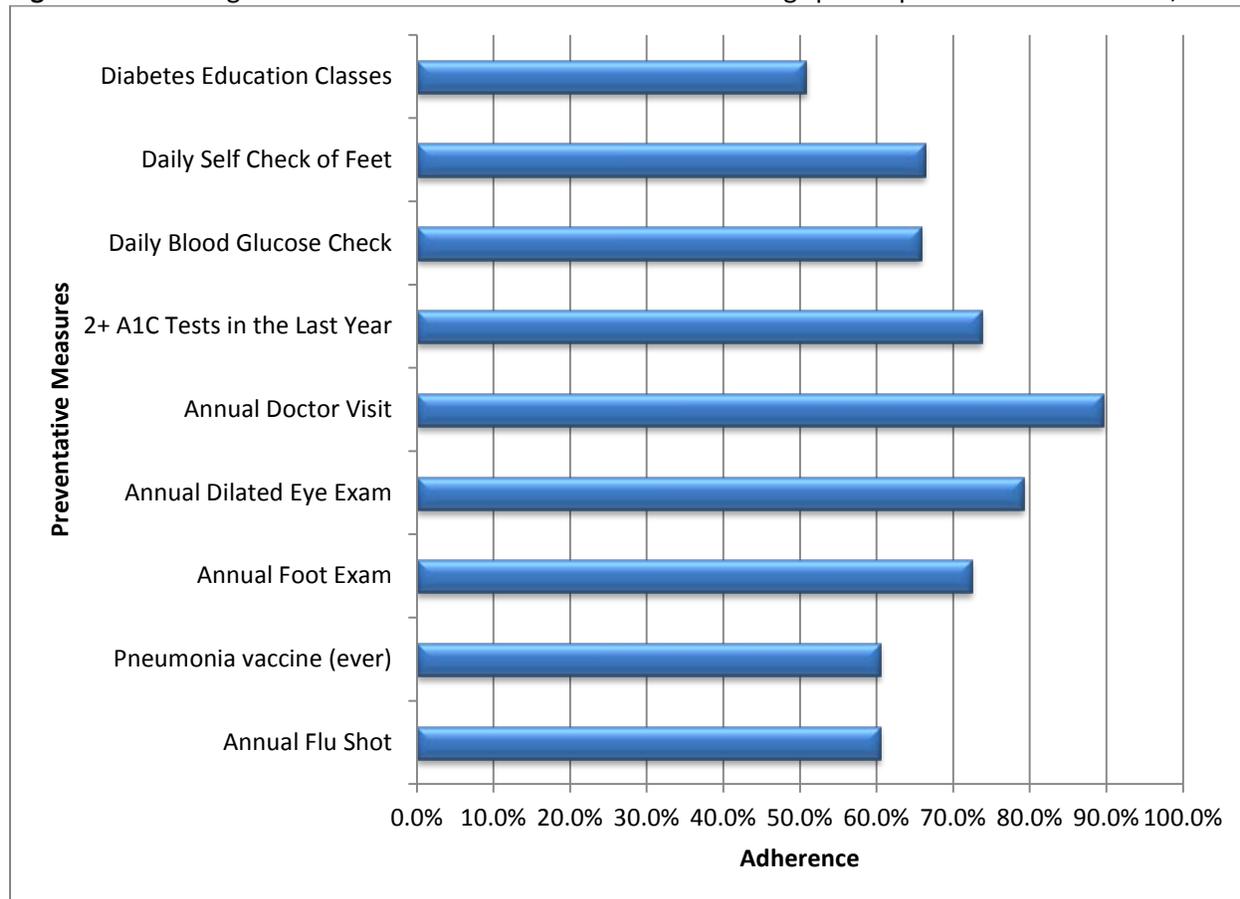
As education level rises, diabetes prevalence decreases. Delaware adults that report having a college degree (7.1 percent) have a lower prevalence than Delaware adults with a high school education (10.3 percent) or less (13.3 percent). While there are no significant differences among reported income groups, in Delaware, the prevalence of diabetes is lower among those with higher incomes than those with lower incomes. Of those making less than \$15,000 annually in 2012, 13.1 percent reported having diabetes, compared to 7.9% of those who make \$50,000 or more annually, according to the BRFSS.

Preventive Care and Disease Management

Those with diabetes can help prevent the development of diabetes-related complications by maintaining a healthy weight, maintaining targeted physical activity levels, and not smoking. Other preventative measures include eye, kidney, foot, teeth, and gum health. People with diabetes are encouraged to follow the following guidelines: receive annual dilated eye exams, routine testing for microalbuminuria, and regular dental exams; conduct daily at-home foot exams; and achieve optimal blood pressure, cholesterol, and blood lipid control.

