

CONNECTICUT DIABETES STATISTICS REPORT, 2020

Estimates of Diabetes and Its Burden in Connecticut

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Diabetes in Connecticut At-A-Glance

October 2020



- An estimated 9.7% of Connecticut adults have diagnosed diabetes (types 1 and 2), or approximately 275,500 adults. An additional 91,500 adults are estimated to have undiagnosed diabetes (2018 Behavioral Risk Factor Surveillance System (BRFSS) data).
- Approximately 19,500 new cases of diabetes are diagnosed per year (2014-2018 BRFSS data).
- About 34.5% of all US adults have prediabetes. However, only 9.1% of Connecticut adults have been told that they have prediabetes (2016-2018 BRFSS data).
- Despite being risk factors for diabetes complications, approximately 13.8% of adults with diagnosed diabetes are current cigarette smokers, 83.6% are categorized as overweight or obese, 41.1% did not participate in leisure time physical activity, 69.8% have high blood pressure, and 62.5% have high blood cholesterol (2017/2018 BRFSS data).
- A number of health conditions occur with diabetes. Approximately 24.4% of adults with diagnosed diabetes have had a heart attack, stroke, or coronary heart disease, 11.2% have kidney disease, 10.8% are either blind or have serious difficulty seeing even with glasses, and 20.3% have periodontal disease (gum disease) (2016-2018 BRFSS data).
- Poorly controlled diabetes may lead to Emergency Department (ED) visits and inpatient hospitalizations. In 2018, there were over 111,000 ED visits with diabetes as any listed diagnosis among adults. Also, there were a total of 80,374 inpatient hospital discharges with diabetes as any listed diagnosis among adults.
- Age-adjusted hospitalization rates (AAHR) vary by race and ethnicity. Diabetes-related AAHRs are higher among Non-Hispanic Black or African American and Hispanic or Latino/a residents compared with non-Hispanic White Connecticut residents.
- In 2017, diabetes was the seventh leading cause of death in both the United States and Connecticut.
- Diabetes may lead to premature deaths. From 2013-2017 there were 4,063 diabetes-related deaths before the age of 75 years among Connecticut residents.
- Diabetes-related age-adjusted mortality rates (AAMR) and years of potential life lost (YPLL) vary by race and ethnicity. Non-Hispanic Black or African American residents have the highest diabetes-related AAMRs and YPLL compared to residents of other races and ethnicities.
- Diabetes-related complications can be prevented or delayed through the receipt of regular medical care, self-management of diabetes, and maintaining a healthy lifestyle. Approximately 94.4% of Connecticut adults (18+ years) with diagnosed diabetes have health care insurance, 94.5% have a doctor or health care provider, 75% had at least two (2) A1C tests in the past year, and 51.4% have ever taken a class on how to manage their diabetes (2016-2018 BRFSS data). Also, only 12.0% of Connecticut adults with diagnosed diabetes met physical activity guidelines and only 16.3% consume at least five fruits or vegetables a day (2015 and 2017 BRFSS data).
- The Connecticut Department of Public Health promotes the use of evidence-based strategies to manage diabetes and prevent or delay onset of type 2 diabetes in high-burden populations and communities through funding from the Centers for Disease Control and Prevention (CDC).

About Diabetes

Diabetes is a serious condition that can lead to many health problems and incurs large costs not only for individuals, but also for communities, businesses, governments, and other organizations. Diabetes is characterized by blood glucose levels that are above normal. Blood glucose levels are elevated in diabetes because either the body does not make enough insulin, or the body does not use insulin as well as it should. (1)

There are three main types of diabetes. Type 1 diabetes is caused by the destruction of insulin-producing cells, leading to insulin deficiency and making insulin treatment necessary. Approximately 5% of persons with diabetes are type 1. Type 2 diabetes is characterized by insulin resistance, a disorder in which the body cannot use insulin properly. Approximately 95% of persons with diabetes are type 2. The third type is gestational diabetes which develops in pregnant women who have never had diabetes. While gestational diabetes typically lasts only during pregnancy, it does increase a woman's risk of developing type 2 diabetes later in life. (1)

About This Report

The *Connecticut Diabetes Statistics Report, 2020* is a publication of the Connecticut Department of Public Health. The statistics and information presented in this report can help in planning targeted efforts that aim to prevent type 2 diabetes and control diabetes in Connecticut.

This report provides information on the prevalence of diabetes, prediabetes, and associated risk factors, the incidence of diabetes, hospitalizations, and deaths. These statistics are presented for various demographic categories (e.g., gender and race and ethnicity). In some cases, Asian, Pacific Islander, American Indian or Alaskan Native, other race, and multiracial adults are reported as Non-Hispanic Other due to small numbers and unreliable estimates.

Data tables and information on the methods used are provided in the *Detailed Data Tables* and *Detailed Methods and Data Sources* sections at the end of this report.

Results

Prevalence of Diabetes among Adults

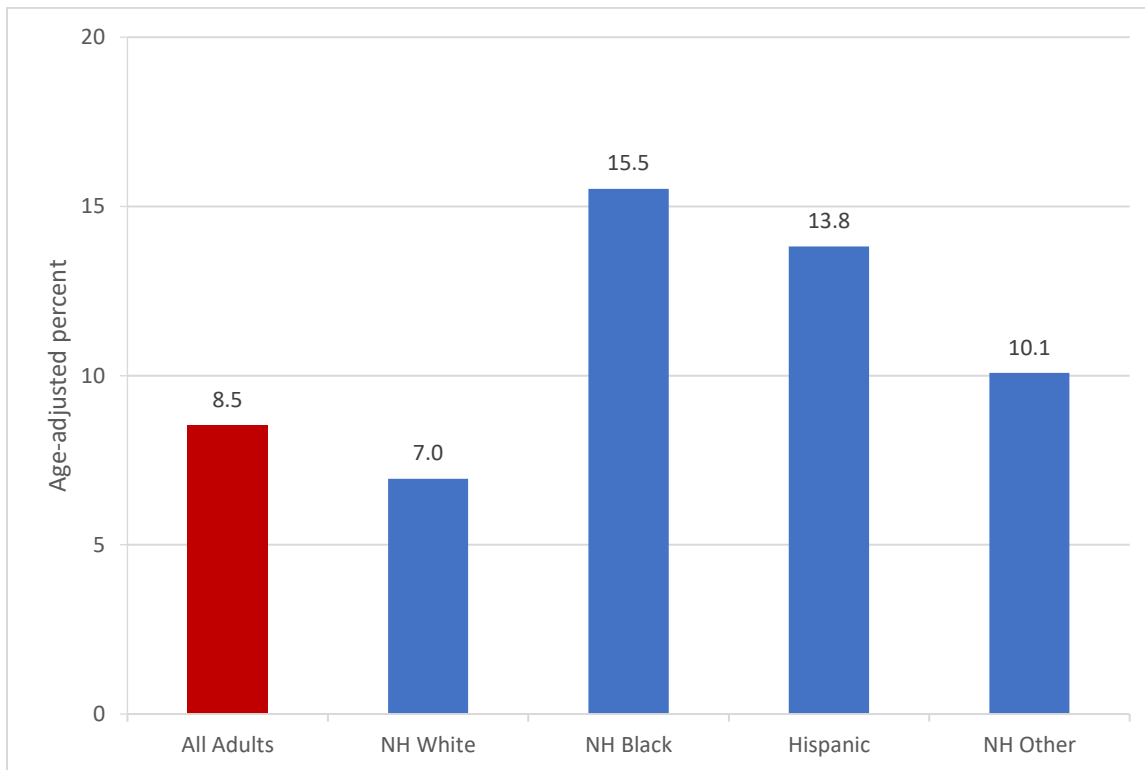
Among Connecticut adults age 18 years and older, unadjusted estimates for 2018 are:

- Approximately 275,500 adults – or 9.7% of Connecticut adults – have diagnosed diabetes.
 - According to the literature, approximately 25% of people with diabetes are undiagnosed.
 - Using the estimated prevalence of diagnosed diabetes among adults, it can be approximated that over 367,000 adults in Connecticut have diabetes (diagnosed and undiagnosed) and that over 91,500 adults have undiagnosed diabetes.
 - These estimates include type 1 and type 2 diabetes.
- The prevalence of diagnosed diabetes increases with age. For example, adults age 65+ years are 8.5 times more likely to have diabetes compared with adults age 18-44 years old.
- For more information see Detailed Table 1.

Among Connecticut adults aged 18 years or older, age-adjusted data for 2016–2018 indicate the following:

- Males have a higher prevalence of diagnosed diabetes compared with females (9.5% vs. 7.7%).
- The prevalence of diagnosed diabetes is highest among non-Hispanic Black or African American (15.5%) and Hispanic or Latino/a (13.8%) residents, followed by non-Hispanic Other or Multiracial (10.1%) and non-Hispanic White (7.0%) residents. [Figure 1]
- Among adults, the prevalence of diagnosed diabetes varies by educational attainment. An estimated 16.2% of adults with less than a high school education have diabetes compared with 10.1% of adults with a high school diploma, 8.3% with some college education, and 5.1% of college graduates.
- Furthermore, the prevalence of diagnosed diabetes varies by annual household income. For example, 13.8% of adults with annual household incomes of less than \$25,000 have diagnosed diabetes versus 7.4% of adults with annual household income of \$25,000 or more.
- For more information see Detailed Table 2.

Figure 1. Age-adjusted prevalence of diagnosed diabetes among Connecticut adults (18+ years) by race and ethnicity, 2016-2018 Behavioral Risk Factor Surveillance System (BRFSS) data

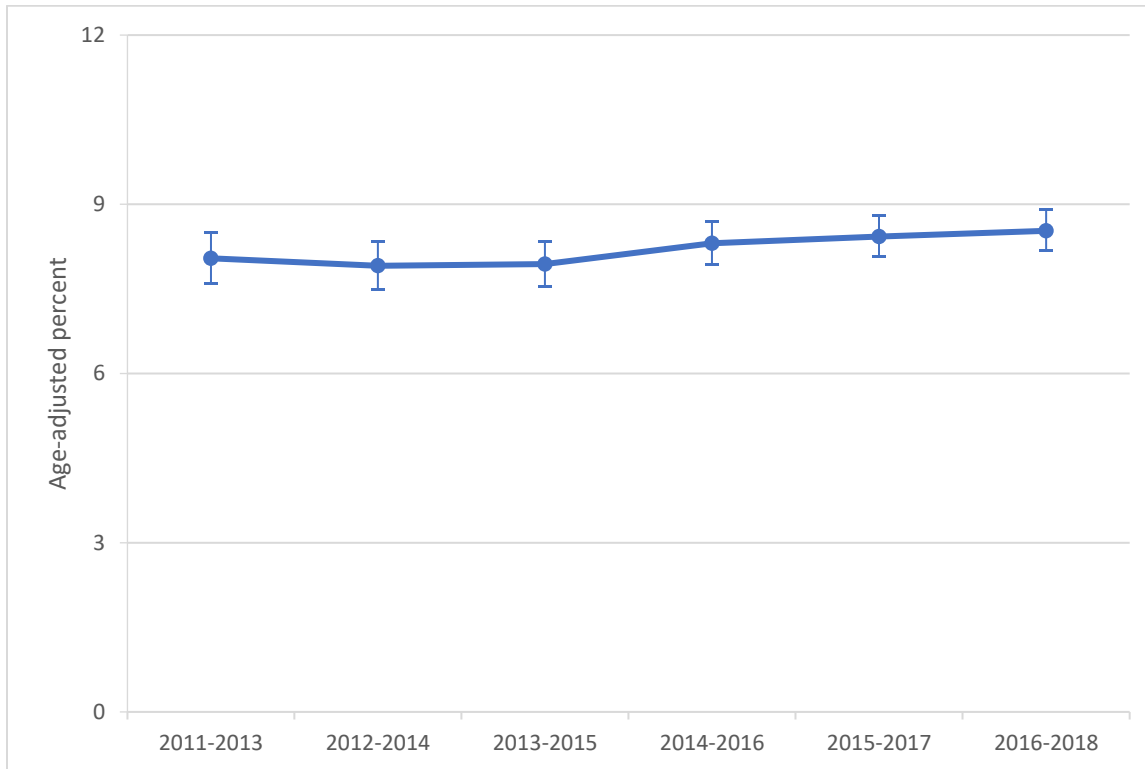


NH = Non-Hispanic or Latino/a

Age-adjusted, three-year aggregated data show that:

- The prevalence of diagnosed diabetes among Connecticut adults remained stable over time.
- For example, approximately 8.0% of adults had diabetes in 2011-2013 compared with 8.5% in 2016-2018. [Figure 2]
- For more information see Detailed Table 3.

