Connecticut Diabetes Surveillance Report

Connecticut Diabetes Control Program

Connecticut Department of Public Health

Hartford

2000

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For further information contact:

Connecticut Department of Public Health
Bureau of Community Health
Connecticut Diabetes Control Program
PO Box 340308, MS#11HLS
Hartford, CT 06134-0308

http://www.state.ct.us/dph/

Telephone: 860 509-7802
Fax: 860 509-7854
e-mail: webmaster.dph@po.state.ct.us

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Connecticut Department of Public Health
Commissioner - Joxel Garcia, M.D., M.B.A.

Bureau of Community Health
Chief - Ardell Wilson, D.D.S., M.P.H.

Prepared by:
Karen Frost, MA
Assessment and Surveillance Unit
Health Education and Intervention Division

Connecticut Diabetes Control Program (CTDCP)
Nancy Berger, M.P.H., CTDCP Program Director,
Division Director, Health Education & Intervention Division
Sharon Mierzwa, M.P.H., R.D., CTDCP Program Coordinator
David Guthrie, M.P.A., CDC Public Health Advisor
Karen Frost, M.A., Epidemiologist
Joan Shaia, Secretary

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Connecticut Department of Public Health

Mary Adams, M.P.H
Federico Amadeo, M.P.A.
Carol E. Bower, B.S.
Jeanette Boyce
Karen Buckley-Bates
Margarita Burgos, Ph.D.
Lynn Carbonneau
Joan Foland, M.H.S., M. Phil.
Michael J. Hofmann, Ph.D.
Meg Hooper, M.P.A.
Margaret M. Hynes, Ph.D, M.P.H.
Donald Iodice, B.A.
Mary C. Kapp, M.Phil.
Heping Li, Ph.D.
Christine Mercier
Lloyd M. Mueller, Ph. D.
D.Charles R. Nathan Jr., M.B.A.
Joseph Oros
Michael J. Purcaro, M.S., P.T.
Janet St. Clair, M.S.
Stanton Wolfe, D.D.S., M.P.H.

Centers for Disease Prevention and Control
Division of Diabetes Translation
Gloria Beckles, M.D.
Medical Epidemiologist
Epidemiology Section

Linda S. Geiss, M.A.
Surveillance Coordinator
Epidemiology and Statistics Branch

American Diabetes Association
Louise Butcher, District Manager,
Eastern Region

Connecticut Insurance Department
Pat Levesque

Connecticut Office of Health Care Access
Kaila J. Riggott, M.P.A
Elizabeth A. Shamaly, M.P.A.

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Pat O'Connell

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Executive Summary

Diabetes is a common, serious and costly disease in Connecticut that affects approximately 173,000 residents, one-third of whom have not been diagnosed. The seventh leading cause of death in Connecticut, diabetes is also a leading cause of blindness among working adults, a major cause of end-stage renal disease, responsible for 70% of all lower extremity amputations and a significant comorbidity of cardiovascular disease. However, much of the mortality and morbidity due to diabetes is preventable as indicated by the Diabetes Complications and Control Trial conducted by the National Institute of Diabetes and Digestive and Kidney Diseases.

An important responsibility of the Connecticut Diabetes Control Program is to assess the burden of diabetes in the state and to develop policies and programs that address areas of concern. This report is intended to inform policymakers, program managers, researchers and others interested in assessing the impact of diabetes in Connecticut and determining where interventions are needed.

The data sources used to report on the burden of diabetes in the state are those most readily available at the time of this writing. Findings include:

- Diabetes disproportionately affects Connecticut residents aged 65 and older. Nearly half of Connecticut residents with diabetes are aged 65 and over. The number of people with diabetes is expected to increase as Connecticut's population ages and its minority populations grow.
- Diabetes particularly affects Connecticut's black and Hispanic populations. Blacks with diabetes had mortality rates 2 times higher and hospitalization rates 3.5 times higher than Connecticut's population of whites with diabetes. Diabetes-related hospitalizations for kidney-related complications, lower extremity amputations and ophthalmic conditions were dramatically higher among blacks with diabetes than whites with diabetes. Connecticut's Hispanics with diabetes also had disproportionately higher hospitalization rates due to the complications of diabetes than white counterparts.
- Connecticut's men with diabetes were significantly more likely than women with diabetes to be hospitalized for diabetes and more likely to have lower extremity amputations.
- Connecticut adults with diabetes are twice as likely to be overweight, have hypertension and elevated cholesterol levels as residents without diabetes even when age is taken into account.
- While adults with diabetes are more likely to practice preventive care than those without diabetes, only half of adults with diabetes reported having an annual influenza shot and only one-third reported ever having a pneumonia shot.
- Over 90% of people with diabetes have some form of health care coverage. Medicare is the most common health insurance provider for people with diabetes since such a high proportion of people with diabetes are over age 65.
- An essential part of the diabetes health care team, Certified Diabetes Educators (CDE) are in short supply in Connecticut with a particularly severe shortage among bilingual CDEs.
- Eleven percent of Connecticut hospitalizations in 1996 were among people with diabetes.

Introduction

Connecticut Diabetes Control Program

The goal of the Connecticut Diabetes Control Program (CTDCP) is to decrease death and disability related to diabetes and improve quality of life for people with diabetes by improving access and availability of quality diabetes care. The program was established within the Department of Public Health to address diabetes prevention and control. The CTDCP is funded and directed by the Centers for Disease Control and Prevention, Division of the Diabetes Translation. Program responsibilities include defining the burden of diabetes within the state in a manner that informs public health decision making, establishing partnerships, developing and implementing a state strategic plan to address needs, and conducting pilot projects. The CTDCP uses methods such as health systems change, health communications, and community interventions to accomplish its goals. Interventions are guided by data from epidemiologic surveillance and evaluation of public health efforts. The ultimate outcomes to be achieved by the program are.

Connecticut Diabetes Surveillance System

Public health surveillance of diabetes and its complications is critical for increasing recognition of the disease, identifying high-risk groups, developing strategies to reduce the economic and human costs of this disease, formulating health care policy and evaluating progress in disease prevention and control. The Connecticut diabetes surveillance system is an ongoing, systematic collection, analysis and interpretation of periodic and representative data from a variety of sources.

One of the key data sources of the diabetes surveillance system is the Behavioral Risk Factor Surveillance System (BRFSS) survey. The BRFSS is an annual random sample telephone survey of non-institutionalized adults (18 years and older). The diabetes surveillance system includes core data from survey years 1989 to the present and provides:

* the ability to monitor the prevalence of diagnosed diabetes among adults in Connecticut over time;
* estimates of the prevalence of gestational diabetes;
* a demographic profile of Connecticut residents with diagnosed diabetes;
* a measure of the prevalence of risk factors associated with diabetes and its complications among persons diagnosed with diabetes;
* the degree to which persons with diagnosed diabetes practice general preventive health care;
* the impact of risk factors and level of health care practices among high risk populations;
* the extent of health care coverage and the use of health care services among those diagnosed with diabetes.

Another key data component of the diabetes surveillance system is public health vital statistics, including natality and mortality data derived from birth and death certificates. Frequencies, crude and age-adjusted mortality rates, and years of potential life lost have been calculated for years 1980 forward for both deaths with diabetes as the underlying cause and for diabetes related deaths. Age-adjusted mortality rates provide a means for identifying trends over time controlling

for population changes in age, assessing attainment of objectives delineated by various health agencies, and comparisons between subgroups of interest.

Several data sources provide an estimation of morbidity due to diabetes. One such source is the in-patient hospital billing data. The CTDCP acquired data for years 1991 to 1996 from the Connecticut Office of Health Care Access and the Connecticut Hospital Association. These data provide information about hospitalizations among people with diabetes as well as the frequency of complications such as kidney disease, lower extremity amputations, ophthalmic complications, and cardiovascular disease.

The End-Stage Renal Disease Network of New England provides incidence and prevalence of end-stage renal disease among Connecticut residents with diabetes. Another measure of morbidity due to diabetes is biennial data provided by the Connecticut Board of Education and Services for the Blind (BESB). BESB provides a count of the number of blind persons with diabetes registered for their services and also provides estimates of diabetes as a secondary disability among the registered blind.

Dissemination of information is another key component of the diabetes surveillance system. Information from the diabetes surveillance system has been shared in the following ways:

* A Connecticut-specific diabetes fact sheet was developed in 1997 and updated in 1999. Over 1,400 copies were distributed to legislators, local health departments, managed care organizations, health professional associations, health providers, home health agencies, pharmaceutical companies, hospitals and community groups.
* A Connecticut specific diabetes related influenza and pneumococcal vaccination fact sheet was developed in 1998.
* Data regarding the burden of diabetes were included in two reports prepared by the Department of Public Health's Office of Policy, Planning and Evaluation for the Connecticut legislature.[21,23]
* From 1996 through the present, the CTDCP has responded to over 40 requests for Connecticut specific diabetes data.

Other components of the diabetes surveillance system are: a tracking system for diabetes-related Healthy People 2000/2010 objectives; identification and documentation of methods to bridge data gaps and limitations; and identification and implementation of appropriate statistical methods.

What is Diabetes?

Diabetes (also called diabetes mellitus or 'sugar diabetes') is a chronic metabolic disease in which the body does not produce or properly use insulin, a hormone that is needed to convert sugar, starches and other food into energy. Diabetes can affect nearly every organ system of the body. Diabetes is a principal cause of congenital malformations, perinatal mortality, premature mortality and disability. Persons with diabetes are at increased risk for stroke, ischemic heart disease, peripheral vascular disease, neuropathy, blindness, lower extremity amputations and end-stage renal disease.[5,6]

Most diabetes cases fall into one of three categories:

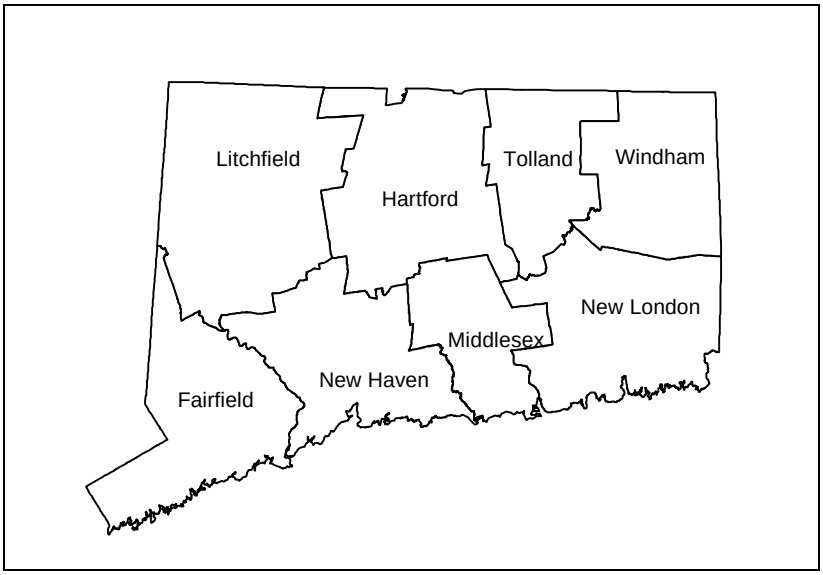
- Type 1 diabetes, formerly called insulin-dependent diabetes or juvenile-onset diabetes, usually begins during childhood or adolescence and requires insulin. About 5 to 10 percent of diabetes cases are type 1.[5]

- Type 2 diabetes, formerly called non-insulin-dependent diabetes or adult-onset diabetes, usually develops in adults who are overweight, physically inactive or who have a family history of diabetes. Insulin resistance and relative insulin deficiency characterize type 2 diabetes. It may be undiagnosed for years because hyperglycemia (too high a level of glucose in the blood) can develop gradually without noticeable symptoms. Prevalence of type 2 diabetes is greater in certain ethnic and racial groups such as Hispanics, African Americans, Native Americans and Asian-Pacific Islanders. Oral medications and/or insulin may be required to control diabetes, but often type 2 diabetes can be controlled through losing weight, improved nutrition and exercise.[5,6]

- Gestational diabetes is the term given to diabetes that develops during pregnancy. Maternal elevated blood glucose levels can have adverse effects for both the mother and infant. At the end of pregnancy, blood glucose levels return to normal in about 95 percent of cases. However, women who have had gestational diabetes are more likely to develop type 2 diabetes later in life.[5,6]

Sociodemographics

Connecticut Geography and Sociodemographics



Of Connecticut's 1997 total population of 3,269,858, 48.6% were males and 51.4% were females. The number of males in age groups 0-19 and 20-44 years exceeded that of females. In all subsequent age groups, females outnumbered males (see Table 2.1 at end of chapter).

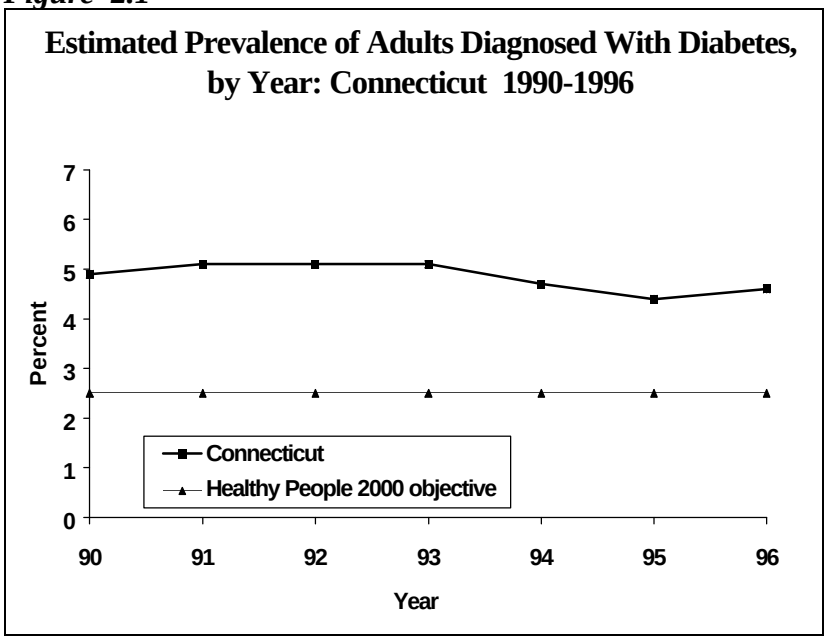
An important demographic trend in Connecticut as well as in the US, is the overall aging of the population. While the state's population is expected to increase by 9% from 1995 to 2020, the projected increase for those aged 65 and older is 35%.[21] Because the prevalence of diabetes is greater among the older population, it is expected that the prevalence of diabetes will increase as this population grows.

Another important demographic trend in Connecticut is the increase in racial or ethnic groups including those at greater risk of diabetes such as Hispanics, blacks and Native Americans. In 1997, the minority population constituted about 19% of the total state population (see Table 2.1). Projections from the US Census estimate that by 2025, 31% of Connecticut's population will belong to a racial or ethnic minority.[23]

These demographic shifts combined with the higher prevalence rates of diabetes among older persons and ethnic groups will necessitate greater resources for diabetes services, greater emphasis on addressing risk factors for developing diabetes so as to prevent or delay its onset, and better methods for identifying and managing this condition.

Sociodemographics of Connecticut's Population with Diabetes

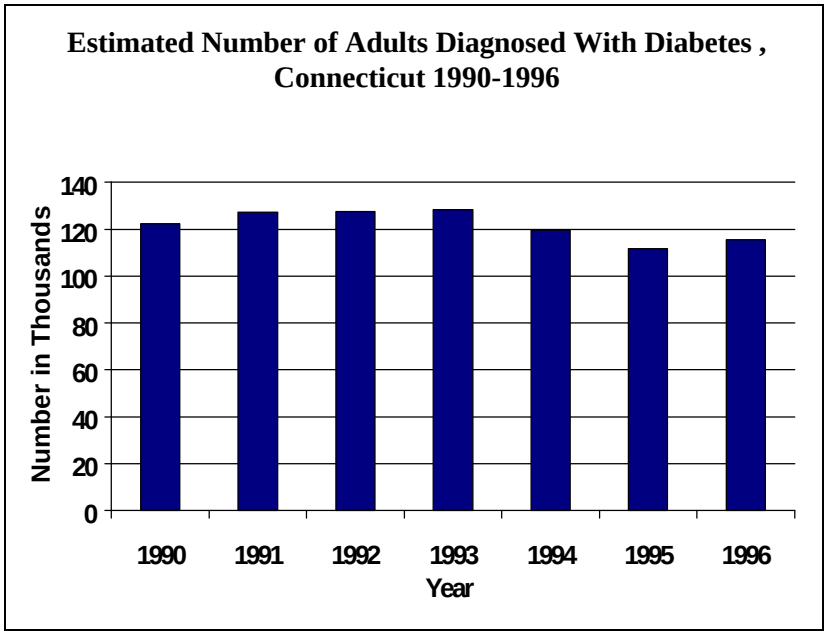
Figure 2.1



Source: See Table 2.4

Nationally, diabetes is becoming increasingly common. In contrast, the prevalence estimates of self-reported diagnosed diabetes in Connecticut remained fairly constant at approximately five percent from 1990 to 1996 (Figure 2.1). This prevalence rate was twice as high as the Healthy People 2000 objective of 2.5%[4] and lower than the 1997 US estimate of 5.9% for adults aged 20 years and older .[5]

Figure 2.2



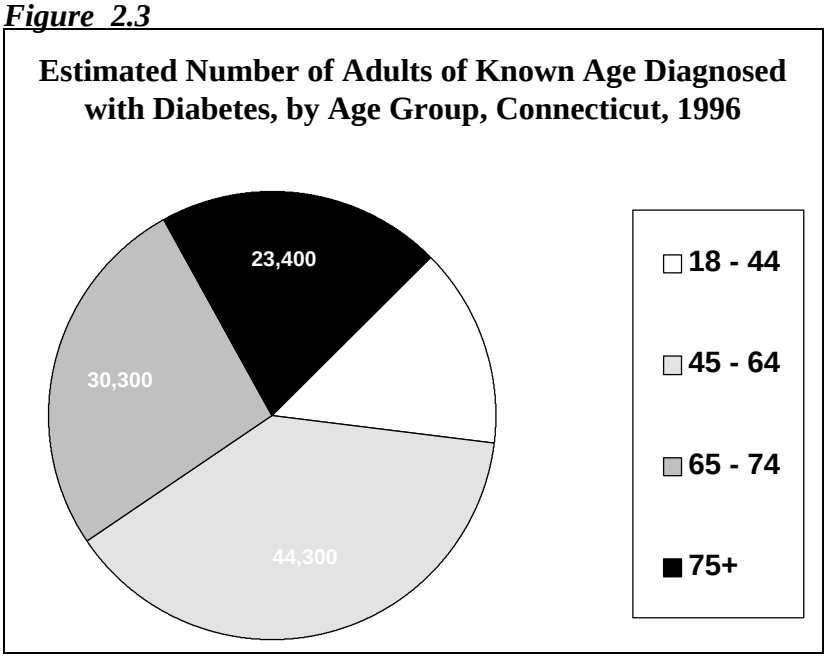
Source: See Table 2.3

In 1996, the number of Connecticut adults aged 18 years and older who reported being diagnosed with diabetes was estimated to be 115,400. Based on national health survey data for prevalence rates of undiagnosed diabetes,[5] another 57,500 Connecticut adults may have diabetes but have not been diagnosed.

Applying the national prevalence rate of type 1 diabetes among children aged 19 years or less[6] to Connecticut population estimates for this age group, approximately 1,500 children have diabetes in Connecticut.

Nationally, the prevalence of diabetes among adult men and women is approximately equal.[5] The prevalence of diagnosed diabetes among Connecticut women and men was not significantly different in 1996 with rates of 4.9% and 4.3% respectively.

