



Facts about Diabetes in Massachusetts

Diabetes is a disease in which the body does not produce or properly use insulin (a hormone used to convert sugar, starches, and other food into the energy needed for everyday life.) There are two types of diabetes: type 1 and type 2. In type 1 diabetes, the body is unable to produce insulin and in type 2 diabetes, the body is able to produce insulin, but is unable to utilize it efficiently. Two other conditions associated with diabetes include gestational diabetes and prediabetes. Gestational diabetes is glucose intolerance (the inability of the body to efficiently convert carbohydrates into energy) during pregnancy. Prediabetes is a condition in which blood glucose levels are higher than normal but not high enough for a diagnosis of diabetes.¹

Every week in Massachusetts there are:

- 104** people discharged from the hospital
- 38** lower leg amputations
- 22** deaths
- 13** new cases of end-stage renal disease
- 5** new case of blindness

...because of diabetes

For the purpose of this report, information was compiled from statewide data surveillance systems in Massachusetts, including the Massachusetts Behavioral Risk Factor Surveillance System (BRFSS), the Massachusetts Hospital Discharge Dataset, the Massachusetts Registry of Vital Records and Statistics, and the Pregnancy to Early Life Longitudinal Data Set (PELL). Data was gathered specifically for diabetes, diabetes-related complications and risk factors.

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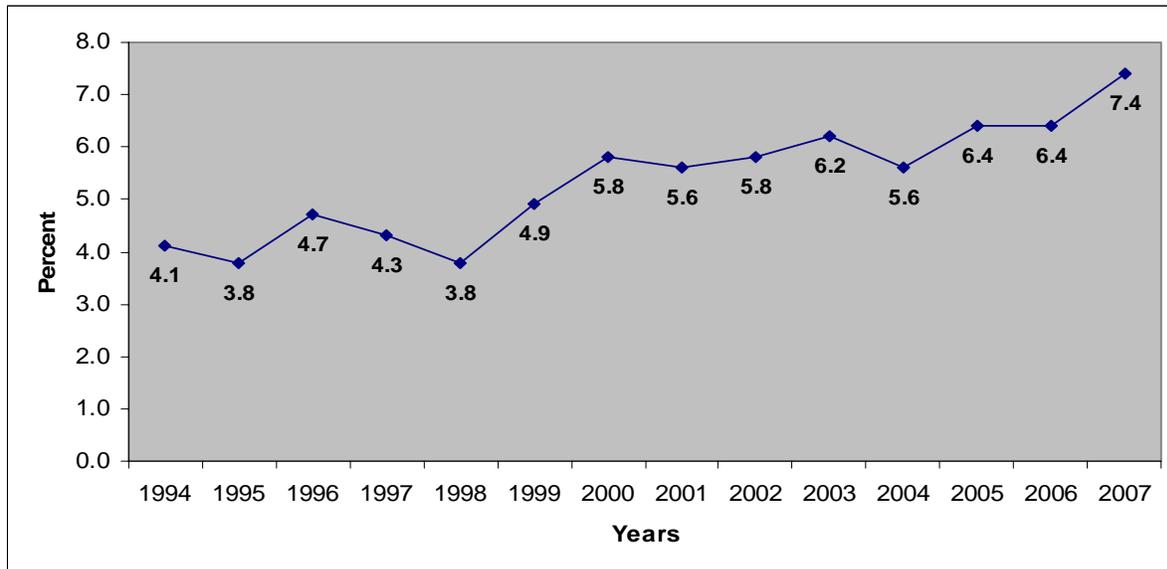
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¹ American Diabetes Association. *All About Diabetes*. 2006 [cited November 15, 2006]; Available from: <http://www.diabetes.org/about-diabetes.jsp>.

A. Overall Prevalence

- Overall (type 1 and type 2 combined) diabetes prevalence has been steadily increasing over the past several years (Figure 1).

Figure 1. Percent of Adults Ever Told They Have Diabetes, MA (1994 - 2007)



Source: Massachusetts Behavioral Risk Factor Surveillance System (MBRFSS), 1994-2007.

- According to the 2007 Massachusetts Behavioral Risk Factor Surveillance System, 7.4% of Massachusetts adults, 18 years and older, reported being told they have diabetes, while 5.4% reported being told they have prediabetes (Table 1).
- In 2007, more adult males reported being diagnosed with diabetes than adult females, 7.4% vs. 6.8% respectively. More females reported being told they have prediabetes compared to males, 5.7% vs. 5.1% respectively (Table 1).
- When compared to other racial/ethnic groups, a greater proportion of Hispanic (13.7%) and Black, non-Hispanic adults (12.6%) reported being diagnosed with diabetes in Massachusetts followed by Asian/Pacific Islander, non-Hispanic adults (7.6%), and White, non-Hispanic adults (6.3%) (Table 1).
- In 2007, Springfield and the Lowell/Lawrence area (13.1% and 11.9%) had the highest percentage of adults who reported being diagnosed with diabetes. Springfield (10.2%) and Fall River/New Bedford area (7.0%) had the highest percentage of adults who reported ever being told they have prediabetes (Table 1).