Figure 2. Age-adjusted prevalence of diagnosed diabetes among Connecticut adults (18+ years) over time with 95% confidence intervals, 2011-2018 three-year aggregates of Behavioral Risk Factor Surveillance System (BRFSS) data



Diagnosed Diabetes Prevalence by Health District/Department

BRFSS data were analyzed by local health district/department to determine the geographic distribution of various indicators. (2) [Data not shown]

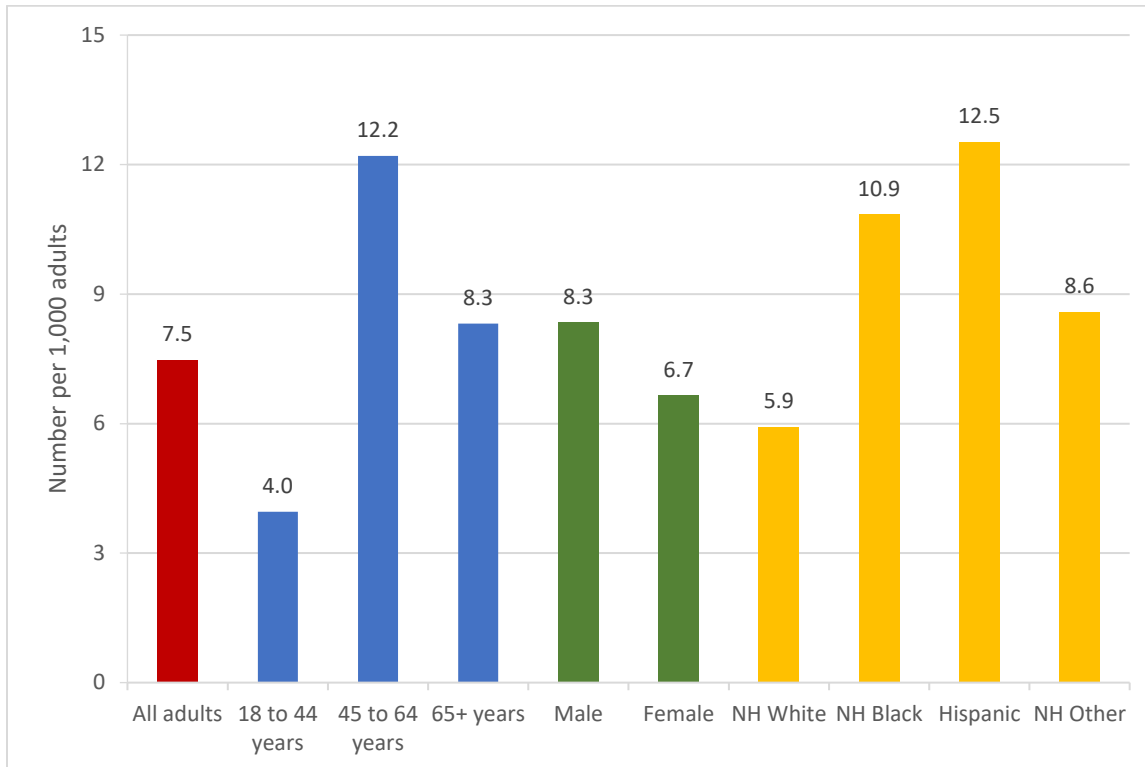
- Adults represented by health districts in eastern Connecticut were more likely to have a higher prevalence of diagnosed diabetes compared with the statewide average.
- Also, adults represented by health departments in Waterbury, New Britain, Hartford, and Bridgeport have a higher prevalence of diagnosed diabetes compared with the statewide average.

Newly Diagnosed Diabetes (Incidence)

Among Connecticut adults age 18 years and older, unadjusted 2014-2018 data indicate:

- Approximately 19,500 new cases of diabetes – or 7.5 per 1,000 adults – are diagnosed per year.
- The incidence of diagnosed diabetes is highest among adults aged 45 to 64 years. [Figure 3]
- The differences in age-adjusted diabetes incidence by gender did not reach statistical significance.
- The estimated incidence of diabetes of Hispanic or Latino/a adults is over twice the incidence among non-Hispanic White adults. [Figure 3]
- For more information see Detailed Table 4.

Figure 3. Crude incidence of diagnosed diabetes among Connecticut adults (18+ years) by age and race and ethnicity (per 1,000 adults), 2014-2018 Behavioral Risk Factor Surveillance System (BRFSS)

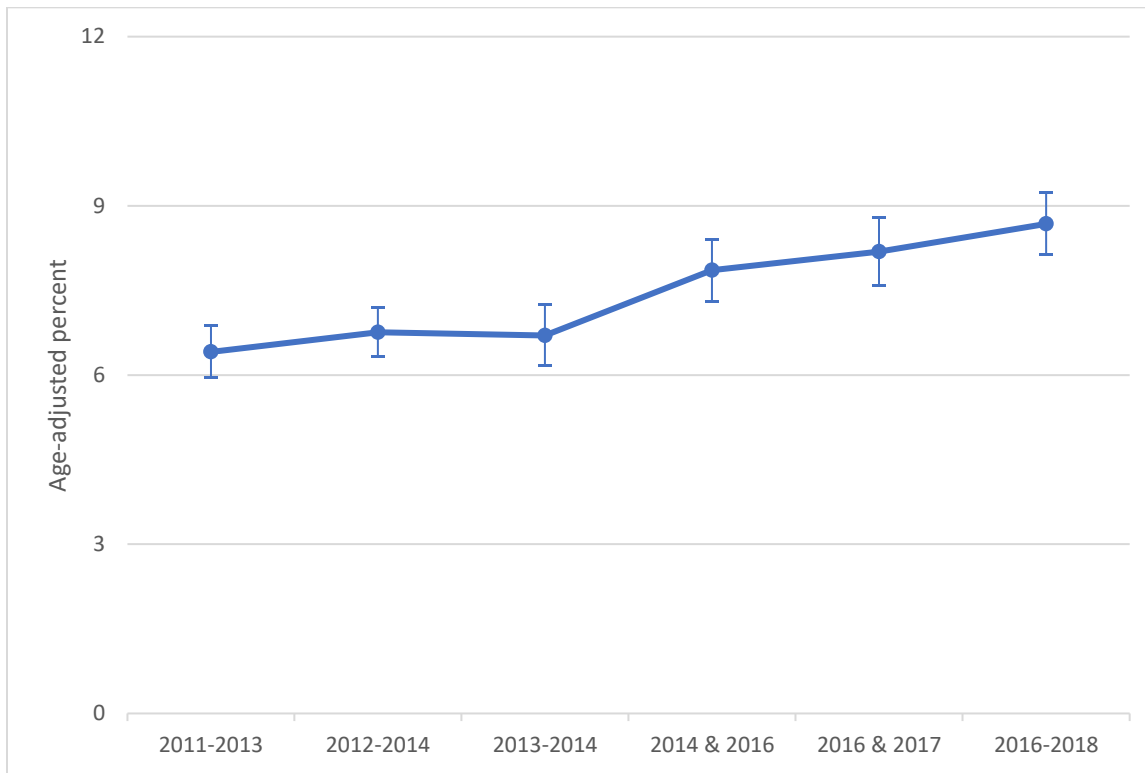


NH = Non-Hispanic or Latino/a

Prevalence of Prediabetes Among Adults

- Prediabetes is a strong risk factor for type 2 diabetes.
- Prediabetes is a condition in which a person's blood glucose levels are higher than normal but are not high enough to be considered diabetes.
- National statistics, based on fasting glucose or A1C levels, indicate that about 34.5% of all US adults have prediabetes. (3)
 - However, only 15.3% of US adults with prediabetes have been told by a health professional that they had this condition.
 - Only 9.1% of Connecticut adults have been told that they have prediabetes (2016-2018 BRFSS data).
 - The prevalence of prediabetes awareness has increased 35% since 2011. This increasing trend may be attributable to the National Prediabetes Awareness Campaign. This campaign was developed by the Centers for Disease Control and Prevention (CDC), the American Diabetes Association, American Medical Association, and Ad Council. The National Prediabetes Awareness Campaign consists of unique, lighthearted public service announcements, distributed through a variety of communications outlets and channels to encourage people to find out their prediabetes risk. [Figure 4]
- For more information see Detailed Tables 5 and 6.

Figure 4. Age-adjusted prevalence of prediabetes awareness among Connecticut adults (18+ years) over time with 95% confidence intervals, 2011-2018, 2- and 3-year aggregated data, Behavioral Risk Factor Surveillance System (BRFSS) data

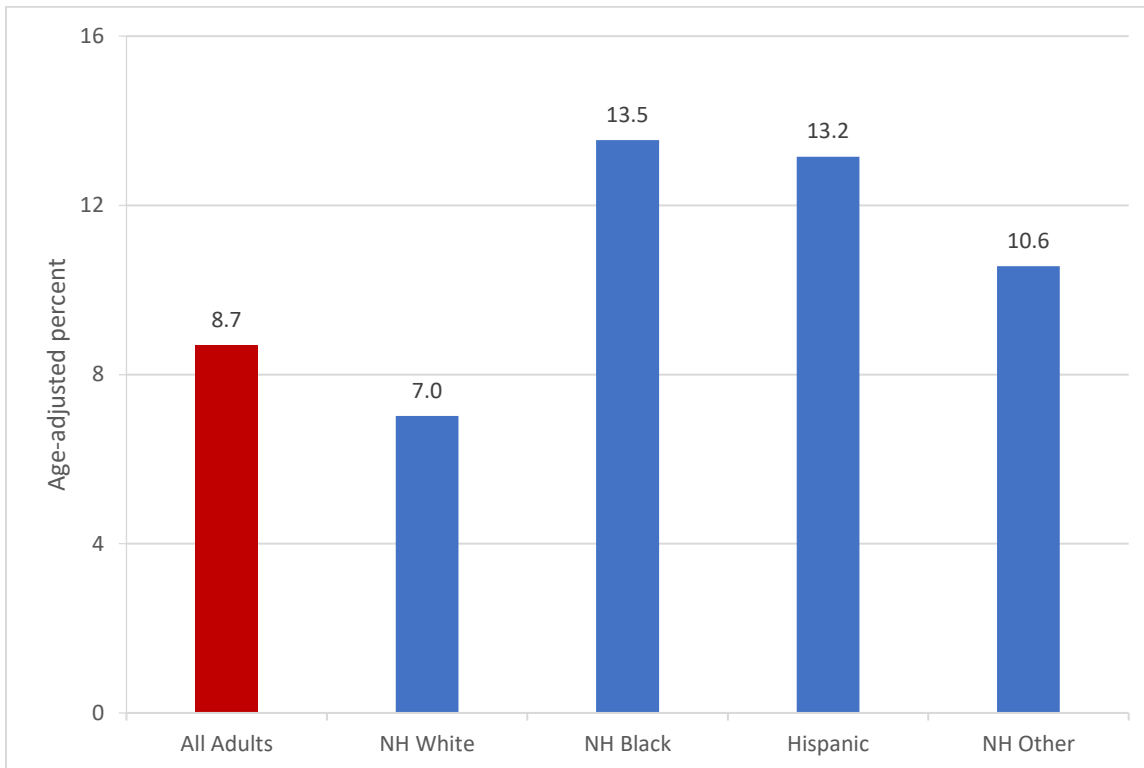


Among Connecticut adults aged 18 years or older, age-adjusted data for 2016–2018 indicate:

- The prevalence of prediabetes awareness did not vary significantly by gender or educational attainment.
- The prevalence of prediabetes was higher among non-Hispanic Black or African American and Hispanic or Latino/a adults compared with non-Hispanic White adults. Non-Hispanic adults of other or multiple races also have a higher prevalence of prediabetes compared with non-Hispanic White adults. [Figure 5]
- The prevalence of prediabetes varies by annual household income. For example, the prevalence of prediabetes among adults with annual household incomes of less than \$25,000 is 11.9% compared to 8.3% of adults with annual household incomes of \$25,000 or more.
- Fasting blood glucose, glucose tolerance, or hemoglobin A1C tests can be used to diagnose prediabetes and diabetes.
 - People with risk factors for prediabetes should talk to their doctor about being tested for prediabetes and diabetes.
 - These risk factors are being overweight or obese, being 45 years or older, having a parent or sibling with type 2 diabetes, being physically active less than three times a week, ever having gestational diabetes or giving birth to a baby who weighed more than nine pounds, and having polycystic ovary syndrome.