In Delaware, according to the 2012 BRFSS, about 50.8 percent of adults with diabetes took a class to learn how to manage their disease. Only two-thirds of Delaware adults report practicing critical daily self-management tasks: 65.8 percent check their blood sugar at least once per day and 66.3 percent reported conducting a daily foot exam. Of those reporting having diabetes, 89.6 percent reported going to the doctor at least once in the last year; 88.5 percent report having their HbA1C checked within the last year; and 79.7 percent report having their HbA1c checked two or more times a year. About 79.2 percent of people with diabetes report having an eye exam, in which their pupils were dilated, within the last year (Figure 6).

Figure 6. Percentage of adult Delawareans with diabetes following specific preventative measures, 2012.



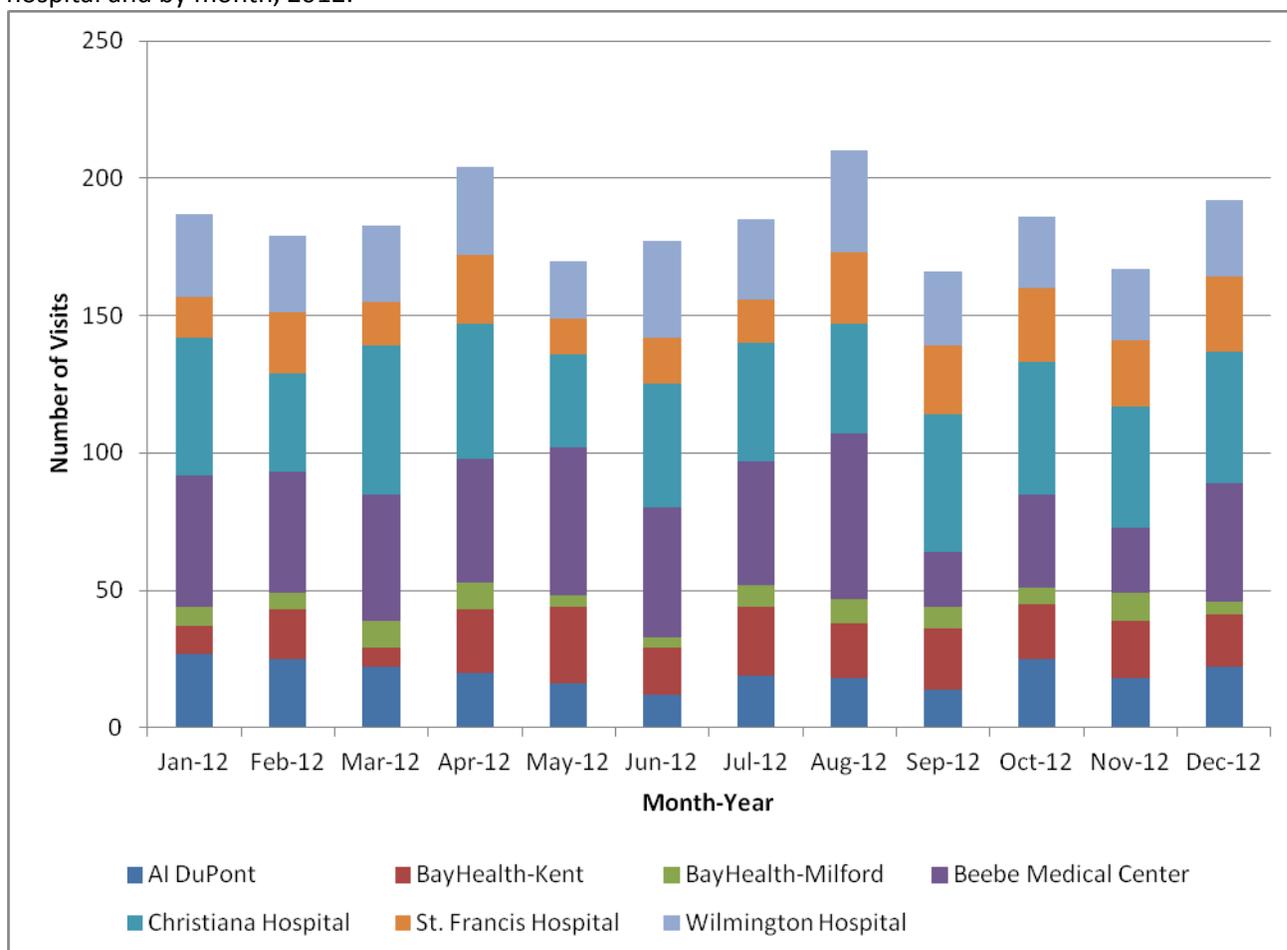
Source: Delaware Health and Social Services, Division of Public Health, Behavioral Risk Factor Survey (BRFS), 2012.