Table 1. Demographic Breakdown of Prevalence in Massachusetts (2007)

Characteristics	Percent Residents Ever Told They Have Diabetes (%)	Percent Residents Ever Told They Have Prediabetes (%)
Total	7.4	5.4
Age		
18-24	1.4	3.0
25-44	2.7	2.4
45-64	9.5	7.0
65-74	17.9	10.5
75+	16.3	11.7
Sex*		
Male	7.4	5.1
Female	6.8	5.7
Race*		
White, Non-Hispanic	6.3	4.8
Black, Non-Hispanic	12.6	8.7
Hispanic	13.7	5.7
Asian/PI, Non-Hispanic	7.6	8.4
Other	7.5	9.7
Education*		
Less Than HS	14.3	8.6
HS Graduate or GED	8.4	6.5
Some College	7.4	6.0
College Graduate or Higher	5.1	3.9
Selected Cities/Towns*		
Springfield	13.1	10.2
Lowell/Lawrence	11.9	5.5
Fall River/New Bedford	11.3	7.0
Boston	9.2	6.3
Worcester	8.3	4.6

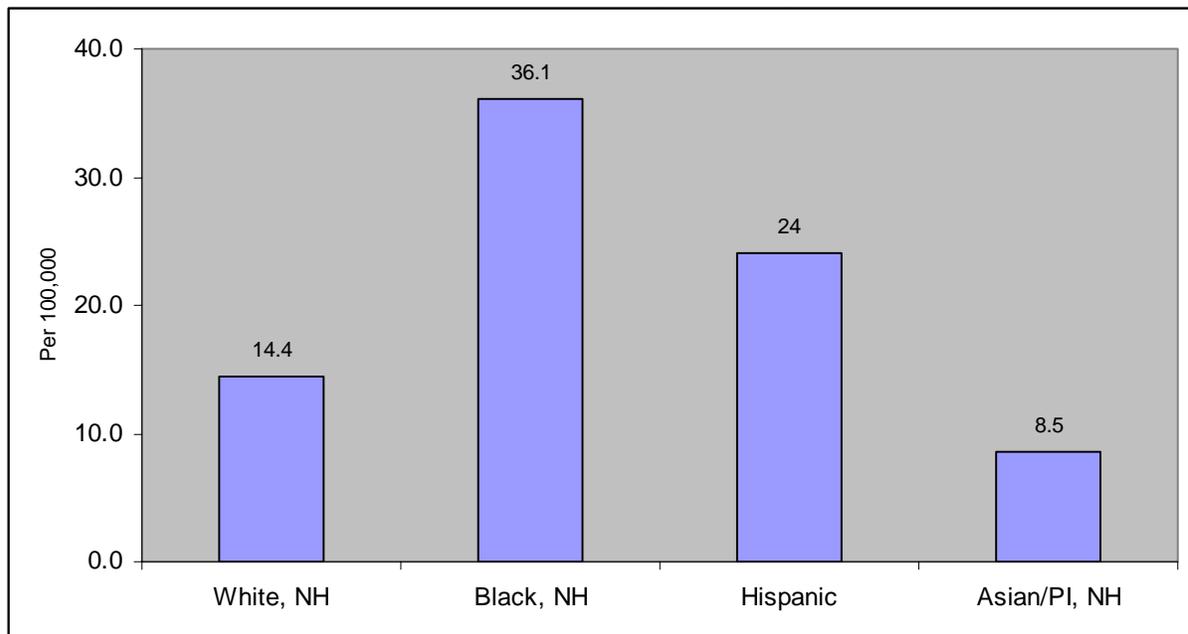
Source: Massachusetts Behavioral Risk Factor Surveillance System (MABRFSS), 2007.

** Note: Data are age-adjusted to the 2000 U.S. standard population. BRFSS includes only adults 18 years of age and older.*

B. Mortality

- In 2006, 1,127 people died due to diabetes as the leading cause. An additional 2,681 people died due to diabetes as a contributing cause only.
- Diabetes ranked as the 9th leading cause of death in Massachusetts in 2005 and 2006. In 2003 and 2004, diabetes ranked 7th and 8th, respectively. However, despite a decrease in mortality from diabetes, diabetes ranks 3rd in mortality when considering all mentioned conditions (either a leading or contributing cause of death).
- In 2006, the age-adjusted² mortality rate for diabetes as an underlying³ cause of death was 15.3 deaths per 100,000 residents in Massachusetts. It has declined 24% since 2002 (20.2 vs. 15.3).
- During 2006, the age-adjusted mortality rate for diabetes as the underlying cause of death was highest among Black, non-Hispanics, at 36.1 deaths per 100,000 (Figure 2).

Figure 2. Massachusetts Diabetes Mortality Rates by Race/Ethnicity, 2006



Source: MDPH Registry of Vital Records and Statistics 2006.