- Also, African Americans, Hispanic or Latino/a Americans, American Indians, Pacific Islanders, and some Asian Americans are at higher risk for prediabetes and type 2 diabetes.
- People whose test results indicate they have prediabetes should have their blood glucose levels checked again in six months to one year. People with blood glucose levels that are in the normal range should get tested every three years, or as recommended by a doctor.
- For more information see Detailed Table 7.

Figure 5. Age-adjusted prevalence of prediabetes awareness among Connecticut adults (18+ years) by race and ethnicity, 2016-2018 Behavioral Risk Factor Surveillance System (BRFSS) data

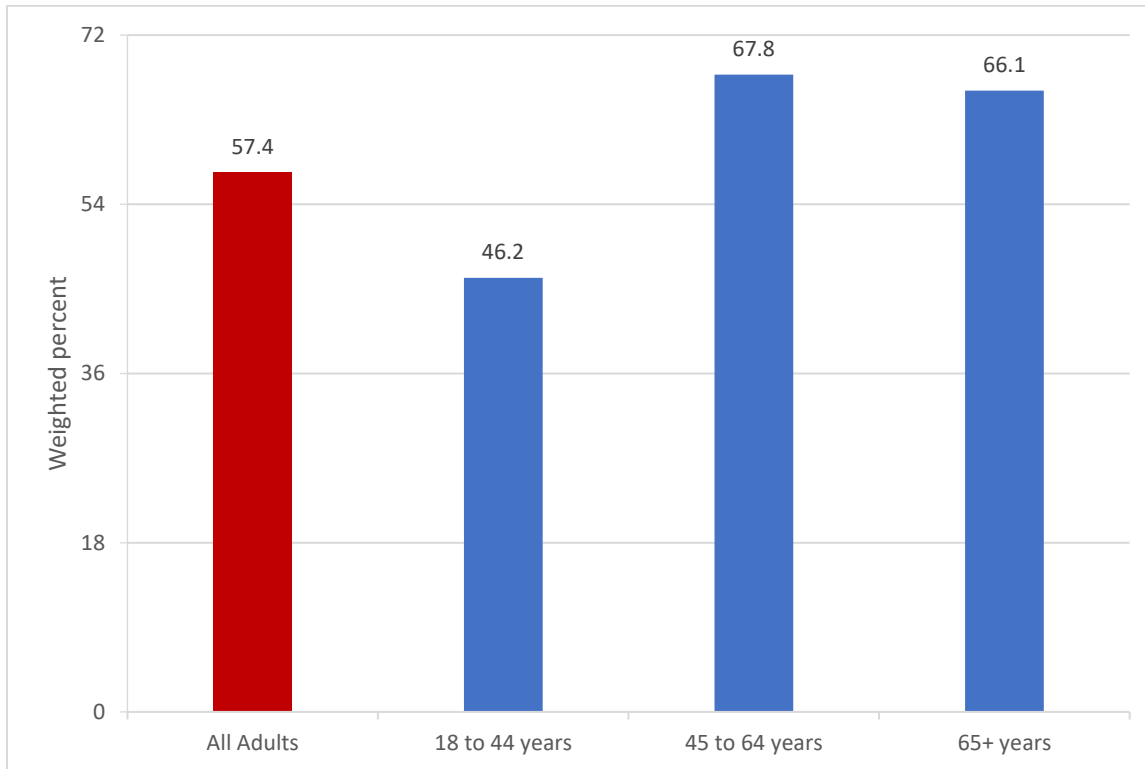


NH = Non-Hispanic or Latino/a

Among Connecticut adults age 18 years and older, unadjusted estimates for 2016-2018 are:

- An estimated 57.4% have had a test for high blood sugar or diabetes within the past three years.
- Older adults are more likely to have been tested for diabetes in the past three years. For example, 67.8% of adults age 45 to 64 years have been tested compared with 46.2% of adults age 18 to 44 years. [Figure 6]
- For more information see Detailed Table 8.

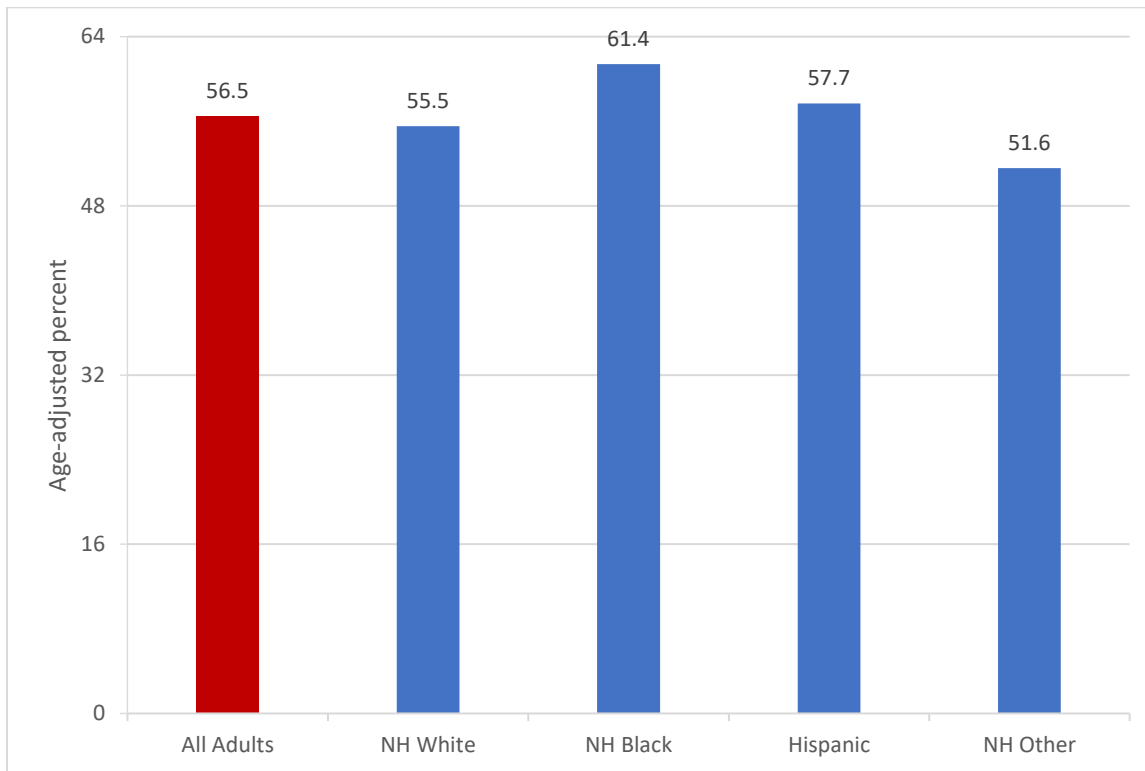
Figure 6. Prevalence of having had a test for high blood sugar or diabetes within the past three years among Connecticut adults (18+ years) by age, 2016-2018 Behavioral Risk Factor Surveillance System (BRFSS) data



Among Connecticut adults aged 18 years or older, age-adjusted data for 2016–2018 indicate:

- Non-Hispanic Black or African American adults have the highest prevalence of having been tested for diabetes in the past three years. [Figure 7]
- Adults who have education beyond a high school diploma are more likely to have been tested for diabetes (58.0%) compared with adults whose educational attainment is a high school diploma or less (54.0%).
- Approximately 57.3% of adults with health care coverage have been tested compared with 44.1% of adults without health care coverage.
- Adults whose weight status is classified as overweight or obese are more likely to have been tested for diabetes compared with adults whose weight status is not classified as overweight or obese (60.1% vs. 50.0%).
- For more information see Detailed Table 9.

Figure 7. Age-adjusted prevalence of having had a test for high blood sugar or diabetes within the past three years among Connecticut adults (18+ years) by race and ethnicity, 2016-2018 Behavioral Risk Factor Surveillance System (BRFSS) data



NH = Non-Hispanic or Latino/a

Risk Factors for Diabetes-Related Complications

- Diabetes can affect many parts of the body. Smoking, being overweight or obese, being physically inactive, having high blood pressure, and having high cholesterol may increase the risk for developing diabetes-related complications.
- Diabetes, smoking, high blood pressure, and high cholesterol can damage blood vessels causing heart disease, the leading cause of death in the United States and Connecticut.
- Nicotine, unhealthy weight status, and physical inactivity can affect blood sugar and may lead to the need for larger doses of insulin control and manage diabetes. (4) (5) (6)
- For more information see Detailed Table 10.

Cigarette Smoking

Among Connecticut adults (18+ years) with diagnosed diabetes, 2018 data indicate:

- An estimated 13.8% of adults with diagnosed diabetes are current cigarette smokers; approximately 37.3% are former smokers; and 48.9% never smoked cigarettes.

Overweight and Obesity

- Body Mass Index (BMI) is a person's weight in kilograms divided by the square of height in meters. A high BMI can be an indicator of high body fatness. (7)

- BRFSS data from 2018 estimate that 83.6% of Connecticut adults (18+ years) with diagnosed diabetes have a BMI categorized as overweight or obese, defined as a body mass index (BMI) of 25 kg/m² or higher, specifically:
 - 32.0% have a BMI considered overweight (BMI of 25.0 to 29.9 kg/m²);
 - 41.6% have a BMI classified as obese (BMI of 30.0 to 39.9 kg/m²); and
 - 10.1% have a BMI classified as extreme obesity (BMI of 40.0 kg/m² or higher).

Physical Inactivity

- Leisure time physical inactivity is defined as participating in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise during the past month, other than the adult's regular job.
- In 2018, 41.1% of Connecticut adults (18+ years) with diagnosed diabetes did not participate in leisure time physical activity.

High Blood Pressure

- High blood pressure (HBP) is a condition where the pressure in the arteries – blood vessels that carry blood away from the heart – is too high. HBP damages or weakens the arteries increasing the risk of rupture or clog. HBP also forces the heart to pump harder, which ultimately weakens the heart muscle. (8) (9)
- An estimated 69.8% of Connecticut adults (18+ years) with diagnosed diabetes have been told that they have high blood pressure (2017 BRFSS data).

High Blood Cholesterol

- Cholesterol is a waxy, fat-like substance that the human body needs to function normally. However, when there is an excess of cholesterol in the blood, it builds up on artery walls and is called plaque. This build-up of plaque narrows and hardens the arteries and is a major risk factor for coronary heart disease. (10) (11)
- BRFSS data from 2017 indicate that approximately 62.5% of Connecticut adults (18+ years) with diagnosed diabetes have been tested for and told that they have high blood cholesterol.

Coexisting Conditions

High blood sugar associated with diabetes causes many people with diabetes to often have coexisting conditions such as cardiovascular diseases, kidney disease, and vision disability.

For more information see Detailed Table 11.

Cardiovascular Diseases

- High blood sugar can damage blood vessels and the nerves that control the heart leading to cardiovascular diseases. (12)
 - An estimated 24.4% of adults with diagnosed diabetes have ever been told by a health professional that they have had a heart attack, stroke, or coronary heart disease. In comparison, 5.7% of adults without diagnosed diabetes have been told that they have at least one of these cardiovascular diseases (2016-2018 BRFSS data).

Kidney Disease

- High blood sugar also damages the blood vessels and nerves of the kidneys reducing the kidneys' ability to filter waste (called chronic kidney disease). Chronic kidney disease can cause kidney failure resulting in the need for dialysis or a kidney transplant. (8)
 - Adults with diagnosed diabetes are nearly six times as likely to have ever been told by a health professional that they have kidney disease compared with adults who do not have diagnosed diabetes (11.2% versus 1.9%). (2016-2018 BRFSS data)

Vision Disability

- In addition to damaging the blood vessels of the heart and kidneys, high blood sugar may damage the small blood vessels of the eyes. The new blood vessels may leak causing vision loss. People with diabetes are also more likely to develop cataracts and glaucoma. (8)
 - An estimated 10.8% of adults with diagnosed diabetes are either blind or have serious difficulty seeing even with glasses compared with 3.4% of adults who do not have diagnosed diabetes (2016-2018 BRFSS data).

