MARCH 2016

Connecticut Diabetes Statistics Report, 2016
Estimates of the burden of diabetes and its risk factors in Connecticut

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Contents

Diabetes in Connecticut at a Glance

March 2016

- Diabetes is a serious chronic disease that can lead to a number of health problems and incur large costs not only for individuals, but also for communities, businesses, governments, and other organizations.

- An estimated 8.9% of Connecticut adults have diagnosed diabetes (types 1 and 2), or approximately 250,000 adults. An additional 83,000 adults are estimated to have undiagnosed diabetes (2012-2014 Behavioral Risk Factor Surveillance System (BRFSS) data).

- Diabetes is the seventh leading cause of death in Connecticut (2012 mortality files). Age-adjusted diabetes and diabetes-related mortality rates are higher among Black and Hispanic Connecticut residents compared with White and Asian residents (2008-2012 mortality files).

- Premature mortality (to age 75) due to diabetes is significantly higher among Black and Hispanic Connecticut residents compared with White and Asian residents (2008-2012 mortality files).

- Black and Hispanic Connecticut residents have higher age-adjusted hospitalization rates for diabetes and diabetes-related lower extremity amputations than White residents (2013 Connecticut Acute Care Hospital Inpatient Discharge Database (HIDD)).

- Approximately $194 million was billed for hospitalizations in Connecticut due to diabetes as a principal diagnosis while almost $71.7 million was billed for diabetes-related hospitalizations with a nontraumatic lower extremity amputation in 2013 (HIDD data).

- Diabetes preventive care practices can reduce complications of diabetes. However, few adults with diabetes report carrying out these practices. For example, only 46.7% of adults with diabetes report that they have ever taken a class on how to manage their diabetes (2012-2014 BRFSS data).

- 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. Many people with prediabetes do not know they have the condition. While an estimated 37% of US adults have prediabetes, only 7.2% of Connecticut adults report having been told that they have prediabetes (2012-2014 BRFSS data).

- The chief modifiable risk factor for diabetes is obesity. Approximately 25.6% of adults in Connecticut are obese. Older adults, and low-income adults are more likely to be obese. Black or African American and Hispanic or Latino adults are more likely to be obese compared with White adults (2012-2014 BRFSS data).

- An estimated 22.6% of Connecticut adults participate in no leisure time physical activity. Females, older adults, Hispanic or Latino adults, and adults with lower annual household incomes are more likely to report no leisure time physical activity (2012-2014 BRFSS data).

- 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.

- Promoting wellness in all aspects of residents' lives involves creating a *grid of resources* to which all residents have equal access. This *grid of resources* includes healthy food, safe places for physical activity, quality clinical and other health services, and community and clinical organizations to support prevention, self-management and control of diabetes, high blood pressure, and obesity.

What is Diabetes?

- Diabetes is a disease in which blood glucose levels 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.
- There are 2 main classifications 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.

Diabetes Mortality (Death) Statistics

Leading Cause of Death

- Diabetes is the seventh leading cause of death in the United States with 73,932 deaths with diabetes as the underlying or principal cause (2.9% of deaths). [Table 1]
- Diabetes is the seventh leading cause of death in Connecticut with 629 deaths with diabetes as the underlying cause (2.1% of deaths). [Table 1]
- Diabetes also contributes to diseases of the heart and to stroke, the first and fifth leading causes of death in Connecticut.

*Table 1 Leading Causes of Death, United States and Connecticut, 2012*

United States Total deaths: 2,543,279	Connecticut Total deaths: 29,318
1. Diseases of the heart: 599,711	1. Diseases of the heart: 7,245
2. All cancers: 582,623	2. All cancers: 6,646
3. Chronic lower respiratory diseases: 143,489	3. Chronic lower respiratory diseases: 1,377
4. Stroke: 128,546	4. Unintentional injuries: 1,351
5. Unintentional injuries:127,792	5. Stroke: 1,258
6. Alzheimer's disease: 83,637	6. Alzheimer's disease: 840
7. Diabetes: 73,932	7. Diabetes: 629
8. Influenza and Pneumonia: 50,636	8. Nephritis, nephrotic syndrome, and nephrosis: 566
9. Nephritis, nephrotic syndrome, and nephrosis: 45,622	9. Pneumonia and Influenza: 559
10. Intentional self-harm (suicide): 40,600	10. Septicemia: 542

Data Sources: National Center for Health Statistics: www.cdc.gov/nchs/fastats/leading-causes-of-death.htm
Connecticut Department of Public Health (CT DPH), Vital Records Mortality Files, 2012 data.

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Age-adjusted Diabetes and Diabetes-related Mortality Rates (per 100,000 population)

- Mortality rates are calculated by dividing the total number of deaths in one year by the number of persons in the population (e.g. total state population or the population total for a racial or ethnic group) at midyear.
  - Since diseases and deaths occur at different rates in different age groups and because different population groups have different age distributions, the mortality rates are age-adjusted to make the rates among different population groups more comparable. A standard population is used to weight age-specific rates. The age-adjusted mortality rates are the rates that would have occurred if the population distribution was the same as the standard population.
- 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 a contributing (or secondary) cause of death among residents.
  - Diabetes is three times as likely to be listed as a contributing cause of death than as the underlying cause of death.
- A trend analysis using data from 1999-2008 showed that diabetes-related age-adjusted mortality rates (AAMRs) decreased significantly in that timeframe (a trend analysis of the data through 2012 has not yet been performed). [Figure 1]
- The change in AAMRs with diabetes as the underlying cause of death was not significant in the 1999-2008 timeframe (a trend analysis of the data through 2012 has not yet been performed). [Figure 1]