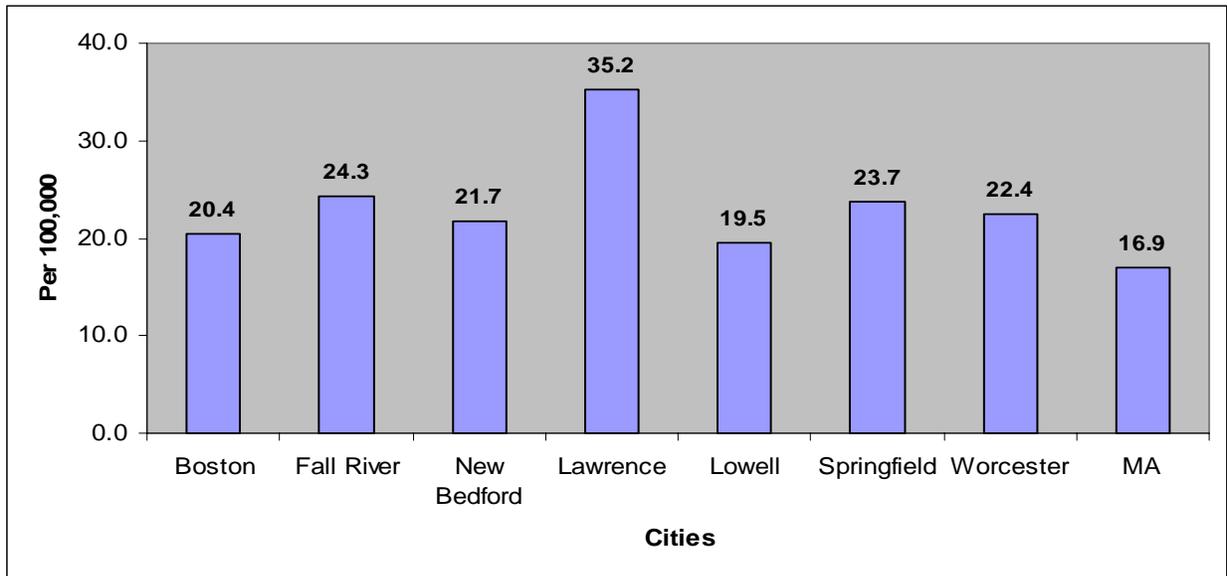
Note: Data are age-adjusted to the 2000 U.S. standard population and comparability modified.

² Rates adjusted according to the age distribution of the 2000 U.S. standard population.

³ The underlying cause of death represents the pathology believed to have initiated the events that culminated in the person's death.

- When compared to Massachusetts as a whole (16.9), the cities of Boston (20.4), Fall River (24.3), New Bedford (21.7), Lawrence (35.2), Lowell (19.5), Springfield (23.7) and Worcester (22.4) all had higher age-adjusted diabetes mortality rates (Figure 3).

Figure 3. Massachusetts Diabetes Mortality Rates for Selected Cities (2004-2006)

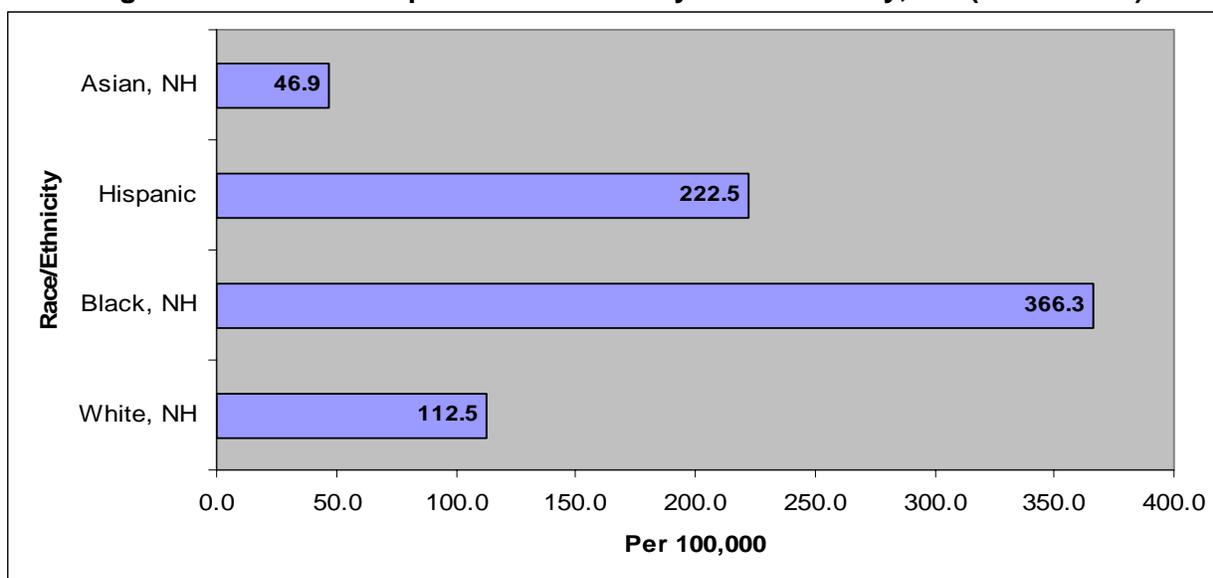


Source: MDPH Registry of Vital Records and Statistics (2004-2006). Note: Data are age-adjusted to the 2000 U.S. standard population and comparability modified. Major cities were selected to represent data at the local level.

C. Hospitalizations and Diabetes-Associated Complications

- According to the Uniform Hospital Discharge Data System from the Division of Health Care Finance & Policy, there were on average from 2004 through 2006, 5,442 discharges each year where diabetes was the primary diagnosis.
- The age-adjusted hospitalization⁴ rate for diabetes as the primary diagnosis was 133.2 hospitalizations per 100,000 residents on average from 2004 through 2006.
- The age-adjusted hospitalization rate for diabetes was highest among Black, non-Hispanics with 366.3 hospitalizations per 100,000 residents on average from 2004 through 2006 (Figure 4).