Periodontal Disease

- High blood sugar associated with diabetes can cause high sugar in saliva resulting in tooth decay. Also, people with diabetes are more like to have gum disease which can cause increase blood sugar levels. (8)
 - Adults with diagnosed diabetes are 1.8 times more likely to have periodontal disease (gum disease) compared with adults who do not have diagnosed diabetes (20.3% versus 11.5%) (2016 & 2018 BRFSS data).

Complications of Poorly Controlled Diabetes

Poorly controlled diabetes can lead to variety of disabling complications and life-threatening events requiring Emergency Department (ED) visits and inpatient hospitalizations (see “Detailed Methods and Data Sources” for ICD-10 codes and other definitions).

- Hyperglycemic crisis occurs in type 1 or type 2 diabetes when high blood sugar goes untreated. This may be a result of illness, stress, hormones, or exercising or eating more than planned. (13)
 - Diabetes Ketoacidosis (DKA) occurs when the body does not have enough insulin and, therefore, cannot not use glucose for energy. As a result, the body breaks down fats for energy and produces ketones. Ketones are waste products that the body excretes in the urine. However, the body is unable to eliminate all the ketones which then build up in the blood. This could be fatal if not treated immediately. DKA is most likely to occur in people with type 1 diabetes. (13)
 - Hyperosmolar hyperglycemic syndrome occurs most often with type 2 diabetes when blood sugar levels are extremely high for a long period of time. The body attempts to clear the glucose through the urine, leading to frequent urination that may result in severe dehydration. (14)

- Hypoglycemia, or low blood sugar, may be severe enough to affect the brain causing difficulty concentrating, confusion, and blurred vision. Starving the brain of glucose for too long may lead to seizures or comas. (15)
- Non-traumatic lower-extremity amputations (NLEA) are amputations due to nerve damage, circulation problems, and foot infections not resulting from trauma. Poorly controlled diabetes and other modifiable risk factors (ex. high blood pressure and high cholesterol) lead to an increased risk for NLEA.

Emergency Department (ED) Visits

In 2018, there were over 111,000 ED visits with diabetes as any listed diagnosis (diabetes-related) among adults (18+y), including:

- 131 for hyperglycemic crisis (0.4 per 1,000 adults with diabetes).
- 1,804 for hypoglycemia (4.9 per 1,000 adults with diabetes). [Table 1]

Table 1. Number and crude rate per 1,000 adults with diabetes-related ED visits among Connecticut adults, Connecticut Inpatient Hospitalization and Emergency Department Visit Dataset, 2018 data.

Diagnosis	Number of ED Visits	Crude rate per 1,000
Diabetes as any listed diagnosis	111,511	303.6
Hyperglycemic crisis	131	0.4
Diabetic ketoacidosis	120	0.3
Hyperosmolar hyperglycemic syndrome	11	0.1
Hypoglycemia	1,804	4.9

Inpatient Hospitalizations

In 2018, there were a total of 80,374 inpatient hospital discharges with diabetes as any listed diagnosis among Connecticut adults (18+y), or 218.8 per 1,000 adults with diabetes. These discharges included:

- 70,675 with cardiovascular diseases as any listed diagnosis (192.4 per 1,000 adults with diabetes), including:
 - 46,769 with heart disease (127.3 per 1,000 adults with diabetes).
 - 6,031 with stroke (16.4 per 1,000 adults with diabetes).
- 840 for non-traumatic lower-extremity amputations (2.3 per 1,000 adults with diabetes).
- 2,218 for hyperglycemic crisis (6.0 per 1,000 adults with diabetes).
- 500 for hypoglycemia (1.4 per 1,000 adults with diabetes). [Table 2]

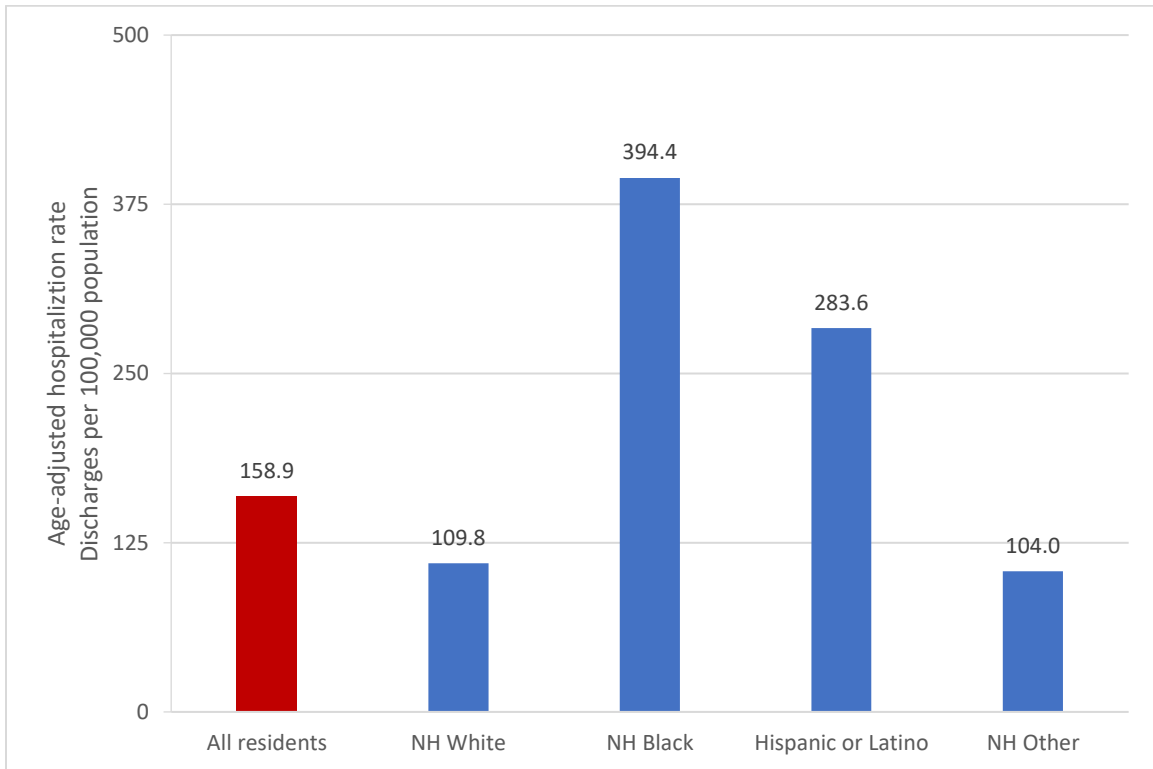
Table 2. Number and crude rate per 1,000 adults with diabetes of diabetes-related hospital discharges among Connecticut adults, Connecticut Inpatient Hospitalization and Emergency Department Visit Dataset, 2018 data.

Diagnosis	Number of Hospital Discharges	Crude rate per 1,000
Diabetes as any listed diagnosis	80,374	218.8
Cardiovascular disease	70,675	192.4
Heart disease	46,769	127.3
Stroke	6,031	16.4
Non-traumatic lower-extremity amputation	840	2.3
Hyperglycemic crisis	2,218	6.0
Diabetic ketoacidosis	1,877	5.1
Hyperosmolar hyperglycemic syndrome	342	0.9
Hypoglycemia	500	1.4

Inpatient Hospitalizations by Race and Ethnicity

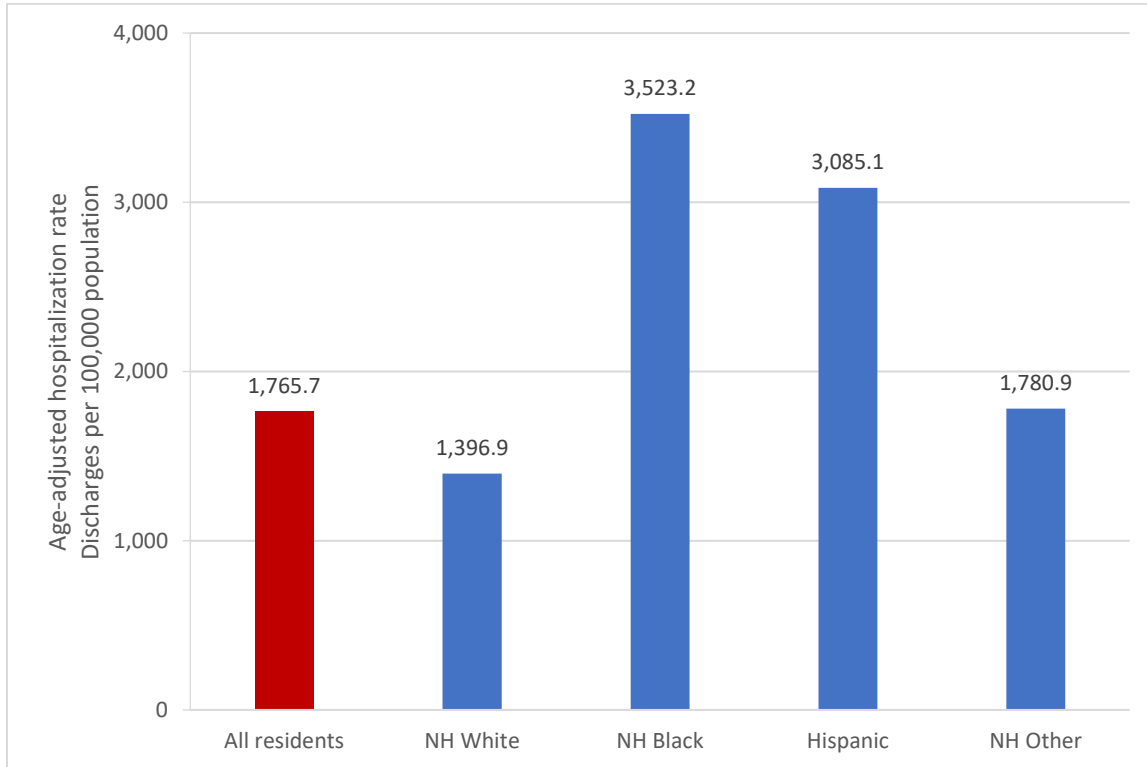
- Age-adjusted hospitalization rates (AAHRs) vary by race and ethnicity. [Figures 8, 9, 10]
- Non-Hispanic Black or African American residents have the highest AAHRs for diabetes as any listed diagnosis, diabetes as first diagnosis, hyperglycemic crisis, and hypoglycemia. Also, the diabetes-related non-traumatic lower-extremity amputation AAHR among non-Hispanic Black or African American residents is higher than the rate among non-Hispanic White and non-Hispanic Other residents.
- Hispanic or Latino/a residents have higher AAHRs for diabetes as any listed diagnosis, diabetes as first diagnosis, diabetes-related non-traumatic lower-extremity amputation, and hyperglycemic crisis compared with non-Hispanic White and non-Hispanic Other residents. Also, Hispanic or Latino/a residents have a higher AAHR for diabetes-related hypoglycemia compared with non-Hispanic White residents.
- Non-Hispanic White residents have a higher diabetes-related hyperglycemic crisis AAHR compared with non-Hispanic Other residents.
- Non-Hispanic Other residents have a higher AAHR for diabetes as any listed diagnosis compared with non-Hispanic White residents.
- For more information see Detailed Table 12.

Figure 8. Age-adjusted diabetes (first diagnosis) inpatient hospitalization rate per 100,000 population by race and ethnicity, Connecticut Inpatient Hospitalization and Emergency Department Visit Dataset, 2018 data.