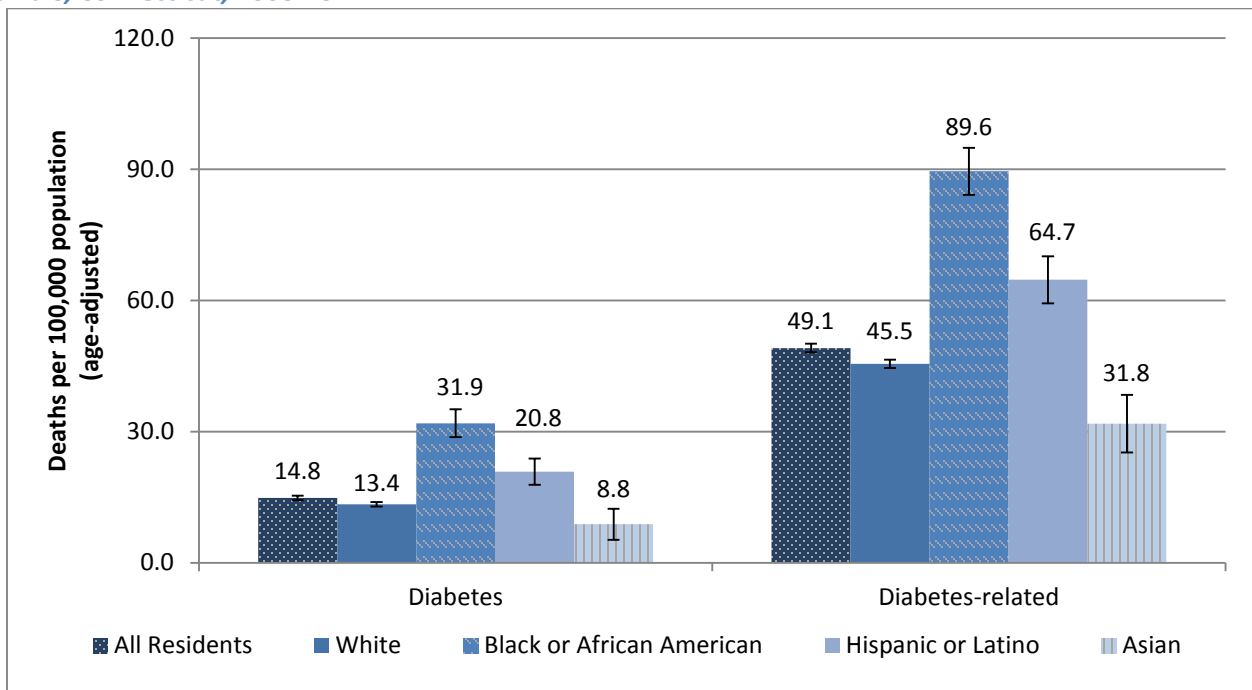*Figure 1 Age-adjusted Diabetes and Diabetes-related Mortality Rates, Connecticut, 1999-2012*
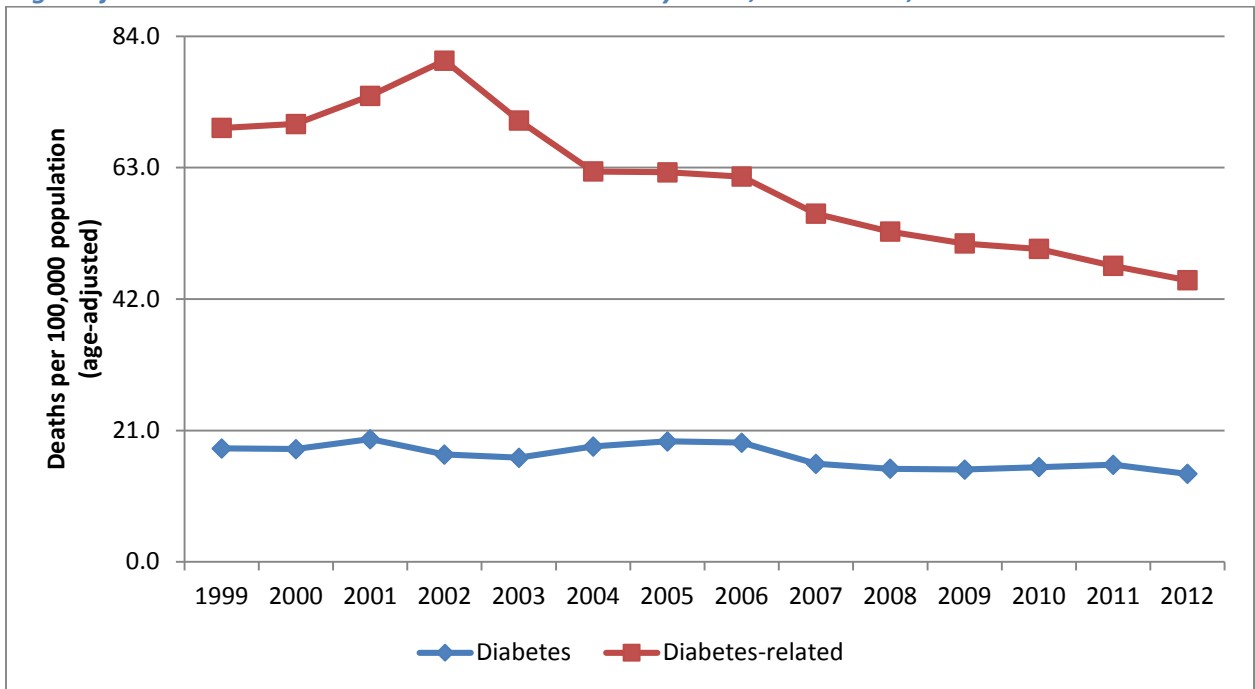
Data Source: CT DPH, Vital Records Mortality Files, 1999-2012 data.

Age-adjusted Mortality Rates (AAMR) by Race and Ethnicity[1] among Connecticut Residents

- Black or African American residents have the highest diabetes and diabetes-related AAMRs. [Figure 2]
- Hispanic or Latino residents have significantly higher diabetes and diabetes-related AAMRs compared with White and Asian residents. [Figure 2]
- Asian residents have significantly lower diabetes-related AAMRs compared with the three other racial and ethnic groups. [Figure 2]
- The diabetes AAMRs of Asian residents are significantly lower than the rates among Black or African American and Hispanic or Latino residents. The difference in diabetes AAMRs among Asian and White residents did not reach statistical significance. [Figure 2]

Figure 2 Age-adjusted Mortality Rates (per 100,000 population) by Race and Ethnicity with 95% Confidence Intervals, Connecticut, 2008-2012

Data Source: CT DPH, Vital Records Mortality Files, 2008-2012 data

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[1] All racial groupings (e.g., "Black," "White," "Asian") *exclude* persons of Hispanic ethnicity. A Hispanic or Latino ethnicity category is included in figures and tables reflecting data separate from race categories. Therefore, the modifier "Non-Hispanic or Latino" is assumed.

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Age-adjusted Mortality Rates (AAMR) by Gender among Connecticut Residents

- Male Connecticut residents have significantly higher age-adjusted diabetes and diabetes-related mortality rates compared with females. [Figure 3]

Figure 3 Age-adjusted Mortality Rates (per 100,000 population) by Gender with 95% Confidence Intervals, Connecticut, 2008-2012
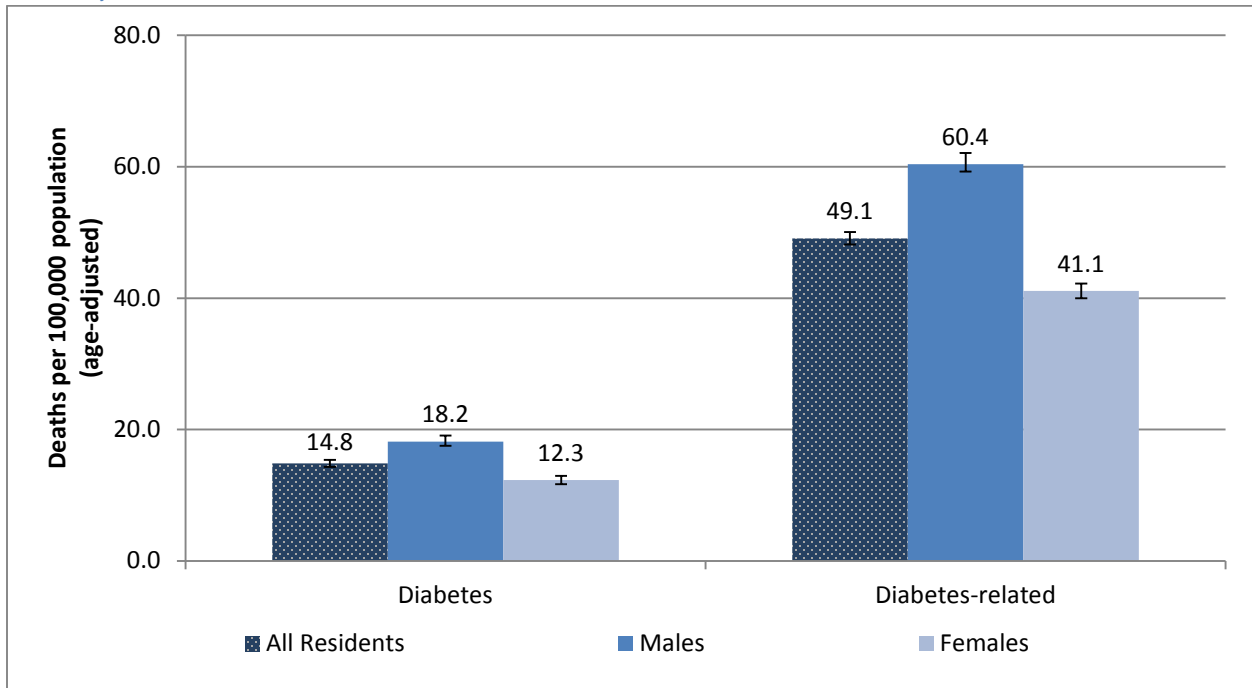