Complications

Diabetes-related complications include retinal disorders, ketoacidosis, coma, lower extremity amputations, heart and blood vessel diseases, stroke, and kidney failure. Diabetes is the leading cause of kidney failure, non-traumatic lower-limb amputations, and new cases of blindness among adults in the United States. Diabetes is a major cause of heart disease and stroke and is the seventh leading cause of death in the United States.¹

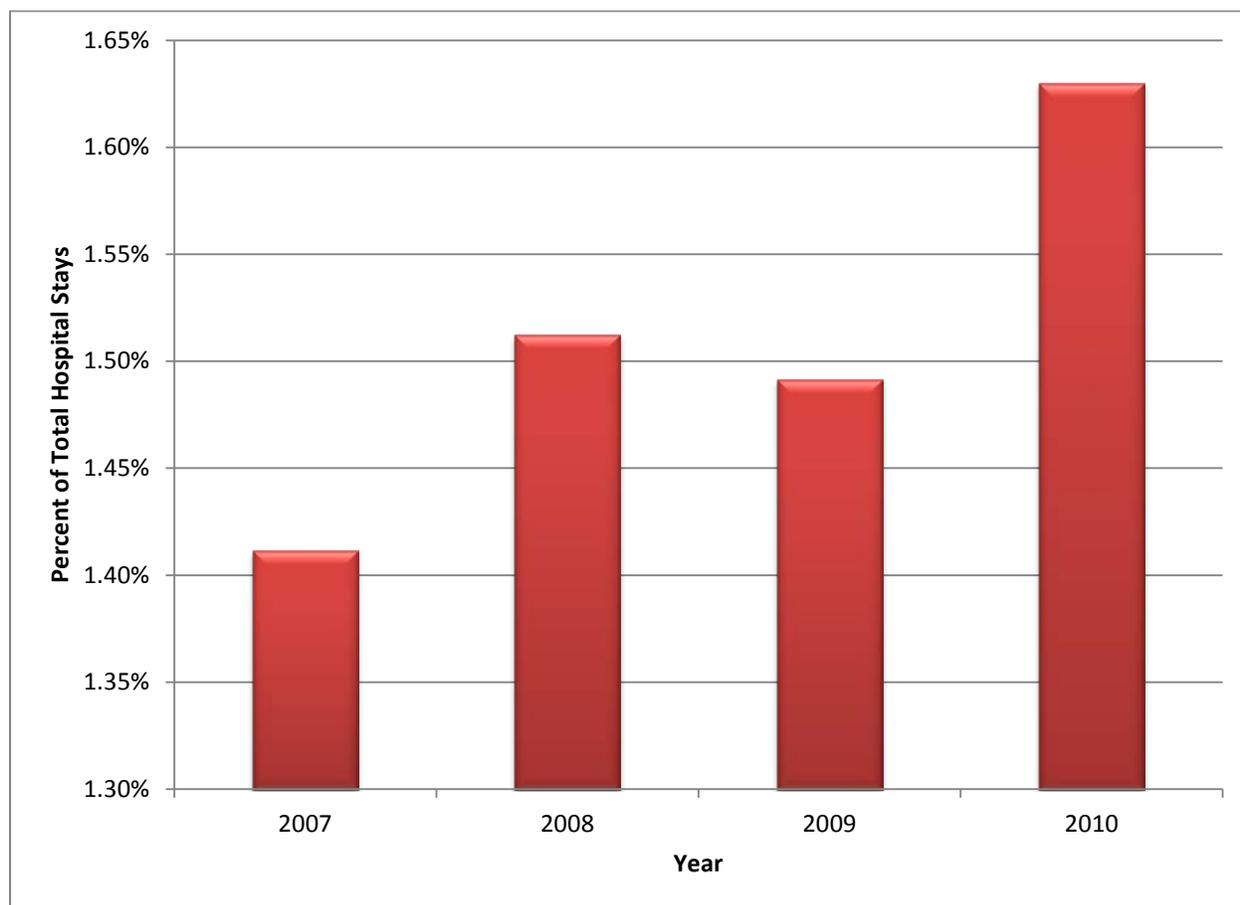
In Delaware during 2012, there were almost 200 hospital emergency department visits each month for diabetes or noticeable diabetes symptoms as a chief complaint. Approximately 85 percent of these visits resulted in hospital stays. Endocrine, nutritional and metabolic disease, and immunity disorders (Figure 7) accounted for approximately 40 percent of all Delaware hospital stays in 2012.

Figure 7. Delaware emergency department visits with a chief complaint of “diabetes syndrome” by hospital and by month, 2012.



Source: Delaware Health and Social Services, Division of Public Health, Delaware Electronic Reporting Surveillance System, Chief Complaint Data, 2012.