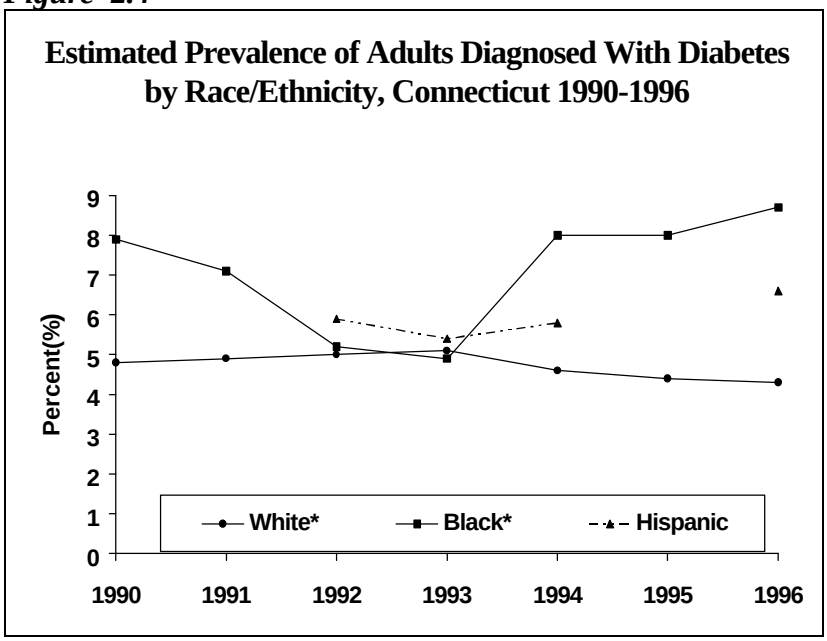
Figure 2.3



Source: See Table 2.3

Older adults are at increased risk for developing diabetes.[6] The prevalence of self-reported diabetes rises dramatically for Connecticut residents aged 45 and older. On average over the period of 1990-1996, Connecticut adults aged 65 and older were 6 times as likely to report having diagnosed diabetes as those aged 18 to 44 years and 1.75 times as likely as those aged 45-64 years. As seen in Figure 2.3, approximately half of Connecticut residents diagnosed with diabetes are aged 65 or older.

Figure 2.4



Source: See Table 2.5

Figure 2.4 depicts prevalence estimates for diagnosed diabetes among selected race and ethnicity groups in Connecticut. While time trends for nonHispanic black[‘] and Hispanic populations were indeterminate, generally prevalence rates were higher for these two groups than the nonHispanic white[‘] population. The 1996 prevalence estimates for diagnosed diabetes among the black and Hispanic populations were 8.7% and 6.6% respectively while the prevalence among the white population was 4.3%. Nationally, blacks are 1.7 times and Hispanics twice as likely to have diabetes as whites.[5] Reliable diabetes prevalence rates are not available for Connecticut's other racial and ethnic populations.

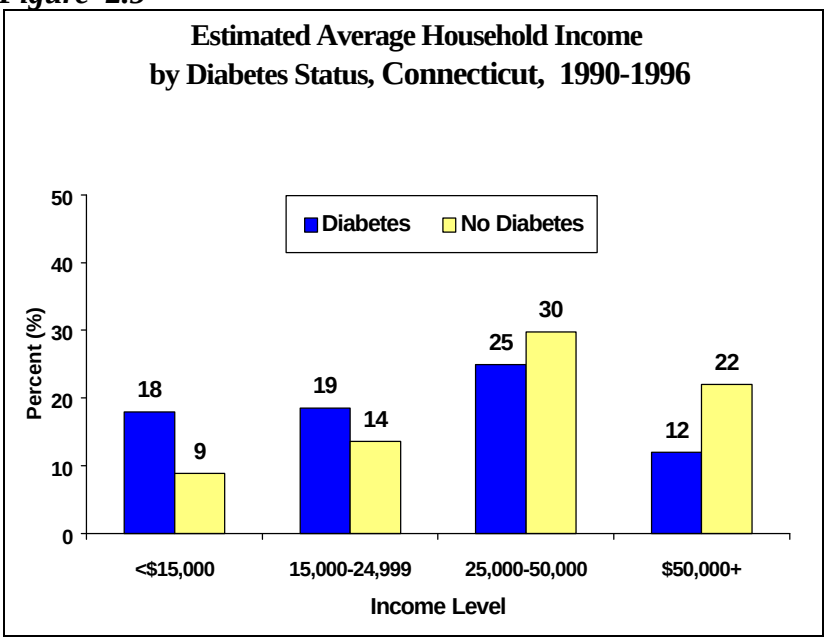
Studies have consistently shown that minority groups suffer higher rates of type 2 diabetes and more severe symptoms than do white Americans. The causal pathways of this observed relationship are not well understood, however. Although much medical research treats racial and ethnic status as innate or genetic risk factors for the development of diabetes, the scientific consensus against the biological basis of racial status is widespread.[24]

Minority Americans are more likely to be poor and of lower social class status compared to whites. Poverty decreases the likelihood that a person will have an adequate diet, healthy lifestyle and good medical care, factors known to influence the development and course of the disease. The relative importance of all of these factors in accounting for higher prevalence of the disease among racial/ethnic minorities is not entirely clear.[25]

[‘] In this report, unless otherwise noted, black refers to non-Hispanic black and white refers to non-Hispanic white.

Calculation of reliable diabetes prevalence estimates among racial and ethnic groups in Connecticut is limited due to several factors. Annual sample sizes for the survey have ranged from approximately 1500 to 3100. Given that each racial or ethnic population is a relatively small fraction of the total population and that diabetes affects a fraction of that fraction, the number of minority respondents with diagnosed diabetes may be too few in any given sample and even for pooled samples to reliably represent the larger racial and ethnic populations.

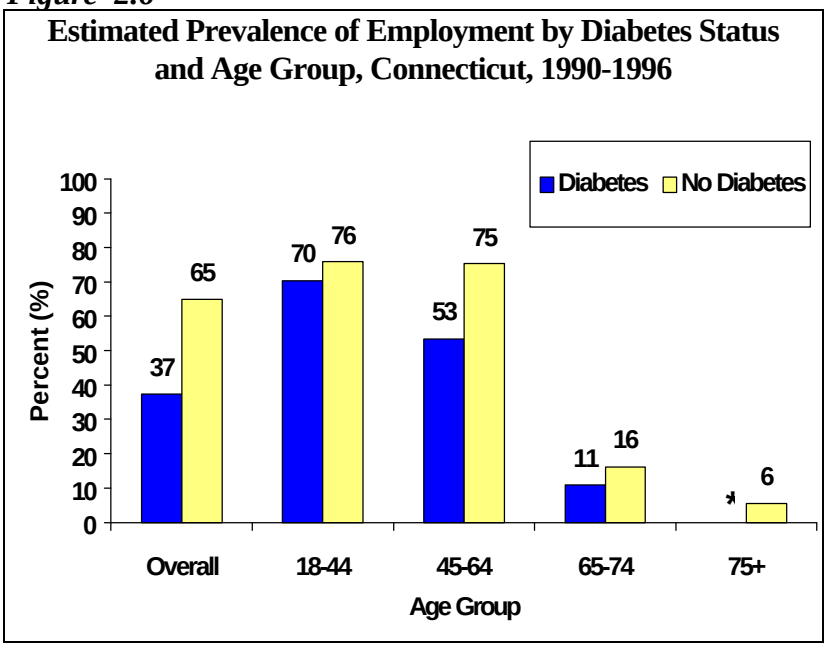
Figure 2.5



Source: See Table 2.6

Pooled 1990-1996 data from the BRFSS survey indicate that Connecticut adults with diagnosed diabetes generally had lower annual household incomes than those not reporting diabetes (Figure 2.5). Over 37% of diagnosed diabetics reported household incomes of less than $25,000 compared to 23% of those not reporting diabetes. Much of this difference is due to the older age distribution of people with diabetes. The proportion of those aged 65 and older with incomes of less than $25,000 showed minimal differences by diabetes status (see Table 2.6). Income data for approximately 25% of respondents were not available.

Figure 2.6



Source: See Table 2.7

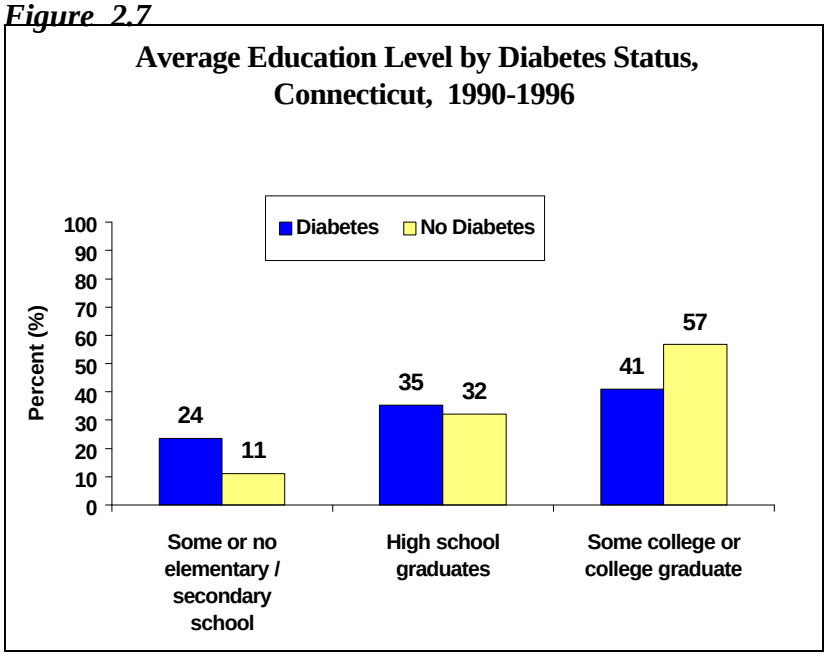
Approximately two-thirds of Connecticut adults with diabetes reported not being in the workforce. Of those not in the workforce, 44% reported being retired, 9.2% reported being

either a housewife or student, 5.5 % reported being unable to work due to disability and 4.4 % were unemployed (Table 2.7).

As shown in Figure 2.6, the largest difference in rates of employment by diabetes status was among the age group of 45-64 years. In this age group, people with diabetes were siginificantly more likely to be retired and to report being unable to work compared to people without diabetes.

Among those aged 65 and older, no significant differences were found in employment status between people with diabetes and those without diabetes.

Figure 2.7



Source: Connecticut Department of Public Health, Behavioral Risk Factor Surveillance System Pooled 1990-1996 data

The level of education among Connecticut adults reporting diagnosed diabetes was generally lower than for those not reporting diabetes. Twenty-four percent of adults with diabetes reported a lower than high school education compared to 11% of the comparison group (Figure 2.7).

Table 2.1: **Estimated population by age and sex: Connecticut, 1997**

			Males			Females		
		Percent of		Percent of			Percent of	
	Total	Total	Number	Age Group	Males	Number	Age Group	Females
Age Group								
0-19	868,846	26.6	445,653	51.3	28.0	423,193	48.7	25.2
20-44	1,233,584	37.7	615,363	49.9	38.7	618,221	50.1	36.8
45-64	697,828	21.3	338,913	48.6	21.3	358,915	51.4	21.4
65-74	241,860	7.4	107,806	44.6	6.8	134,054	55.4	8.0
75+	227,740	7.0	81,895	36.0	5.2	145,845	64.0	8.7
All Ages	3,269,858	100.0	1,589,630	48.6	100.0	1,680,228	51.4	100.0

Data Source: Connecticut Dept. of Public Health, Office of Policy, Planning and Evaluation

Table 2.2: **Selected sociodemographic indicators: Connecticut, 1997**

	Number	**Percent**
Race/Ethnicity[1]		
African American	275,302	8.4
Hispanic	259,159	7.9
Asian American/Pacific Islander	72,646	2.2
Native American	6,148	0.2
White	2,656,603	81.2
Socioeconomic indicators[2]		
Percent of population below povery level		8.6
Percent of population over age 25 with educational attainment of:		
High school graduate or more		84.0
College graduate or more		30.0

Data Source:

1 Connecticut Dept of Public Health, Office of Policy, Planning and Evaluation

2 US Dept of Health and Human Services, Office of Scientific and Health Communications.

Table 2.3: **Estimated number[a] of adults diagnosed with diabetes, in thousands, by age and gender: Connecticut, 1990-1996**

Gender and Year	Age Group 18-44 Number	18-44 Std error	45-64 Number	45-64 Std error	65-74 Number	65-74 Std error	75+ Number	75+ Std error	All Adults* Number	All Adults* Std error
Both Sexes										
1990	27.6	4.0	44.9	5.5	28.6	4.8	21.2	3.5	122.3	8.9
1991	31.2	4.1	45.9	5.3	31.6	4.5	17.9	2.8	127.1	8.5
1992	34.3	4.6	42.2	5.1	33.6	4.3	16.5	2.7	127.4	8.5
1993	32.6	4.3	43.1	5.1	37.7	4.4	14.6	2.4	128.5	8.3
1994	24.2	3.8	38.9	5.0	37.9	4.6	17.8	2.9	119.4	8.2
1995	16.9	3.1	40.7	4.9	31.8	4.0	21.3	3.2	111.6	7.7
1996	16.5	3.0	44.3	5.0	30.3	4.4	23.4	3.4	115.4	8.0
Males										
1990	10.8	2.7	21.0	4.1	15.5	3.8	7.7	2.3	54.9	6.5
1991	10.2	2.4	23.1	3.8	15.1	3.4	na[b]	na[b]	53.1	5.8
1992	15.2	3.4	24.5	4.1	15.5	3.2	na[b]	na[b]	59.9	6.3
1993	15.2	3.4	24.5	4.2	16.4	3.2	na[b]	na[b]	59.4	6.3
1994	13.4	3.2	20.7	4.1	15.5	3.1	6.4	1.9	56.6	6.3
1995	7.3	2.1	18.3	3.7	11.4	2.4	9.0	2.3	46.5	5.4
1996	7.3	1.9	21.4	3.9	11.5	2.3	10.1	2.4	50.8	5.6
Females										
1990	16.8	3.0	23.9	3.8	13.1	2.8	13.5	2.6	67.4	6.0
1991	21.1	3.3	22.9	3.8	16.5	2.9	13.6	2.3	74.0	6.2
1992	19.4	3.1	17.7	3.1	18.2	3.0	12.2	2.2	67.5	5.7
1993	17.4	2.8	18.6	3.0	21.3	3.1	11.9	2.2	69.1	5.6
1994	10.8	2.1	18.2	2.9	22.4	3.4	11.5	2.2	62.9	5.3
1995	9.6	2.4	22.4	3.2	20.4	3.2	12.4	2.3	65.1	5.6
1996	9.2	2.3	22.9	3.1	18.8	3.7	13.3	2.5	64.7	5.9

Data Source: CT Dept Public Health, Behavioral Risk Factor Surveillance System

a Three year moving average

*** Includes those of unknown age.**

Table 2.4: **Prevalence[a] of adults diagnosed with diabetes, by age and gender: Connecticut, 1990-1996**

Gender and	Age Group									
	18-44		45-64		65-74		75+		All Adults*	
Year	Percent	Std error	Percent	Std error	Percent	Std error	Percent	Std error	Percent	Std error
Both Sexes										
1990	2.0	0.3	6.8	0.8	10.0	1.6	14.5	2.2	4.9	0.4
1991	2.2	0.3	7.1	0.8	10.9	1.5	12.4	1.9	5.1	0.3
1992	2.5	0.3	6.6	0.8	11.5	1.4	10.9	1.7	5.1	0.3
1993	2.3	0.3	6.8	0.8	12.6	1.4	9.7	1.5	5.1	0.3
1994	1.7	0.3	6.0	0.7	12.9	1.5	11.3	1.7	4.7	0.3
1995	1.2	0.2	6.1	0.7	11.1	1.3	12.6	1.8	4.4	0.3
1996	1.2	0.2	6.4	0.7	10.8	1.5	12.8	1.8	4.6	0.3
Males										
1990	1.6	0.4	6.5	1.2	12.6	2.9	14.7	4.1	4.6	0.5
1991	1.5	0.3	7.4	1.2	11.9	2.5	na[b]	na[b]	4.5	0.5
1992	2.2	0.5	7.7	1.2	12.7	2.5	na[b]	na[b]	5.0	0.5
1993	2.1	0.5	7.9	1.3	12.5	2.3	na[b]	na[b]	4.9	0.5
1994	1.9	0.5	6.5	1.2	12.3	2.3	11.7	3.3	4.7	0.5
1995	1.1	0.3	5.6	1.1	9.1	1.9	15.9	3.7	3.8	0.5
1996	1.1	0.3	6.3	1.1	9.5	1.9	15.9	3.4	4.3	0.5
Females										
1990	2.4	0.4	7.0	1.1	8.1	1.6	14.4	2.6	5.2	0.5
1991	3.0	0.5	6.8	1.1	10.1	1.7	14.3	2.3	5.6	0.5
1992	2.8	0.4	5.5	0.9	10.7	1.7	12.1	2.1	5.1	0.4
1993	2.4	0.4	5.8	0.9	12.7	1.7	11.5	2.0	5.2	0.4
1994	1.5	0.3	5.5	0.9	13.3	1.9	11.0	2.0	4.8	0.4
1995	1.4	0.3	6.6	0.9	12.6	1.9	10.9	1.9	4.9	0.4
1996	1.4	0.4	6.5	0.9	11.8	2.1	11.2	2.0	4.9	0.4

Data Source: Connecticut Dept Public Health, Behavioral Risk Factor Surveillance System

a Three year moving average **b Insufficient respondents for reliable estimates.**

*** Includes those of unknown age.**

Table 2.5: **Estimated number[a] in thousands and prevalence[a] of adults diagnosed with diabetes, by race/ethnicity: Connecticut, 1990-1996**

	Race/Ethnicity							
	White[b]		Black[b]		Hispanic		All Adults	
Year	Number	Std error	Number	Std error	Number	Std error	Number	Std error
Number (in thousands)								
1990	104.9	8.3	11.9	2.4	na[c]	na[c]	122.3	8.9
1991	109.6	8.0	10.4	2.3	na[c]	na[c]	127.1	8.5
1992	110.7	7.9	7.7	2.0	6.4	2.4	127.4	8.5
1993	114.4	7.7	6.4	1.8	6.3	2.4	128.5	8.3
1994	101.2	7.4	10.8	2.5	7.5	2.6	119.4	8.2
1995	96.8	7.2	11.6	2.6	na[c]	na[c]	111.6	7.7
1996	92.4	7.1	12.7	2.6	9.2	2.8	115.4	8.0
Prevalence (percent)								
1990	4.8	0.4	7.9	1.6	na[c]	na[c]	4.9	0.4
1991	4.9	0.4	7.1	1.5	na[c]	na[c]	5.1	0.3
1992	5.0	0.4	5.2	1.3	5.9	2.1	5.1	0.3
1993	5.1	0.3	4.9	1.4	5.4	2.0	5.1	0.3
1994	4.6	0.3	8.0	1.8	6.2	2.0	4.7	0.3
1995	4.4	0.3	8.0	1.7	na[c]	na[c]	4.4	0.3
1996	4.3	0.3	8.7	1.8	6.6	1.9	4.6	0.3

Data Source: Connecticut Dept Public Health, Behavioral Risk Factor Surveillance System

a Three year moving average. **b Excludes respondents of Hispanic origin.**

c Insufficient respondents for reliable estimates.

Table 2.6: **Estimated average household income by diabetes status[a], by age: Connecticut, 1990-1996***

	Age Group									
Household	18-44		45-64		65-74		75+		All Adults**	
Income	Percent	Std error	Percent	Std error	Percent	Std error	Percent	Std error	Percent	Std error
Diagnosed with diabetes										
<$15,000	13.7	4.3	10.8	2.1	22.7	3.4	32.5	4.5	18.0	1.7
$15,000-24,999	14.2	3.3	15.5	2.8	24.4	4.0	21.3	4.5	18.5	1.8
$25,000-49,999	34.7	4.7	30.0	3.6	17.9	3.3	12.2	3.5	25.0	2.0
$50,000+	11.6	2.8	14.1	2.7	9.1	2.5	12.4	3.4	11.9	1.4
Unknown	25.9	3.9	29.6	3.7	26.0	3.8	21.5	4.4	26.7	2.0
Not diagnosed with diabetes										
<$15,000	7.0	0.4	4.9	0.4	17.3	1.1	28.9	1.7	8.9	0.3
$15,000-24,999	12.3	0.5	10.2	0.6	24.5	1.3	23.3	1.7	13.6	0.4
$25,000-49,999	33.1	0.7	29.3	0.9	23.3	1.3	13.8	1.4	29.8	0.5
$50,000+	22.9	0.6	26.0	0.9	12.0	1.0	9.3	1.1	21.7	0.4
Unknown	24.7	0.6	29.5	0.9	22.9	1.3	24.6	1.7	26.1	0.5

Data Source: Connecticut Dept Public Health, Behavioral Risk Factor Surveillance System

[a] Based on responses to question "Have you ever been told by a doctor that you have diabetes?"