Data Source: CT DPH, Vital Records Mortality Files, 2008-2012 data

Age-adjusted Years of Potential Life Lost (under the age of 75 years)

- Years of potential life lost (YPLL) is a measure of premature mortality, or deaths that occur before a person reaches an expected age.
- YPLL represent the number of years of potential life lost by each death before a predetermined end point (e.g., 75 years of age).
- 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 is over 75 years.

Age-adjusted Years of Potential Life Lost < 75 Years (YPLL) by Race and Ethnicity among Connecticut Residents

- Black or African American residents have significantly higher diabetes and diabetes-related YPLL compared with the three other racial and ethnic groups. [Figure 4]
- Hispanic or Latino residents have significantly higher diabetes and diabetes-related YPLL compared with White and Asian residents. [Figure 4]
- Asian residents have significantly lower diabetes and diabetes-related YPLL compared with the three other racial and ethnic groups. [Figure 4]

Figure 4 Age-adjusted Years of Potential Life Lost (<75y) per 100,000 population by Race and Ethnicity with 95% Confidence Intervals, Connecticut, 2008-2012

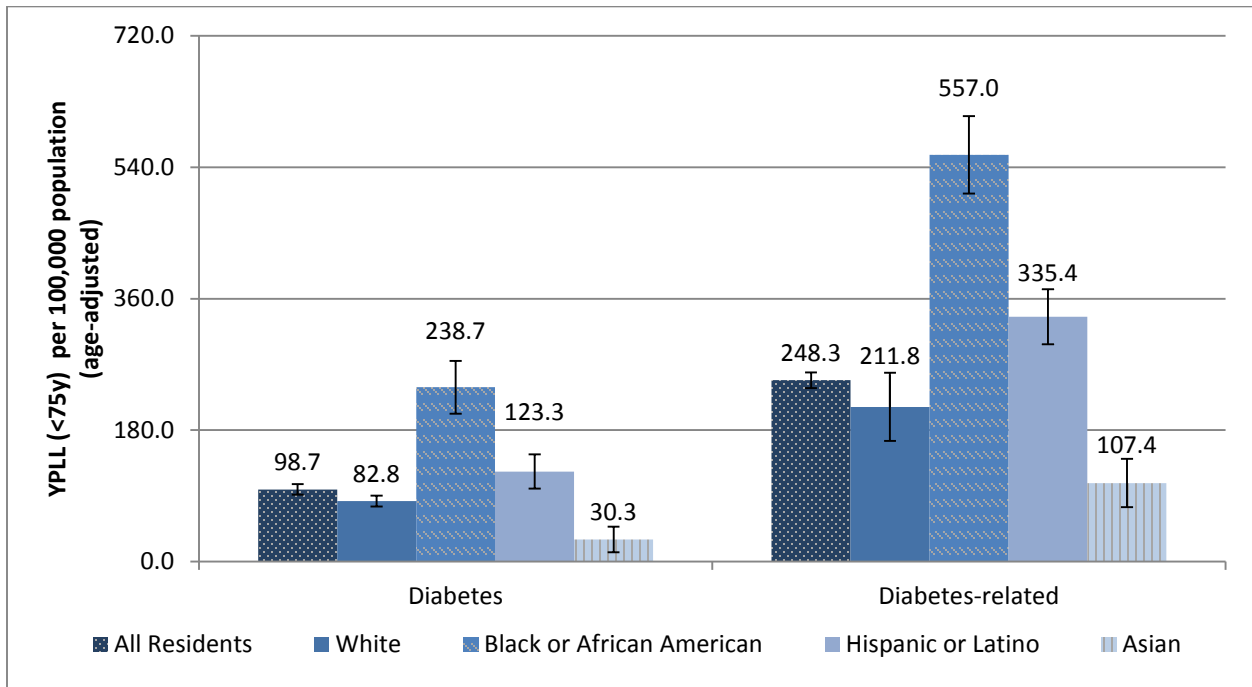Data Source: CT DPH, Vital Records Mortality Files, 2008-2012 data

Diabetes Hospital Discharge Data

Acute Care Hospital Inpatient Discharge Database (HIDD)

- All acute care hospitals in Connecticut are required by law to submit inpatient discharge data to the Office of Health Care Access (OHCA).
- The information is taken from medical record abstracts and hospital bills.
- Although data are coded for billing, not surveillance, purposes, they can provide useful information on the burden of disease.
- Hospitalizations are the number of hospital discharges, not unduplicated patients.
- Hospitalization rates are calculated by dividing the total number of hospital discharges in one year by the number of persons in the population (e.g. total state population or the population total for a racial or ethnic group) at midyear.
    - Since diseases and hospitalizations occur at different rates in different age groups and because different population groups have different age distributions, the hospitalization rates are age-adjusted to make the rates among different population groups more comparable. A standard population is used to weight age-specific rates. The age-adjusted hospitalization rates are the rates that would have occurred if the population distribution was the same as the standard population.

Age-adjusted Diabetes Hospital Discharge Rates and Total Charges among Connecticut Residents

- Diabetes can lead to variety of disabling complications and life-threatening events, and the economic burden of diabetes is great.
- In 2013, there were 5,580 hospital discharges with diabetes as the primary diagnosis. This represented 1.7% of all hospital discharges, excluding pregnancy and newborn hospitalizations (Connecticut Acute Care Hospital Inpatient Discharge Database (HIDD)).
- 1.5% of all hospital charges, excluding pregnancy and newborn hospitalizations, (approximately $194 million) were for hospitalizations with diabetes as the primary diagnosis in 2013 (HIDD).

Age-adjusted Diabetes-related Hospital Discharges and Total Charges among Connecticut Residents

- Diabetes-related hospitalizations are defined as hospitalizations with diabetes as any listed diagnosis.
- In 2013, 20.4% (64,958 discharges) of all hospital discharges excluding pregnancy and newborn hospitalizations were diabetes-related (HIDD).
- 18.2% (approximately $2.4 billion) of all hospital charges, excluding pregnancy and newborn hospitalizations, were for diabetes-related hospitalizations in 2013 (HIDD).

Age-adjusted Diabetes-related Nontraumatic Lower Extremity Amputation Hospital Discharge Rates (per 100,000 population) and Total Charges among Connecticut Residents

- Nationally, about 60% of nontraumatic lower extremity amputations (NLEA) among people aged 20 years or older occur in people with diabetes (Centers for Disease Control and Prevention's (CDC) National Diabetes Statistics Report, 2014[2]).