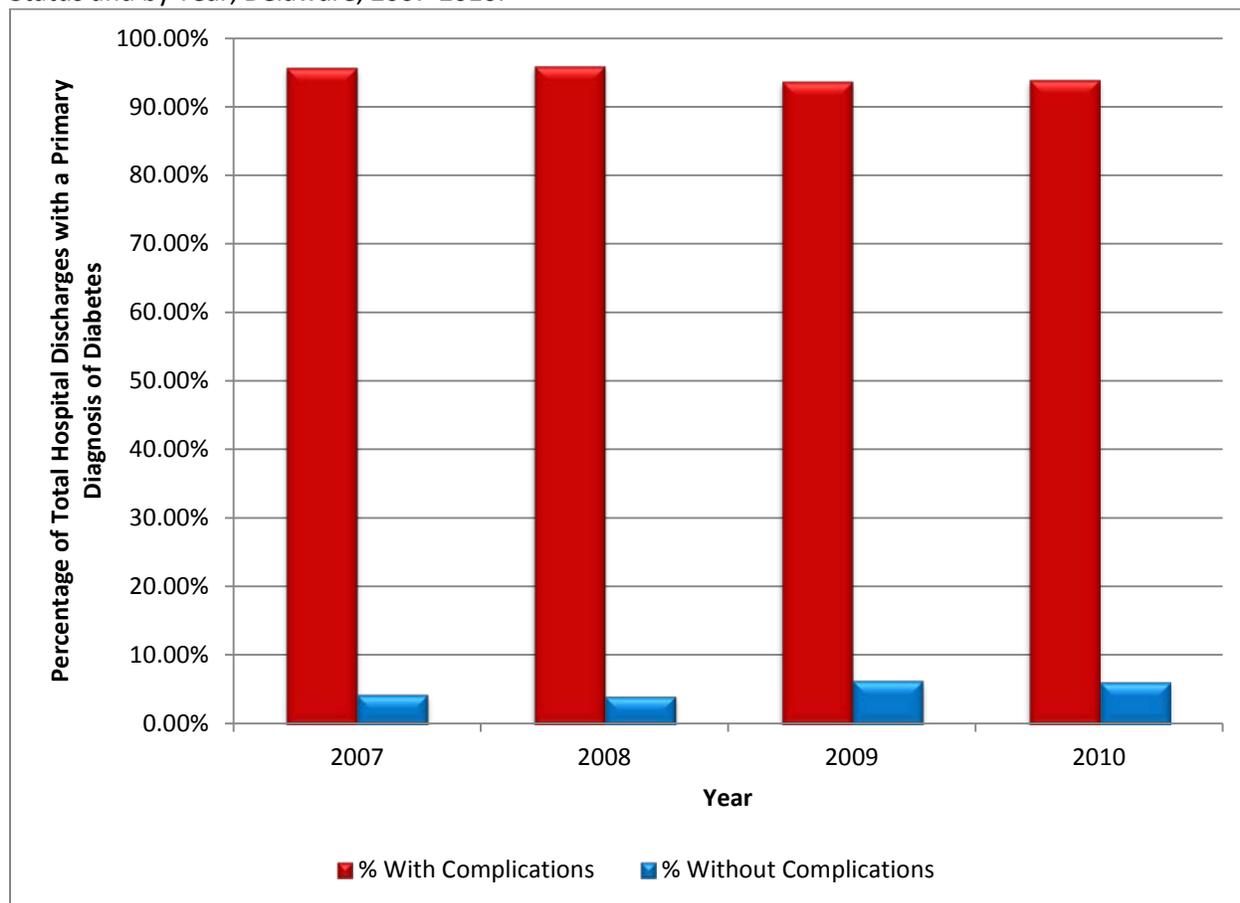
In Delaware in 2012, of all hospital stays, a primary diagnosis of diabetes accounts for over 1.63 percent, or 1,823 hospital stays. The number of diabetes hospital stays in Delaware has increased from 1.41 percent in 2007 to 1.63 percent in 2010 (Figure 8).

Figure 8. Percentage of total Delaware hospital stays with a primary diagnosis of diabetes, 2007-2010.

Source: Delaware Health and Social Services, Division of Public Health, Health Statistics Center, Hospital Discharge Data, 2007-2010.

While the total of primary diagnosis of diabetes hospital stays in Delaware only accounts for 1.63 percent of the total number of hospital stays, over 93 percent of those stays are listed as diabetes with complications (Figure 9). The total cost of stays with complications is staggeringly different than stays without complications. According to the 2011 *Delaware Hospital Discharge Summary Report*, stays without complications averaged a cost of \$10,707 in 2009. In contrast, stays with complications were almost double the financial burden, at an average cost of \$19,383 per stay.⁴

Figure 9. Percentage of Total Hospital Discharges with a Primary Diagnosis of Diabetes by Complication Status and by Year, Delaware, 2007-2010.



Source: Delaware Health and Social Services, Division of Public Health, Health Statistics Center, Hospital Discharge Data, 2007-2010.