*** Pooled data from survey years 1990-1996.**

**** Includes those of unknown age.**

Table 2.7: **Employment status by diabetes status[a], by age: Connecticut, 1990-1996***

Employment Status	Age Group 18-44 Percent	18-44 Std error	45-64 Percent	45-64 Std error	65-74 Percent	65-74 Std error	75+ Percent	75+ Std error	All Adults** Percent	All Adults** Std error
Diagnosed with diabetes										
Employed[1]	70.4	4.8	53.4	3.9	10.9	2.7	na[b]	na[b]	37.3	2.2
Retired[2]	na[b]	na[b]	20.1	3.2	80.3	3.4	90.8	3.0	43.6	2.2
Unable to Work[3]	na[b]	na[b]	9.6	2.2	na[b]	na[b]	na[b]	na[b]	5.5	1.2
Unemployed[4]	11.9	4.0	7.9	2.1	na[b]	na[b]	na[b]	na[b]	4.4	0.9
Other[5]	14.9	3.5	9.0	2.2	6.2	2.1	na[b]	na[b]	9.2	1.3
Not diagnosed with diabetes										
Employed[1]	75.8	0.6	75.3	0.9	16.2	1.2	5.6	1.1	65.0	0.5
Retired[2]	<1	--	10.0	0.6	75.4	1.3	88.2	1.3	16.1	0.4
Unable to Work[3]	<1	--	1.2	0.2	<1	--	na[b]	na[b]	<1	--
Unemployed[4]	7.2	0.4	5.7	0.5	<1	--	na[b]	na[b]	5.8	0.3
Other[5]	16.2	0.6	7.8	0.5	6.8	0.8	4.9	0.8	12.4	0.4

Data Source: Connecticut Dept Public Health, Behavioral Risk Factor Surveillance System

a Based on responses to question "Have you ever been told by a doctor that you have diabetes?"

* Pooled data from survey years 1990-1996.

** Includes those of unknown age.

b Insufficient respondents to calculate a reliable estimate

1 Includes respondents who reported current employment including self-employment.

2 Includes respondents who reported being retired from employment which may include disability retirement.

3 Includes respondents who reported being unable to work due to disability.

4 Includes respondents who reported no current employment

5 Includes respondents who reported 'student, housewife or other' as current employment

Risk Factors

Risk Factors for Developing Diabetes

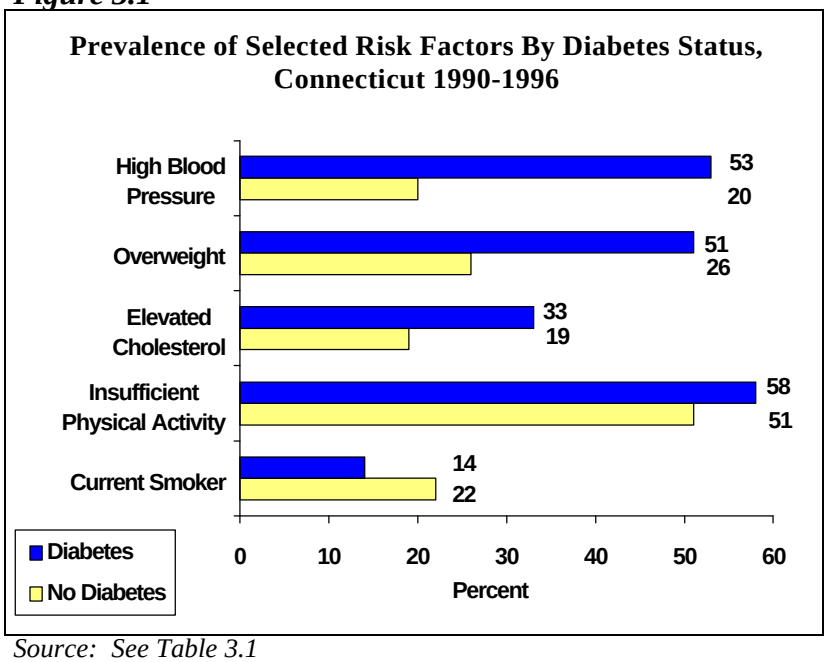
Several genetic, metabolic and behavioral factors have been identified that influence or are highly associated with the risk of developing diabetes. Risk of developing type 1 diabetes is highly associated with racial and ethnic background with the highest incidence occurring among children in Scandanavian countries. Environmental factors such as viruses, nutrition and socioeconomic factors may also play a role in type 1 diabetes etiology.[6]

The etiology of type 2 diabetes is similarly unclear but several factors have been identified as being highly associated with the risk of developing type 2 diabetes. These risk factors include [10]:

- family history of diabetes among parents or siblings
- history of obesity (i.e. $\geq$ 20% over desired weight or Body Mass Index $\geq$27 kg/m^2)
  (BMI: weight in kilograms divided by height in meters squared)
- specific racial and ethnic backgrounds including African-Americans, Hispanic-Americans, Native Americans, Asian-Americans and Pacific Islanders
- age of 40 years or older
- previous indication of Impaired Fasting Glucose (IFG) or Impaired Glucose Tolerance (IGT)
- history of hypertension ($\geq$140/90 mmHg)
- history of physical inactivity
- history of Gestational Diabetes Mellitus (GDM) or delivery of babies over 9 pounds

Health Indicators

Figure 3.1



Source: See Table 3.1

Figure 3.1 shows the strong association of high blood pressure, overweight and elevated cholesterol with having diabetes. Epidemiologic evidence indicates that the risk of developing type 2 diabetes could be reduced by 50% to 75% through reductions in obesity, while increased physical activity could reduce the risk by 30% to 50%. [10]

Among persons diagnosed with diabetes, certain risk factors also interact to increase the risk or severity of the complications of diabetes. Being overweight poses a serious threat to overall health and increases the risk of cardiovascular disease among people with diabetes. As seen in Figure 3.1, people with diabetes were twice as likely to be overweight as those without diagnosed diabetes.

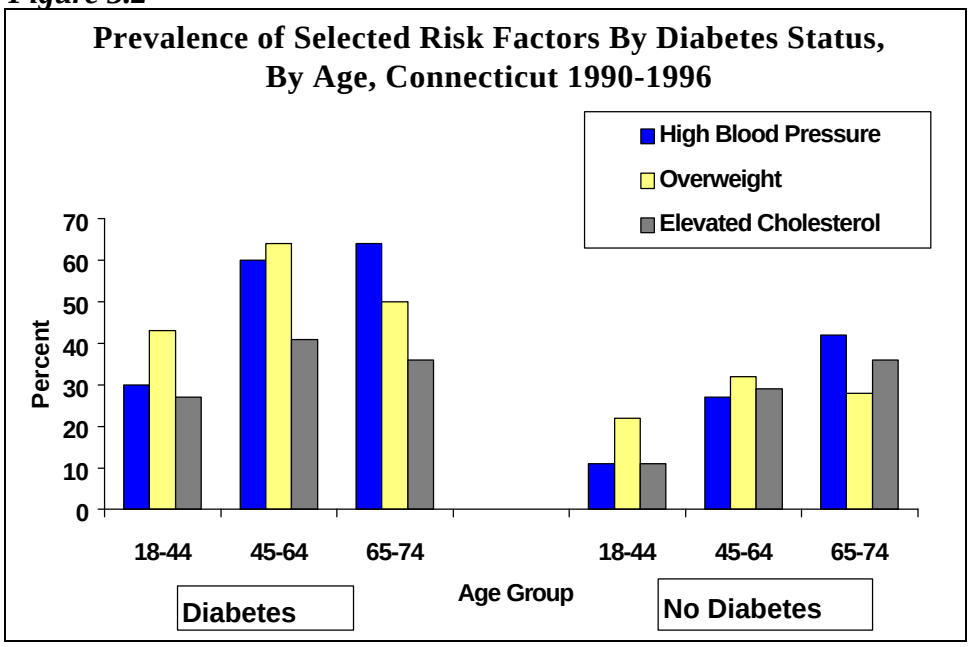
Insufficient physical activity increases the risk of early death in general and the occurrence of ischemic heart disease and colon cancer. Benefits of regular physical activity include: improved strength and endurance, healthy bones and muscles, weight control, decreased blood pressure in hypertensives, increased high density lipids (HDL) and decreased serum triglycerides.[10]

Figure 3.1 also indicates that persons who reported having diagnosed diabetes had prevalence rates of hypertension and elevated cholesterol levels twice as high as those not diagnosed with diabetes. Both hypertension and elevated cholesterol increase the risk of cardiovascular disease among people with diabetes. Hypertension also contributes to development and progression of renal disease and blindness.[6]

Smoking is harmful for everyone but especially harmful to people with diabetes because it accelerates damage to blood vessels. Connecticut residents diagnosed with diabetes were one-third less likely to smoke than people without diabetes.

No significant differences were found between males and females diagnosed with diabetes for the selected risk factors.

Figure 3.2



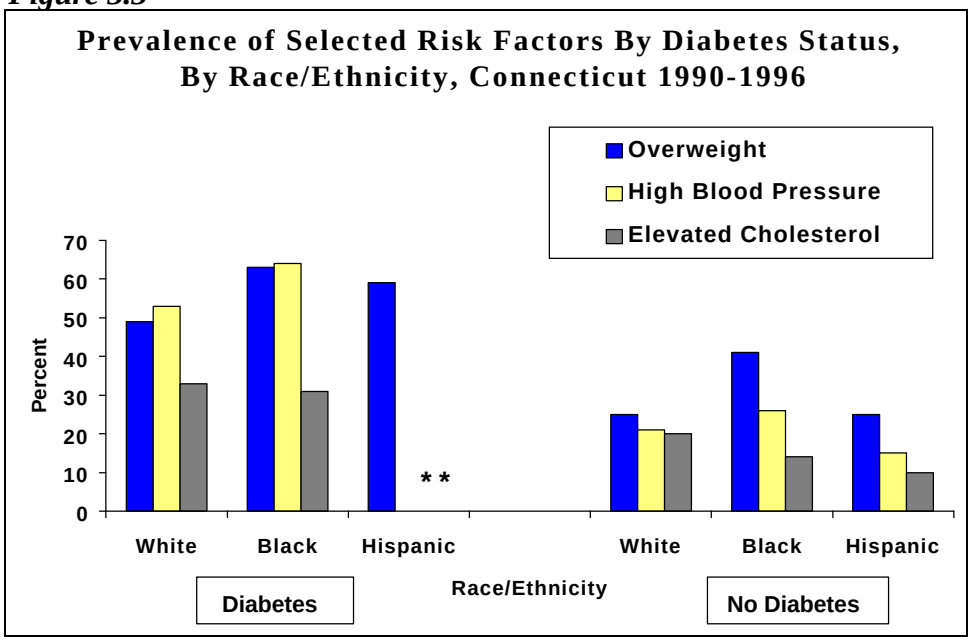
Source: See Table 3.2

People with diabetes had significantly higher rates of high blood pressure and overweight regardless of age and significantly higher rates of elevated cholesterol among those diabetes aged 18-44 and 45-64 compared to those of similar age without diabetes (Figure 3.2).

Of those with diabetes, the 18-44 age group had the largest differences in prevalence of high blood pressure, elevated cholesterol and overweight compared to those without diabetes. Among those aged 18-44, people with diabetes were 2.7 times as likely to have high blood pressure, 2.5 times as likely to have elevated cholesterol and 2 times as likely to be overweight as than those without diabetes.

Rates of overweight were also twice as high for people with diabetes aged 45-64 and 65-74 than for those without diabetes. While the prevalence of high blood pressure remained higher for people with diabetes in older age groups than the comparison group, the magnitude of the difference decreased with increasing age. Differences in the prevalence of elevated cholesterol also decreased with increasing age becoming equivalent by age 65-74.

Figure 3.3



Source: See Table 3.3

Figure 3.3 depicts the differences among race/ethnicity subgroups for selected risk factors. Insufficient data exist for Hispanic people reporting diagnosed diabetes to calculate estimates except for the risk factor of overweight.

People of Hispanic origin who reported diagnosed diabetes were significantly more likely to be overweight than those who did not report diabetes. This same difference was also found among the white and black subgroups.

White and black people with diabetes were significantly more likely to have high blood pressure than those without diabetes of the same subgroup. A significant difference was also found for elevated cholesterol level among the white subgroup with those reporting diabetes more likely to have elevated cholesterol than those not reporting diabetes.

Table 3.1: **Prevalence of risk factor by diabetes status*, by gender: Connecticut, 1990-1996**

	Males		Females		Overall	
Risk Factor	**Percent**	**Std error**	**Percent**	**Std error**	**Percent**	**Std error**
Adults with diagnosed diabetes						
Overweight[1]	50	3.7	51	2.8	51	2.3
Insuffient Physical Activity[2]	54	4.4	61	3.1	58	2.6
High Blood Pressure[3]	52	4.3	54	3.4	53	2.7
Elevated Cholesterol[4]	37	3.9	30	2.7	33	2.3
Current Smoker[5]	14	2.5	14	2.0	14	1.6
Adults not diagnosed with diabetes						
Overweight[1]	27	0.7	25	0.6	26	0.5
Insuffient Physical Activity[2]	49	0.9	52	0.8	51	0.6
High Blood Pressure[3]	20	0.8	20	0.6	20	0.5
Elevated Cholesterol[4]	19	0.7	19	0.6	19	0.4
Current Smoker[5]	23	0.7	21	0.6	22	0.4

Data Source: CT DPH, Behavioral Risk Factor Surveillance System

* Based on responses to question "Have you ever been told by a doctor that you have diabetes?"

1-5 See footnotes below.

Table 3.2 **Prevalence of risk factors by diabetes status*, by age group: Connecticut, 1990-1996**

	Age Group							
	18 - 44		45 - 64		65 - 74		75+	
Risk Factor	**Percent**	**Std error**	**Percent**	**Std error**	**Percent**	**Std error**	**Percent**	**Std error**
Adults diagnosed with diabetes								
Overweight[1]	43	4.9	64	3.7	50	4.4	32	4.7
Insuffient Physical Activity[2]	60	5.4	51	4.5	60	5.0	69	5.6
High Blood Pressure[3]	30	4.9	60	4.6	64	5.1	56	6.0
Elevated Cholesterol[4]	27	4.8	41	4.3	36	4.3	22	4.8
Current Smoker[5]	25	4.2	18	3.0	5	1.5	na[a]	na[a]
Adults not diagnosed with diabetes								
Overweight[1]	22	0.6	32	1.0	28	1.4	25	1.7
Insuffient Physical Activity[2]	49	0.8	51	1.2	55	1.8	63	2.3
High Blood Pressure[3]	11	0.5	27	1.1	42	1.8	40	2.3
Elevated Cholesterol[4]	11	0.5	29	1.0	36	1.6	26	1.8
Current Smoker[5]	25	0.6	22	0.8	14	1.0	8	1.1

Data Source: CT Dept Public Health, Behavioral Risk Factor Surveillance System

* Based on responses to question "Have you ever been told by a doctor that you have diabetes?"

[a] Insufficient number of respondents to calculate reliable estimates.

1-5 See footnotes below.

Table 3.3: **Prevalence of risk factors by diabetes status*, by race/ethnicity: Connecticut, 1990-1996**

	White[a]		Black[a]		Hispanic	
Risk Factor	**Percent**	**Std error**	**Percent**	**Std error**	**Percent**	**Std error**
Adults diagnosed with diabetes						
Overweight[1]	49	2.4	63	7.4	59	11.9
Insuffient Physical Activity[2]	57	2.8	69	7.8	na[a]	na[a]
High Blood Pressure[3]	53	2.9	64	6.9	na[a]	na[a]
Elevated Cholesterol[4]	33	2.5	31	7.5	na[a]	na[a]
Current Smoker[5]	14	1.7	na	na	na[a]	na[a]
Adults not diagnosed with diabetes						
Overweight[1]	25	0.5	41	2.2	25	2.1
Insuffient Physical Activity[2]	51	0.7	49	2.6	50	3.2
High Blood Pressure[3]	21	0.5	26	2.2	15	2.1
Elevated Cholesterol[4]	20	0.5	14	1.6	10	1.5
Current Smoker[5]	22	0.5	21	1.8	24	2.1

Data Source: CT DPH, Behavioral Risk Factor Surveillance System

* Based on responses to question "Have you ever been told by a doctor that you have diabetes?"

[a] Insufficient number of respondents to calculate reliable estimates.

1-5 See footnotes below.

Footnotes for Tables 3.1 - 3.3: Prevalence of risk factors

1. Pooled 1990 - 1996 data. Overweight category based on the Body Mass Index. Body Mass Index is computed as kilograms divided by height in meters squared:(weight/height**2). Female respondents with a body mass index greater than or equal to 27.3 and male respondents with body mass index greater 27.8 are categorized as overweight or obese.

2. Pooled 1990-1992,1994,1996 data. Respondents who reported no physical activity or who reported a physical activity or pair of activities that were done for 20 minutes or less, fewer than 3 times per week were categorized as having insufficient physical activity.

3. Pooled 1990-1993, 1995 data. Includes respondents who answered yes to the question: "Have you ever been told by a doctor or other health professional that you have high blood pressure?"

4. Pooled 1990-1995 data. Includes respondents who answered yes to the question:" Have you ever been told by a doctor or other health professional that your blood cholesterol is high?"

5. Pooled 1990-1996 data. Includes respondents who had smoked 100 cigarettes in lifetime and still smoked either every day or some days. Question was changed slightly during interval.

Health Care Practices, Coverage and Resources

Recommendations for Quality Diabetes Care

Proper care and management of diabetes are important for two reasons: a cure for diabetes does not currently exist, and many of the adverse outcomes associated with diabetes are preventable, lessened or at least can be delayed with appropriate treatment and management. Most diabetes care must be individualized based on the type and severity of diabetes as well as other patient characteristics. An on-going relationship with the health care system is necessary and treatment plans should address diet, exercise, and medication. Quality health care for people with diabetes also encompasses preventive health services and patient self-management.[8,9]

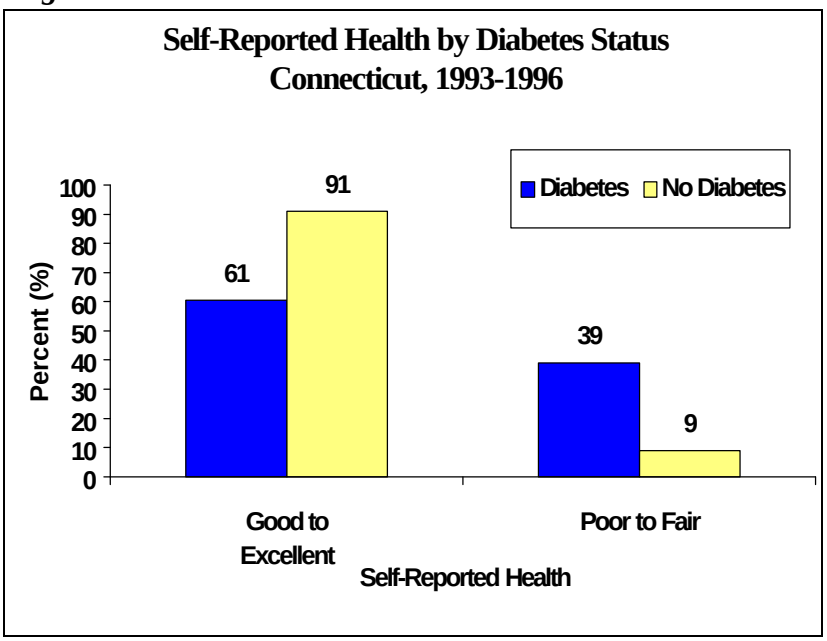
To ensure quality care for people with diabetes, the Connecticut Diabetes Control Program recommends the following priority activities for health care providers.