- Age-adjusted diabetes-related NLEA hospitalization rates decreased nearly 21% in Connecticut between 2001 and 2013 – from 28.1 discharges per 100,000 population to 22.3 discharges per 100,000 population (HIDD).

- The total charges of diabetes-related NLEA hospitalizations increased from $32.3 million in 2001 to $71.7 million in 2013 (HIDD).
  - Possible reasons for this increase in charges include inflation and the use of more sophisticated medical technology.

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[2] http://www.cdc.gov/diabetes/pubs/statsreport14/national-diabetes-report-web.pdf

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Age-adjusted Hospital Discharge Rates (per 100,000 population) by Race and Ethnicity among Connecticut Residents

- Black or African American residents have significantly higher diabetes, diabetes-related, and diabetes-related NLEA age-adjusted hospitalization rates compared with White residents. [Table 2]
- Furthermore, Black or African American residents have significantly higher diabetes and diabetes-related age-adjusted hospitalization rates compared with Hispanic or Latino residents. The differences in the rates of diabetes-related NLEA of Black or African American and Hispanic or Latino residents did not reach statistical significance. [Table 2]
- Hispanic or Latino residents have significantly higher diabetes, diabetes-related, and diabetes-related NLEA age-adjusted hospitalization rates compared with White residents. [Table 2]
- There were too few diabetes-related and diabetes-related NLEA hospitalizations among Asian, Pacific Islander, and American Indian residents to calculate reliable rates.

Table 2 Age-adjusted Hospital Discharge Rates (per 100,000 population) by Race and Ethnicity, Connecticut Residents, 2013*

Diagnostic Group (ICD-9)	Race and Ethnicity	Number of Discharges	AAHR	(95% CI)
Diabetes	Connecticut	5,580	142.2	(138.3-146.0)
	White	3,042	101.1	(97.0-105.0)
	Hispanic or Latino	932	234.2	(217.0-251.0)
	Black or African American	1,402	408.3	(386.0-430.0)
Diabetes-related	Connecticut	64,958	1,521.10	(1,509.1-1,533.1)
	White	43,933	1,236.40	(1,224.0-1,249.0)
	Hispanic or Latino	8,307	2,637.20	(2,574.0-2,700.0)
	Black or African American	10,185	3,132.50	(3,070.0-3,195.0)
Diabetes-related nontraumatic lower extremity amputation	Connecticut	958	22.3	(20.8-23.7)
	White	581	16.5	(15.0-18.0)
	Hispanic or Latino	199	47.1	(39.0-55.0)
	Black or African American	152	61.7	(53.0-70.0)

Data Source: CT DPH, Connecticut Acute Care Hospital Inpatient Discharge Database, 2013 data; *There were too few diabetes-related and diabetes-related NLEA hospitalizations among Asian, Pacific Islander, and American Indian residents to calculate reliable rates. AAHR = Age-adjusted hospital discharge rate; CI = Confidence Interval.

Prevalence of Diabetes

Behavioral Risk Factor Surveillance System (BRFSS)

- The BRFSS is a state-based system of health surveys that generate information about health risk behaviors, clinical preventive practices, and health care access and utilization.
- The BRFSS is sponsored by the Centers for Disease Control and Prevention (CDC) and is the world's largest telephone survey. It is conducted in all 50 states.
- Respondents are randomly selected adults (aged 18 and older) within randomly selected households with landline telephones, or with cellular telephones owned by adults with no landline or who use their cellular telephones for at least 90% of their calls.

Prevalence of Diagnosed Diabetes among Connecticut Adults (18+ years)

- BRFSS respondents are asked if they have ever been told by a doctor, nurse, or other health professional that they have diabetes. Female respondents indicating that they were only told that they had diabetes during pregnancy are classified as not having diabetes. Respondents reporting prediabetes are also classified as not having diabetes.
- An estimated 8.9% of Connecticut adults have been diagnosed with diabetes or approximately 250,000 adults. [Table 3]
  - According to the literature, approximately 25% of people with diabetes are undiagnosed.
    - Using the estimated prevalence of diagnosed diabetes among adults in the state, it can be approximated that over 330,000 adults in Connecticut have diabetes (diagnosed and undiagnosed) and that over 83,000 adults have undiagnosed diabetes.
  - These estimates include types 1 and 2 diabetes.
- Age-adjusted prevalence rates of diagnosed diabetes vary by gender and race and ethnicity. [Table 3]
  - Males have higher rates than females.
  - The diabetes rates among Black or African American and Hispanic or Latino adults are double the diabetes rates of White adults.
- Prevalence rates of diagnosed diabetes vary by age and socioeconomic status. [Table 3]
  - Rates of diabetes increase with increasing age.
  - In terms of educational attainment, adults who are less than high school graduates have the highest rates of diagnosed diabetes.
  - In terms of income, adults with annual household incomes of <$25,000 have the highest diabetes rates.

Table 3 Prevalence of Diagnosed Diabetes among Adults (18+y), Connecticut, 2012-2014

Characteristic	Unweighted Number*	Weighted Number†	Unadjusted % (95% CI)	Age-adjusted % (95% CI)‡
All Adults	2,646	250,000	8.9 (8.5-9.4)	7.9 (7.5-8.3)
Gender				
Male	1,229	132,000	9.8 (9.1-10.5)	9.1 (8.4-9.8)
Female	1,417	118,000	8.1 (7.5-8.7)	6.9 (6.4-7.4)
Race & Ethnicity§				
White	1,877	161,000	8.1 (7.6-8.6)	6.5 (6.1-7.0)
Black or African American	325	37,000	14.6 (12.4-16.8)	14.6 (12.6-16.6)
Hispanic or Latino	284	37,000	10.2 (8.5-11.8)	13.8 (11.8-15.8)
Other	98	10,000	6.3 (4.5-8.0)	8.8 (6.6-11.02)
Age (in years)				
18-44	168	30,000	2.5 (2.0-3.0)	NA
45-64	1,041	109,000	10.8 (9.9-11.6)	NA
65+	1,402	108,000	19.5 (18.3-20.7)	NA
Educational Attainment				
Less than High School Graduate	348	52,000	15.9 (13.7-18.1)	13.6 (11.6-15.7)
High School Graduate	862	79,000	10.2 (9.3-11.1)	9.0 (8.1-9.9)
Some College	675	68,000	8.9 (8.0-9.9)	8.4 (7.6-9.3)
College Graduate	748	49,000	5.4 (4.9-5.9)	4.9 (4.4-5.3)
Annual Household Income				
<$25,000	847	72,000	13.6 (12.3-14.9)	12.6 (11.4-13.8)
$25,000-49,999	561	52,000	11.2 (10.0-12.4)	8.9 (7.9-9.9)
$50,000-74,999	297	27,000	7.8 (6.5-9.0)	6.6 (5.3-7.9)
≥$75,000	512	56,000	5.7 (5.0-6.4)	5.6 (4.9-6.2)

Data Source: CT DPH. BRFSS, 2012-2014 data; *Numbers may not sum to total due to missing data. †Data are weighted to make the responses representative of the state's population. The weighted number is rounded to the nearest thousand. ‡Percentages are age-adjusted to eliminate differences in crude rates in populations of interest that result from differences in the populations' age distributions. The percentages were age-adjusted using the 2000 Projected U.S. Population. §Asian, Pacific Islander, American Indian or Alaskan Native, other race, and multiracial adults are not reported in separate categories due to the small number of respondents.