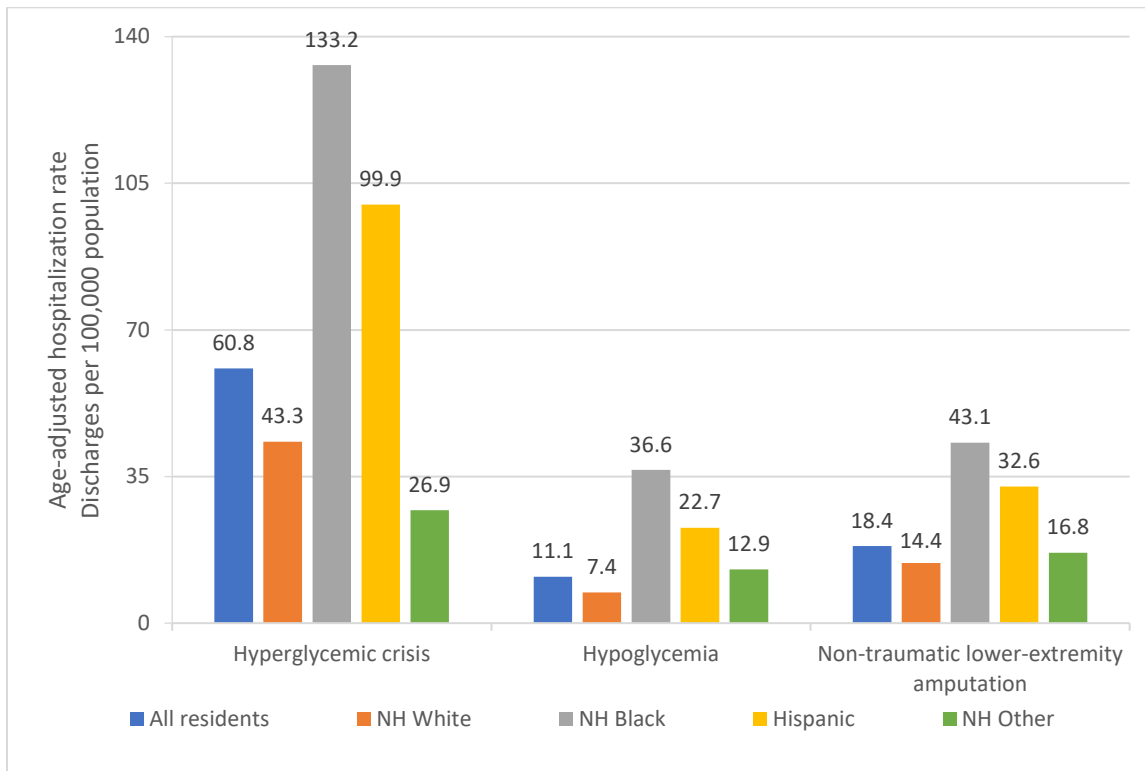
NH = Non-Hispanic or Latino/a

Figure 9. Age-adjusted diabetes-related inpatient hospitalization rate per 100,000 population by race and ethnicity, Connecticut Inpatient Hospitalization and Emergency Department Visit Dataset, 2018 data.



NH = Non-Hispanic or Latino/a

Figure 10. Age-adjusted diabetes-related hyperglycemic crisis, hypoglycemia, and non-traumatic lower-extremity amputation inpatient hospitalization rates per 100,000 population by race and ethnicity, Connecticut Inpatient Hospitalization and Emergency Department Visit Dataset, 2018 data.



NH = Non-Hispanic or Latino/a

Length of Stay and Charges for Diabetes Inpatient Hospitalizations

Diabetes hospitalizations are costly. [Table 3]

- In 2018, the total charges for inpatient hospitalizations with diabetes as any listed diagnosis were over \$3.9 billion with a median length of stay of 4 days.
- The total charges for hyperglycemic crisis were approximately \$93.8 million with a median length of stay of 3 days.
- For hypoglycemia, the total charges were about \$15 million with a median length of stay of 3 days

Table 3. Total and median charges (in dollars) and median length of hospital stay (in days) for diabetes inpatient hospitalizations, Connecticut Inpatient Hospitalization and Emergency Department Visit Dataset, 2018 data.

Diagnosis	Total charges (\$)	Median charges (\$)	Median length of stay (days)
Diabetes as any listed diagnosis	3,905,605,074.79	32,657.86	4
Hyperglycemic crisis	93,814,763.54	26,734.47	3
Diabetic ketoacidosis	83,368,477.50	27,956.95	4
Hyperosmolar hyperglycemic syndrome	10,690,921.55	21,204.82	3
Hypoglycemia	15,032,716.12	20,067.58	3
Diabetes as first-listed diagnosis	281,246,824.27	27,304.00	4

Deaths

- In 2017, diabetes was the seventh leading cause of death in both the United States and Connecticut. [Table 4]
 - Diabetes was listed as the underlying or principal cause of death on 686 death certificates in Connecticut (crude rate, 19.1 per 100,000 persons).

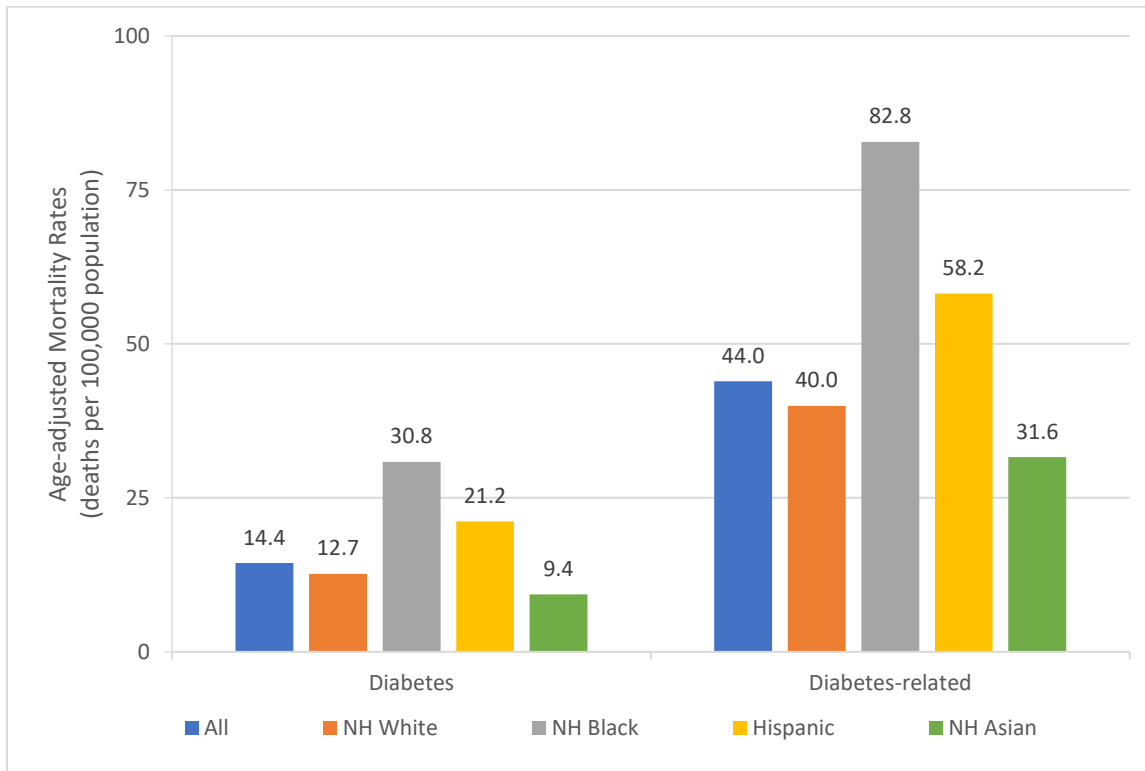
Table 4. Leading causes of death in Connecticut, 2017 data from Connecticut Department of Public Health Vital Records Mortality Files.

Leading Causes of Death	Number of Deaths
All causes	31,330
1. Heart disease	7,101
2. Malignant neoplasms (cancer)	6,570
3. Accidents (unintentional injuries)	2,043
4. Chronic lower respiratory diseases	1,467
5. Cerebrovascular disease (stroke)	1,396
6. Alzheimer's disease	1,071
7. Diabetes	686
8. Pneumonia and influenza	666
9. Septicemia	613
10. Nephritis, nephrotic syndrome, nephrosis	552

- People with diabetes often die from the complications of diabetes rather than the disease itself; therefore, diabetes is underreported as the underlying or principal cause of death.
 - Diabetes-related mortality is defined as deaths with diabetes as either the principal or contributing (or secondary) cause of death among residents.
 - In 2017, there were 2,113 diabetes-related deaths in Connecticut (crude rate, 58.9 per 100,000 persons).

- Mortality data from 2013-2017 indicate that diabetes and diabetes-related age-adjusted mortality rates (AAMRs) vary by race and ethnicity. [Figure 11]
 - Non-Hispanic Black residents have the highest diabetes and diabetes-related AAMRs (30.8 per 100,000 and 82.8 per 100,000, respectively).
 - Non-Hispanic Asian residents have the lowest diabetes and diabetes-related AAMRs (9.4 per 100,000 and 31.6 per 100,000, respectively).
- For more information see Detailed Table 13.

Figure 11. Age-adjusted diabetes and diabetes-related mortality rates (per 100,000 population) by race and ethnicity, 2013-2017 data from the Connecticut Department of Public Health Vital Records Mortality Files.



NH – Non-Hispanic or Latino/a

Years of Potential Life Lost

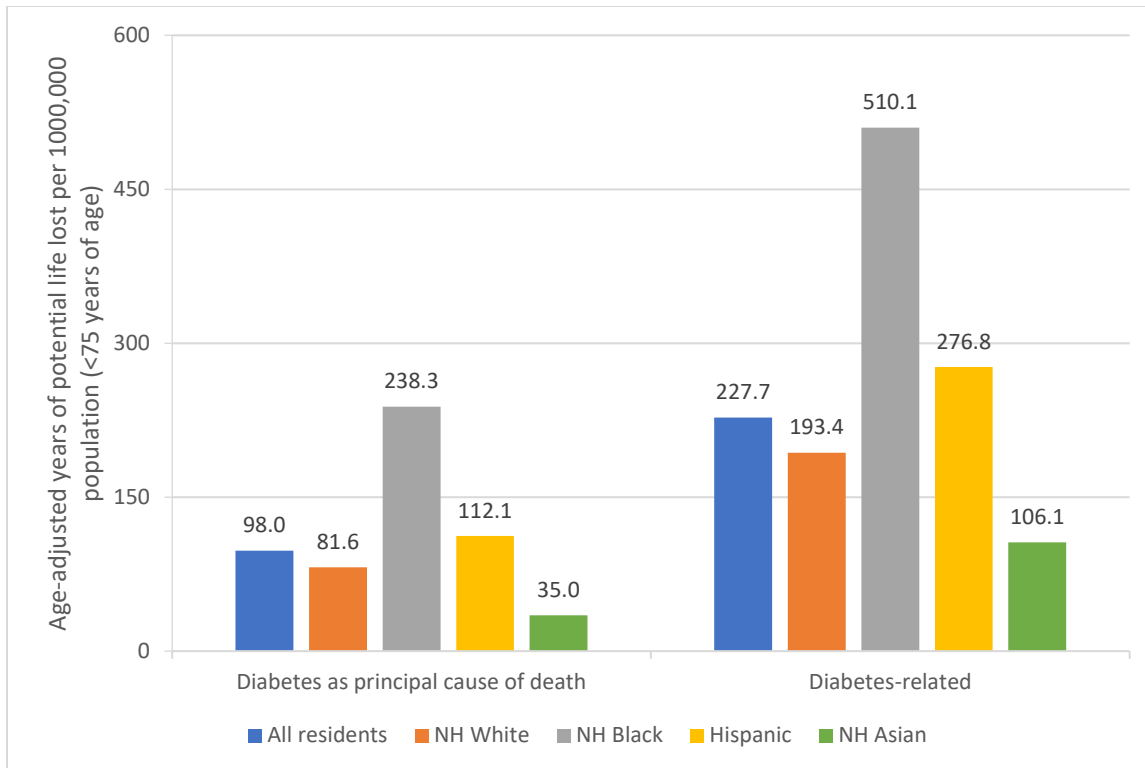
Years of potential life lost (YPLL) is a measure of premature mortality, or deaths before the age of 75 years.

- From 2013-2017 there were 4,063 diabetes-related deaths before the age of 75 years among Connecticut residents. This represents 39.4% of diabetes-related deaths in that time period.
- There were 1,516 deaths with diabetes as the principal cause of death among Connecticut residents under the age of 75 years.

The age-adjusted YPLL for both diabetes as principal cause of death and diabetes-related deaths vary by race and ethnicity. [Figure 12]

- The age-adjusted diabetes and diabetes-related YPLL are highest among non-Hispanic Black or African American residents.
- Hispanic or Latino/a residents have higher age-adjusted diabetes and diabetes-related YPLL compared with non-Hispanic White and non-Hispanic Asian residents.
- For more information see Detailed Table 14.

Figure 12. Age-adjusted diabetes and diabetes-related years of potential life lost (per 100,000 population) by race and ethnicity, 2013-2017 data from the Connecticut Department of Public Health Vital Records Mortality Files.



NH = Non-Hispanic or Latino/a

Prevention and Control of Type 2 Diabetes

- Individuals, communities, health departments, the health care system, and others can partner to prevent type 2 diabetes and the complications of diabetes (e.g. premature death and lower extremity amputations).
- To prevent and control type 2 diabetes among all Connecticut residents, wellness must be promoted in all aspects of people’s lives – where they are born, grow, live, learn, play, work, worship, and age, including the health system.
- Increasing access to and receipt of regular medical care and diabetes self-management education and maintaining a healthy lifestyle including physical activity and healthy eating are important in preventing and controlling type 2 diabetes.