Cost of Care

The American Diabetes Association estimates the total cost of diagnosed diabetes in 2012 to be \$245 billion, which includes \$176 billion (Table 2) in direct medical costs and \$69 billion in reduced productivity. This is a 41 percent increase since the previous estimate in 2007. Nationally, the average medical expenditure for people with diabetes is approximately \$13,700 total per year, with \$7,900 (57.7 percent) attributed directly to diabetes. On average, people with diabetes have medical expenditures that are 2.3 times higher than those without diabetes. Indirect costs for the employed population

include absenteeism (\$5 billion) and reduced productivity (\$20.8 billion). Among unemployed Americans, indirect costs include reduced productivity (\$2.7 billion), disease-related disability (\$21.6 billion), and early mortality (\$18.5 billion).⁵

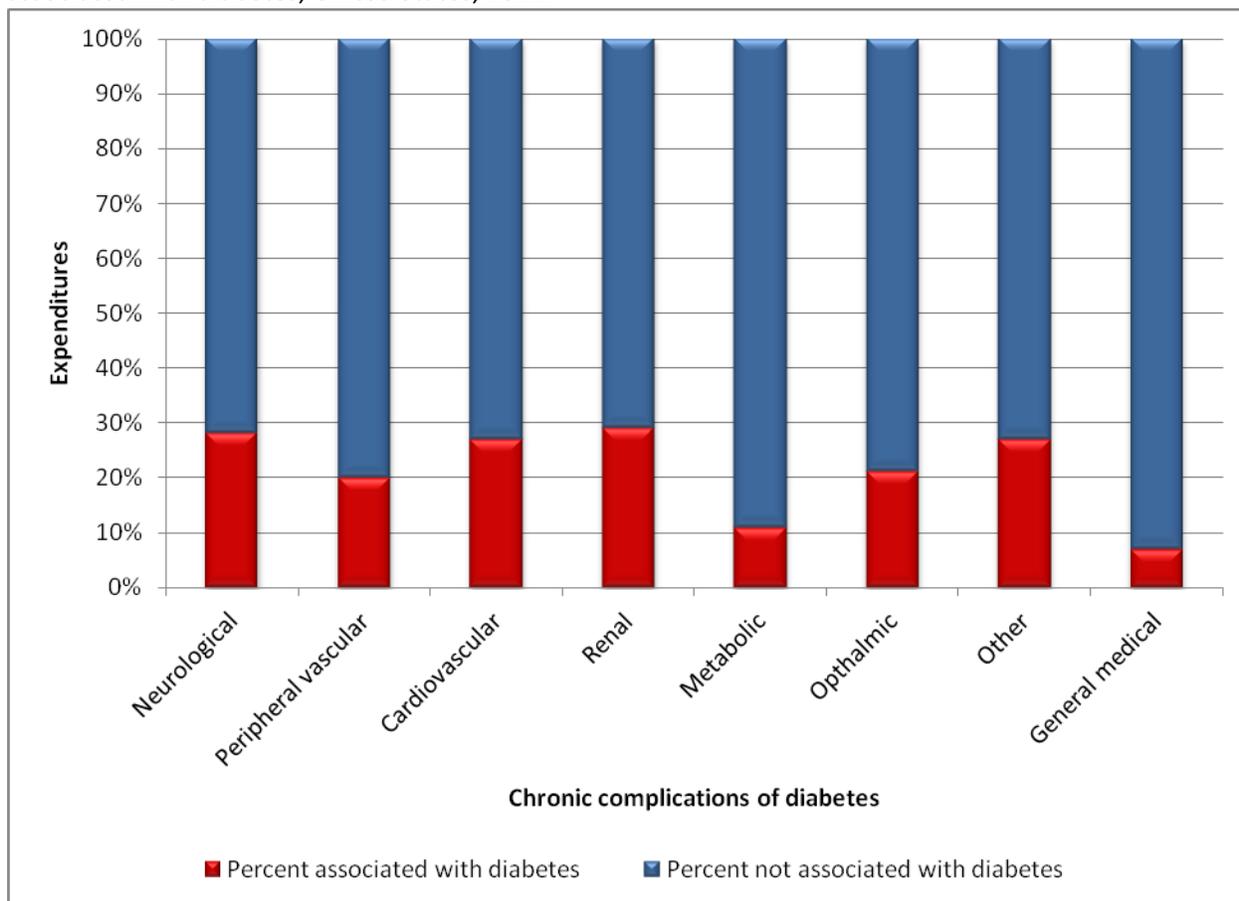
Table 2. Health care expenditures in the U.S. by diabetes status and type of services, 2012 (in millions of dollars).