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Diabetes Preventive Care Practices

Preventive Care Practices among Connecticut Adults (18+y) with Diagnosed Diabetes

- Diabetes preventive care can reduce the microvascular (i.e., eye, kidney, and nerve diseases) and macrovascular (e.g., heart attack and stroke) complications of diabetes.
- Preventive care practices are practices that include receiving eye and foot examinations, routinely having A1C tests to monitor blood glucose level as directed, attending diabetes self-management classes, receiving appropriate immunizations, and performing self-examinations of the feet daily.
- Healthy People (HP) 2020 has national goals for these diabetes preventive care practices.
- Behavioral Risk Factor Surveillance System (BRFSS) data show low rates of preventive care practices among Connecticut adults with diagnosed diabetes. [Table 4]
- Possible reasons for the low rates include lack of awareness of the need for multiple preventive care services, inadequate health insurance coverage, and inability to make co-payments, deductibles, or visit specialists.

Table 4 Preventive Care Practices, Connecticut Adults (18+y) with Diagnosed Diabetes, 2012-2014

Preventive Care Practice	Healthy People 2020 Target (%)	Age-adjusted %, Connecticut*
2+ A1C tests in past year	71.1	70.4
Annual dilated eye exam†	58.7	65.0
Annual foot exam	74.8	75.3
Attended diabetes self-management class	62.5	52.5
Annual influenza immunization‡	70.0	53.9
Ever had pneumococcal immunization (18-64 years of age)^	90.0	45.5
Ever had pneumococcal immunization (65+ years of age)^	90.0	73.2

*Data source: CT DPH. BRFSS, 2012-2014 data; †The HP 2020 target and Connecticut estimates for annual dilated eye exam have different data sources and are not comparable. ‡The HP 2020 target for influenza immunization is for all adults not specifically those with diabetes. The HP 2020 data source is the National Health Interview Survey. ^The HP 2020 targets for pneumococcal immunizations are for high-risk noninstitutionalized adults. The HP 2020 data source is the National Health Interview survey.

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Diabetes Self-management Education and Comprehensive Diabetes Clinical Care (CDCC)

- BRFSS variables are available for the following American Diabetes Association-recommended clinical services: annual dilated retinal examination, annual foot examination by a health care professional, at least one A1C test every 6 months, annual flu vaccination, and ever having had the pneumococcal vaccination.
- High comprehensive diabetes clinical care (CDCC) includes respondents reporting having received four or more of the ADA recommended clinical services.
- Diabetes self-management education (DSME) is a key step in preventing diabetes complications. DSME 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.
    - o Adults reporting having ever taken a class on how to self-manage diabetes were more likely than those who did not take a class to have higher levels of CDCC. [Figure 5].
- Older adults and adults with insurance are also more likely to have high levels of CDCC (data not shown).

Figure 5 Diabetes Self-management Education and Comprehensive Diabetes Clinical Care (CDCC) with 95% Confidence Intervals, Connecticut Adults (18+y) with Diagnosed Diabetes, 2012-2014
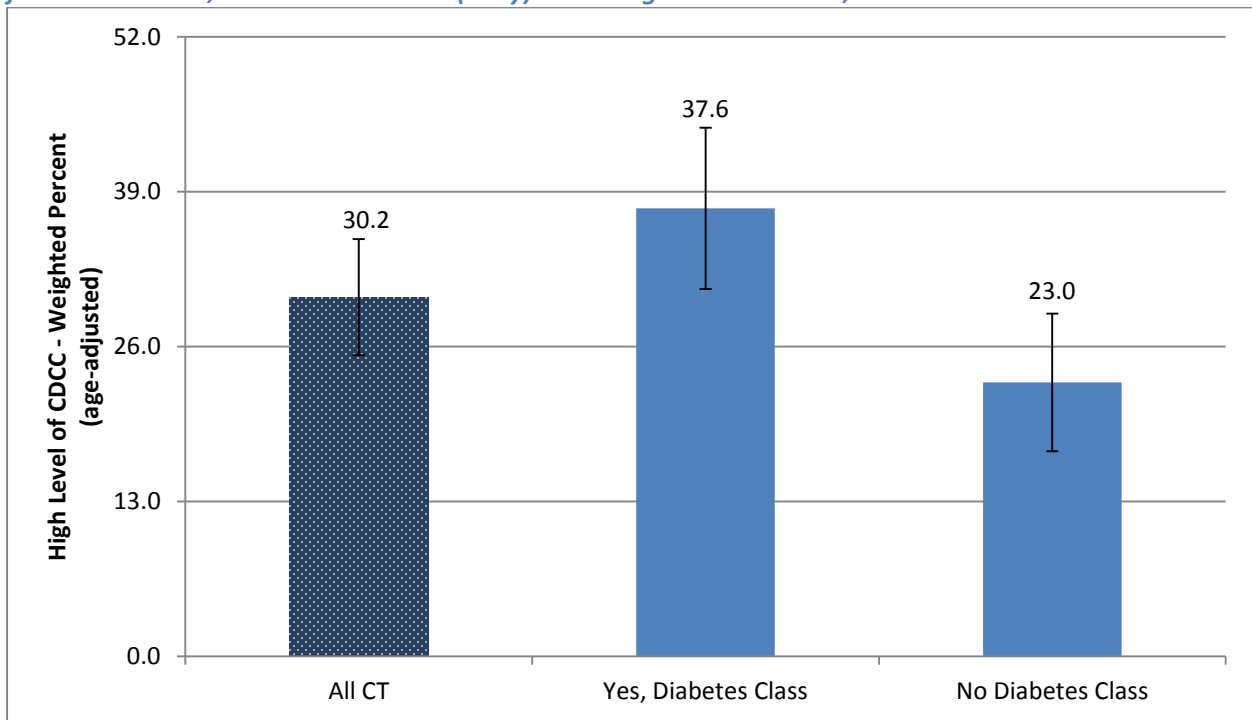
Data Source: CT DPH. BRFSS, 2012-2014 data

Prediabetes among Connecticut Adults (18+y) and Diabetes Screening Tests

- 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 37% of US adults (20+y) have prediabetes (CDC's *National Diabetes Statistics Report, 2014*[3]).
  - However, according to the CDC, 9 out of 10 people who have prediabetes do not know that they have it.
  - Only 7.2% of Connecticut adults reported having been told that they have prediabetes (2012-2014 BRFSS data; not shown).
- Fasting blood glucose, glucose tolerance, or hemoglobin A1C tests can be used to diagnose prediabetes and 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.
- Only 55.6% of Connecticut adults without diagnosed diabetes report having been tested for diabetes in the past 3 years. [Table 5]
- Prevalence rates of diabetes testing among adults (18+y) vary by gender, race and ethnicity, and age. [Table 5]
  - Females are more likely than males to report having been tested for diabetes in the last three years.
  - Adults categorized as "other" race and ethnicity are the least likely to report having been tested for diabetes in the last three years.
  - The differences in the rates of diabetes testing among White, Black or African American, and Hispanic or Latino adults did not reach statistical significance.
  - Adults aged 18-44 years are significantly less likely to report having been tested for diabetes in the last three years compared with adults aged 45-64 years and 65 years and older.
- Connecticut adults with health care coverage are more likely to have been tested for diabetes in the last three years compared with adults who do not have health care coverage. [Table 5]
- Also, adults who are overweight or obese are more likely to have been tested for diabetes in the last three years compared with adults who are not overweight or obese. [Table 5]
- The differences in the rates of diabetes testing among adults (18+y) within the categories of educational attainment and annual household income did not reach statistical significance. [Table 5]