CTDCP Priority Activity	*American Diabetes Association's Recommendations*
Comprehensive Primary Care Visit	All patients with diabetes should receive a comprehensive visit and risk assessment annually.
HbA_1C Testing	All patients with diabetes tested at least annually
Eye Exams	Annual dilated retinal exams scheduled for all patients with diabetes
Foot Exams	Perform at least annually comprehensive foot exams for all patients with diabetes, including sensory testing with monofilament
Lipid Profile	Obtain fasting lipid profile at least annually for all patients with diabetes; test more frequently if levels indicate
Blood Pressure	Measure at every visit
Monitoring for Nephropathy	Screen urine for microalbuminuria annually
Influenza Vaccine	Administer or refer for vaccination every fall for all patients with diabetes, including those younger than 65
Pneumococcal Vaccine	Assess immunization status; administer or refer for vaccination all patients with diabetes who cannot document receiving vaccine
Self Management Training	Refer at initial diagnosis with retraining annually as needed
Smoking Cessation	Assess smoking status and counsel as needed; refer to cessation programs
Dental Care	Encourage all patients with diabetes to visit a dentist for preventive care every 6 months
Pregnancy Related Diabetes	Provide appropriate follow-up care both prenatal and post-partum

(Comprehensive recommendations for the management of diabetes are available through the American Diabetes Association's "Clinical Practice Recommendations, 1999" .[9])

Health Care Practices

Figure 4.1



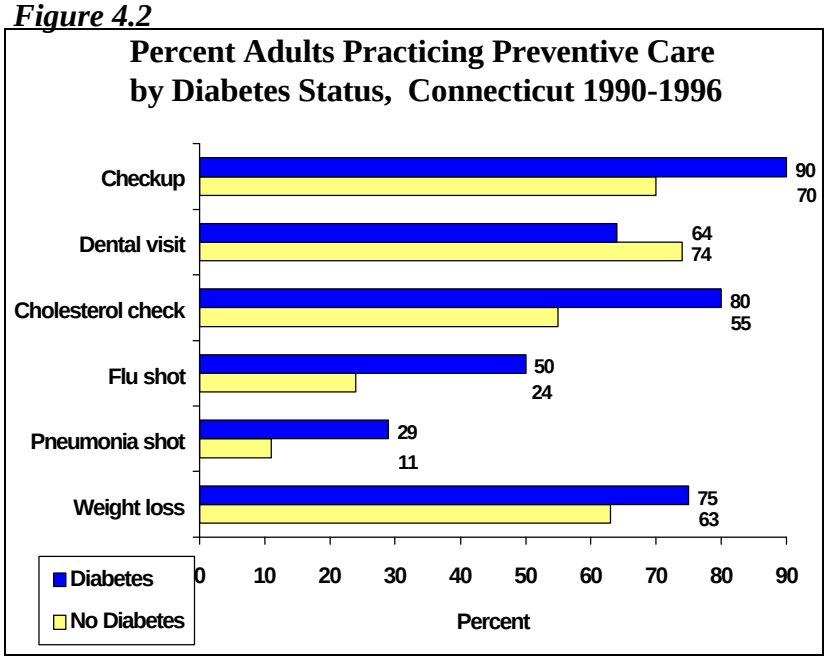
Source: See Table 4.1

Based on responses to the Behavioral Risk Factor Surveillance System (BRFSS) survey from 1993 to 1996, a larger proportion of people with diabetes perceived themselves as being in poor to fair health compared to those without diabetes (Figure 4.1).

Prior to 1998, limited data on preventive health care practices were available through the BRFSS core and rotating core survey questions. Beginning in 1998, several enhancements to the diabetes surveillance system will enable assessment of all the recommended health care practice priorities listed above. These enhancements include:

- addition of the diabetes module to the BRFSS survey (which will also provide data concerning diabetes self-care practices)
- addition of a gestational diabetes check box to the birth certificate
- establishment of mechanisms to access Medicare and managed care quality of care indicator data.

Figure 4.2



Source: See Table 4.2

People with diabetes are more likely to practice preventive care than non-diabetics with the exceptions of annual dental visits (Figure 4.2). Those who reported having diabetes were significantly more likely to report having an annual checkup, influenza immunization, cholesterol level check and to have had a pneumococcal vaccination than the comparison group. Generally as age increased, the percentage of people who reported having an annual checkup, influenza vaccination and pneumonia vaccination increased regardless of diabetes status (Table 4.2).

After controlling for age, those with diabetes were significantly more likely to have an annual checkup than those without diabetes. People with diabetes aged 18-44 were significantly less likely to have an annual checkup than those aged 45 and older (Table 4.2).

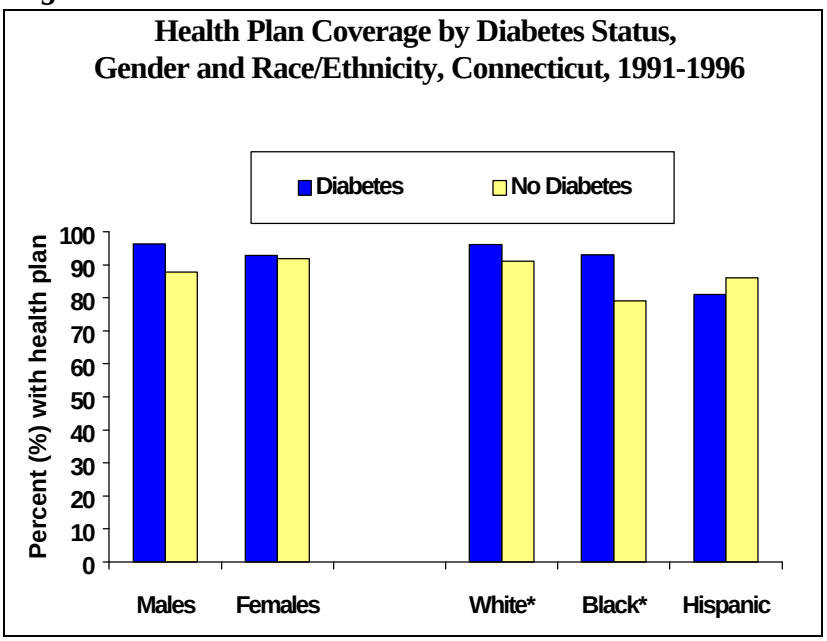
Adults with diabetes in the age groups 18-44 and 45-64 were significantly more likely to have an annual cholesterol level check and influenza vaccination than those without diabetes of similar age. Of adults with diabetes, those aged 18-64 were significantly less likely to have an annual cholesterol level check and influenza vaccination than those 65 years and older (Table 4.2).

Adults aged 18-74 with diabetes were significantly more likely to have a pneumonia vaccination than those without diabetes. Among people with diabetes, those aged 18-64 were significantly less likely to have had a pneumonia shot than adults without diabetes (Table 4.2).

Generally, three out of four adults with diabetes who were overweight reported trying to lose weight regardless of age. Overweight people with diabetes were slightly more likely to attempt weight loss than the comparison group (Table 4.2).

Health Care Coverage

Figure 4.3

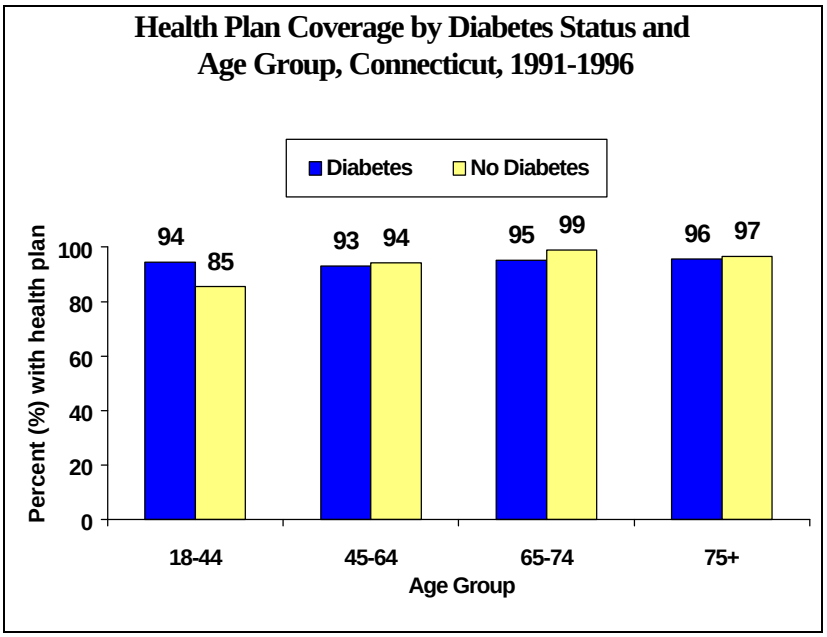


Source: See Table 4.3

Nationally about 92% of people with diabetes have some form of health care coverage[6] while in Connecticut, an estimated 94% of people with diabetes have health care coverage (Table 4.3).

As seen in Figure 4.3, a slightly higher proportion of Connecticut adults with diagnosed diabetes had coverage than the general public particularly among the black and white populations.

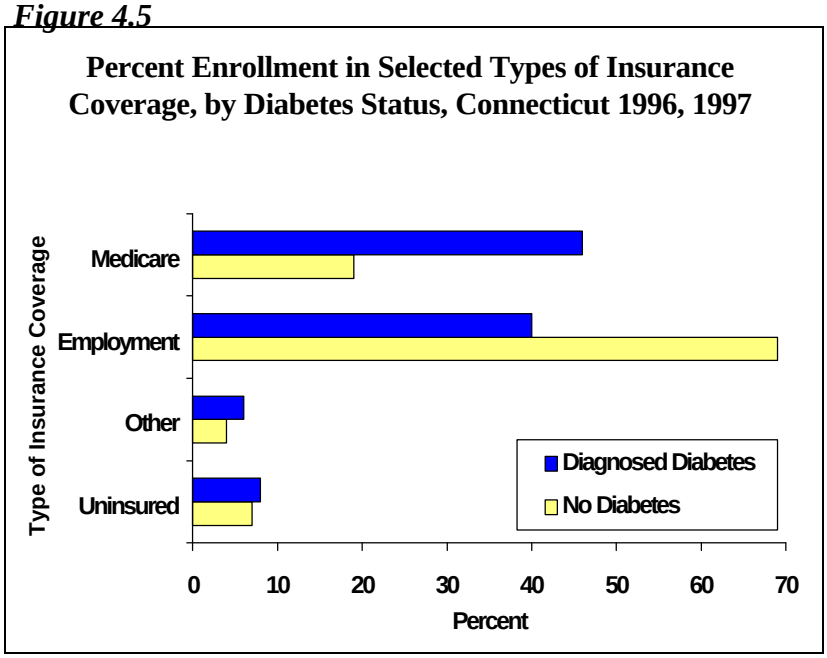
Figure 4.4



Source: See Table 4.3

Generally, as age increases the proportion of people with health care insurance increases primarily because of Medicare coverage. In Connecticut, the percentage of adults with diagnosed diabetes who reported health care coverage remained relatively stable regardless of age group (Figure 4.4). In contrast, the proportion of those not reporting diabetes with health insurance rose to 99% for the 65-74 age group then declined slightly for those aged 75 and older.

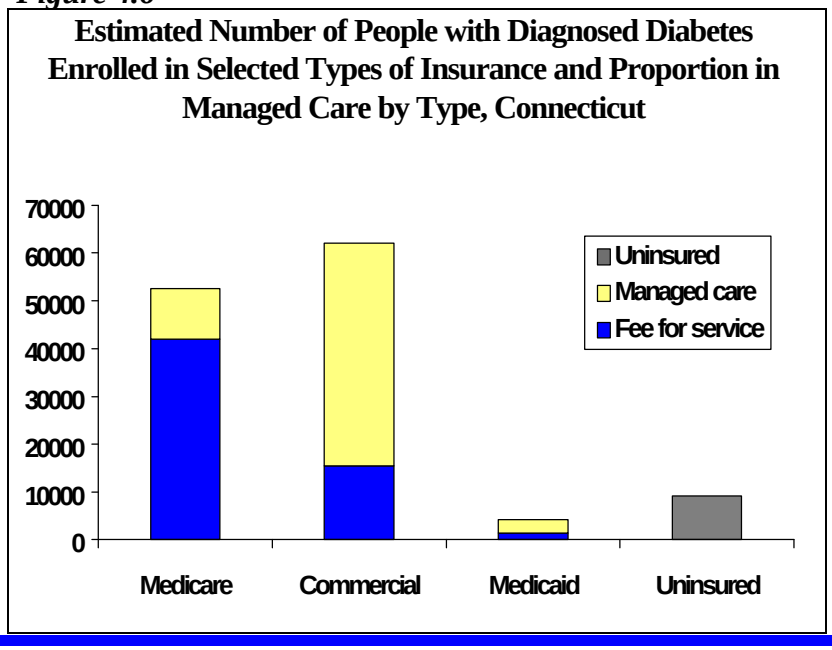
Figure 4.5



Source: See Table 4.3

A higher percentage of adults with diabetes report Medicare as their primary source of health care than reported by the general population (Figure 4.5) primarily due to the higher prevalence of diabetes among those aged 65 and older. People with diabetes were also slightly less likely to have dental insurance than those without diabetes (Table 4.3) also due to the higher prevalence of diabetes among the older age group.

Figure 4.6



Source: See Table 4.4

Figure 4.6 depicts synthetic estimates of the number of adults with diagnosed diabetes who have Medicare, commercial insurance, Medicaid or no health insurance. This graph also shows the proportion of each type of insurance that is fee for service (FFS) coverage versus a form of managed care coverage (MCO).

Among adults with diabetes, approximately 20% Medicare enrollees, up to 84% of those enrolled in commercial lines and approximately 64% of Medicaid enrollees have some form of managed care coverage. An estimated 9,750 Connecticut residents with diabetes, most of whom are aged 18-44, are uninsured (Table 4.4).

Health Care Resources

Quality diabetes care requires a team of health care professionals including primary care and specialty physicians, dietitians, podiatrists and diabetes educators.

Certified diabetes educators (CDEs) are essential to the health care team providing care to people with diabetes. CDEs are in short supply in Connecticut with about 10 CDEs per 10,000 diabetic population. Not all of the 100 educators in Connecticut are actively practicing, however. Connecticut is also experiencing a shortage of bilingual CDEs.

CDE certification requires a training program that includes 2,000 hours of direct care and the successful completion of a certification exam based on national standards. Approximately 55% of Connecticut's CDEs hold nursing degrees (RN, BSN, MSN), 13% are Advanced Practice Registered Nurses and 20% are registered dietitians.

Health Care Practices ,Coverage and Resources

CDEs in Connecticut are found in a variety of practice settings such as hospitals, medical centers, diabetes centers, pharmacies, long term care facilities, visiting nurse associations and consultants. Actual practice distribution patterns are not known at this time.
As of 1999, Connecticut has eleven American Diabetes Association (ADA) certified diabetes education programs in addition to 22 other hospital-based diabetes education programs. Table 4.5 provides a list of these programs. The hospital-based diabetes programs in Connecticut vary in structure and staffing. Some programs offer group counseling while others offer one-on-one counseling or a combination of both. Listed below is the ADA Recommended Curriculum for Diabetes Self Management Education Programs, 1999.

American Diabetes Association: National Standards for Diabetes Self-Management Education Programs and Review Criteria - Curriculum[9]
Standard 12: Based on the needs of the target population, the program shall be capable of offering instruction in the following content areas:
a. Diabetes overview b. Stress and psychosocial adjustment c. Family involvement and social support d. Nutrition

e. Exercise and activity

f. Medications

g. Monitoring and use of results

h. Relationships among nutrition, exercise, medication and blood glucose levels

I. Prevention, detection and treatment of acute complications

j. Prevention, detection and treatment of chronic complications

k. Foot, skin and dental care

l. Behavior change strategies, goal setting, risk factor reduction and problem solving

m. Benefits, risks and management options for improving glucose control

n. Preconception care, pregnancy and gestational diabetes

o. Use of health care systems and community resources

Table 4.1: **Self-reported health status[1] of fair or poor by diabetes status[2], by age, by gender, by race/ethnicity: Connecticut, 1990-1996**

	Diagnosed w/ diabetes		No diabetes	
Category	**Percent**	**Std error**	**Percent**	**Std error**
Age				
18-44	21	6.7	5	0.4
45-64	36	5.0	8	0.7
65-74	43	5.4	20	1.6
75+	58	6.6	29	2.2
Gender				
Overall	39	2.9	9	0.4
Males	37	4.9	8	0.6
Females	40	3.5	9	0.5
Race/Ethnicity				
White[a]	37	3.1	9	0.4
Black[a]	55	10.2	12	1.9
Hispanic	--	--	10	1.7

Data Source: CT DPH, Behavioral Risk Factor Surveillance System

1 Pooled 1993-1995 data. Includes respondents who reported their general health as Fair or Poor.

2 Based on responses to question "Have you ever been told by a doctor that you have diabetes?"

a Excludes respondents of Hispanic origin.

-- Insufficient respondents to calculate estimates.

Table 4.2: Health care practices by diabetes status*, by age: Connecticut, 1990-1996

	Age Group									
	18-44		45-64		65-74		75+		All Adults**	
Health Care Practice	Percent	Std error	Percent	Std error	Percent	Std error	Percent	Std error	Percent	Std error
Diagnosed										
Checkup in past year[1]	75.1	4.0	91.3	2.0	95.7	1.6	96.3	1.5	89.8	1.3
Influenza Immunization	37.3	7.9	36.9	5.6	66.2	6.7	67.7	6.6		3.4
(in previous year)[2]									50.4	
Pneumonia Vaccination	13.3[a]	4.7	17.8	4.6	42.1	6.4	47.6	7.4		3.0
(ever had)[3]									28.8	
Cholesterol checked in past year[4]	59.6	5.0	85.8	3.0	86.5	3.7	83.5	3.7	80.0	2.0
Overweight trying to lose weight[5]	76.3	8.6	79.2	5.1	70.8	7.6	70.3	10.0	75.0	3.4
Dental visit in last year[6]	--	--	--	--	--	--	--	--	64.0	5.6
No diabetes										
Checkup in past year[1]	63.6	0.7	72.0	0.9	83.1	1.1	86.6	1.3	70.3	0.5
Influenza Immunization	14.3	0.8	22.8	1.3	55.6	2.3	66.1	2.5	24.3	0.7
(in previous year)[2]										
Pneumonia Vaccination	7.1	0.6	6.7	0.7	26.1	2.0	37.4	2.7	11.0	0.5
(ever had)[3]										
Cholesterol checked in past year[4]	43.0	0.7	66.8	1.0	78.3	1.4	74.4	1.8	55.0	0.6
Overweight trying to lose weight[5]	63.1	2.0	84.1	2.5	64.7	3.8	53.7	5.7	63.0	1.3
Dental visit in last year[6]	--	--	--	--	--	--	--	--	74.0	1.3

Data Source: Connecticut Dept Public Health, Behavioral Risk Factor Surveillance System

* Based on responses to question "Have you ever been told by a doctor that you have diabetes?"

1 Pooled 1990-1996 data. Respondents were asked the question: "About how long has it been since you last visited a doctor for a routine checkup?"

2 Pooled 1993,1995, 1997 data. Respondents were asked the question: "During the past 12 months, have you had flu shot?"

3 Pooled 1993,1995, 1997 data. Respondents were asked the question: "Have you ever a pneumonia vaccination?"

4 Pooled 1990-1995 data. Respondents were asked the question: "Have you ever had your cholesterol checked?"

5 Pooled 1991, 1992, 1994, 1996 data among respondents identified as overweight or obese based on the Body Mass Index (BMI). Body mass index is computed as weight in kilograms divided by height in meters squared: (weight/height**2). Female respondents with body mass index greater than or equal to 27.3 and Male Respondents with body mass index greater than or equal to 27.8 are identified as overweight or obese. Respondents were asked the question: "Are you now trying to lose weight?"

6 Question asked in 1996 only. Respondents were asked the question: "How long has it been since you last visited the dentist or a dental clinic?"

a Rate considered unreliable due to small numbers.

-- Insufficient respondents to calculate estimates.

Table 4.3: **Estimated percent of adults with health insurance coverage by diabetes status*, by gender, by age and by race/ethnicity: Connecticut, 1991-1996****

	Diagnosed with Diabetes		No Diabetes	
Category	**Percent**	**Std error**	**Percent**	**Std error**
Overall	94.4	1.2	89.9	0.4
Gender				
Males	96.3	1.5	87.8	0.6
Females	92.8	1.8	91.8	0.4
Age Group				
18-44	94.4	3.0	85.4	0.6
45-64	93.0	1.9	94.2	0.5
65-74	95.2	2.5	99.0	0.3
75+	95.6	2.3	96.6	0.8
Race/Ethnicity				
White[1]	95.5	1.1	91.1	0.4
Black[1]	92.8	3.7	78.8	2.2
Hispanic	80.6	11.8	86.0	2.0
Type of Insurance[2]				
Employment[3]	39.6	5.6	69.2	1.2
Medicare	45.6	5.5	19.4	1.0
Other	6.3	3.3	3.8	0.5
Uninsured	8.0	2.5	7.0	0.8
Dental[4]	49.4	6.0	60.9	1.4

Data Source: Connecticut Department of Public Health, Behavioral Risk Factor Surveillance System

* Based on responses to question "Have you ever been told by a doctor that you have diabetes?"

* Pooled 1991-1996 data.

1 Excludes those of Hispanic origin.

2 All type of insurance data from the 1997 BRFSS except dental.

3 Includes insurance through employer, someone else's employer or purchased by the individual.

4 Data from the 1996 BRFSS oral health module.

Table 4.4: **Estimated number of people diagnosed with diabetes by selected types of insurance and estimated percentage in managed care by type of insurance: Connecticut**

Type of Insurance Coverage	Estimated Number of People with Diabetes Enrolled	Estimated Percent Enrolled in Managed Care**	Primary Ages Covered by Type of Insurance
Medicare	52,500	20%	65 years and older
Commercial Insurance	62,000	70-84	19-64 years
Medicaid	4,150	64	Women 19-55 yrs and Children <19 yrs
Uninsured	9,750	NA	19-64 years

* The estimated number of diabetics by type of coverage are synthetic estimates with a large margin of error.