| | | |
|---|------------------------|----------|
| <i>Institutional Care</i> | <i>\$90,652</i> | |
| Hospital inpatient | | \$75,872 |
| Nursing/residential facility | | \$14,748 |
| Hospice | | \$32 |
| <i>Outpatient Care</i> | <i>\$31,798</i> | |
| Physician office | | \$15,221 |
| Emergency department | | \$6,654 |
| Ambulance services | | \$218 |
| Hospital Outpatient | | \$5,027 |
| Home health | | \$4,466 |
| Podiatry | | \$212 |
| <i>Outpatient medications and supplies</i> | <i>\$53,369</i> | |
| Insulin | | \$6,157 |
| Diabetic supplies | | \$2,296 |
| Other anti-diabetic agents | | \$12,137 |
| Prescription medications | | \$31,716 |
| Other equipment and supplies | | \$1,063 |
| Total | \$175,819 | |

Source: American Diabetes Association. (2012). *Economic Diabetes Costs in the United States in 2012*. *Diabetes Care*, 36:1033-1046, published ahead of print March 6, 2013, doi:10.2337/dc12-2625.

The costs of diabetes-associated chronic complications, such as neurological, cardiovascular, and renal complications, are disproportionately high. The national prevalence of diabetes does not equate to the total percentage of expenditures related to diabetes for these conditions. The national diabetes prevalence rate for 2012 as estimated by the American Diabetes Association using the CDC's National Health Interview Survey is 7.0 percent. In contrast, for the same year, the percentage of expenditures for chronic conditions associated with diabetes by those with diabetes spans 7 percent for general medical to 30 percent for peripheral vascular (Figure 10).⁵

Figure 10. Percentage of expenditures of chronic complications associated with diabetes vs. not associated with diabetes, United States, 2012.



Source: American Diabetes Association. (2012). *Economic Diabetes Costs in the United States in 2012*. *Diabetes Care*, 36:1033-1046, published ahead of print March 6, 2013, doi:10.2337/dc12-2625.

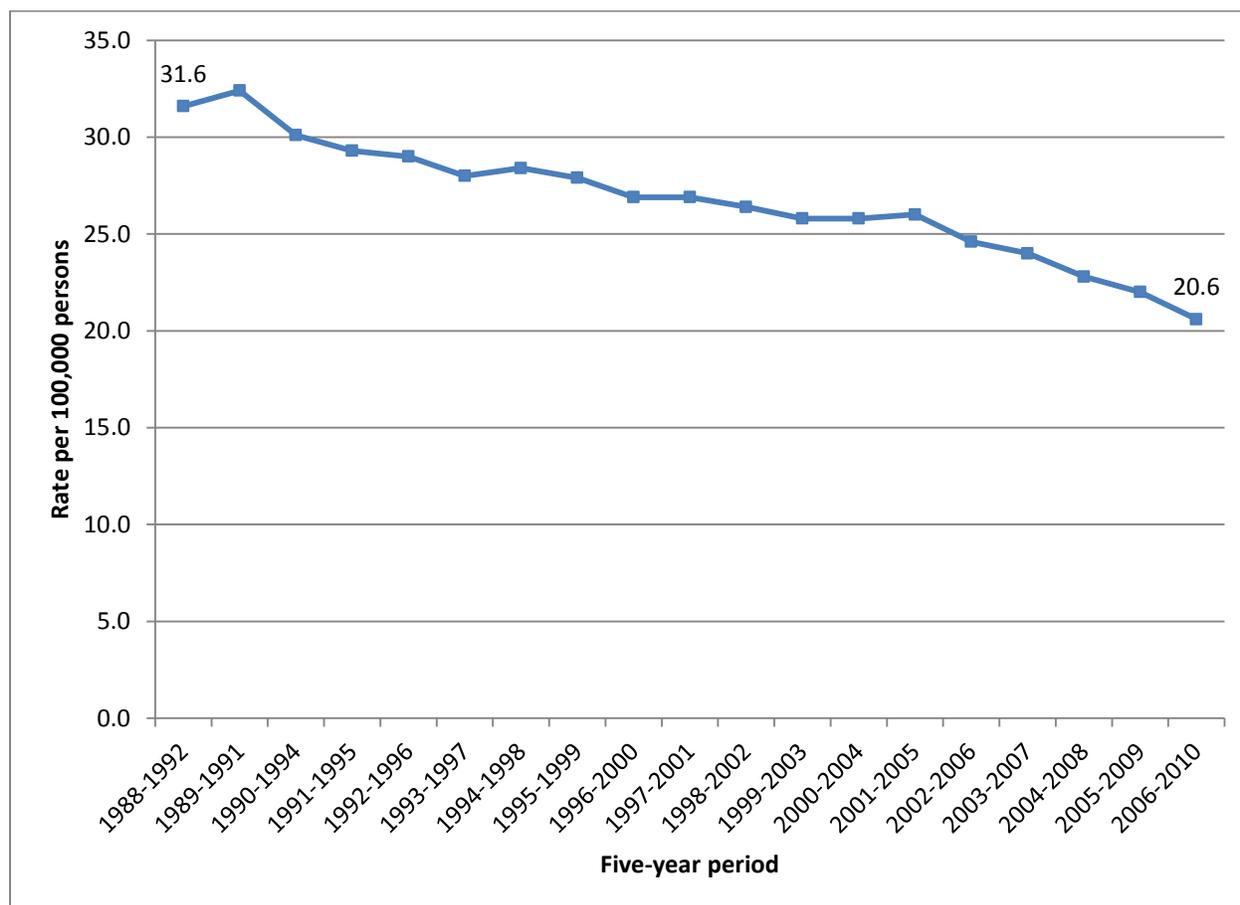
For Delaware in 2012, the American Diabetes Association estimates the total cost burden of diabetes at \$860 million. Direct medical costs are estimated at \$600 million and indirect costs are estimated at \$260 million.⁵