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[3] http://www.cdc.gov/diabetes/pubs/statsreport14/national-diabetes-report-web.pdf

Table 5 Connecticut Adults (18+y) without Diagnosed Diabetes Who Report Having Been Tested for Diabetes in the Last Three Years, 2012-2014

Characteristic	Unweighted Number*	Weighted Number†	Unadjusted Percent (95% CI)	Age-adjusted % (95% CI)‡
All Adults	12,377	1,328,000	55.6 (54.6-56.6)	54.6 (53.6-55.6)
Gender				
Male	4,960	601,000	53.0 (51.5-54.5)	52.3 (50.8-53.7)
Female	7,417	727,000	57.9 (56.5-59.2)	57.0 (55.6-58.3)
Race & Ethnicity§				
White	9,843	962,000	56.6 (55.5-57.8)	54.1 (52.9-55.2)
Black or African American	950	118,000	57.5 (53.9-61.1)	58.3 (54.9-61.6)
Hispanic or Latino	903	169,000	54.6 (51.3-57.9)	57.5 (54.1-60.9)
Other	464	59,000	42.9 (38.4-47.4)	45.3 (40.9-49.7)
Age (in years)				
18-44	2,770	481,000	43.9 (42.2-45.6)	NA
45-64	5,473	554,000	65.1 (63.8-66.5)	NA
65+	3,946	278,000	66.4 (64.7-68.1)	NA
Educational Attainment				
Less than High School Graduate	668	143,000	53.3 (49.6-57.1)	52.8 (49.0-56.5)
High School Graduate	2,871	358,000	54.0 (52.0-56.0)	53.4 (51.3-55.4)
Some College	2,851	349,000	53.6 (51.6-55.7)	54.5 (52.5-56.5)
College Graduate	5,925	471,000	59.3 (58.0-60.7)	56.7 (55.1-58.2)
Annual Household Income				
<$25,000	2,061	233,000	53.3 (50.9-55.7)	53.8 (51.4-56.2)
$25,000-49,999	2,183	223,000	57.2 (54.9-59.6)	55.4 (52.9- 58.0)
$50,000-74,999	1,700	176,000	58.5 (55.9-61.2)	55.7 (52.8-58.6)
$75,000+	4,662	498,000	58.1 (56.4-59.7)	56.0 (54.4-57.6)
Health Care Coverage (all adults)				
Has Health Care Coverage	11,726	1,229,000	57.6 (56.6-58.7)	56.2 (55.1-57.3)
No Health Care Coverage	631	95,000	38.6 (35.3-41.9)	40.0 (36.4-43.7)
Overweight or Obese				
Overweight or Obese	7,594	825,000	61.6 (60.3-62.8)	59.0 (57.5-60.4)
Not Overweight or Obese	4,003	418,000	46.9 (45.2-48.6)	48.1 (46.5-49.8)

Data Source: CT DPH. BRFSS, 2012-2014 data; *Numbers may not sum to total due to missing data; †Data are weighted to make the responses representative of the state's population. The weighted number is rounded to the nearest thousand; ‡Percentages are age-adjusted to eliminate differences in crude rates in populations of interest that result from differences in the populations' age distributions. The percentages were age-adjusted using the 2000 Projected U.S. Population. §Asian, Pacific Islander, American Indian or Alaskan Native, other race, and multiracial adults are not reported in separate categories due to the small number of respondents.

Modifiable Risk Factors for Type 2 Diabetes

- Risk factors for type 2 diabetes may be non-modifiable or modifiable.
- Some population groups are at increased risk for diabetes (non-modifiable risk):
    - Adults age 45 years or older;
    - Individuals having a parent or sibling with type 2 diabetes;
    - People who are African American, American Indian, Asian American, Pacific Islander, or Hispanic American or Latino heritage; and
    - Women having a prior history of gestational diabetes or birth of at least one baby weighing more than 9 pounds[4].
- Collecting and sharing one's family health history can help health care professionals assess a person's risk of developing type 2 diabetes and recommend actions to lower that risk. For more information, visit the [Department of Public Health's Genomics web page](5).
- Modifiable risk factors, those that can be altered or controlled, include:
    - Being overweight or obese;
    - Being physically inactive (exercising fewer than three times a week)
    - Having high blood pressure (blood pressure measuring 140/90 or higher); and
    - Having abnormal cholesterol with HDL ("good") cholesterol is 35 or lower, or triglyceride level is 250 or higher[6].
        - For information on hypertension and high blood cholesterol, visit www.ct.gov/dph/HeartStrokeData.

Obesity

- Obesity is considered the chief modifiable risk factor for type 2 diabetes.
    - Research has demonstrated an association between obesity and abnormal glucose tolerance.
- An estimated 25.6% of Connecticut adults (18+y) are obese. [Table 6]
- Prevalence rates of obesity among adults (18+y) vary by age and race and ethnicity. [Table 6]
    - Adults aged 18-44 years have the lowest rates of obesity compared with other age groups.
    - White adults have significantly lower rates of obesity compared with Black or African American and Hispanic or Latino adults.
    - The difference in obesity rates among males and females did not reach statistical significance.
- Prevalence rates of obesity among adults (18+y) vary by socioeconomic status. [Table 6]
    - In terms of educational attainment, adults who are college graduates have the lowest rates of obesity.
    - In terms of income, adults with annual household incomes of <$25,000 have the highest obesity rates.

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[4] www.cdc.gov/diabetes/basics/prevention.html
[5] www.ct.gov/dph/genomics
[6] www.cdc.gov/diabetes/basics/prevention.html

Table 6 Prevalence of Obesity among Adults (18+y), Connecticut, 2012-2014

Characteristic	Unweighted Number*	Weighted Number†	Unadjusted Percent (95% CI)	Age-adjusted % (95% CI)‡
All Adults	5,942	671,000	25.6 (24.8-26.4)	25.5 (24.6-26.3)
Gender				
Male	2,695	345,000	26.4 (25.2-27.6)	26.3 (25.1-27.5)
Female	3,247	326,000	24.8 (23.7-25.9)	24.7 (23.5-25.8)
Race & Ethnicity§				
White	4,362	455,000	24.2 (23.3-25.1)	23.8 (22.8-24.7)
Black or African American	668	82,000	34.7 (31.6-37.8)	34.4 (31.4-37.4)
Hispanic or Latino	595	99,000	30.9 (28.0-33.8)	32.6 (29.7-35.6)
Other	225	26,000	17.7 (14.7-20.7)	19.1 (16.0-22.1)
Age (in years)				
18-44	1,411	251,000	22.3 (20.9-23.6)	NA
45-64	2,617	276,000	29.0 (27.8-30.3)	NA
65+	1,888	141,000	26.7 (25.3-28.1)	NA
Educational Attainment				
Less than High School Graduate	515	94,000	31.2 (28.1-34.3)	30.4 (27.1-33.7)
High School Graduate	1,763	212,000	29.0 (27.3-30.6)	30.0 (28.2-31.8)
Some College	1,629	201,000	27.9 (26.3-29.6)	29.2 (27.5-30.9)
College Graduate	2,022	163,000	18.8 (17.8-19.8)	18.2 (17.0-19.3)
Annual Household Income				
<$25,000	1,431	158,000	32.2 (30.2-34.3)	33.1 (30.9-35.3)
$25,000-49,999	1,229	126,000	28.2 (26.3-30.1)	27.6 (25.5-29.8)
$50,000-74,999	831	91,000	27.1 (24.9-29.3)	25.8 (23.6-28.1)
≥$75,000	1,729	209,000	22.1 (20.9-23.3)	21.4 (20.1-22.7)