These estimates were calculated by applying composite rates of enrollment in type of insurance based on the Connecticut Office of Health Care Access *'Report on Connecticut's Insured and Uninsured', April 1998* and preliminary analysis of the Connecticut 1997 BRFSS questions concerning type of health care coverage to synthetic estimates of the number of diagnosed diabetics in Connecticut. The synthetic counts were calculated by applying an average of 1990-1996 CT BRFSS diagnosed diabetes prevalence rates to 1996 CT population estimates.

** Estimated percent in Managed Care information sources:

Medicare: *"Medicare Managed Care Market Penetration for all Medicare Plan Contractors - Quarterly State/County Data Files -'* http://www.hcfa.gov/medicare/mpsct1.htm

Medicaid: *"Medicaid Managed Care State Enrollment"* http://www.hcfa.gov/medicaid/mcsten97.htm

Commercial: Connecticut Department of Public Health, *Looking Toward 2000, An Assessment of Health Status and Health Services*

Unpublished data from the American Association of Health Plan summary of a 1998 household survey conducted by National Research Corp., Lincoln, Nebraska.

Table 4.5: **Connecticut Hospital Based Diabetes Programs**

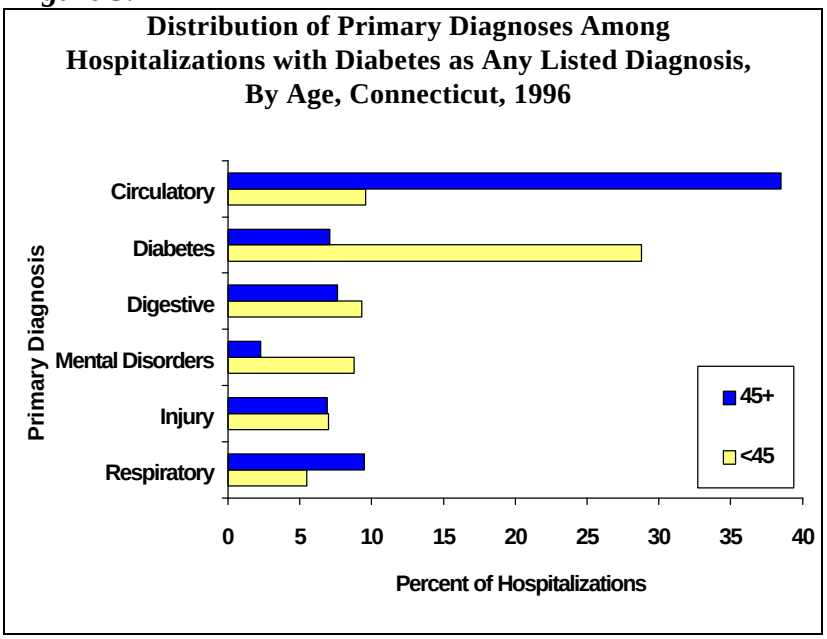
Hospital	Street	Town	Zip	Phone
Bradley Memorial Hospital and Health Center	81 Meriden Ave	Southington	06489	860-276-5099
*** Bridgeport Hospital**	**267 Grant St, PO 5000**	**Bridgeport**	**06610**	**203-384-3773**
Bristol Hospital	Brewster Rd.	Bristol	06010-0977	860-585-3160
Connecticut Children's Medical Center Endocrinology/Diabetes Clinic	282 Washington St.	Hartford	06106	860-545-9370
*** Danbury Hospital**	**235 Main St**	**Danbury**	**06810**	**203-730-5944**
Day Kimball, Diabetes Education	320 Pomfret Street	Putnam	06260	860-963-6332
Greenwich Hospital	Perryridge Road	Greenwich	06830	203-863-3238
Griffin Hospital	130 Division St	Derby	06418	203-732-7524
*** Hartford Hospital**	**PO Box 5037, 80 Seymour**	**Hartford**	**06102-5037**	**860-545-3526**
Hospital of St. Raphael	1450 Chapel St.	New Haven	06511	860-789-3355
Johnson Memorial Hospital Patient Care Services	PO Box 860 201 Chestnut Hill Rd	Stafford Springs	06076-0860	860-684-8142
*** Lawrence and Memorial Hospital**	**365 Montauk Avenue**	**New London**	**06320**	**860-442-0711 x2300**
*** Manchester Memorial Hospital Diabetes Self Management Program**	**71 Hayes Street**	**Manchester**	**06040**	**860-647-6824**
Middlesex Hospital, Dept of Education	28 Crescent Street	Middletown	06457	860-344-6025
*** Midstate Medical Center Diabetes Education Program**	**435 Lewis Ave**	**Meriden**	**06451**	**203-238-8505**
Milford Hospital	300 Seaside Ave.	Milford	06460	203-876-4005
Joselin Ctr for Diabetes, New Britain Hospital	100 Grand St.	New Britain	06050	860-224-5672
New Milford Hospital	21 Elm Street	New Milford	06776	860-350-7264
Norwalk Hospital, Diabetes Education Program	Maple Street	Norwalk	06586	203-852-2181
Rockville General Hospital, Diabetes Education	31 Union Street	Vernon	06066	860-872-5318
Rocky Hill Veteran's Home and Hospital Nursing Education	287 West Street	Rocky Hill	06067	860-529-2571 x-2419
Sharon Hospital, Good Neighbor Program	PO 1709, 1 Low Rd	Sharon	06069	800-666-6885
*** St. Francis Hospital & Medical Center Diabetes Care Center**	**114 Woodland Street**	**Hartford**	**06105**	**860-714-4402**
St. Joseph Medical Center	128 Strawberry Hill Ave	Stamford	06904	203-353-2240
St. Mary's Hospital	56 Frankling St.	Waterbury	06706	203-574-6039
St. Vincent's Medical Center	2800 Main Street	Bridgeport	06606	203-576-6000
*** The Charlotte Hungerford Hospital Diabetes Management Center**	**540 Litchfield Street**	**Torrington**	**06790**	**860-496-6599**
The Stamford Hospital	Shelburne and W Broad	Stamford	06904	203-325-7268
University of Connecticut Health Systems Diabetes Education Program	263 Farmington Ave	Farmington	06032-6220	860-679-4910
*** Veterans Affairs Medical Center**	**950 Campbell Ave Nursing Department/118A**	**West Haven**	**06516**	**203-932-5711**
Waterbury Hospital	64 Robbins St	Waterbury	06721	203-573-6558
*** William W. Backus**	**326 Washington Street**	**Norwich**	**06360**	**860-823-6313**
*** Windam Community Memorial Hospital**	**112 Mansfield Avenue**	**Willimantic**	**06226**	**860-456-6727**
Yale New Haven Hospital	20 York St	New Haven	06504	203-737-2367
Yale Program for Children with Diabetes	430 Congress Avenue	New Haven	06520	203-785-4648

Prepared By: CT Dept. of Public Health, Diabetes Control Program
Programs with an asterisk are ADA certified programs

Diabetes Related Hospitalization

Diabetes was the eleventh leading cause of Connecticut resident hospitalizations based on the primary diagnosis recorded on the hospital discharge records in 1996. Because people with diabetes are much more likely to be hospitalized for the complications of diabetes rather than the disease itself, diabetes is often listed as a secondary diagnosis rather than the primary diagnosis for hospitalization. In 1996, diabetes was listed as the primary diagnosis on 4,061 hospital discharge records or 1% of the hospitalizations while 44,753 hospital discharge records or 11% of hospitalizations listed diabetes as either the primary or a secondary diagnosis (any listed diagnosis) .

Figure 5.1



Source: See Table 5.1

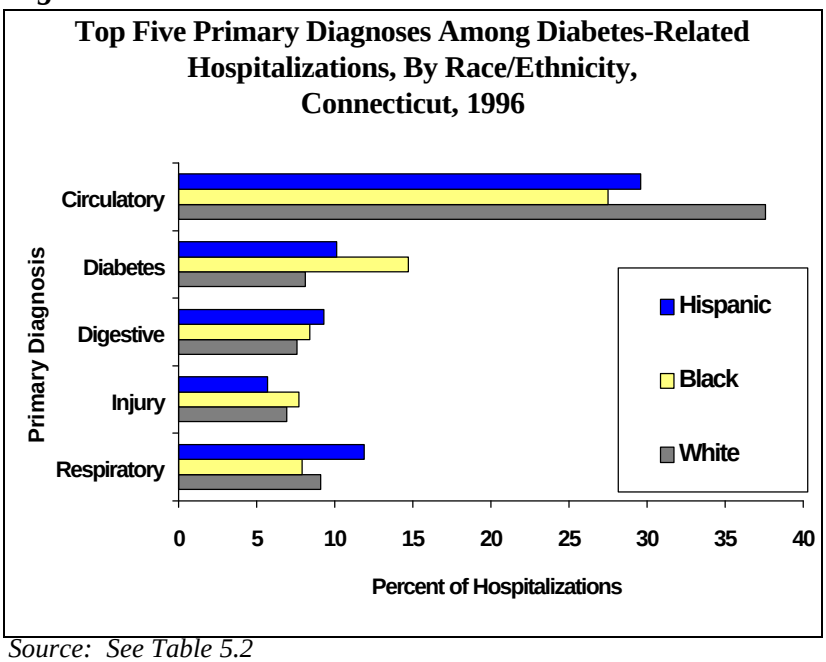
As seen in Figure 5.1, diabetes was the most common primary diagnosis for those aged less than 45 among hospitalizations which listed diabetes as any listed diagnosis, accounting for 29% of the hospitalizations. Among those 45 and older, diseases of the circulatory system was the primary diagnosis for 39% of diabetes-related hospitalizations while diabetes was the primary diagnosis for only 9.1% of hospital discharge records (Table 5.1).

The primary diagnosis among diabetes-related hospitalizations differs by racial and ethnicity groupings as seen in Figure 5.2. Diseases of the circulatory system was the top ranked primary diagnosis for the white, black and Hispanic populations. Diseases of the circulatory system was a more common primary diagnosis among whites while diabetes was a more common primary diagnosis among blacks.

Data from Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base. Excludes hospitalizations for newborns and conditions related to pregnancy and childbirth.

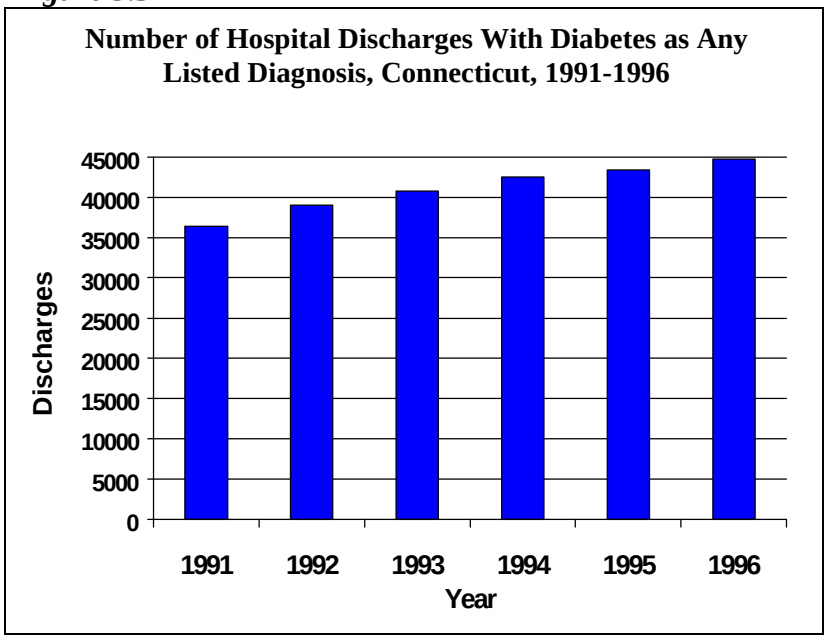
For this report, 'any listed diagnosis' and 'diabetes-related' refer to hospitalizations which include hospital discharge records listing diabetes as either a primary or secondary diagnosis and will be used interchangeably.

Figure 5.2



Source: See Table 5.2

Figure 5.3



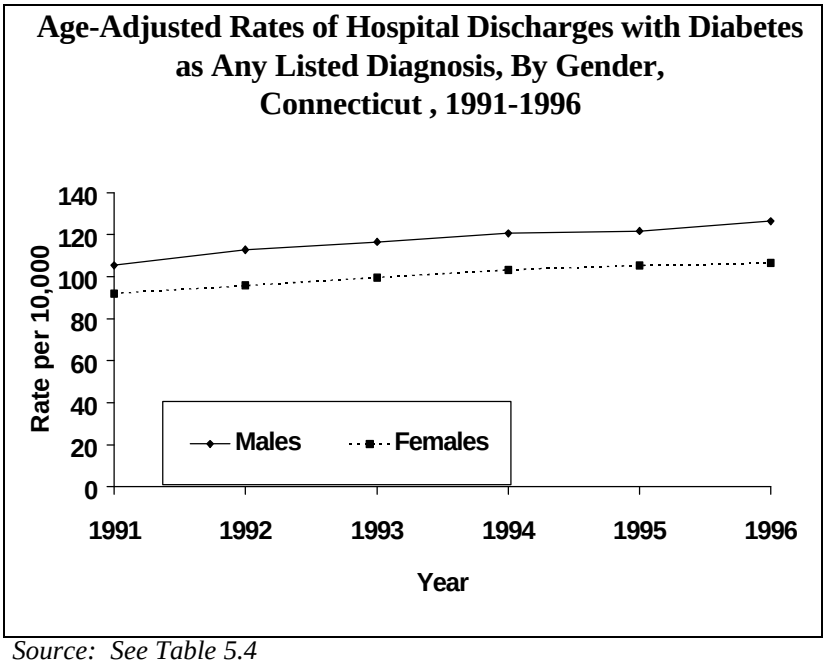
Source: See Table 5.3

The 1989 National Health Interview Survey indicated that people with diabetes were three times as likely to report being hospitalized in the previous year as those without diabetes.[6] As Figure 5.3 and Table 5.3 show, both the number of hospital discharges with diabetes as a primary diagnosis and discharges with diabetes as any listed diagnosis increased in Connecticut from 1991 through 1996. Diabetes-related hospitalizations rose from 9% of all hospitalizations in 1991 to 11% in 1996. Both age-adjusted rates' of hospital discharges with diabetes as the primary

' In this chapter, hospitalization rates refer to age-adjusted rates of hospital discharges standardized to the 1980 standard million using the direct method to assure comparability to published national data. Rates standardized to the 2000 standard million are also provided in the tables at the end of this chapter.

diagnosis and with diabetes as any listed diagnosis increased significantly in Connecticut from 1991 to 1996 (Figure 5.4, Table 5.3).

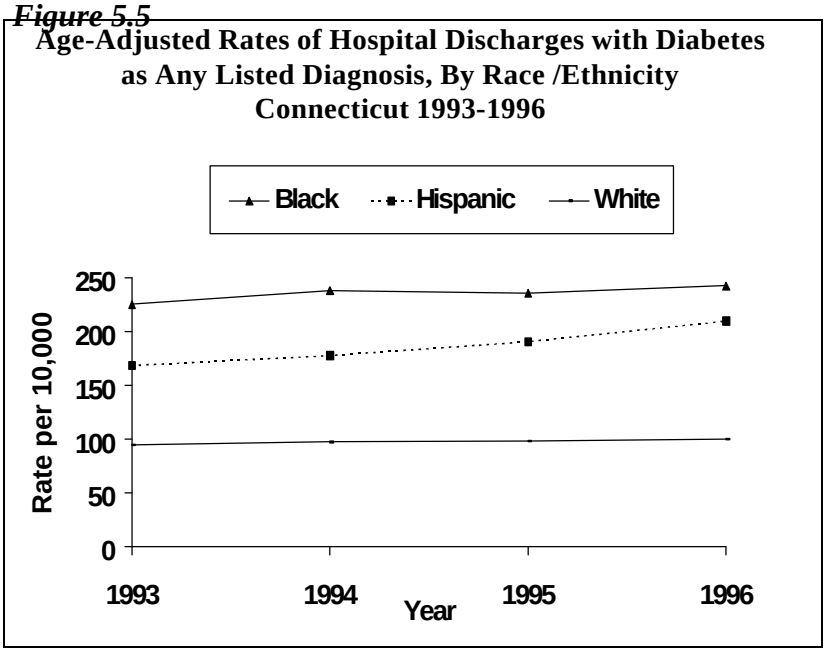
Figure 5.4



Source: See Table 5.4

Diabetes-related hospitalization rates increased significantly from 1991 to 1996 for both males and females (Figure 5.4). Males had significantly higher rates than females for both hospitalizations with diabetes as the primary diagnosis and as any listed diagnosis (Figure 5.4, Tables 5.4 and 5.5).

Figure 5.5

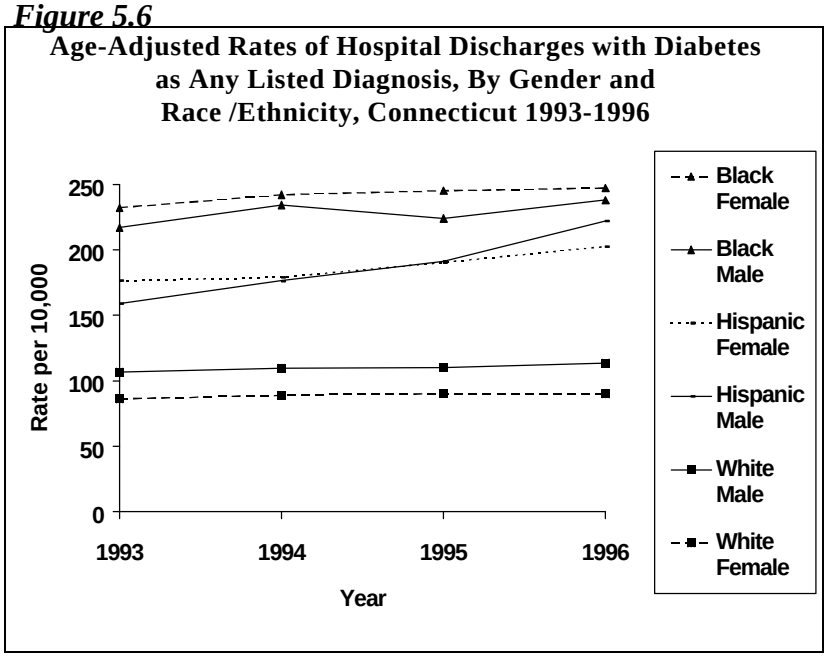


Source: See Tables 5.6, 5.7, 5.8

As shown in Figure 5.5, hospitalization rates are much higher among the black and Hispanic populations than the white population. The 1996 black rate was 3.5 times higher and the Hispanic rate was 2 times higher than the white rate. The same trend but smaller magnitude was seen for discharge rates with diabetes as primary diagnosis (see Tables 5.6 to 5.8).

Hospitalization rates for all three population groups rose from 1993 to 1996 (Figure 5.5). The Hispanic rate rose fastest among the three groups with a 25% increase over this time period.

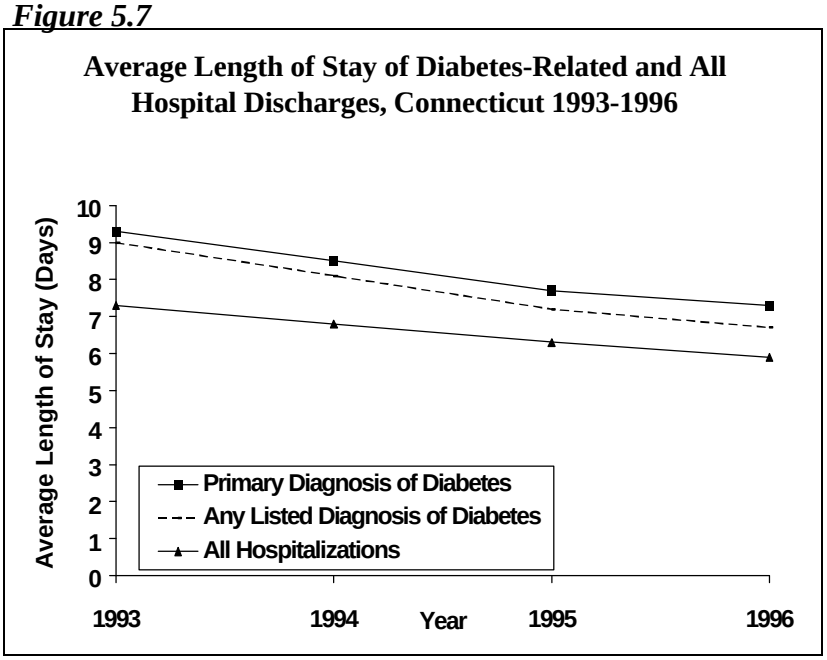
Figure 5.6



Source: See Tables 5.9, 5.10, 5.11

Among the white population, diabetes-related hospitalization rates for males were significantly higher than for females. Among the black population, the rates for females were consistently higher than for males from 1993 to 1996 but the gender differences were not statistically different. The rates among Hispanic males and females remained close throughout the same time period (Figure 5.6).