Mortality

The risk of death among people with diabetes is about twice that of people of similar age but without diabetes. According the Delaware Health Statistics Center, the five-year age-adjusted mortality rate for

diabetes is 20.6 per 100,000 deaths.⁶ As illustrated in Figure 11, there was a 35 percent decrease in overall age-adjusted mortality rates in Delaware between the periods 1988-1992 and 2006-2010.^{6,7}

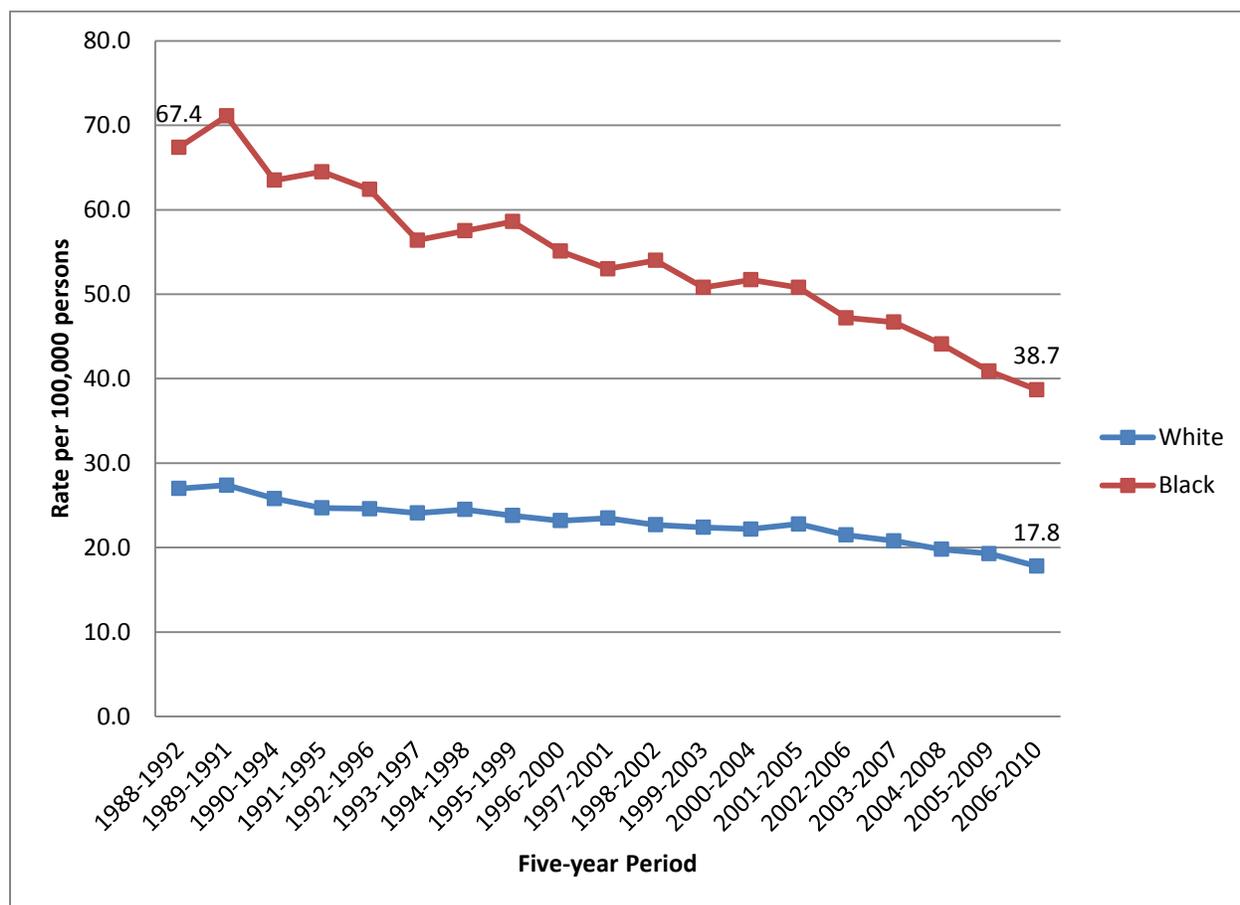
Figure 11. Five-year age-adjusted diabetes mortality rates in Delaware, 1988-2010.