Data Source: CT DPH. BRFSS, 2012-2014 data; *Numbers may not sum to total due to missing data; †Data are weighted to make the responses representative of the state's population. The weighted number is rounded to the nearest thousand; ‡Percentages are age-adjusted to eliminate differences in crude rates in populations of interest that result from differences in the populations' age distributions. The percentages were age-adjusted using the 2000 Projected U.S. Population. §Asian, Pacific Islander, American Indian or Alaskan Native, other race, and multiracial adults are not reported in separate categories due to the small number of respondents.*

Connecticut Department of Public Health
Community, Family, & Health Equity Section
www.ct.gov/dph/DiabetesData

DPH
Connecticut Department of Public Health

Physical Inactivity

- In this document, physical inactivity is defined as not participating in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise during the past month, other than the respondents' regular job (i.e., no leisure time physical activity).
- Physical inactivity, independent of obesity or diet, is a risk factor for type 2 diabetes.
- Research has shown that populations with higher rates of physical activity have lower rates of diabetes.
- An estimated 22.6% of Connecticut adults participate in no leisure time physical activity. [Table 7]
- Prevalence rates of physical inactivity vary by gender, race and ethnicity, age, and socioeconomic status. [Table 7]
  - Females have higher rates of physical inactivity compared with males.
  - Hispanic or Latino adults have significantly higher physical inactivity rates than White and Black or African American adults.
  - The rate of physical inactivity increases with increasing age.
  - In terms of educational attainment, adults who are college graduates have the lowest physical inactivity rates.
  - The rate of physical inactivity decreases with increasing annual household income.

Table 7 Prevalence of No Leisure Time Physical Activity, Adults (18+y), Connecticut, 2012-2014

Characteristic	Unweighted Number*	Weighted Number†	Unadjusted Percent (95% CI)	Age-adjusted % (95% CI)‡
All Adults	3,425	392,000	22.6 (21.6-23.6)	22.0 (21.0-23.1)
Gender				
Male	1,284	169,000	20.4 (19.0-21.7)	20.1 (18.6-21.5)
Female	2,141	223,000	24.7 (23.3-26.1)	23.9 (22.4-25.4)
Race & Ethnicity§				
White	2,414	243,000	19.7 (18.7-20.8)	18.2 (17.1-19.4)
Black or African American	359	43,000	28.3 (24.7-31.9)	28.1 (24.6-31.6)
Hispanic or Latino	413	78,000	34.8 (31.2-38.4)	36.9 (33.2-40.5)
Other	168	21,000	21.3 (16.9-25.7)	23.0 (18.6-27.4)
Age (in years)				
18-44	679	136,000	18.4 (16.7-20.1)	NA
45-64	1,291	141,000	22.6 (21.1-24.1)	NA
65+	1,400	110,000	31.6 (29.8-33.5)	NA
Educational Attainment				
Less than High School Graduate	438	80,000	39.9 (35.8-43.9)	38.1 (33.9-42.3)
High School Graduate	1,171	132,000	27.6 (25.6-29.6)	26.6 (24.5-28.6)
Some College	844	110,000	23.2 (21.1-25.2)	23.7 (21.6-25.9)
College Graduate	949	68,000	12.0 (11.0-12.9)	11.3 (10.3-12.4)
Annual Household Income				
<$25,000	1,003	114,000	34.7 (32.1-37.3)	34.6 (31.8-37.4)
$25,000-49,999	733	80,000	28.4 (25.9-30.9)	26.9 (24.1-29.6)
$50,000-74,999	386	43,000	19.5 (17.1-21.9)	17.5 (15.1-19.8)
≥$75,000	660	78,000	13.0 (11.7-14.2)	12.8 (11.5-14.1)

Data Source: CT DPH. BRFSS, 2012-2014 data; *Numbers may not sum to total due to missing data; †Data are weighted to make the responses representative of the state's population. The weighted number is rounded to the nearest thousand; ‡Percentages are age-adjusted to eliminate differences in crude rates in populations of interest that result from differences in the populations' age distributions. The percentages were age-adjusted using the 2000 Projected U.S. Population. §Asian, Pacific Islander, American Indian or Alaskan Native, other race, and multiracial adults are not reported in separate categories due to the small number of respondents.*

Health Care Coverage among Connecticut Adults (18-64 years old)

- Access to health care is crucial to the prevention, diagnosis, treatment, and management of diabetes.
- Based on 2012-2014 BRFSS data, an estimated 11.9% of Connecticut adults are uninsured. [Table 8]
  - This is likely an overestimate because 2012-2014 data include two years of data that predate health insurance expansion as well as data from the first year of expansion.
- Age-adjusted prevalence rates of not having health insurance vary by gender and race and ethnicity. [Table 8]
  - Adult males are less likely to have health insurance than adult females.
  - Hispanic or Latino adults are least likely to have health insurance than other racial and ethnic groups.
  - Black or African American adults are less likely than White adults to have health insurance.
- Age-adjusted prevalence rates of not having health insurance vary by socioeconomic status. [Table 8]
  - The rates of uninsured adults decreases with increasing educational attainment levels.
  - Adults with annual household incomes of less than $25,000 are 11 times more likely to not have health insurance compared to adults with annual household incomes of $75,000 or more.
- Provisions of the Patient Protection and Affordable Care Act (ACA) that went into effect on January 1, 2014, expanded health care coverage in many states, including Connecticut.
  - The current uninsured rate in Connecticut is approximately 3.8% according to Access Health CT (Connecticut Health Insurance Exchange)[7].
    - This estimate was calculated using a combination of Access Health CT enrollment data, Medicaid enrollment data, Kaiser Family Foundation statistics, and survey data.

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[7] http://www.ct.gov/hix/lib/hix/Connecticuts_Remaining_Uninsured_Results_Revised_%5BRead-Only%5D.pdf

Table 8 Prevalence of <u>Not</u> Having Health Care Coverage among Adults (18-64y), Connecticut, 2012-2014*

Characteristic	Unweighted Number†	Weighted Number‡	Unadjusted Percent (95% CI)	Age-adjusted % (95% CI) §
All Adults	1,617	264,000	11.9 (11.2-12.6)	12.4 (11.6-13.2)
Gender				
Male	855	155,000	14.2 (13.0-15.3)	14.9 (13.6-16.1)
Female	762	108,000	9.7 (8.8-10.6)	10.0 (9.0-11.0)
Race & Ethnicity‖				
White	813	109,000	7.3 (6.6-7.9)	7.7 (6.9-8.5)
Black or African American	201	31,000	14.7 (12.1-17.2)	14.8 (12.1-17.4)
Hispanic or Latino	464	106,000	32.0 (29.0-34.9)	31.3 (28.5-34.1)
Other	92	12,000	8.4 (6.1-10.7)	8.7 (6.5-11.0)
Educational Attainment				
Less than High School Graduate	285	80,000	33.5 (29.7-37.4)	34.2 (30.3-38.0)
High School Graduate	568	89,000	14.8 (13.3-16.3)	15.7 (14.1-17.3)
Some College	416	63,000	10.3 (9.0-11.5)	10.5 (9.2-11.8)
College Graduate	333	30,000	4.0 (3.5-4.6)	4.3 (3.7-5.0)
Annual Household Income				
<$25,000	715	117,000	29.2 (26.8-31.6)	29.5 (27.1-32.0)
$25,000-49,999	365	51,000	15.3 (13.4-17.3)	15.4 (13.4-17.4)
$50,000-74,999	126	18,000	6.4 (5.0-7.8)	6.4 (4.9-7.9)
≥$75,000	133	20,000	2.3 (1.8-2.8)	2.7 (2.0-3.4)