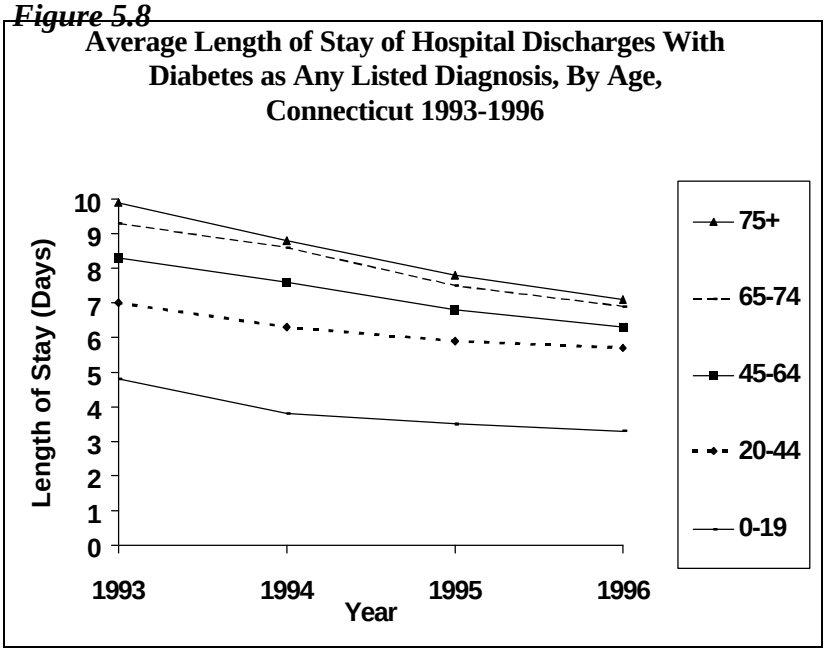
Figure 5.7



Source: See Table 5.12

From 1993 to 1996, the average length of stay (LOS) for all Connecticut hospitalizations decreased from 6.3 to 5.2 days. Diabetes-related hospitalizations, both with diabetes listed as primary diagnosis and as any listed diagnosis, also showed a decreasing trend over the same time period but higher average lengths of stay than hospitalizations overall (Figure 5.7). The average LOS for hospital discharges with diabetes as any listed diagnosis decreased from 9.0 days in 1993 to 6.7 days in 1996. Over the same time period, the average LOS for discharges listing diabetes as the primary diagnosis decreased from 9.3 to 7.3 days.

Figure 5.8

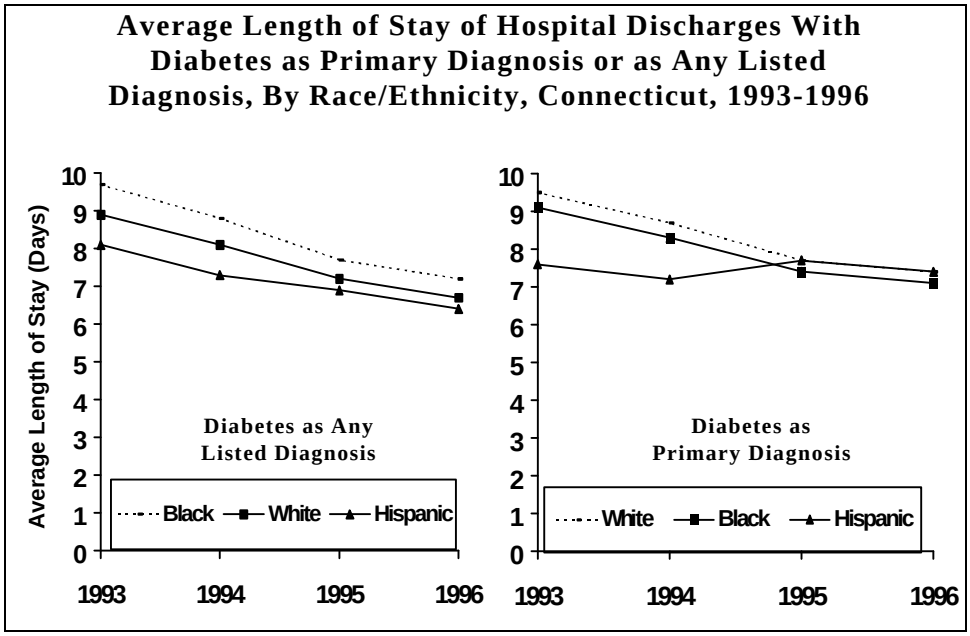


Source: See Table 5.12

Decreasing trends in average length of stay were apparent across age group and race/ethnicity groups as seen in Figures 5.8 and 5.9. As age increases, average LOS increases among diabetes-

related hospitalizations (Table 5.12). For hospitalizations with diabetes as a primary diagnosis, the average LOS peaks at 8.8 days for those aged 65-74 (see Table 5.12).

Figure 5.9



Source: See Table 5.13

Consistent differences exist in average LOS across race/ethnicity groups for persons hospitalized due to other conditions as seen in Figure 5.9. Blacks were hospitalized an average one-half day longer than whites for diabetes-related hospitalization. Among those hospitalized with diabetes as primary diagnosis, the average LOS for Hispanic males increased from 6.8 to 7.6 days over 1993-1996. Further data are needed to confirm this trend (Table 5.13).

Table 5.1: **Distribution of primary diagnoses among hospital discharges with diabetes as any listed diagnosis, by age: Connecticut, 1996**

	All Ages		Age Group 0-44		45-64		65-74		75+	
Primary Diagnosis	**Number**	**Percent of Age Group**	**Number**	**Percent of Age Group**	**Number**	**Percent of Age Group**	**Number**	**Percent of Age Group**	**Number**	**Percent of Age Group**
All	44,753	100.0	4,089	100.0	12,478	100.0	12,966	100.0	15,220	100.0
Diseases of the circulatory system (390-459)	16,033	35.8	391	9.6	4,317	34.6	5,346	41.2	5,979	39.3
Diseases of the respiratory system (460-519)	4,084	9.1	225	5.5	956	7.7	1,137	8.8	1,766	11.6
Diabetes (250)	**4,061**	**9.1**	**1,177**	**28.8**	**1,217**	**9.8**	**877**	**6.8**	**790**	**5.2**
Diseases of the digestive system (520-579)	3,480	7.8	382	9.3	1,024	8.2	901	7.0	1,173	7.7
Injury and poisoning (800-999)	3,081	6.9	285	7.0	873	7.0	879	6.8	1,044	6.9
Neoplasms (140-239)	1,909	4.3	52	1.3	523	4.2	634	4.9	700	4.6
Diseases of the genitourinary system (580-629)	1,762	3.9	144	3.5	439	3.5	469	3.6	710	4.7
Diseases of the musculoskeletal system and connective tissue (710-739)	1,600	3.6	103	2.5	503	4.0	535	4.1	459	3.0
Mental disorders (290-319)	1,305	2.9	361	8.8	422	3.4	247	1.9	275	1.8
Diseases of the skin and subcutaneous tissue (680-709)	1,150	2.6	166	4.1	415	3.3	287	2.2	282	1.9
Infectious and parasitic diseases (001-139)	1,100	2.5	123	3.0	255	2.0	275	2.1	447	2.9
Other endocrine, nutritional and metabolic diseases (240-249, 251-279)	906	2.0	89	2.2	205	1.6	231	1.8	381	2.5
Diseases of the nervous system and sense organs (320-389)	456	1.0	45	1.1	145	1.2	135	1.0	131	<1
Complications of pregnancy, childbirth and the puerperium (630-677)	281	<1	281	6.9	<25	<1	--	--	--	--
Diseases of the blood and blood-forming organs (280-289)	243	<1	<25	<1	61	0.5	70	<1	89	<1
Congenital anomalies (740-759)	26	<1	<25	<1	<25	<1	--	--	--	--
Other (all codes not listed above)	3,276	7.4	238	5.8	1,123	9.0	943	7.2	994	6.5

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Database

Table 5.2: **Distribution of primary diagnoses among hospital discharges with diabetes as any listed diagnosis, by race/ethnicity: Connecticut, 1996**

	Race/Ethnicity								
	White*			Black*			Hispanic		
Category of Primary Diagnosis and ICD9-CM code	**Number**	**Percent**	**Rank**	**Number**	**Percent**	**Rank**	**Number**	**Percent**	**Rank**
All	35,614			5,416			3,033		
Diseases of the circulatory system (390-459)	13,402	37.6	1	1,490	27.5	1	899	29.6	1
Diseases of the respiratory system (460-519)	3,236	9.1	2	428	7.9	5	362	11.9	2
Diabetes (250)	**2,898**	**8.1**	**3**	**799**	**14.7**	**2**	**305**	**10.1**	**3**
Diseases of the digestive system (520-579)	2,695	7.6	4	456	8.4	4	281	9.3	4
Injury and poisoning (800-999)	2,447	6.9	5	417	7.7	6	173	5.7	6
Neoplasms (140-239)	1,610	4.5	7	185	3.4	9	74	2.4	11
Diseases of the genitourinary system (580-629)	1,425	4.0	8	189	3.5	8	120	4.0	8
Diseases of the musculoskeletal system and connective tissue (710-739)	1,339	3.8	9	161	3.0	10	71	2.3	12
Mental disorders (290-319)	945	2.7	10	198	3.7	7	143	4.7	7
Diseases of the skin and subcutaneous tissue (680-709)	931	2.6	11	127	2.3	13	85	2.8	10
Infectious and parasitic diseases (001-139)	823	2.3	12	152	2.8	11	101	3.3	9
Other endocrine, nutritional and metabolic diseases (240-249, 251-279)	700	2.0	13	136	2.5	12	56	1.8	13
Diseases of the nervous system and sense organs (320-389)	357	1.0	14	67	1.2	14	25	<1	15
Complications of pregnancy, childbirth and the puerperium (630-677)	181	<1	15	41	<1	16	<25	<1	16
Diseases of the blood and blood-forming organs (280-289)	176	<1	16	47	<1	15	47	1.5	14
Congenital anomalies (740-759)	21	<1	17	<1	<1	17	<25	<1	17
Other (all codes not listed above)	2,428	6.8	6	523	9.6	3	277	9.1	5

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Database

Table 5.3: **Number and age-adjusted rates per 10,000 population of hospital discharges with diabetes as primary diagnosis and diabetes as any listed diagnosis, by age: Connecticut 1991-1996**

Diagnosis and Year	Age Group 0-19	20-44	45-64	65-74	75+	All Ages	*Age Adj. (1980)	Std. Error	**Age Adj. (2000)	Std. Error
Diabetes as primary diagnosis										
1991	255	822	1,083	765	710	3,635	10.2	0.2	11.0	0.2
1992	304	823	1,083	777	651	3,638	10.2	0.2	10.9	0.2
1993	275	871	1,142	779	675	3,742	10.4	0.2	11.2	0.2
1994	302	854	1,183	830	762	3,931	10.9	0.2	11.7	0.2
1995	311	906	1,186	776	789	3,968	11.0	0.2	11.8	0.2
1996	294	883	1,217	877	790	4,061	11.2	0.2	12.0	0.2
Diabetes as any listed diagnosis										
1991	371	3,155	10,276	11,209	11,420	36,431	97.2	0.5	109.2	0.6
1992	396	3,258	10,953	11,948	12,439	38,994	102.4	0.5	115.0	0.6
1993	380	3,315	11,474	12,411	13,189	40,769	106.5	0.5	119.6	0.6
1994	390	3,381	12,110	12,673	13,917	42,471	110.2	0.5	123.7	0.6
1995	396	3,575	12,234	12,797	14,366	43,368	111.9	0.5	125.5	0.6
1996	414	3,675	12,478	12,966	15,220	44,753	114.6	0.6	128.5	0.6

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Hospital Discharge Rates were adjusted to the 1980 U.S. standard million population, using the direct method.

** Hospital Discharge Rates were adjusted to the 2000 U.S. standard million population, using the direct method.

Table 5.4: **Number and age-adjusted rates per 10,000 population of hospital discharges with diabetes as primary diagnosis and diabetes as any listed diagnosis, males by age: Connecticut 1991-1996**

Diagnosis and Year	Age Group 0-19	20-44	45-64	65-74	75+	Total	*Age Adj. (1980)	Std. Error	**Age Adj. (2000)	Std. Error
Diabetes as primary diagnosis										
1991	117	444	574	368	292	1,795	11.1	0.3	12.1	0.3
1992	144	434	591	402	269	3,786	11.3	0.3	12.1	0.3
1993	120	465	631	409	290	3,832	11.7	0.3	12.6	0.3
1994	142	475	657	432	336	3,908	12.4	0.3	13.4	0.3
1995	160	501	642	385	345	4,036	12.3	0.3	13.3	0.3
1996	131	473	738	446	337	4,061	12.8	0.3	13.8	0.3
Diabetes as any listed diagnosis										
1991	154	1,556	5,189	5,287	4,635	16,821	105.3	0.8	119.1	0.9
1992	182	1,540	5,626	5,751	5,204	18,303	112.7	0.8	127.5	1.0
1993	158	1,605	5,914	6,045	5,358	19,080	116.5	0.8	131.5	1.0
1994	182	1,647	6,109	6,220	5,773	19,931	120.5	0.9	136.1	1.0
1995	186	1,739	6,180	6,222	5,982	20,309	121.7	0.9	137.3	1.0
1996	175	1,760	6,475	6,411	6,540	21,361	126.3	0.9	142.6	1.0

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Hospital Discharge Rates were adjusted to the 1980 U.S. standard million population, using the direct method.

** Hospital Discharge Rates were adjusted to the 2000 U.S. standard million population, using the direct method.

Table 5.5: **Number and age-adjusted rates per 10,000 population of hospital discharges with diabetes as primary diagnosis and diabetes as any listed diagnosis, females by age: Connecticut 1991-1996**

Diagnosis and Year	Age Group 0-19	20-44	45-64	65-74	75+	Total	*Age Adj. (1980)	Std. Error	**Age Adj. (2000)	Std. Error
Diabetes as primary diagnosis										
1991	138	378	509	397	418	1,840	9.5	0.2	10.2	0.2
1992	160	389	492	375	382	1,798	9.3	0.2	9.9	0.3
1993	155	406	511	370	385	1,827	9.5	0.2	10.1	0.3
1994	160	379	526	398	426	1,889	9.7	0.2	10.3	0.2
1995	151	405	544	391	444	1,935	9.9	0.2	10.6	0.2
1996	163	410	479	431	453	1,936	9.9	0.2	10.5	0.2
Diabetes as any listed diagnosis										
1991	217	1,599	5,087	5,922	6,785	19,610	91.9	0.7	102.9	0.7
1992	214	1,718	5,327	6,197	7,235	20,691	95.7	0.7	107.0	0.8
1993	222	1,710	5,560	6,366	7,831	21,689	99.6	0.7	111.6	0.8
1994	208	1,734	6,001	6,453	8,144	22,540	103.2	0.7	115.6	0.8
1995	210	1,836	6,054	6,575	8,384	23,059	105.3	0.7	117.7	0.8
1996	239	1,915	6,003	6,555	8,680	23,392	106.4	0.7	118.8	0.8

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Hospital Discharge Rates were adjusted to the 1980 U.S. standard million population, using the direct method.

** Hospital Discharge Rates were adjusted to the 2000 U.S. standard million population, using the direct method.

Table 5.6: **Number and age-adjusted rates per 10,000 population of hospital discharges with diabetes as primary diagnosis and diabetes as any listed diagnosis, whites[1] by age: Connecticut 1993-1996**

Diagnosis and Year	Age Group 0-19	20-44	45-64	65-74	75+	Total	*Age Adj. (1980)	Std. Error	**Age Adj. (2000)	Std. Error
Diabetes as primary diagnosis										
1993	177	543	745	637	598	2,700	8.5	0.2	9.2	0.2
1994	229	537	735	650	661	2,812	8.9	0.2	9.6	0.2
1995	232	540	744	623	664	2,803	8.9	0.2	9.5	0.2
1996	211	525	791	686	685	2,898	9.2	0.2	9.8	0.2
Diabetes as any listed diagnosis										
1993	246	2,103	8,203	10,669	12,051	33,272	94.9	0.5	106.9	0.6
1994	286	2,140	8,440	10,817	12,681	34,364	97.5	0.5	109.9	0.6
1995	293	2,196	8,430	10,839	13,107	34,865	98.4	0.5	110.9	0.6
1996	288	2,263	8,489	10,853	13,721	35,614	100.0	0.5	112.6	0.6

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Hospital Discharge Rates were adjusted to the 1980 U.S. standard million population, using the direct method.

** Hospital Discharge Rates were adjusted to the 2000 U.S. standard million population, using the direct method.

1 Excludes those of Hispanic origin

Table 5.7: **Number and age-adjusted rates per 10,000 population of hospital discharges with diabetes as primary diagnosis and diabetes as any listed diagnosis, blacks[1] by age: Connecticut 1993-1996**

Diagnosis and Year	Age Group 0-19	20-44	45-64	65-74	75+	Total	*Age Adj. (1980)	Std. Error	**Age Adj. (2000)	Std. Error
Diabetes as primary diagnosis										
1993	61	242	275	98	53	729	29.8	1.1	32.1	1.3
1994	45	213	327	125	80	790	33.3	1.2	36.4	1.4
1995	47	241	295	96	90	769	31.4	1.2	34.5	1.3
1996	42	239	305	133	80	799	32.4	1.2	35.2	1.3
Diabetes as any listed diagnosis										
1993	76	750	2,098	1,136	718	4,778	225.5	3.4	250.9	3.8
1994	64	764	2,321	1,217	779	5,145	238.1	3.4	265.5	3.9
1995	58	832	2,373	1,210	765	5,238	236.1	3.4	262.3	3.8
1996	64	810	2,317	1,320	910	5,421	242.7	3.4	270.6	3.8

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Hospital Discharge Rates were adjusted to the 1980 U.S. standard million population, using the direct method.

** Hospital Discharge Rates were adjusted to the 2000 U.S. standard million population, using the direct method.

1 Excludes those of Hispanic origin

Table 5.8: **Number and age-adjusted rates per 10,000 population of hospital discharges with diabetes as primary diagnosis and diabetes as any listed diagnosis, Hispanics by age: Connecticut 1993-1996**

Diagnosis and Year	Age Group 0-19	20-44	45-64	65-74	75+	Total	*Age Adj. (1980)	Std. Error	**Age Adj. (2000)	Std. Error
Diabetes as primary diagnosis										
1993	32	73	110	35	17	1,827	17.1	1.1	18.5	1.3
1994	26	86	105	42	15	1,889	17.1	1.1	18.3	1.2
1995	30	103	124	41	23	1,935	19.2	1.2	20.8	1.3
1996	34	94	111	45	21	1,936	17.7	1.1	19.0	1.2
Diabetes as any listed diagnosis										
1993	52	406	995	472	268	2,193	168.5	3.9	186.0	4.3
1994	36	412	1,140	469	320	2,377	177.8	3.9	197.8	4.4
1995	41	475	1,199	556	354	2,625	190.8	4.0	211.3	4.5
1996	54	529	1,430	608	412	3,033	210.0	4.1	233.4	4.6

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Hospital Discharge Rates were adjusted to the 1980 U.S. standard million population, using the direct method.

** Hospital Discharge Rates were adjusted to the 2000 U.S. standard million population, using the direct method.

Table 5.9: **Number and age-adjusted rates per 10,000 population of hospital discharges with diabetes as any listed diagnosis, whites[1] by gender and age: Connecticut 1993-1996**

Diagnosis and Year	Age Group 0-19	20-44	45-64	65-74	75+	Total	*Age Adj. (1980)	Std. Error	**Age Adj. (2000)	Std. Error
Males										
1993	109	1,039	4,466	5,370	4,940	15,924	107.0	0.9	121.1	1.0
1994	139	1,073	4,463	5,451	5,332	16,458	109.7	0.9	124.2	1.0
1995	149	1,095	4,451	5,438	5,545	16,678	110.2	0.9	124.7	1.0
1996	120	1,107	4,695	5,515	5,955	17,392	113.7	0.9	128.8	1.0
Females										
1993	137	1,064	3,737	5,299	7,111	17,348	86.1	0.7	96.9	0.8
1994	147	1,067	3,977	5,366	7,349	17,906	88.9	0.7	100.0	0.8
1995	144	1,101	3,979	5,401	7,562	18,187	90.1	0.7	101.3	0.8
1996	168	1,156	3,794	5,338	7,766	18,222	90.0	0.7	101.0	0.8

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Hospital Discharge Rates were adjusted to the 1980 U.S. standard million population, using the direct method.