Regular Medical Care

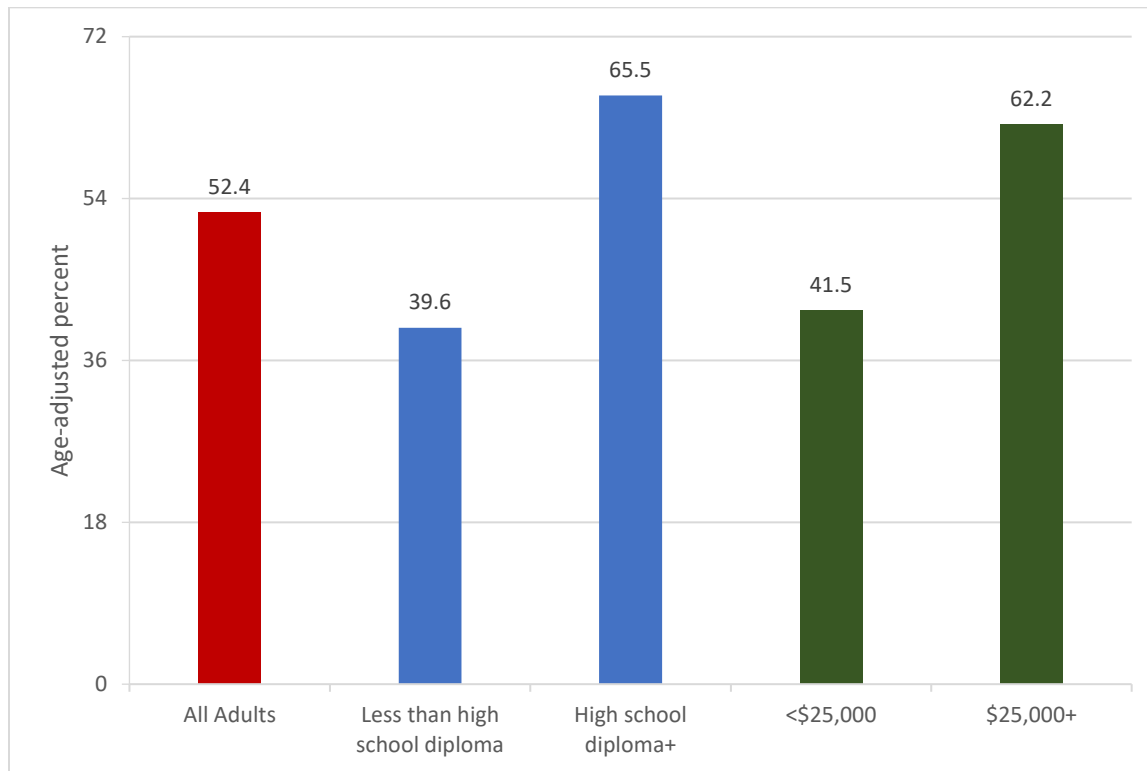
- Access to health care is crucial to the prevention, diagnosis, treatment, and management of diabetes.
 - Approximately 94.4% of Connecticut adults (18+ years) with diagnosed diabetes have health care coverage or insurance (2016-2018 BRFSS data).
- Seeking regular medical care is important to determine blood sugar, blood pressure, and cholesterol levels and to set and maintain these levels at goals set by a health care provider. (8)
 - An estimated 94.5% of Connecticut adults (18+ years) with diagnosed diabetes have at least one person that they think of as their personal doctor or health care provider (2016-2018 BRFSS data, not shown).
 - The hemoglobin A1C (A1C) blood test measures average blood sugar levels over the past three months. Higher A1C results correlate with increased likelihood of diabetes-related complications. (16)
 - People with diabetes should get an A1C test at least twice a year, when medicine changes or if they have other health conditions.
 - Approximately 75% of Connecticut adults with diagnosed diabetes had at least two A1C tests in the past year (2017-2018 BRFSS data).
- For more information see Detailed Table 15.

Diabetes Self-Management Education and Support (DSMES)

DSMES is a key step in preventing diabetes complications. DSMES is a collaborative process in which diabetes educators help people with or at risk for diabetes gain the knowledge, problem-solving and coping skills needed to successfully self-manage the disease and its related conditions. (17)

- An estimated 51.4% of Connecticut adults (18+ years) with diagnosed diabetes have ever taken a class on how to manage their diabetes (2016-2018 BRFSS data).
- The age-adjusted prevalence of ever taking a class on how to manage diabetes is higher among adults with higher educational attainment and adults with higher annual household incomes. [Figure 13]
- For more information see Detailed Table 16.

Figure 13. Age-adjusted prevalence of ever taking a class on how to self-manage diabetes among Connecticut adults (18+ years) by educational attainment and annual household income, 2016-2018 Behavioral Risk Factor Surveillance System (BRFSS) data



Lifestyle Changes

Many diabetes-related complications can be prevented or delayed through lifestyle changes such as eating healthy and participating in regular physical activity. (8)

- An estimated 12.0% of Connecticut adults (18+ years) with diagnosed diabetes participated in enough aerobic and muscle strengthening exercises to meet physical activity guidelines (2015 and 2017 data). To meet the physical activity guidelines, adults must participate in 150 minutes or more of aerobic physical activity per week and muscle strengthening exercises two or more times per week
- While almost 64% of adults with diagnosed diabetes consume at least one fruit a day and 76% consume at least one vegetable a day, only 16.3% consume at least five fruits or vegetables a day (2015 and 2017 BRFSS data).
- For more information see Detailed Table 17.

The Connecticut Department of Public Health's Role

- One way that the Connecticut Department of Public Health (DPH) promotes the development of wellness in all aspects of people's lives is through funding from the Centers for Disease Control and Prevention (CDC) entitled "Improving the Health of Americans Through Prevention and Management of Diabetes, Heart Disease, and Stroke (1815)".

- This five-year cooperative agreement promotes the use of evidence-based strategies to manage diabetes and prevent or delay the onset of type 2 diabetes in high-burden populations and communities.
- The strategies include:
 - Improving access to and participation in diabetes self-management education and support (DSMES);
 - Increasing pharmacist engagement in medication therapy management;
 - Assisting health care organizations in implementing systems to identify people with prediabetes and referring them to CDC-recognized lifestyle change programs for type 2 diabetes prevention;
 - Increasing enrollment in CDC-recognized lifestyle change programs for type 2 diabetes prevention; and
 - Developing statewide infrastructure for Community Health Worker sustainability and reimbursement.
- For more information visit:
 - www.cdc.gov/diabetes/programs/stateandlocal/funded-programs/dp18-1815.html
 - <https://portal.ct.gov/mysmartheart>

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Detailed Data Tables

Detailed Table 1. Unadjusted prevalence of diagnosed diabetes among adults (18+ years) overall and by age groups, Connecticut, 2018

Characteristics	# of Respondents	Weighted Frequency	Weighted Percent	95% CI	CV (%)
All Adults	1,258	275,000	9.68	8.97-10.40	3.8
Age (years)					
18 to 44	70	29,000	2.42	1.77-3.06	13.6
45 to 64	484	117,000	12.19	10.88-13.50	5.5
65+	674	122,000	20.63	18.62-22.64	5.0

Note: CI = confidence interval; CV = coefficient of variation

Data source: 2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS)

Detailed Table 2. Age-adjusted prevalence of diagnosed diabetes among adults (18+ years) overall and by gender, race and ethnicity, educational attainment, and annual household income, Connecticut, 2016-2018

Characteristic	Age-Adjusted Percent	95% CI
Adults		
All Adults	8.53	8.17-8.90
Gender		
Male	9.49	8.94-10.04
Female	7.70	7.21-8.19
Race & Ethnicity (4 categories)		
Non-Hispanic White	6.95	6.59-7.31
Non-Hispanic Black or African American	15.52	13.82-17.22
Hispanic or Latino	13.82	12.19-15.45
Non-Hispanic Other or Multiracial	10.08	8.16-12.01
Educational Attainment		
Less than High School Graduate	16.24	14.31-18.18
High School Graduate or GED	10.13	9.37-10.90
Some College	8.25	7.60-8.90
College Graduate	5.11	4.74-5.47
Annual Household Income		
<\$25,000	13.77	12.58-14.95
\$25,000+	7.36	6.96-7.77

Note: CI = confidence interval

Data source: 2016-2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS)

Detailed Table 3. Age-adjusted prevalence of diagnosed diabetes among adults (18+ years) over time (three-year aggregates), Connecticut, 2011-2018

Three-Year Aggregate	Age-Adjusted Percent	95% CI
2011-2013	8.04	7.59-8.49
2012-2014	7.91	7.48-8.34
2013-2015	7.94	7.54-8.34
2014-2016	8.31	7.93-8.69
2015-2017	8.43	8.07-8.80
2016-2018	8.53	8.17-8.90

Note: CI = confidence interval

Data source: 2011-2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS)

Detailed Table 4. Unadjusted incidence of diagnosed diabetes among adults (18+ years) overall and by age, gender, and race and ethnicity (per 1,000 adults), 2014-2018, Connecticut

Characteristic	New Cases of Diabetes per 1,000 Adults	95% CI
Adults		
All Adults	7.48	6.57-8.37
Age (years)		
18 to 44	3.96	2.80-5.07
45 to 64	12.20	10.27-14.06
65+	8.32	6.45-10.13
Gender		
Male	8.34	6.91-9.73
Female	6.66	5.54-7.74
Race & Ethnicity (4 categories)		
Non-Hispanic White	5.93	5.08-6.77
Non-Hispanic Black or African American	10.85	6.65-14.67
Hispanic or Latino	12.53	8.85-15.92
Non-Hispanic Other or Multiracial	8.59	4.87-11.89

Note: CI = confidence interval

Data source: 2014-2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS)

Detailed Table 5. Age-adjusted prevalence of prediabetes awareness among adults (18+ years) over time (aggregated data), Connecticut, 2011-2018

Three-Year Aggregate	Age-Adjusted Percent	95% CI
2011-2013	6.41	5.95-6.87
2012-2014	6.76	6.32-7.20
2013-2014	6.70	6.16-7.24
2014 & 2016	7.86	7.31-8.40
2016 & 2017	8.19	7.58-8.79
2016-2018	8.68	8.13-9.23

Note: CI = confidence interval

Data source: 2011-2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS)

Detailed Table 6. Unadjusted prevalence of prediabetes awareness among adults (18+ years) overall and by age groups, Connecticut, 2016-2018

Characteristics	# of Respondents	Weighted Frequency	Weighted Percent	95% CI	CV (%)
All Adults	2,049	229,152	9.14	8.60-9.68	3.0
Age (in years)					
18 to 44	227	58,695	5.13	4.32-5.93	8.0
45 to 64	879	101,449	11.97	11.04-12.90	4.0
65+	889	63,111	13.54	12.43-14.65	4.2

Note: CI = confidence interval; CV = coefficient of variation

Data source: 2016-2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS)

Detailed Table 7. Age-adjusted prevalence of prediabetes awareness among adults (18+ years) overall and by gender, race and ethnicity, educational attainment, and annual household income, Connecticut, 2016-2018

Characteristic	Age-Adjusted Percent	95% CI
Adults		
All Adults	8.68	8.13-9.23
Gender		
Male	8.20	7.44-8.96
Female	9.13	8.34-9.93
Race & Ethnicity (4 categories)		
Non-Hispanic White	7.02	6.48-7.56
Non-Hispanic Black or African American	13.54	11.00-16.07
Hispanic or Latino	13.15	10.78-15.53
Non-Hispanic Other or Multiracial	10.56	8.12-13.00
Educational Attainment		
Less than High School Graduate	9.92	7.43-12.41
High School Graduate or GED	9.51	8.28-10.74
Some College	9.98	8.82-11.14
College Graduate	7.15	6.46-7.84
Annual Household Income		
<\$25,000	11.93	10.22-13.65
\$25,000+	8.25	7.60-8.91

Note: CI = confidence interval

Data source: 2016-2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS)

Detailed Table 8. Unadjusted prevalence of adults (18+ years) tested for high blood sugar or diabetes within the past three years overall and by age groups, Connecticut, 2016-2018

Characteristics	# of Respondents	Weighted Frequency	Weighted Percent	95% CI	CV (%)
All Adults	11,315	1,370,000	57.40	56.33-58.46	0.94
Age (in years)					
18 to 44	1,950	505,000	46.17	22.26-48.08	2.11
45 to 64	4,973	547,000	67.78	66.43-69.13	1.02
65+	4,104	291,000	66.10	64.53-67.67	1.21

Note: CI = confidence interval; CV = coefficient of variation

Data source: 2016-2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS)

Detailed Table 9.