Figure 4. Diabetes Hospitalization Rates by Race/Ethnicity, MA (2004 - 2006)



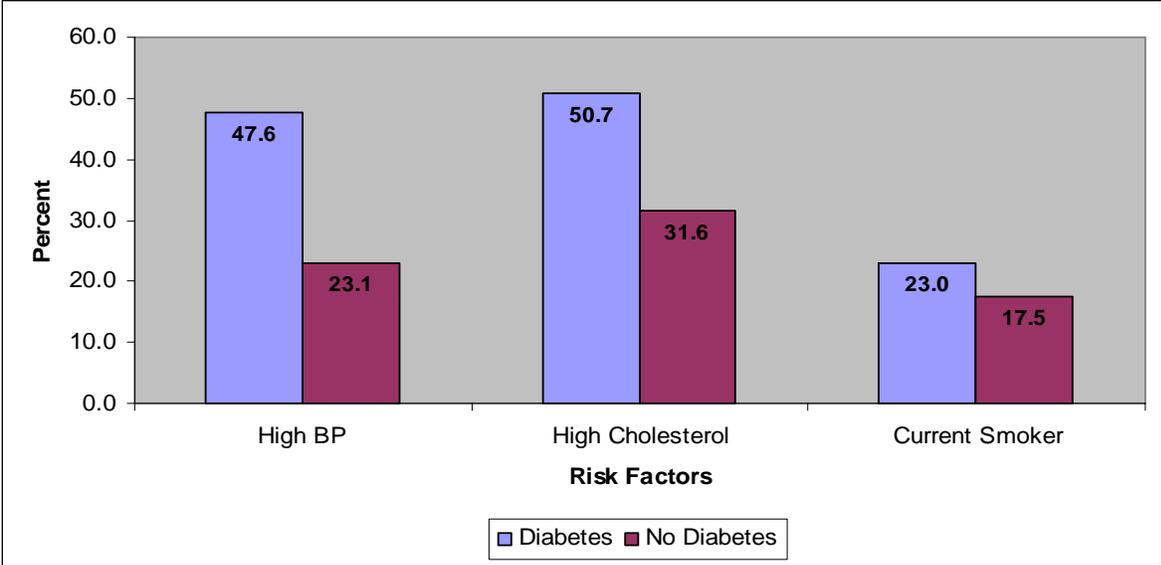
Source: Massachusetts Hospital Discharge Data (2004-2006), Mass. Division of Healthcare Finance and Policy.
Note: Data are age-adjusted to the 2000 U.S. standard population.

- According to the Uniform Hospital Discharge Data System from the Division of Health Care Finance & Policy, there were 9,921 discharges related to diabetes-associated lower extremity amputations from 2002 through 2006. This represents 70.2% of all hospital discharges related to lower extremity amputations performed in Massachusetts.
- According to the Massachusetts Commission for the Blind's register, there were 12,523 new cases of blindness in Massachusetts from 2001 through 2006. Of these new cases, 11.9% (1,495) were caused by diabetes.

⁴ Diabetes-related hospitalizations refer to hospitalized individuals who had diabetes listed as a primary diagnosis upon discharge.

- According to the End-Stage Renal Disease (ESRD) Network of New England, there were 13,558 new cases of ESRD in Massachusetts from 1999 through 2006. Of these new cases, 39% (5,288) were caused by diabetes.
- From 2005 through 2007, people with diabetes compared to people without diabetes had higher rates of the following risk factors for complications from diabetes: high blood pressure (47.6% vs. 23.1%), high cholesterol (50.7% vs. 31.6%) and being a current smoker (23.0% vs. 17.5%) (Figure 5).

Figure 5. Risk Factors for Complications of Diabetes, MA (2005-2007)



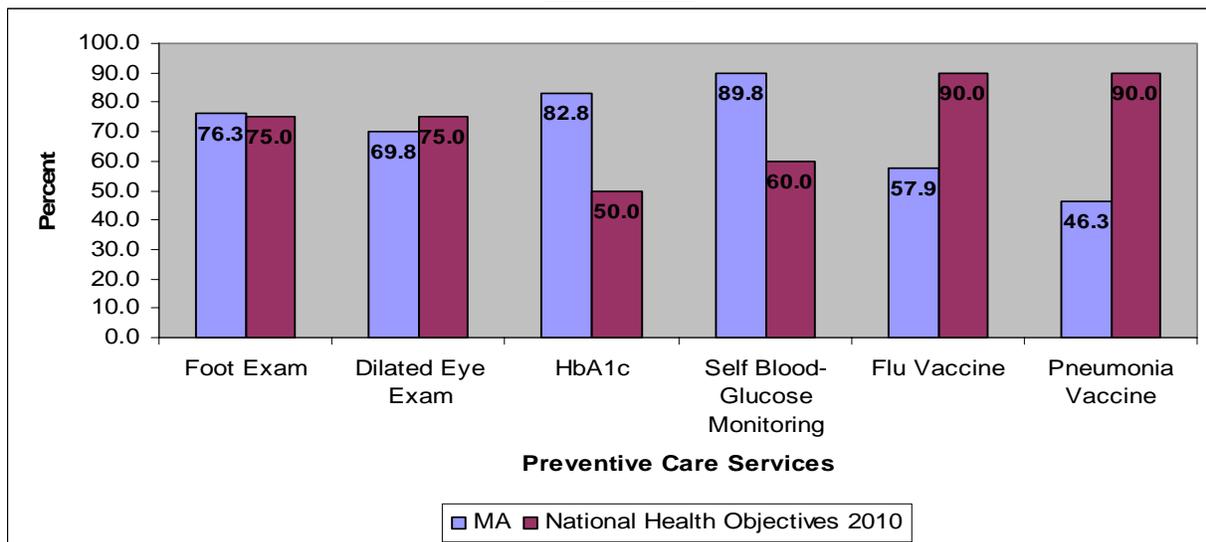
Source: Massachusetts Behavioral Risk Factor Surveillance System (MBRFSS), 2005-2007.
 Note: Data are age-adjusted to the 2000 U.S. standard population. BRFSS includes only adults 18 years of age and older.