** Hospital Discharge Rates were adjusted to the 2000 U.S. standard million population, using the direct method.

1 Excludes those of Hispanic origin

Table 5.10: **Number and age-adjusted rates per 10,000 population of hospital discharges with diabetes as any listed diagnosis, blacks[1] by gender and age: Connecticut 1993-1996**

Diagnosis and Year	Age Group 0-19	20-44	45-64	65-74	75+	Total	*Age Adj. (1980)	Std. Error	**Age Adj. (2000)	Std. Error
Males										
1993	27	335	890	454	242	1,948	217.1	5.2	242.3	6.1
1994	27	356	995	472	289	2,139	234.4	5.4	263.2	6.3
1995	18	375	1,025	447	263	2,128	224.1	5.1	250.5	5.9
1996	33	372	957	528	343	2,233	238.2	5.3	267.3	6.2
Females										
1993	49	415	1,208	682	476	2,830	232.3	4.4	257.9	5.0
1994	37	408	1,326	745	490	3,006	242.2	4.5	268.5	5.0
1995	40	457	1,348	763	502	3,110	245.3	4.5	271.4	5.0
1996	31	438	1,360	792	567	3,188	247.3	4.5	274.8	5.0

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Hospital Discharge Rates were adjusted to the 1980 U.S. standard million population, using the direct method.

** Hospital Discharge Rates were adjusted to the 2000 U.S. standard million population, using the direct method.

1 Excludes those of Hispanic origin

Table 5.11: **Number and age-adjusted rates per 10,000 population of hospital discharges with diabetes as any listed diagnosis, Hispanics by gender and age: Connecticut 1993-1996**

Diagnosis and Year	Age Group 0-19	20-44	45-64	65-74	75+	Total	*Age Adj. (1980)	Std. Error	**Age Adj. (2000)	Std. Error
Males										
1993	20	198	455	162	105	940	158.8	5.8	177.5	6.6
1994	14	175	530	213	106	1,038	176.4	6.0	195.1	6.8
1995	18	224	563	243	123	1,171	191.2	6.2	211.1	7.0
1996	18	259	668	281	168	1,394	221.9	6.6	247.1	7.5
Females										
1993	32	208	540	310	163	1,253	176.5	5.2	193.1	5.8
1994	22	237	610	256	214	1,339	179.1	5.1	199.9	5.8
1995	23	251	636	313	231	1,454	190.5	5.2	211.4	5.9
1996	36	270	762	327	244	1,639	202.7	5.2	225.2	5.9

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Hospital Discharge Rates were adjusted to the 1980 U.S. standard million population, using the direct method.

** Hospital Discharge Rates were adjusted to the 2000 U.S. standard million population, using the direct method.

***Table 5.12*: Number of hospital discharges, number of days of hospital stay, and average length of stay (LOS) with diabetes as primary diagnosis and with diabetes as any listed diagnosis, by age: Connecticut, 1991-1996**

Diagnosis and Year		Age Group 0-19	20-44	45-64	65-74	75+	All ages
Primary diagnosis							
1991	**Discharges**	255	822	1,083	765	710	3,635
	Days	na	na	na	na	na	na
	Average LOS	na	na	na	na	na	na
1992	**Discharges**	304	823	1,083	777	651	3,638
	Days	na	na	na	na	na	na
	Average LOS	na	na	na	na	na	na
1993	**Discharges**	275	871	1,142	779	675	3,742
	Days	1,024	5,190	11,808	8,970	7,852	34,844
	Average LOS	3.7	6.0	10.3	11.5	11.6	9.3
1994	**Discharges**	302	854	1,183	830	762	3,931
	Days	923	4,993	11,086	9,156	7,384	33,542
	Average LOS	3.1	5.8	9.4	11.0	9.7	8.5
1995	**Discharges**	311	906	1,186	776	789	3,968
	Days	936	5,251	9,804	7,377	6,996	30,364
	Average LOS	3.0	5.8	8.3	9.5	8.9	7.7
1996	**Discharges**	294	883	1,217	877	790	4,061
	Days	772	4,632	9,809	7,690	6,832	29,735
	Average LOS	2.6	5.2	8.1	8.8	8.6	7.3
Any listed diagnosis							
1991	**Discharges**	371	3155	10,276	11,209	11,420	36,431
	Days	na	na	na	na	na	na
	Average LOS	na	na	na	na	na	na
1992	**Discharges**	396	3,258	10,953	11,948	12,439	38,994
	Days	na	na	na	na	na	na
	Average LOS	na	na	na	na	na	na
1993	**Discharges**	380	3,315	11,474	12,411	13,189	40,769
	Days	1,805	23,270	94,667	115,240	130,945	365,927
	Average LOS	4.8	7.0	8.3	9.3	9.9	9.0
1994	**Discharges**	390	3,381	12,110	12,673	13,917	42,471
	Days	1,464	21,170	91,577	109,181	122,444	345,836
	Average LOS	3.8	6.3	7.6	8.6	8.8	8.1
1995	**Discharges**	396	3,575	12,234	12,797	14,366	43,368
	Days	1,381	20,970	83,415	95,866	111,411	313,043
	Average LOS	3.5	5.9	6.8	7.5	7.8	7.2
1996	**Discharges**	414	3,675	12,478	12,966	15,220	44,753
	Days	1,373	21,121	78,468	90,043	108,643	299,639
	Average LOS	3.3	5.7	6.3	6.9	7.1	6.7

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data

***Table 5.13*: Number of hospital discharges, number of days of hospital stay, and average length of stay (LOS) with diabetes as primary diagnosis and with diabetes as any listed diagnosis, by gender and race/ethnicity: Connecticut, 1991-1996**

Diagnosis and Year		Race/Ethnicity							
		Overall		White*		Black*		Hispanic	
		Males	Females	Males	Females	Males	Females	Males	Females
Primary diagnosis									
1991	**Discharges**	1,795	1,840	na	na	na	na	na	na
	Days	na	na	na	na	na	na	na	na
	Average LOS	na	na	na	na	na	na	na	na
1992	**Discharges**	1,840	1,798	na	na	na	na	na	na
	Days	na	na	na	na	na	na	na	na
	Average LOS	na	na	na	na	na	na	na	na
1993	**Discharges**	1,915	1,827	1,380	1,320	360	369	145	122
	Days	18,066	16,778	13,510	12,211	3,230	3,426	991	1,046
	Average LOS	9.4	9.2	9.8	9.3	9.0	9.3	6.8	8.6
1994	**Discharges**	2,042	1,889	1,461	1,351	378	412	168	106
	Days	18,011	15,531	13,546	11,052	3,043	3,538	1,171	793
	Average LOS	8.8	8.2	9.3	8.2	8.1	8.6	7.0	7.5
1995	**Discharges**	2,033	1,935	1,449	1,354	361	408	185	136
	Days	15,974	14,390	11,578	9,974	2,702	3,023	1,398	1,072
	Average LOS	7.9	7.4	8.0	7.4	7.5	7.4	7.6	7.9
1996	**Discharges**	2,125	1,936	1,515	1,383	403	396	181	124
	Days	15,811	13,924	11,593	9,930	2,684	2,968	1,367	890
	Average LOS	7.4	7.2	7.7	7.2	6.7	7.5	7.6	7.2
Any listed diagnosis									
1991	**Discharges**	16,821	19,610	na	na	na	na	na	na
	Days	na	na	na	na	na	na	na	na
	Average LOS	na	na	na	na	na	na	na	na
1992	**Discharges**	18,303	20,691	na	na	na	na	na	na
	Days	na	na	na	na	na	na	na	na
	Average LOS	na	na	na	na	na	na	na	na
1993	**Discharges**	19,080	21,689	15,924	17,348	1,948	2,830	940	1,253
	Days	166,914	199,013	138,255	159,211	18,855	27,362	7,634	10,025
	Average LOS	8.7	9.2	8.7	9.2	9.7	9.7	8.1	8.0
1994	**Discharges**	19,931	22,540	16,458	17,906	2,139	3,006	1,038	1,339
	Days	160,028	185,808	132,122	146,320	17,727	27,759	8,083	9,365
	Average LOS	8.0	8.2	8.0	8.2	8.3	9.2	7.8	7.0
1995	**Discharges**	20,309	23,059	16,678	18,187	2,128	3,110	1,171	1,454
	Days	143,610	169,433	116,988	133,087	16,240	24,060	8,098	9,969
	Average LOS	7.1	7.3	7.0	7.3	7.6	7.7	6.9	6.9
1996	**Discharges**	21,361	23,392	17,392	18,222	2,233	3,188	1,394	1,639
	Days	140,727	158,912	113,643	123,483	15,355	23,427	9,643	9,834
	Average LOS	6.6	6.8	6.5	6.8	6.9	7.3	6.9	6.0

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

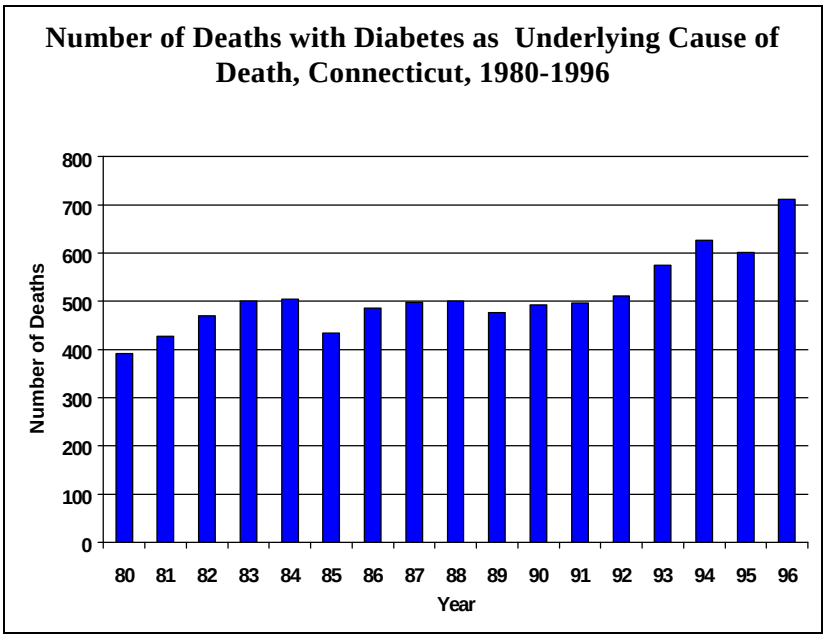
* Excludes those of Hispanic origin.

Mortality

The underlying cause of death (the disease or injury that initiated the sequence of events leading directly to death) is the cause of death most often reported in mortality statistics. Because people tend to die of the complications of diabetes rather than the disease itself, diabetes is more often listed as a contributing cause of death rather than the underlying cause. As a result, mortality statistics based on the underlying cause of death underestimate the actual mortality experience of people with diabetes. This report includes analyses of mortality rates for diabetes as the underlying cause of death and as any listed cause of death (contributing cause) to provide a more complete measure of the impact of diabetes.

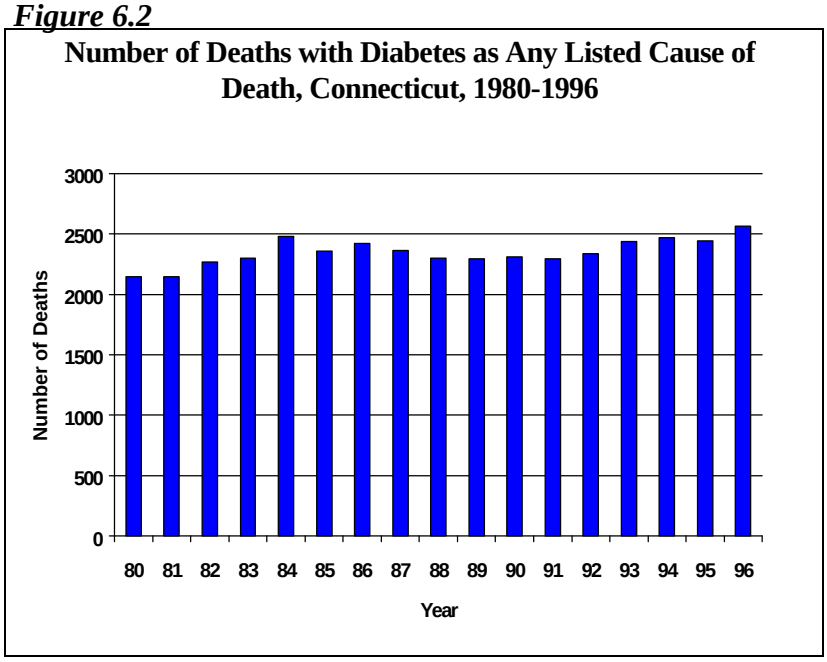
National studies suggest that people with diabetes have about twice the death rates as people without diabetes. Mortality risk factors for people with diabetes include, increasing age, age of onset, gender, duration of diabetes and cardiovascular risk factors (smoking, hypertension, high lipid levels, physical inactivity and obesity).[6]

Figure 6.1



Source: See Table 6.2

Figure 6.2

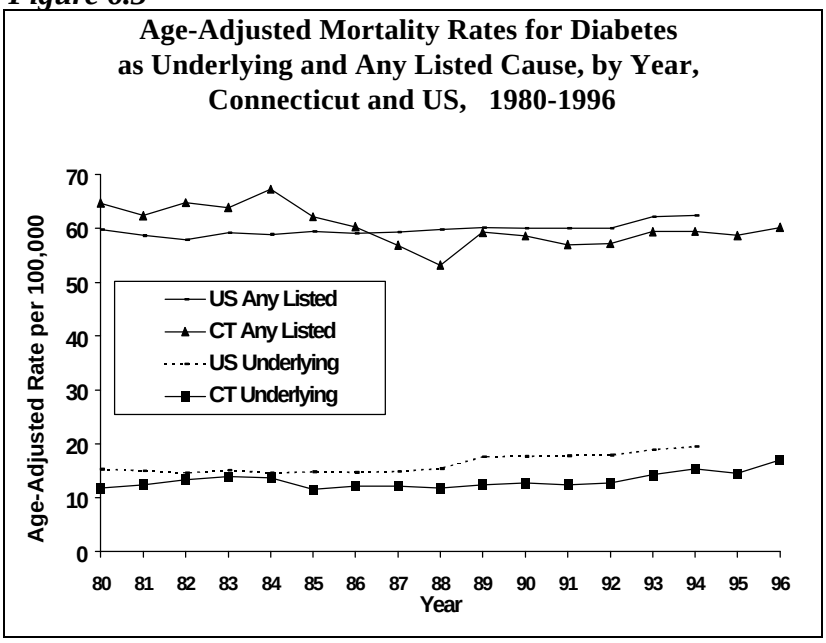


Source: See Table 6.2

In Connecticut from 1980 to 1996, the number of deaths with diabetes as either an underlying or as any listed cause of death increased as shown in Figures 6.1 and 6.2. During this time frame, the number of death certificates listing diabetes as the underlying cause of death nearly doubled. However, a less dramatic increase was found over the same time period for deaths with diabetes as any listed cause (contributing cause).

In 1996, diabetes was the seventh leading cause of death in Connecticut. It was listed as the underlying cause of death on 711 death certificates; an additional 1853 death certificates listed diabetes as a contributing cause (see Table 6.2).

Figure 6.3

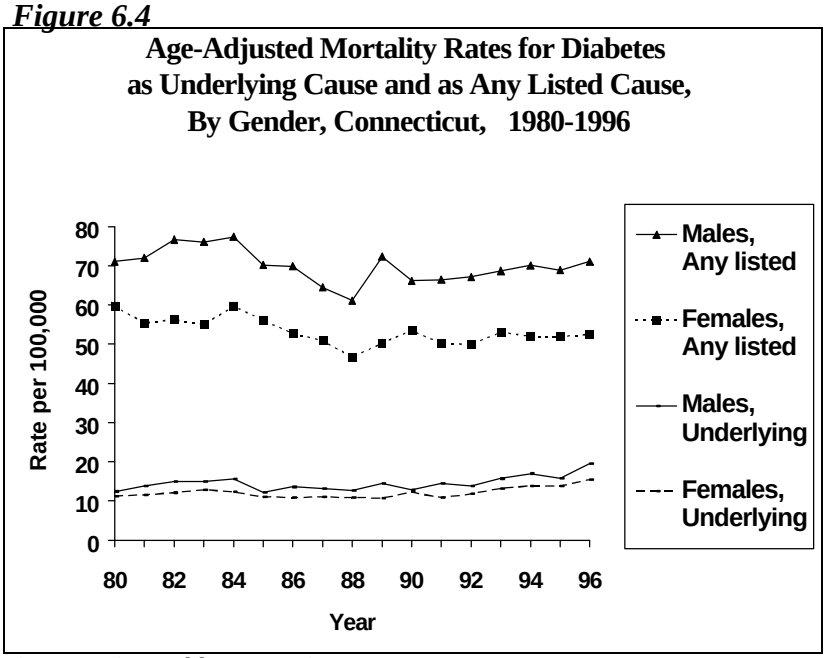


Source: See Table 6.6,
Centers for Disease Control and Prevention, Diabetes Surveillance

Connecticut age-adjusted mortality rates (AAMR) for diabetes listed as underlying cause increased significantly from 1980 to 1996 and remained consistently lower than US rates (Figure 6.3)[13]. For the same time period, Connecticut AAMRs for diabetes as any listed cause (diabetes-related) showed no significant trend (Figure 6.3) and remained relatively equivalent to US rates.

As is the case with mortality rates in general, diabetes mortality rates increase with increasing age (Table 6.6).

Figure 6.4



Source: See Tables 6.7, 6.8

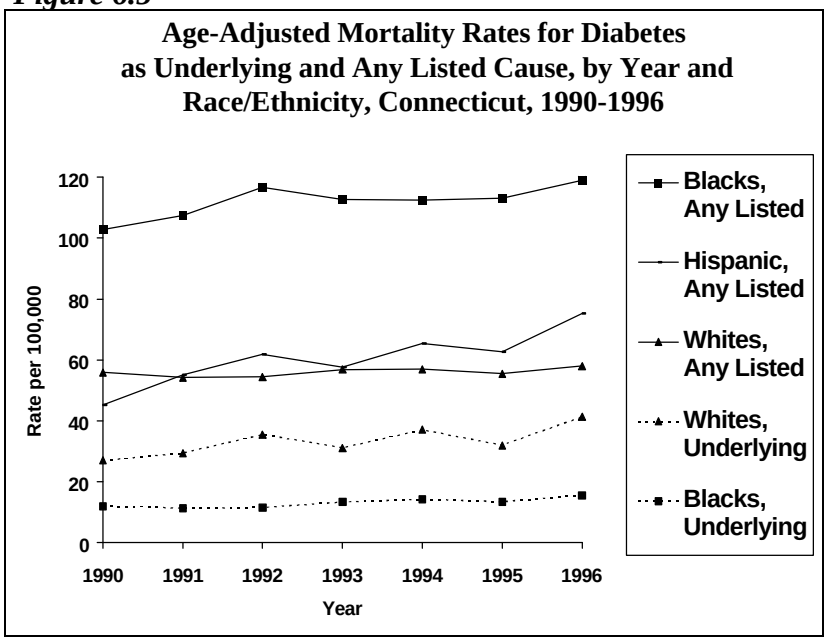
Over the time period of 1980 to 1996, both males and females diabetes AAMRs (diabetes as underlying cause) increased significantly in Connecticut. These trends were not apparent for the diabetes-related AAMRs (diabetes as any listed cause). No consistent time trends were identified for either gender during this time period (Figure 6.4).

Nationally, males have shown higher diabetes mortality rates than females[13] as is the case in Connecticut. In 1996, Connecticut males had significantly higher diabetes and diabetes-related AAMRs (Figure 6.4) than females.

In this chapter, mortality rates refer to age-adjusted mortality rates standardized to the 1980 standard million using the direct method to assure comparability to published national data. Rates standardized to the 2000 standard million are also provided in the tables at the end of this chapter.

For this report, 'any listed cause' and 'diabetes-related' both refer to rates based on death certificates which had diabetes listed in any cause of death field.