Detailed Table 9. Age-adjusted prevalence of adults (18+ years) tested for high blood sugar or diabetes within the past three years overall and by gender, race and ethnicity, educational attainment, annual household income and BMI status, Connecticut, 2016-2018

Characteristic	Age-Adjusted Percent	95% CI
Adults		
All Adults	56.46	55.36-57.56
Gender		
Male	55.39	53.80-56.99
Female	57.64	56.11-59.16
Race & Ethnicity (4 categories)		
Non-Hispanic White	55.54	54.17-56.90
Non-Hispanic Black or African American	61.39	57.72-65.06
Hispanic or Latino	57.68	54.56-60.80
Non-Hispanic Other or Multiracial	51.56	47.29-55.84
Educational Attainment		
Less than High School Graduate	54.95	50.35-59.54
High School Graduate or GED	53.57	51.32-55.83
Some College	58.11	55.96-60.27
College Graduate	58.29	56.63-59.96
Annual Household Income		
<\$25,000	56.57	53.73-59.42
\$25,000+	56.65	55.30-58.00
BMI Status		
Overweight or Obese	60.09	58.52-61.65
Not Overweight or Obese	50.01	48.18-51.84

Note: CI = confidence interval

Data source: 2016-2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS)

Detailed Table 10. Unadjusted prevalence of risk factors for diabetes-related complications among adults (18+ years) with diagnosed diabetes, Connecticut, 2017 or 2018

Risk Factor	# of Respondents	Weighted Frequency	Weighted Percent	95% CI	CV (%)
Cigarette Smoking Status					
Current Cigarette Smoker	158	37,000	13.82	11.03-16.61	10.29
Former Cigarette Smoker	479	99,000	37.32	33.59-41.04	5.10
Never Smoked	575	129,000	48.86	45.00-52.72	4.03
BMI Status					
Overweight	387	80,000	31.96	28.27-35.65	5.89
Obese	455	104,000	41.57	37.63-45.51	4.83
Extreme Obesity	111	25,000	10.09	7.80-12.39	11.61
Physical Inactivity					
No Leisure Time Physical Activity	479	113,000	41.10	37.26-44.95	4.77
High Blood Pressure Awareness*					
Told Has High Blood Pressure	869	192,000	69.78	66.17-73.40	2.64
High Blood Cholesterol Awareness*					
Tested and Told Has High Cholesterol	724	165,000	62.45	58.69-66.22	3.08

Note: CI = confidence interval

Data source: 2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS); *2017 BRFSS

Detailed Table 11. Unadjusted prevalence of coexisting of conditions among adults (18+ years), Connecticut, 2016-2018

Diagnosis	Adults with Diagnosed Diabetes	Adults without Diagnosed Diabetes
	Weighted Percent (95% CI)	Weighted Percent (95% CI)
Cardiovascular Diseases	24.39 (22.54-26.23)	5.69 (5.38-6.01)
Kidney Disease	11.23 (9.64-12.81)	1.88 (1.69-2.08)
Vision Disability	10.78 (9.26-12.30)	3.42 (3.10-3.75)
Periodontal Disease*	20.28 (17.21-23.36)	11.51 (10.67-12.35)

Note: CI = confidence interval

Data source: 2016-2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS); *2016 & 2018 BRFSS

Detailed Table 12. Number and age-adjusted hospitalization rate (AAHR) for diabetes inpatient hospitalizations overall and by race and ethnicity, all Connecticut residents, 2018

Diagnosis	All residents	NH White	NH Black	Hispanic	NH Other
	# Discharges AAHR (95% CI)	# Discharges AAHR (95% CI)	# Discharges AAHR (95% CI)	# Discharges AAHR (95% CI)	# Discharges AAHR (95% CI)
Diabetes as any listed diagnosis	80,725 1,765.65 (1,753.07-1,778.23)	52,091 1,396.89 (1,384.19-1,409.59)	13,100 3,523.22 (1,384.19-1,409.59)	12,267 3,085.12 (3,461.33-3,585.11)	2,614 1,780.94 (1,709.48-1,852.39)
Hyperglycemic Crisis	2,351 60.78 (58.23-63.32)	1,224 43.28 (40.65-45.90)	514 133.23 (121.46-145.00)	543 99.94 (91.06-108.81)	47 26.93 (18.96-34.90)
Hypoglycemia	505 11.11 (10.11-12.11)	273 7.3 (6.42-8.28)	128 36.57 (30.10-43.05)	84 14.24 (17.55-27.94)	17 12.85 (6.52-19.18)
Non-Traumatic Lower-Extremity Amputations	840 18.39 (17.1-19.68)	520 14.35 (13.03-15.66)	161 43.07 (36.23-49.90)	128 32.63 (26.66-38.60)	27 16.78 (10.21-23.34)
Diabetes as first listed diagnosis	6,515 158.86 (154.84-162.88)	3,458 109.84 (105.86-113.83)	1,493 394.40 (373.95-414.86)	1,343 283.61 (267.32-299.91)	174 103.98 (87.93-120.02)

Note: CI = confidence interval

Data source: 2018 Connecticut Inpatient Hospitalization and Emergency Department Visit Dataset

Detailed Table 13. Number of diabetes and diabetes-related deaths and age-adjusted mortality rates (AAMR) overall and by race and ethnicity, all Connecticut residents, 2013-2017

Diagnosis	All residents	NH White	NH Black	Hispanic	NH Asian
	# Deaths AAMR	# Deaths AAMR	# Deaths AAMR	# Deaths AAMR	# Deaths AAMR
Diabetes	3,373 14.43	2,555 12.68	481 30.84	282 21.17	45 9.35
Diabetes-related	10,304 43.95	8,104 39.96	1,270 82.81	756 58.16	147 31.62

Data source: 2013-2017 Connecticut Department of Public Health Vital Records Mortality Files

Detailed Table 14. Number of diabetes and diabetes-related deaths under age 75 years and age-adjusted years of potential life lost (YPLL) overall and by race and ethnicity, all Connecticut residents, 2013-2017

Diagnosis	All residents	NH White	NH Black	Hispanic	NH Asian
	# Deaths < 75 Years YPLL	# Deaths < 75 Years YPLL	# Deaths < 75 Years YPLL	# Deaths < 75 Years YPLL	# Deaths < 75 Years YPLL
Diabetes	1,516 98.0	1,038 81.6	285 238.3	166 112.1	23 35.0
Diabetes-related	4,063 227.7	2,868 193.4	695 510.1	419 276.8	69 106.1

Data source: 2013-2017 Connecticut Department of Public Health Vital Records Mortality Files

Detailed Table 15. Unadjusted prevalence of regular medical care among adults (18+ years) with diagnosed diabetes, Connecticut, 2016-2018

Regular Medical Care Indicator	# of Respondents	Weighted Frequency	Weighted Percent	95% CI	CV (%)
Has Health Care Coverage	3,634	258,000	94.42	93.26-95.58	0.63
Has at Least One Health Care Provider	3,644	260,000	94.50	93.35-95.65	0.62
2+ A1C Tests in Past Year*	865	191,000	75.02	71.55-78.50	2.36

Note: CI = confidence interval

Data source: 2016-2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS); 2017 & 2018 BRFSS

Detailed Table 16. Age-adjusted prevalence of adults (18+ years) with diagnosed diabetes who have any taken a class on how to manage their diabetes themselves overall and by gender, race and ethnicity, educational attainment, and annual household income, Connecticut, 2016-2018

Characteristic	Age-Adjusted Percent	95% CI
Adults		
All Adults	52.44	45.09-59.80
Gender		
Male	45.50	39.12-51.87
Female	52.41	43.68-61.13
Race & Ethnicity (4 categories)		
Non-Hispanic White	60.52	54.24-66.80
Non-Hispanic Black or African American	*	*
Hispanic or Latino	48.56	36.58-60.53
Non-Hispanic Other or Multiracial	35.84	22.78-48.90
Educational Attainment		
High School Graduate or less	39.63	33.42-45.85
Higher than High School Graduate	65.46	59.60-71.33
Annual Household Income		
<\$25,000	41.54	32.83-50.26
\$25,000+	62.23	56.48-67.98
Health Care Coverage		
Has Health Care Coverage	52.76	44.96-60.57
No Health Care Coverage	40.26	27.70-52.83

Note: CI = confidence interval; *Unreliable estimate, could not display

Data source: 2016-2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS)

Detailed Table 17. Unadjusted prevalence of lifestyle change indicators among adults (18+ years) with diagnosed diabetes, Connecticut, 2015 and 2017

Lifestyle Change Indicator	# of Respondents	Weighted Frequency	Weighted Percent	95% CI
Meets Physical Activity Recommendations	283	27,000	12.02	10.23-13.81
Consumes at least 1 Fruit per Day	1,498	150,000	63.58	60.86-66.30
Consumes at least 1 Vegetable per Day	1,745	173,000	76.05	73.48-78.61
Consumes 5 or More Fruits or Vegetables per Day*	369	39,000	16.26	14.16-18.37

Note: CI = confidence interval

Data source: 2015 & 2017 Connecticut Behavioral Risk Factor Surveillance System (BRFSS)

Detailed Methods and Data Sources

This section provides additional information about data sources and methods used in the Connecticut Diabetes Statistics Report.

Prevalence of Diabetes among Adults

Data Source

- 2016-2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS) data, Connecticut Department of Public Health

Methods

The percentage and weighted number of adults 18 years or older with diabetes (diagnosed and undiagnosed) was estimated using 2018 BRFSS data. Adults who self-reported being told by a doctor or health professional that they had diabetes (other than during pregnancy) were classified as having diagnosed diabetes. To estimate the percentage of adults with undiagnosed diabetes, it was assumed that 25% of adults with diabetes are undiagnosed. The following formulas were used to estimate total diabetes prevalence and undiagnosed diabetes prevalence among adults:

- Number with Diagnosed Diabetes = $\frac{3}{4}$ * Total Number with Diabetes
- Number with Undiagnosed Diabetes = $\frac{1}{4}$ * Total Number with Diabetes

BRFSS data from 2016, 2017, and 2018 were aggregated to estimate the percentage of diagnosed diabetes among adults by gender, race and ethnicity, educational attainment, and annual household income. Data were aggregated to ensure large enough numbers of responses to produce statistically reliable estimates. Regarding BRFSS prevalence estimates, the coefficients of variation (CV) is used to assess the validity of each estimate. Prevalence estimates with a CV less than 15% are shown in this report.

Three-year aggregates were also used to show diagnosed diabetes prevalence over time. Three-year moving averages were used to smooth out any fluctuations that may occur from year to year.

Diagnosed diabetes prevalence estimates presented by demographic characteristics and over time were age-adjusted. Age-adjusted estimates derived from Behavioral Risk Factor Surveillance System (BRFSS) data were calculated among adults aged 18 years or older by the direct method to the 2000 US Census standard population, using age groups 18-44 years, 45-64 years, and 65 years or older. Prevalence estimates were age-adjusted to remove the effect of differing age distributions between the groups or over periods of time.

The estimates in this report do not differentiate between type 1 and type 2 diabetes. The data presented are more likely to be related to type 2 diabetes.

Newly Diagnosed Diabetes (Incidence)

Data Source

- 2014-2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS) data, Connecticut Department of Public Health

Methods

The rate of new cases of diabetes was calculated using 2014-2018 BRFSS data on respondents' age at diagnosis and age at interview. Five-years of data were aggregated to improve the precision of the estimates. Adults who self-reported being told by a doctor or health professional that they had diabetes (other than during pregnancy) were classified as having diagnosed diabetes. These adults were asked at what age they were diagnosed with diabetes. The number of years since diagnosis was calculated by subtracting the person's age at diagnosis from the person's current age. Adults who had a value of zero were identified as having been diagnosed with diabetes within the last year. In addition, half of the adults who had a value of one were classified as having been diagnosed with diabetes within the last year. To calculate the rate, the numerator was the weighted frequency of adults who were diagnosed with diabetes within the last year. The denominator was weighted frequency of the adult population for each demographic category, excluding adults who had been diagnosed with diabetes for more than year and who were categorized as "refused" or "don't know" or who had missing values on the diabetes status question.