D. Diabetes Preventive Care

From 2005 through 2007:

- 76.3% of adults with diabetes had received one or more visual foot exams, just above the 75% target level set by the National Health Objectives for 2010 (Figure 6).
- 69.8% of adults with diabetes had a dilated eye exam, below the 75% target level set by the National Health Objectives for 2010 (Figure 6).
- Approximately 83% of adults with diabetes had at least two Hemoglobin A1c tests, compared to the 50% target level set by the National Health Objectives for 2010 (Figure 6).
- 89.8% of Massachusetts adults with diabetes perform self blood glucose monitoring (SBGM), above the 60% target level set by the National Health Objectives for 2010 (Figure 6).
- Approximately 58% of persons with diabetes had a flu vaccine in the past year (Figure 6).
 - 46.3% of persons with diabetes reported they “ever had” a pneumonia vaccine (Figure 6).

Figure 6. Percentage of Adults in the State Receiving Recommended Preventive Care Services (2005-2007)



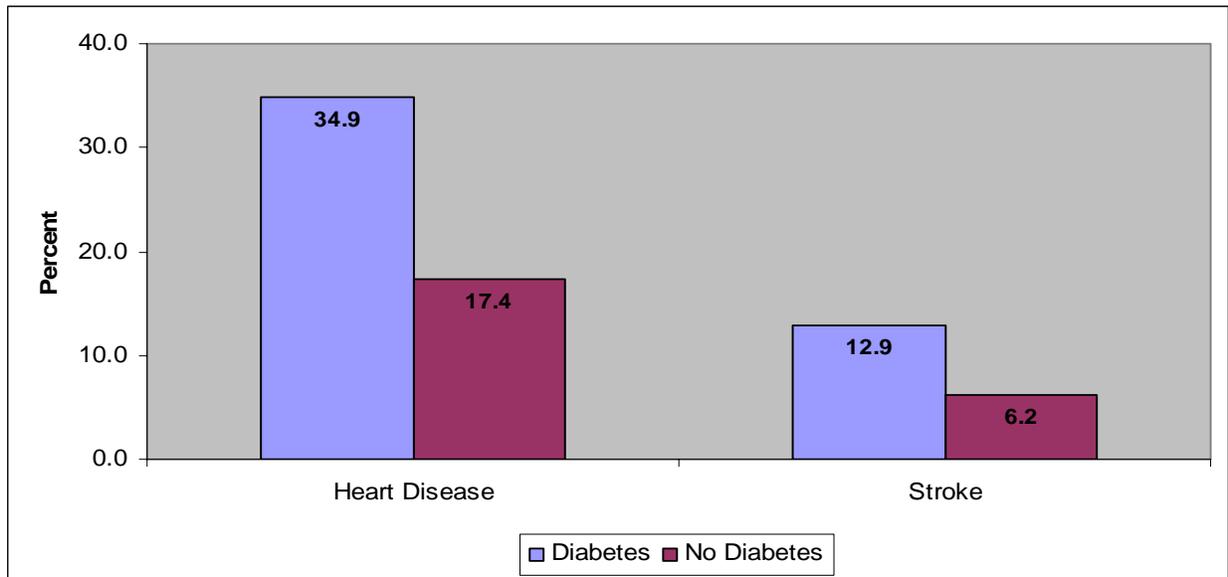
Source: Massachusetts Behavioral Risk Factor Surveillance System (MBRFSS), 2005-2007.

Note: Data are age-adjusted to the 2000 U.S. standard population. BRFSS includes only adults 18 years of age and older.

E. Diabetes and Cardiovascular Disease

- From 2005 through 2007, of Massachusetts adults over the age of 45 years with diabetes, 34.9% had a diagnosis of heart disease and 12.9% had a stroke. Of Massachusetts adults over the age of 45 years *without* diabetes, only 17.4% had a diagnosis of heart disease and 6.2% had a stroke (Figure 7).

Figure 7. Heart Disease and Stroke in People Aged 45+ w/ and w/o Diabetes (2005-2007)