Source: Delaware Vital Statistics Annual Report 2008, 2010.

Delawarean adult blacks experienced a 43 percent decrease in age-adjusted diabetes mortality rates from 1988-1992 to 2006-2010. Delawarean adult whites experienced a 34 percent decrease in age-adjusted diabetes mortality rates during the same time period. However, black age-adjusted mortality rates (38.7 per 100,000 deaths) were over twice as high as whites (17.8 per 100,000 deaths) during 2006-2010 (Figure 12). Both black male and female mortality rates during 2006-2010 in Delaware (45.0 per 100,000 deaths and 33.9 per 100,000 deaths, respectively) are twice as high as white male and female mortality rates during the same period (21.5 per 100,000 deaths and 14.6 per 100,000 deaths, respectively).^{6,7}

Figure 12. Five-Year Age-Adjusted Diabetes Mortality Rates by Race in Delaware, 1988-2010.



Source: Delaware Health Statistics Center. *Delaware Vital Statistics Annual Report, 2010*. Delaware Department of Health and Social Services, Division of Public Health: 2013; Delaware Health Statistics Center. *Delaware Vital Statistics Annual Report, 2008*. Delaware Department of Health and Social Services, Division of Public Health: 2010.

Support Services

An infrastructure exists for Delawareans who need help managing their diabetes. These programs provide technical support, provider and patient education, and resources for people with diabetes, those at risk for developing the disease, and their families.

- *Delaware Helpline*

The Delaware Helpline provides referrals for callers in need of diabetes services, medications, or supplies. The Delaware Helpline can be reached by calling 2-1-1 or 1-800-560-3372. Additional information can be found on their website: <http://www.delaware211.org/>.

- *Diabetes and Heart Disease Prevention and Control Program (DHDPCP)*, Delaware Division of Public Health

The DHDPCP provides educational materials, wellness promotion, statistics, education, and links to state and national resources. Additional information can be found on their website at <http://dhss.delaware.gov/dhss/dph/dpc/diabetes.html> or by calling 302-744-1020.

- *Delaware Diabetes Coalition, Inc. (DDC)*

DDC, Inc., strives to improve the quality of life for all Delawareans affected by diabetes. Its efforts focus on diabetes awareness, prevention, identification and dissemination of services, and advocacy. Each year, the Diabetes Wellness Expo provides educational training to more than 300 Delawareans with diabetes and their caregivers. Additional information can be found on their website <http://www.dediabetescoalition.org/> or by calling 302-737-1011.

- *National Diabetes Education Program (NDEP)*

Founded in 1997, the NDEP is a federally-sponsored initiative that involves public and private partners to improve treatment and outcomes for people with diabetes. NDEP also promotes early diagnosis and efforts to prevent or delay the onset of diabetes. The NDEP provides free educational resources. Additional information can be found on their website: www.ndep.nih.gov.

Conclusion

The prevalence of diabetes increased over the last two decades, both nationally and in Delaware. This increase coincided with increased unhealthy BMI. A higher prevalence of diabetes is observed in Delaware's black adults and those of advancing age. In addition, diabetes continues to be a leading cause of kidney failure, non-traumatic lower-limb amputations, new cases of blindness, heart disease, and stroke.

For Delawareans diagnosed with diabetes, preventative care and disease management is important to help prevent complications. Over half of Delawareans diagnosed with diabetes took a class to learn how to manage their disease. Most report going to the doctor at least once a year and having their HbA1C checked within the last year. Additionally, most people with diabetes also report having an eye exam in which their pupils were dilated with the last year.

The American Diabetes Association estimates the total cost of diagnosed diabetes in 2012 to be \$245 billion, a 41 percent increase since its 2007 estimate. Those with diabetes have medical expenditures 2.3 times higher than those without diabetes. Diabetes-associated chronic complications such as neurological, cardiovascular, and renal complications are disproportionately high, accounting for as much as 30 percent of total expenditures for the total population.

Although diabetes is the seventh leading cause of death in the United States, there was marked improvement in mortality for Delawareans with diabetes. Delaware's overall age-adjusted mortality rates decreased among people with diabetes from 31.6 per 100,000 in 1988-1992 to 20.6 per 100,000 in 2006-2010. Despite this decrease, mortality rates of black Delawareans with diabetes are twice as high as mortality rates of white Delawareans with diabetes.

Several support services exist for Delawareans who need help managing their diabetes. These programs provide technical support, provider and patient education, and resources for people with diabetes, those at risk for developing the disease, and their families.

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