Prevalence of Prediabetes Among Adults

Data Source

- 2011-2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS) data, Connecticut Department of Public Health

Methods

The prevalence of prediabetes awareness was calculated using aggregated years of BRFSS data. Adults who self-reported being told by a doctor or other health professional that that they had prediabetes or borderline diabetes (other than during pregnancy) were classified as having prediabetes.

Multiple years of BRFSS data were aggregated to estimate the prevalence of prediabetes awareness to ensure there were large enough numbers of responses to produce statistically reliable estimates. Regarding BRFSS prevalence estimates, the coefficients of variation (CV) is used to assess the validity of each estimate. Prevalence estimates with a CV less than 15% are shown in this report. Moving averages were used to smooth out any fluctuations that may occur from year to year. The prediabetes question was not included on the BRFSS questionnaire in the year 2015; therefore, both two- and three-year aggregates of data are presented.

Prediabetes awareness prevalence estimates presented by demographic characteristics and over time were age-adjusted. Age-adjusted estimates derived from Behavioral Risk Factor Surveillance System (BRFSS) data were calculated among adults aged 18 years or older by the direct method to the 2000 US

Census standard population, using age groups 18-44 years, 45-64 years, and 65 years or older. Prevalence estimates were age-adjusted to remove the effect of differing age distributions between the groups or over periods of time.

Risk Factors for Diabetes-Related Complications

Data Source

- 2017 and 2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS) data, Connecticut Department of Public Health

Methods

The percentage of adults aged 18 or older with diagnosed diabetes who had selected risk factors were estimated using the following definitions:

Smoking

Cigarette smoker status was determined using 2018 BRFSS data. Respondents reporting having smoked at least 100 cigarettes in their lifetime and now smoke every day or some days were categorized as current smokers. Respondents reporting having smoked at least 100 cigarettes in their lifetime and currently do not smoke were categorized as former smokers. Respondents who reported they had not smoked at least 100 cigarettes in their lifetime were categorized as never smoked.

Overweight and Obesity

Overweight and obesity were classified according to body mass index (BMI) of self-reported height and weight from 2018 BRFSS data:

- Overweight – BMI of 25.0-29.9 kg/m²
- Obese – BMI of 30.0-39.9 kg/m²
- Extreme Obesity – BMI of 40.0 kg/m² or higher

Physical Inactivity

The prevalence of physical inactivity was determined using 2018 BRFSS data. Physical inactivity was defined as self-report of no participation in physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise during the past month, other than for a regular job.

High Blood Pressure

The prevalence of high blood pressure was determined using 2017 BRFSS data. Adults who self-reported being told by a doctor or health professional that they had high blood pressure (other than during pregnancy) were classified as having high blood pressure.

High Blood Cholesterol

The prevalence of high blood cholesterol was determined using 2017 BRFSS data. Adults who self-reported having had their blood cholesterol checked and had been told that they have high blood cholesterol were classified as having high blood cholesterol.

Coexisting Conditions and Complications

Data Sources

- 2016-2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS) data, Connecticut Department of Public Health
- 2018 Connecticut Inpatient Hospitalization and Emergency Department Visit Dataset, Connecticut Department of Public Health
- 2018 Connecticut State/County Longitudinal Population Estimates by single year of age, sex, bridged race, and Hispanic origin.
- 2013-2017 Vital Records Mortality Files, Connecticut Department of Public Health

Methods

Cardiovascular Diseases

The prevalence of cardiovascular diseases among adults with diagnosed diabetes was determined using 2016-2018. BRFSS data. Adults were categorized as having at least one cardiovascular disease if they self-reported ever being told by a doctor that they have had a heart attack, stroke, or coronary heart disease. Adults who were categorized as “refused” or “don’t know” or who had missing values on any of the three cardiovascular disease questions were excluded from the analysis.

Kidney Disease

The prevalence of kidney disease among adults with diagnosed diabetes was determined using 2016-2018. BRFSS data. Adults were categorized as having kidney disease if they self-reported ever being told by a doctor that they had kidney disease not including kidney stones, bladder infection or incontinence.

Vision Disability

The prevalence of vision disability among adults with diagnosed diabetes was determined using 2016-2018. BRFSS data. Adults were categorized as having a vision disability if they self-reported having serious difficulty seeing, even when wearing glasses.

Periodontal Disease

The prevalence of periodontal disease among adults with diagnosed diabetes was determined using 2016 and 2018. BRFSS data. Adults were categorized as having kidney disease if they self-reported ever being told by a doctor that they had periodontal disease (gum disease).

Emergency Department (ED) Visits

The number of ED visits for diabetes as any diagnosis (hypoglycemia and hyperglycemic crisis, including diabetic ketoacidosis and hyperosmolar hyperglycemic syndrome) in 2018 were determined using the Connecticut Inpatient Hospitalization and Emergency Department Visit Dataset. The following International Classification of Diseases (ICD)-10 CM codes were used to define each of these conditions:

- Diabetes: E10-E13
- Diabetic ketoacidosis (DKA): E11.69, E13.10, or E10.10 as the first diagnosis or a combination of E11.10, E11.69, E13.10, and E11.65.
- Hyperosmolar hyperglycemic syndrome: E11.00 or E11.01 as the first diagnosis or a combination of E11.00 and E11.65.
- Hyperglycemic crisis: visit for either DKA or hyperosmolar hyperglycemic syndrome as defined above.
- Hypoglycemia: E10.641, E10.649, or E11.649 as the first diagnosis.

The crude rate per 1,000 adults was calculated by dividing the number of ED visits by the 2018 adult (18+ years old) population then multiplying by 1,000. The adult population in 2018 was determined using 2018 Connecticut State/County Longitudinal Population Estimates by age.

It is important to note that the Connecticut Inpatient Hospitalization and Emergency Department Visit Dataset contains the number of ED visits not unduplicated patients.

Inpatient Hospitalizations

The number of inpatient hospitalizations and the age-adjusted hospitalization rates for diabetes as the first-listed diagnosis and diabetes as any diagnosis in 2018 were calculated using the Connecticut Inpatient Hospitalization and Emergency Department Dataset. Diabetes-related hospitalization were further categorized as cardiovascular disease, including heart disease and stroke; non-traumatic lower-extremity amputations; and hyperglycemic crisis, including diabetic ketoacidosis (DKA) and hyperosmolar hyperglycemic syndrome. The following International Classification of Diseases (ICD)-10 CM codes were used to define each of these conditions

- Diabetes: E10-E13
- Cardiovascular disease: I00-I78
- Heart disease: I09, I11, I13, I20-I51
- Stroke: I60-I69
- Diabetic ketoacidosis (DKA): E11.69, E13.10, or E10.10 as the first diagnosis or a combination of E11.10, E11.69, E13.10, and E11.65.
- Hyperosmolar hyperglycemic syndrome: E11.00 or E11.01 as the first diagnosis or a combination of E11.00 and E11.65.
- Hyperglycemic crisis: visit for either DKA or hyperosmolar hyperglycemic syndrome as defined above.
- Hypoglycemia: E10.641, E10.649, or E11.649 as the first diagnosis.
- Non-traumatic lower-extremity amputation was defined according to the Agency for Healthcare Research and Quality (AHRQ) Prevention Quality Indicators #16 (PQI #16) Lower-Extremity Amputation among Patients with Diabetes Rate from November 2013.

Age-adjusted hospitalization rates (AAHR) were calculated for all ages by the direct method to the 2000 US Census standard population, using age groups 0-4, 5-9, 10-14, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, and 85+ years. The data source used for the denominator was the Connecticut State/County Longitudinal Population Estimates by single year of age, sex, bridged race, and Hispanic origin. The AAHRs are presented in this report as rates per 100,000 population.

The dataset also contains length of inpatient stay and total charges. Total and median charges and median length of stay are presented in this report.

It is important to note that the Connecticut Inpatient Hospitalization and Emergency Department Visit Dataset contains the number of ED visits not unduplicated patients.

Deaths

The leading causes of death in Connecticut were determined using data from the 2018 Connecticut Vital Records Mortality Files. The list of causes of deaths (i.e., the grouping of ICD-10 codes used) is based on National Center for Health Statistics (NCHS) rankings for the national leading causes of death.

The number of deaths and the age-adjusted mortality rates (AAMR) categorized as diabetes and diabetes-related were calculated using 2013-2017 data from the Connecticut Vital Records Mortality Files. The International Classification of Diseases (ICD)-10 codes for diabetes were E10-E14. Diabetes-related refers to diabetes as any of the causes of death listed on the death certificate.

AAMRs were calculated for all ages by the direct method to the 2000 US Census standard population, using age groups 0-4, 5-9, 10-14, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, and 85+ years. The data source used for the denominator was the Connecticut State/County Longitudinal Population Estimates by single year of age, sex, bridged race, and Hispanic origin. The AAMRs are presented in this report as rates per 100,000 population.

Years of Potential Life Lost (YPLL)

Diabetes and diabetes-related YPLL presented in this report were calculated using 2013-2017 Connecticut Vital Statistics Mortality Files data. The International Classification of Diseases (ICD)-10 codes for diabetes were E10-E14. Diabetes-related refers to diabetes as any of the causes of death listed on the death certificate.

YPLL are a measure of premature mortality representing the number of years of potential life lost by each death before a predetermined end point (75 years of age in this report). For example, the death of a person 15-24 years of age counts as 55.5 years of life lost. The YPLL statistic is derived by summing age-specific years of life lost figures over all age groups up to 75 years. YPLL is presented for persons less than 75 years of age because the average life expectancy in the United States.

Age-adjusted YPLLs were calculated for all ages by the direct method to the 2000 US Census standard population, using age groups 0-4, 5-9, 10-14, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, and 85+ years. The data source used for the denominator was the Connecticut State/County Longitudinal Population Estimates by single year of age, sex, bridged race, and Hispanic origin. The age-adjusted YPLLs are presented in this report as rates per 100,000 population.

Preventing Diabetes-Related Complications

Data Source

- 2015-2018 Connecticut Behavioral Risk Factor Surveillance System (BRFSS) data, Connecticut Department of Public Health

Methods

The percentage of adults aged 18 years or older with diagnosed diabetes who had selected protective factors were estimated using the following definitions:

Regular Medical Care

1. The prevalence of having health care coverage was determined using 2016-2018 BRFSS data. Adults who self-reported having any kind of health care coverage, including health insurance, prepaid plans such as HMOs, government plans such as Medicare, or Indian Health Service were classified as having health care coverage.
2. The prevalence of having a health care provider was determined using 2016-2018 BRFSS data. Adults who self-reported having at least one person they think of as their personal doctor or health care provider were classified as having a health care provider.
3. The prevalence of having at least two A1C tests was determined using 2017 and 2018 BRFSS data. Adults self-report how many times in the past 12 months a doctor, nurse, or other health professional checked has them for A1C. The A1C questions was not included on the 2016 BRFSS questionnaire.

Diabetes Self-Management Education and Support (DSMES)

The prevalence of having participated in DSMES was calculated using 2016-2018 BRFSS data. Adults who self-reported ever haven taken a course or class in how to manage your diabetes yourself were classified as having participated in DSMES.

Participation in DSMES prevalence estimates presented by demographic characteristics were age-adjusted. Age-adjusted estimates derived from Behavioral Risk Factor Surveillance System (BRFSS) data were calculated among adults aged 18 years or older by the direct method to the 2000 US Census standard population, using age groups 18-44 years, 45-64 years, and 65 years or older. Prevalence estimates were age-adjusted to remove the effect of differing age distributions between the groups.

Lifestyle Changes

1. The prevalence of meeting physical activity recommendations was calculated using 2015 and 2017 data. Adults reported the number of minutes they participated in aerobic physical activity and how often they participated in muscle strengthening exercises per week. To be considered as meeting physical activity guidelines, adults must have participated in 150 minutes or more of aerobic physical activity per week and muscle strengthening exercises two or more times per week.
2. The prevalence of fruit and vegetable consumption was calculated using 2015 and 2017 data. Fruit and vegetable consumption are self-reported through multiple questions. Respondents are asked to consider the fruits and vegetables they ate or drank in the past 30 days. All

responses are converted to daily intake. Fruit and vegetable consumption are described in this reported as at least one fruit per day, at least one vegetable per day, and five or more fruits or vegetables per day.