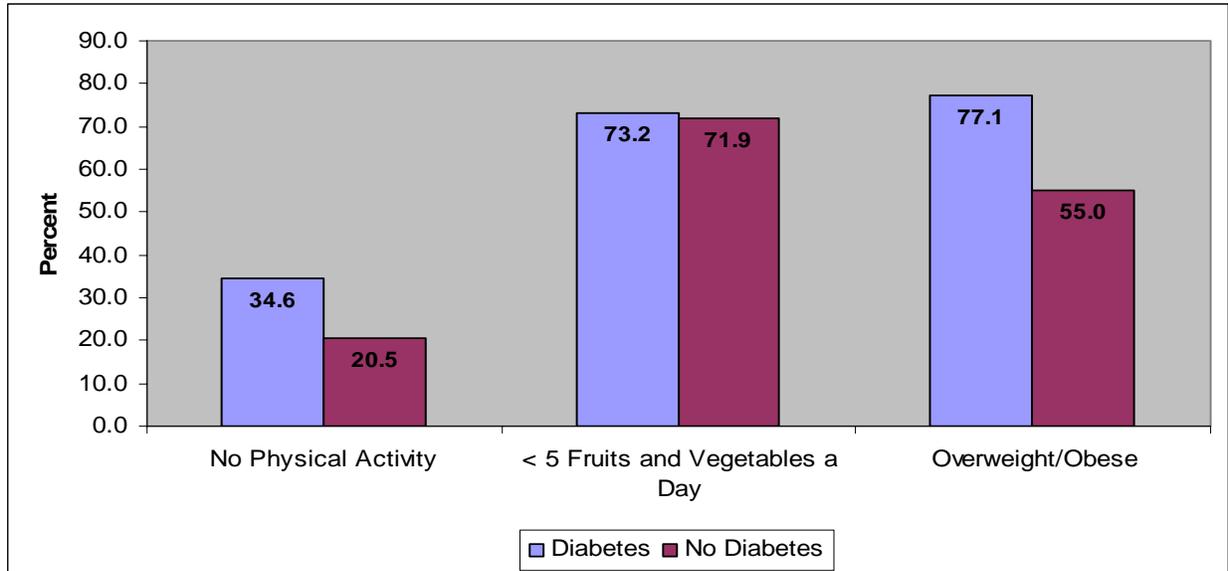
Source: Massachusetts Behavioral Risk Factor Surveillance System (MBRFSS), 2005-2007.

- The age-adjusted hospitalization rate for cardiovascular disease where diabetes was an associated condition was, on average, 513 hospitalizations per 100,000 residents from 2002 through 2006.
- In 2005, 48.3% of deaths that had an underlying cause due to cardiovascular disease had a contributing cause of death from diabetes. Also, 51.9% of deaths that had an underlying cause due to diabetes had a contributing cause of death from cardiovascular disease.

F. Activity Patterns, Eating Habits, and Weight

- From 2005 through 2007, a higher percentage of people with diabetes, compared to people without diabetes, reported no physical activity, eat less than 5 recommended servings of fruits and vegetables a day, and report being overweight or obese (Figure 8).

Figure 8. Activity Patterns, Eating Habits, and Weight Issues in People With and Without Diabetes (2005-2007)



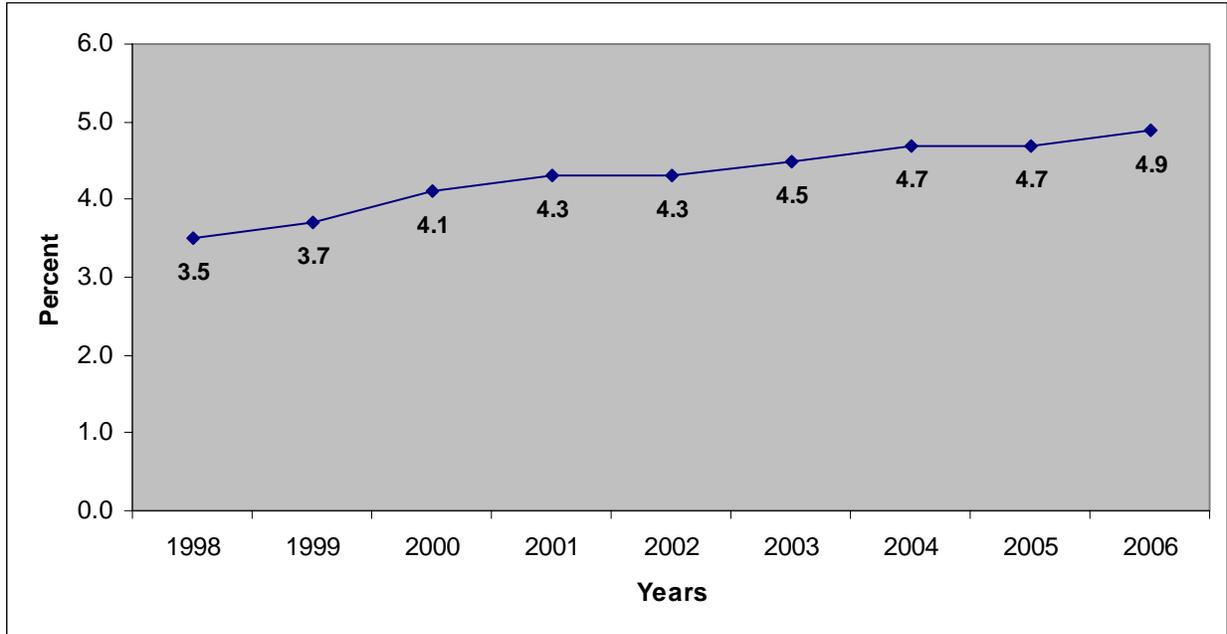
Source: Massachusetts Behavioral Risk Factor Surveillance System (MBRFSS), 2005-2007.

Note: Data are age-adjusted to the 2000 U.S. standard population. BRFSS includes only adults 18 years of age and older.

G. Gestational Diabetes

- From 1998 through 2005, the prevalence of gestational diabetes increased, but leveled off during the last two years (Figure 9).