Data Source: CT DPH. BRFSS, 2012-2014 data; *Time period prior to health insurance expansion; †Numbers may not sum to total due to missing data; ‡ Data are weighted to make the responses representative of the state's population. The weighted number is rounded to the nearest thousand; §Percentages are age-adjusted to eliminate differences in crude rates in populations of interest that result from differences in the populations' age distributions. The percentages were age-adjusted using the 2000 Projected U.S. Population. ‖Asian, Pacific Islander, American Indian or Alaskan Native, other race, and multiracial adults are not reported in separate categories due to the small number of respondents.

Prevention and Control of Type 2 Diabetes
- Diabetes is a serious condition that can lead to a number of health problems and incur large costs not only for individuals, but also for communities, businesses, governments, and other organizations.
- However, 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.
  - Promoting wellness in all aspects of residents' lives involves creating a *grid of resources* to which all residents have equal access.
  - This *grid of resources* includes healthy food, safe places for physical activity, quality clinical and other health services, and community and clinical organizations to support prevention, self-management and control of diabetes, high blood pressure, and obesity.
- One way that the Connecticut Department of Public Health (DPH) promotes the development of this wellness environment and equal access to the *grid of resources* is through funding from the Centers for Disease Control and Prevention (CDC) entitled "State Public Health Actions to Prevent and Control Diabetes, Heart Disease, Obesity and Associated Risk Factors and Promote School Health (1305)".

Grant activities that promote wellness and access to the *grid of resources* include:

- *Increasing links between community and clinical organizations to support prevention, self-management and control of diabetes, high blood pressure, and obesity*
  - American Diabetes Association (ADA)-recognized, American Association of Diabetes Educators (AADE)-accredited, and Stanford licensed diabetes self-management programs
    - Diabetes self-management programs are evidence-based programs that teach people with diabetes or their caregivers about how to modify food choices, increase physical activity, perform blood sugar monitoring, set goals for health, take medications, and see a health care provider regularly.
    - The Diabetes Prevention and Control Program partners with local health departments, community-based organizations, and community health centers to increase the number of diabetes self-management programs in the state and the number of participants in these programs.
  - Diabetes Prevention Programs
    - Research shows that modest weight loss (5% to 7% of body weight) and regular physical activity (at least 150 minutes each week of physical activity, such as brisk walking) can help people with prediabetes prevent or delay type 2 diabetes.
    - Diabetes Prevention Programs are evidence-based, lifestyle change programs led by lifestyle coaches that help participants with prediabetes learn about healthy eating, physical activity, dealing with stress, coping with challenges, and setting goals to reduce their risk of type 2 diabetes and improve their overall health.

- The Connecticut Diabetes Prevention and Control Program partners with the local YMCAs, hospitals, community health centers, and other community organizations to increase provider referrals to and participation in Diabetes Prevention Programs.
  - o Community Pharmacists
    - Medication therapy management (MTM) is defined as a distinct service or group of services provided by a credentialed pharmacist that optimize medication safety and therapeutic outcomes for individuals. MTM services include: (a) medication reconciliation, (b) comprehensive medication management, and (c) medication coordination and monitoring processes across all prescribers, pharmacies, and care settings.
    - DPH partners with the University of Connecticut, School of Pharmacy to promote and establish MTM programs in community pharmacies, focusing on the management of hypertension and diabetes.

- *Improving the delivery and use of quality clinical and other health services aimed at preventing and managing high blood pressure and diabetes*
  - o DPH partners with Connecticut's Regional Extension Center to assist large health care systems in reporting blood pressure and diabetes control measures and establishing quality improvement protocols related to these measures, identifying patients eligible for self-blood pressure monitoring, identifying patients with high blood pressure readings that do not have a diagnosis of hypertension, identifying patients with pre-diabetes and diabetes based on established evidence-based criteria, and integrating referrals to diabetes education and diabetes prevention programs into existing referral systems.
  - o DPH partners with Quality Improvement experts to establish self-blood pressure monitoring (SBPM) policies within large health care systems.
    - SBPM is defined as the regular measurement of blood pressure by the patient outside the clinical setting, either at home or elsewhere. SBPM plus additional support is one strategy that can be implemented in communities to reduce the risk of disability or death due to high blood pressure.[8]

- *Increasing access to healthier food*
  - o DPH partners with local health departments, community partners and corner stores to increase the amount of healthier food options available in the corner stores. The Healthy Corner Store Initiative supports small store owners through incentives and education on how to handle, store, price, exhibit, and promote fresh fruits and vegetables, and other healthy items, in their stores.

- *Enhancing access to places for physical activity with a focus on walking*
  - o DPH partners with Bike Walk Connecticut and the Department of Transportation to promote Complete Streets in communities to create streets that are designed and operated to enable

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[8] Centers for Disease Control and Prevention. Self-Measured Blood Pressure Monitoring: Action Steps for Public Health Practitioners. Atlanta, GA: Centers for Disease Control and Prevention, US Dept of Health and Human Services; 2013. Available at: millionhearts.hhs.gov/Docs/MH_SMBP.pdf.

safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities. Activities include:

- Conducting trainings for planners, engineers, public works staff and other professional employees on best practices for urban design and complete streets.
- Promoting the Department of Transportation's Share the Road campaign. The goal of the campaign is to improve the safety of all travelers, including bicyclists, pedestrians and equestrians, through awareness and education.

- *Promoting healthy eating and physical activity in schools and early care and education centers (ECEs)*
  - DPH and the Connecticut State Department of Education partner to provide professional development for administrators and staff on creating a healthy environment for children which prevents obesity through implementation of nationally recommended policies and best practices.

- *Increasing access to breastfeeding friendly environments*
  - DPH supports Connecticut Breastfeeding Coalition's (CBC) Ten Step Collaborative to provide training and support to hospital staff on "The Ten Steps to Successful Breastfeeding".
  - DPH partners with a training consultant from UConn Health Center for Public Health and Health Policy to provide staff at Federally Qualified Health Centers and various peer support networks such as Breastfeeding USA, Nurturing Families and La Leche League access to the Secrets of Baby Behavior training.
  - DPH supports the CBC's Breastfeeding Friendly Worksite Program, which recognizes employers that comply with both Federal and State lactation accommodation laws.

- For information on the Department of Public Health's efforts to prevent and control diabetes and other chronic diseases, visit the following websites:
  - www.ct.gov/dph/diabetes
  - www.ct.gov/dph/chronicdisease.

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  - Citation of the source is appreciated.
    - Connecticut Department of Public Health. *Connecticut Diabetes Statistics Report, 2016*. Hartford, CT: Connecticut Department of Public Health; 2016.