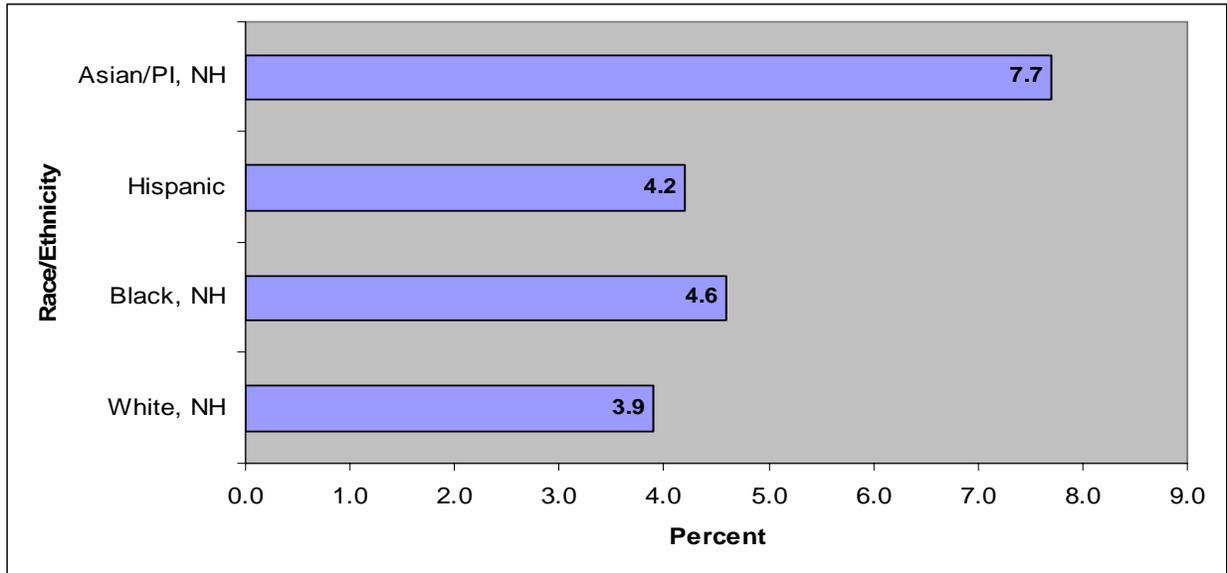
Figure 9. Prevalence of Gestational Diabetes in Massachusetts Women for All Live Births (1998-2006)



Source: MDPH Registry of Vital Records and Statistics (Birth data), 1998-2006 and HCUP Uniform Hospital Discharge Data System, 1998-2006, Pregnancy Early Life Longitudinal (PELL) program.

- The prevalence of gestational diabetes varies among race/ethnic groups (Figure 10). White, non-Hispanics have the lowest percentage (3.9%). Black, non-Hispanics and Hispanics have a higher proportion (4.6% and 4.2%, respectively). Asian/Pacific Islanders, non-Hispanics have the highest percentage (7.7%) (Figure 10).

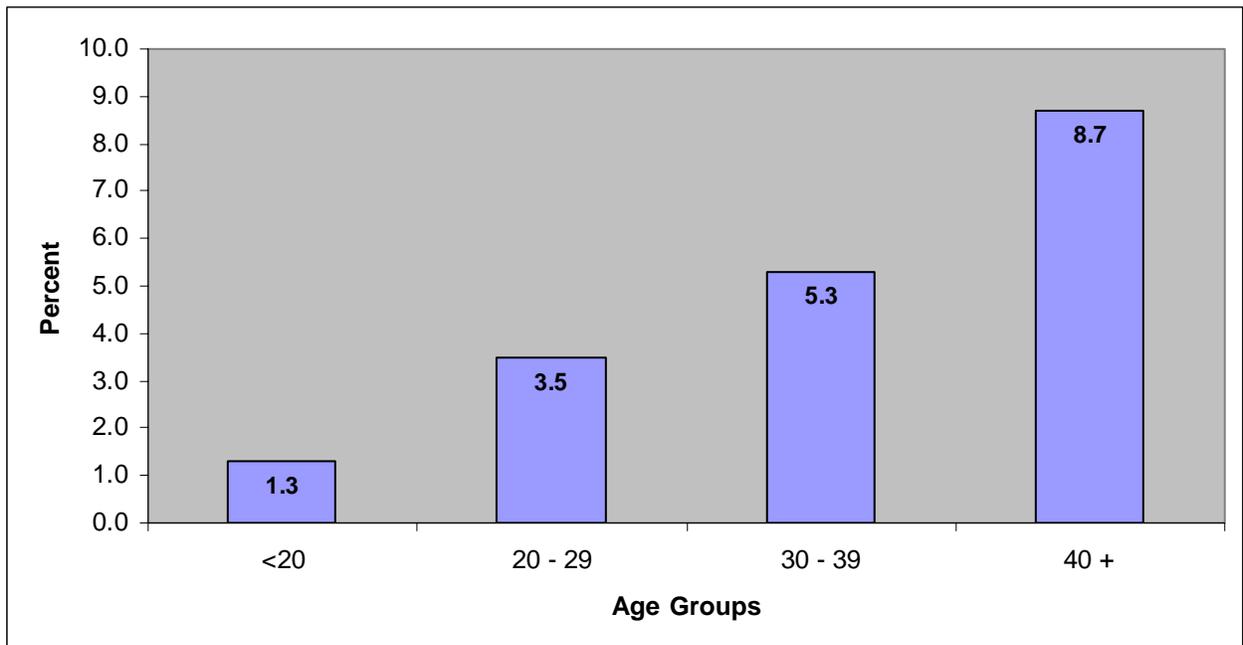
Figure 10. Prevalence of Gestational Diabetes in Massachusetts Women by Race/Ethnicity, 1998-2006



Source: MDPH Registry of Vital Records and Statistics (Birth data), 1998-2006 and HCFCP Uniform Hospital Discharge Data System, 1998-2006, Pregnancy Early Life Longitudinal (PELL) program.

- The percentage of women with gestational diabetes increases as the age of the mother increases (Figure 11).

Figure 11. Prevalence of Gestational Diabetes in Massachusetts Women by Age Groups, 1998-2006



Source: MDPH Registry of Vital Records and Statistics (Birth data), 1998-2006 and HCFCP Uniform Hospital Discharge Data System, 1998-2006, Pregnancy Early Life Longitudinal (PELL) program.

H. Diabetes in Children and Adolescents

- While there is a lack of surveillance information on diabetes in children and adolescents, there is a consensus among researchers and clinicians that diabetes prevalence is increasing in this population.
- In the most recent results collected by the Youth Health Survey (YHS, 2006-2007), there was a greater than 50% increase in diabetes prevalence from the 2003-2004 results for middle school students and a 38% increase among high school students for both type 1 and type 2 diabetes.
- In 2007, school nurses from systems that participate in the Massachusetts Department of Public Health's Essential School Health Services (ESHS) program reported that 0.25% students (2.5 per 1000 or 1,338) had type 1 diabetes and 0.06% students (0.6 per 1000 or 311) had type 2 diabetes (ESHS, DPH, 2007).
- In the CDC's SEARCH for Diabetes in Youth surveillance project, the estimated prevalence of diabetes in adolescents under the age of 20 was 0.18% (1.8 per 1000) for data from 2001. For youths between 10 and 19 years old, the prevalence was 0.23% (2.3 per 1000). Prevalence varied by ethnicity in the 10- to 19-year-old age groups, with Black and White youth having the highest prevalence, Native American and Hispanic youth having the next highest prevalence and Asian/Pacific Islander youth having the lowest prevalence.
- Recently, a National Health and Nutrition Examination Survey (NHANES) sample of 12- to 19-year-olds surveyed from 1999 through 2002 reported a 0.5% prevalence of diabetes. Of those reporting diabetes, roughly 71% were categorized as having type 1 and 29% as having type 2.

Glossary of Data Sets:

Behavioral Risk Factor Surveillance System

The Behavioral Risk Factor Surveillance System (BRFSS) survey is an ongoing annual, random digit-dial telephone health survey of adults ages 18 years and older. The survey is conducted in all 50 states in collaboration with the Centers for Disease Control and Prevention and state departments of public health and has been conducted in Massachusetts since 1986. BRFSS collects information about a variety of health concerns such as risk factors for chronic conditions and preventive behaviors.

Massachusetts Hospital Discharge Data Set

The Division of Health Care Finance and Policy hospital discharge data was used to obtain information regarding diabetes-related hospitalizations in Massachusetts. All acute care facilities in Massachusetts are required to submit hospital discharge data to the Division of Health Care Finance and Policy. Data include patient-level information on demographics, diagnosis, length of stay, procedures, and charges.

Massachusetts Registry of Vital Records and Statistics (Mortality Data and Birth Data)

Mortality information was obtained from death certificate data, which include the underlying cause of death and mentioned conditions. Causes of death are classified and coded according to the International Classification of Diseases. Information on diabetes during pregnancy comes from birth certificate data that provide data on all births in Massachusetts for each year. It includes information on demographics, perinatal medical conditions of the mother, and medical information on the infant. In 1996, the Massachusetts birth certificate form was changed to allow for an expanded collection of natality data. The change in the form included a differentiation between gestational and pre-existing diabetes.

Register of the Massachusetts Commission for the Blind

Eye care providers are required by law to report all persons with legal blindness to the Register of the Massachusetts Commission for the Blind (MCB) within 30 days of diagnosis. The MCB provides a wide range of services and benefits to registrants that encourage reporting of eligible persons. The diagnosis codes used in the analysis were based on diabetes as the etiology of blindness.

End-Stage Renal Disease Network of New England, Inc.

Each dialysis and transplant program in New England submits information on their patients to the End-Stage Renal Disease (ESRD) Network of New England, Inc. The Network is part of a national ESRD network coordinated by and responsible to the Centers for Medicare and Medicaid Services (formerly known as the Health Care Financing Administration). Data managed by the Network include information from monthly patient activity forms and medical evidence forms.

Pregnancy to Early Life Longitudinal Data Set (PELL)

The Pregnancy to Early Life Longitudinal (PELL) Data System represents a public-private partnership between the Boston University School of Public Health (BUSPH), the Massachusetts Department of Public Health (MDPH), and the Centers for Disease Control and Prevention (CDC), the primary funding agency. PELL is a unique, innovative population-based longitudinal reproductive data system, with multiple linked datasets that can be used for cross-sectional and longitudinal analyses. The core of PELL consists of the annual linkage of all Massachusetts birth (BC) and fetal death (FD) certificate records with the birth-related hospital discharge (HD) records of both mother and infant.

Youth Health Survey (YHS)/Youth Risk Behavioral Survey (YRBS)

The YHS and the YRBS are administered jointly through the collaboration among the Massachusetts Departments of Elementary and Secondary Education (ESE) and the Massachusetts Department Public Health (DPH), along with the University of Massachusetts' Center for Survey Research (CSR) and the Centers for Disease Control and Prevention (CDC). The survey is administered to randomly selected schools and topics include: tobacco use, alcohol consumption and illicit drug use, extracurricular activities, dietary behaviors, physical activity, emotional status, and chronic conditions.