Figure 6.5



Source: See Table 6.9

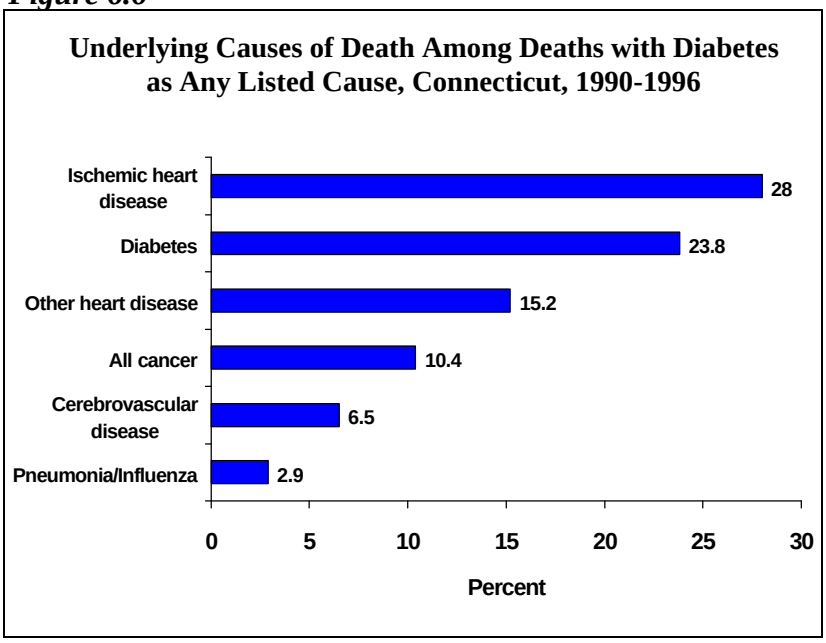
Figure 6.5 depicts AAMRs by race/ethnicity in Connecticut. Insufficient data were available to calculate AAMRs for diabetes as underlying cause for Hispanics. Whites[+] had a significant increasing trend in diabetes AAMRs from 1990-1996. No trend in diabetes AAMRs was found for blacks[+] over the same time period.

The 1996 Connecticut diabetes and diabetes-related AAMRs for the black population were significantly higher than the white and Hispanic AAMRs. This difference is consistent with that found nationally in 1994.[13]

While no significant trends were found among any of the three race/ethnicity groups for diabetes-related AAMRs, the mortality rates among the Hispanic population appeared to rise at a faster pace than those of blacks or whites. Insufficient data were available to calculate AAMRs with diabetes as any listed cause for Hispanics prior to 1990.

[+] In this report, mortality data race/ethnicity categories of white and black include those of Hispanic origin.

Figure 6.6



Source: See Table 6.1

As indicated in Figure 6.6, the complication of diabetes most often resulting in death is cardiovascular disease. Among Connecticut death certificates which list diabetes as any cause of death, cardiovascular disease, (ischemic heart, cerebrovascular and other heart disease) was the underlying cause on 50% of the certificates. Nationally, cardiovascular disease was listed as the primary cause of death for 44% of diabetes-related deaths in 1994.[13]

In Connecticut as well as nationally, diabetes, cancer and pneumonia/influenza are the other leading underlying causes of death among death certificates with diabetes as any listed cause. While cancer was listed as the underlying cause of death in approximately 10% of the Connecticut diabetes-related deaths, people with diabetes are not at a higher mortality risk from cancer than those without diabetes. However, people with diabetes are at increased risk of dying from pneumonia or influenza and the risk is particularly high if other comorbidities such as cardiovascular disease are present.[6]

Table 6.1: **Number of deaths for the leading causes of death and rank order of cause, by age group: Connecticut, 1996**

	Age group									
	All Ages		0-44		45-64		65-74		75+	
Cause of death	Number deaths	Rank	Number deaths	Rank	Number deaths	Rank	Number deaths	Rank	Number deaths	Rank
All	29,541		2,293		4,289		5,640		17,319	
Diseases of the heart	9,898	1	227	4	1,135	2	1,771	2	6,765	1
Malignant neoplasms	7,135	2	287	2	1,595	1	1,987	1	3,266	2
Cerebrovascular disease	1,940	3	36	9	149	4	265	4	1,490	3
Chronic obstructive pulmonary disease	1,202	4	17	12	106	8	310	3	769	5
Pneumonia and Influenza	1,147	5	25	10	72	10	131	6	919	4
Unintentional injuries	1,000	6	417	1	189	3	92	7	302	7
Diabetes mellitus	**711**	**7**	**24**	**11**	**139**	**5**	**162**	**5**	**386**	**6**
Human immunodeficiency virus	391	8	278	3	109	7	3	17	1	17
Septicemia	363	9	12	14	40	11	61	11	250	8
Other diseases of arteries, arteriole & capillaries	363	10	9	15	32	13	83	8	239	9
Nephritis, nephrotic syndrome, nephrosis	342	11	13	13	36	12	71	10	222	10
Chronic liver disease and cirrohosis	302	12	43	8	117	6	79	9	63	13
Suicide and self-inflicted injury	286	13	165	5	74	9	27	12	20	14
Atherosclerosis	211	14	2	17	5	17	21	14	183	11
Homicide and legal intervention	170	15	132	6	25	14	10	15	3	16
Benign and unspecified neoplasm	118	16	8	16	21	15	25	13	64	12
Congential anomalies	114	17	82	7	12	16	8	16	13	15

Data Source: Connecticut Dept Public Health, Vital Statistics

Table 6.2: **Number of deaths with diabetes as the underlying cause and with diabetes as any listed cause, by age: Connecticut, 1980-1996**

Cause and Year	Age Group 0-24	25-34	35-44	45-54	55-64	65-74	75+	All Ages
Underlying Cause								
1980	0	2	9	19	53	92	217	392
1981	1	3	6	24	55	121	218	428
1982	2	5	17	32	78	120	216	470
1983	1	3	17	19	69	126	265	500
1984	1	9	10	31	72	128	253	504
1985	1	9	19	13	69	126	197	434
1986	0	8	10	12	68	127	261	486
1987	0	9	16	26	70	129	248	498
1988	3	7	19	32	64	130	245	500
1989	1	6	15	32	67	133	223	477
1990	0	3	12	20	64	138	256	493
1991	1	7	18	26	61	127	256	496
1992	1	6	15	24	72	133	260	511
1993	1	6	13	32	84	140	298	574
1994	2	14	17	45	66	172	311	627
1995	0	2	10	36	79	152	317	601
1996	2	0	19	41	98	162	386	711
Any listed cause								
1980	2	6	27	94	327	592	1,096	2,144
1981	2	5	26	98	312	607	1,097	2,147
1982	2	13	35	109	361	634	1,117	2,271
1983	1	8	34	90	344	638	1,182	2,297
1984	2	16	25	84	358	714	1,281	2,480
1985	2	12	37	90	341	684	1,192	2,358
1986	5	11	34	61	367	683	1,260	2,421
1987	0	15	35	85	331	647	1,251	2,365
1988	3	11	43	99	272	667	1,204	2,299
1989	3	12	38	92	326	659	1,164	2,294
1990	0	6	33	82	261	667	1,261	2,310
1991	2	14	42	77	236	665	1,256	2,292
1992	2	14	36	80	265	623	1,316	2,336
1993	2	15	31	101	286	649	1,355	2,439
1994	3	18	38	115	232	724	1,341	2,471
1995	0	11	30	101	304	623	1,374	2,443
1996	3	9	36	109	282	625	1,500	2,564

Data Source: Connecticut Dept Public Health, Vital Statistics

Table 6.3: **Number of deaths with diabetes as the underlying cause and with diabetes as any listed cause, males by age: Connecticut, 1980-1996**

Cause and Year	Age Group 0-24	25-34	35-44	45-54	55-64	65-74	75+	All Ages
Underlying Cause								
1980	0	1	5	10	30	45	68	159
1981	1	1	4	13	25	55	84	183
1982	2	3	11	20	47	53	72	208
1983	0	2	12	14	36	61	84	209
1984	1	7	7	19	41	56	91	222
1985	0	3	11	6	32	66	65	183
1986	0	5	5	7	34	76	85	212
1987	0	4	11	20	39	63	81	218
1988	3	6	11	21	32	57	87	217
1989	0	5	12	19	37	67	83	223
1990	0	1	7	11	33	67	76	195
1991	1	4	12	14	38	68	89	226
1992	0	2	10	17	39	60	93	221
1993	0	2	7	19	39	73	112	252
1994	2	9	11	27	37	76	113	275
1995	0	2	6	20	31	80	121	260
1996	2	1	11	21	47	81	162	325
Any listed cause								
1980	0	3	14	52	173	304	372	918
1981	1	2	14	54	187	314	388	960
1982	2	9	17	68	219	321	412	1,048
1983	0	6	22	60	199	335	435	1,057
1984	2	10	11	52	209	362	456	1,102
1985	0	4	23	47	195	344	420	1,033
1986	3	6	22	34	222	367	444	1,098
1987	0	7	22	57	182	337	448	1,053
1988	3	7	28	63	162	347	435	1,045
1989	0	10	26	59	189	334	469	1,087
1990	0	4	19	40	138	333	464	998
1991	2	10	26	46	134	335	474	1,027
1992	0	5	24	52	144	333	502	1,060
1993	0	7	18	59	153	325	529	1,091
1994	2	9	26	66	133	356	543	1,135
1995	0	3	17	56	156	336	554	1,122
1996	2	3	22	64	154	331	607	1,183

Data Source: Connecticut Dept Public Health, Vital Statistics

Table 6.4: **Number of deaths with diabetes as the underlying cause and with diabetes as any listed cause, females by age: Connecticut, 1980-1996**

Cause and Year	Age Group 0-24	25-34	35-44	45-54	55-64	65-74	75+	All Ages
Underlying Cause								
1980	0	1	4	9	23	47	149	233
1981	0	2	2	11	30	66	134	245
1982	0	2	6	12	31	67	144	262
1983	1	1	5	5	33	65	181	291
1984	0	2	3	12	31	72	162	282
1985	1	6	8	7	37	60	132	251
1986	0	3	5	5	34	51	176	274
1987	0	5	5	6	31	66	167	280
1988	0	1	8	11	32	73	158	283
1989	1	1	3	13	30	66	140	254
1990	0	2	5	9	31	71	180	298
1991	0	3	6	12	23	59	167	270
1992	1	4	5	7	33	73	167	290
1993	1	4	6	13	45	67	186	322
1994	0	5	6	18	29	96	198	352
1995	0	5	4	16	48	72	196	341
1996	0	2	8	20	51	81	224	386
Any listed cause								
1980	2	3	13	42	154	288	724	1,226
1981	1	3	12	44	125	293	709	1,187
1982	0	4	18	41	142	313	705	1,223
1983	1	2	12	30	145	303	747	1,240
1984	0	6	14	32	149	352	825	1,378
1985	2	8	14	43	146	340	772	1,325
1986	2	5	12	27	145	316	816	1,323
1987	0	8	13	28	149	310	803	1,311
1988	0	4	15	36	110	320	769	1,254
1989	3	2	12	33	137	325	695	1,207
1990	0	2	14	42	123	334	797	1,312
1991	0	4	16	31	102	330	782	1,265
1992	2	9	12	28	121	290	814	1,276
1993	2	8	13	42	133	324	826	1,348
1994	1	9	12	49	99	368	798	1,336
1995	0	8	13	45	148	287	820	1,321
1996	1	6	14	45	128	294	893	1,381

Data Source: Connecticut Dept Public Health, Vital Statistics

Table 6.5: **Number of deaths with diabetes as the underlying cause and with diabetes as any listed cause, by race/ethnicity: Connecticut, 1980-1996**

Cause and	Race/Ethnicity								
	White*			Black*			Hispanic		
Year	Males	Females	Total	Males	Females	Total	Males	Females	Total
Underlying Cause									
1980	151	222	373	7	9	16	2	1	3
1981	170	222	392	12	23	35	1	1	2
1982	191	246	437	17	16	33	0	3	3
1983	291	197	488	11	18	29	3	2	5
1984	194	263	457	28	18	46	2	3	5
1985	167	224	391	16	26	42	3	3	6
1986	201	258	459	10	16	26	5	4	9
1987	200	260	460	17	20	37	4	5	9
1988	197	256	453	19	27	46	3	6	9
1989	197	232	429	24	22	46	4	8	12
1990	180	267	447	14	29	43	4	11	15
1991	201	236	437	22	32	54	6	6	12
1992	193	252	445	27	36	63	2	12	14
1993	228	289	517	24	32	56	4	9	13
1994	242	314	556	33	36	69	8	8	16
1995	238	297	535	20	42	62	5	7	12
1996	286	340	626	37	44	81	15	14	29
Any listed cause									
1980	876	1,158	2,034	41	66	107	6	7	13
1981	904	1,112	2,016	53	74	127	7	8	15
1982	992	1,159	2,151	54	63	117	9	14	23
1983	1,005	1,163	2,168	50	74	124	15	10	25
1984	1,032	1,288	2,320	67	86	153	14	12	26
1985	981	1,209	2,190	51	112	163	17	18	35
1986	1,029	1,224	2,253	66	97	163	13	22	35
1987	989	1,206	2,194	63	106	169	19	18	37
1988	966	1,137	2,103	78	113	191	14	17	31
1989	992	1,105	2,097	86	97	183	30	33	63
1990	930	1,200	2,130	57	107	164	19	23	42
1991	943	1,148	2,091	77	110	187	25	24	49
1992	970	1,154	2,124	80	120	200	18	41	59
1993	1,004	1,225	2,229	84	117	201	23	34	57
1994	1,035	1,221	2,256	98	110	208	37	34	71
1995	1,030	1,186	2,216	88	126	214	33	35	68
1996	1,086	1,232	2,318	89	141	230	43	40	83

Data Source: Connecticut Dept Public Health, Vital Statistics

* Includes those of Hispanic origin

Table 6.6: **Mortality rates per 100,000 with diabetes as underlying cause and with diabetes as any listed cause: Connecticut, 1980-1996**

Cause and Year	Age Specific Rate <45	45-64	65-74	75+	Crude Rate	*Age Adj (1980)	Std Error	**Age Adj (2000)	Std Error
Underlying Cause									
1980	0.5	10.7	41.9	149.5	12.6	11.8	0.6	14.6	0.7
1981	0.5	11.8	79.1	142.6	13.7	12.4	0.6	14.9	0.7
1982	1.2	16.6	51.9	137.8	15.0	13.4	0.6	15.9	0.7
1983	1.0	13.3	53.2	164.0	15.9	13.9	0.6	16.8	0.8
1984	1.0	15.5	51.7	153.3	15.9	13.7	0.6	16.5	0.7
1985	1.4	12.4	49.7	114.6	13.6	11.5	0.6	13.5	0.7
1986	0.8	12.1	48.3	139.5	15.0	12.1	0.6	14.4	0.7
1987	1.2	14.4	47.6	125.9	15.2	12.1	0.5	14.4	0.7
1988	1.3	14.1	46.4	117.6	15.0	11.8	0.5	14.0	0.6
1989	1.0	15.2	52.4	120.1	14.5	12.4	0.6	14.6	0.7
1990	0.7	13.0	54.0	136.1	15.0	12.7	0.6	15.0	0.7
1991	1.2	13.4	49.7	131.1	15.1	12.4	0.6	14.8	0.7
1992	1.0	14.4	52.0	129.2	15.6	12.7	0.6	15.0	0.7
1993	0.9	17.4	55.0	144.0	17.5	14.2	0.6	16.7	0.7
1994	1.5	16.5	68.1	146.6	19.1	15.3	0.6	18.0	0.7
1995	0.8	17.0	60.8	146.0	18.4	14.5	0.6	17.1	0.7
1996	1.1	20.3	65.8	172.6	21.7	17.0	0.7	20.0	0.8
Any listed cause									
1980	1.7	62.4	269.4	755.1	69.0	64.7	1.4	77.5	1.7
1981	1.6	61.4	270.0	717.5	68.9	62.4	1.4	74.5	1.6
1982	2.4	70.8	274.4	712.4	72.6	64.8	1.4	76.7	1.6
1983	2.1	65.8	269.3	731.3	73.2	63.9	1.3	76.2	1.6
1984	2.1	66.7	288.2	776.0	78.2	67.3	1.4	80.4	1.6
1985	2.4	65.4	269.6	693.7	73.7	62.2	1.3	73.9	1.5
1986	2.3	64.5	259.8	673.5	74.7	60.3	1.2	71.3	1.5
1987	2.3	62.4	238.7	634.9	72.1	56.9	1.2	67.6	1.4
1988	2.6	54.6	238.3	577.8	69.1	53.2	1.1	63.3	1.3
1989	2.4	64.3	259.5	627.0	69.9	59.3	1.2	69.9	1.5
1990	1.8	52.9	261.0	670.6	70.3	58.6	1.2	70.1	1.5
1991	2.7	48.1	260.3	643.1	69.7	57.0	1.2	68.0	1.4
1992	2.4	51.7	243.7	654.1	71.2	57.2	1.2	68.4	1.4
1993	2.2	58.1	255.1	654.9	74.4	59.4	1.2	70.6	1.4
1994	2.8	51.7	286.5	632.0	75.4	59.5	1.2	70.4	1.4
1995	1.9	59.8	249.0	633.0	74.6	58.7	1.2	69.1	1.4
1996	2.3	57.1	253.9	670.8	78.3	60.2	1.2	71.5	1.4

Data Source: Connecticut Dept Public Health, Vital Statistics

* Adjusted to the 1980 U.S. standard million population, using the direct method.

** Adjusted to the 2000 U.S. standard million population, using the direct method.

Table 6.7: **Mortality rates per 100,000 with diabetes as underlying cause and with diabetes as any listed cause, males: Connecticut, 1980-1996**

Cause and	Age Specific Rate				Crude	*Age Adj	Std	**Age Adj	Std
Year	<45	45-64	65-74	75+	Rate	(1980)	Error	(2000)	Error
Underlying Cause									
1980	0.6	12.4	47.5	139.6	10.6	12.4	1.0	15.1	1.3
1981	0.6	11.9	56.6	164.8	12.2	13.9	1.0	16.8	1.3
1982	1.5	21.1	52.9	138.1	13.8	14.9	1.0	17.4	1.3
1983	1.3	15.8	59.3	156.4	13.8	14.9	1.0	17.7	1.3
1984	1.4	18.9	51.5	164.9	14.5	15.6	1.1	18.9	1.4
1985	1.3	12.1	59.1	113.6	11.9	12.2	0.9	14.1	1.1
1986	0.9	12.9	65.7	132.2	13.6	13.6	0.9	16.0	1.1
1987	1.4	18.5	52.6	117.9	13.8	13.2	0.9	15.5	1.1
1988	1.9	16.3	45.9	118.0	13.5	12.7	0.9	15.1	1.1
1989	1.5	17.9	60.5	131.7	14.0	14.4	1.0	16.8	1.2
1990	0.7	14.1	60.1	118.9	12.2	12.8	0.9	14.8	1.1
1991	1.5	16.5	61.0	132.5	14.2	14.4	1.0	16.7	1.2
1992	1.1	17.3	53.7	133.2	13.9	13.9	0.9	16.4	1.1
1993	0.8	18.0	65.3	155.6	15.9	15.7	1.0	18.6	1.2
1994	2.0	19.7	68.1	152.1	17.3	17.0	1.0	19.8	1.2
1995	0.7	15.5	72.3	157.5	16.4	15.8	1.0	18.8	1.2
1996	1.3	20.5	74.1	201.7	20.4	19.5	1.1	23.2	1.3
Any listed cause									
1980	1.6	63.9	243.4	385.7	61.3	71.1	2.4	83.9	2.9
1981	1.6	69.2	245.8	380.7	64.0	72.0	2.4	84.8	2.9
1982	2.7	82.8	245.2	393.7	69.6	76.7	2.4	90.1	2.9
1983	2.7	75.3	249.7	403.0	70.0	76.1	2.4	90.0	2.9
1984	2.2	75.5	260.4	415.0	72.1	77.4	2.4	91.5	2.9
1985	2.6	70.3	242.4	366.4	66.9	70.2	2.2	82.5	2.7
1986	2.9	74.0	249.4	361.7	70.3	69.9	2.1	81.2	2.6
1987	2.7	68.8	222.6	349.2	66.7	64.5	2.0	75.8	2.4
1988	3.5	63.6	222.6	323.1	65.2	61.1	1.9	71.6	2.3
1989	3.3	73.7	233.1	382.4	68.4	72.3	2.2	85.4	2.7
1990	2.1	53.1	231.0	373.9	62.7	66.2	2.1	78.8	2.6
1991	3.5	53.5	232.7	370.0	64.5	66.4	2.1	79.0	2.6
1992	2.7	56.9	231.4	382.2	66.7	67.2	2.1	80.0	2.5
1993	2.3	61.8	228.0	392.1	68.7	68.7	2.1	81.8	2.6
1994	3.5	57.5	252.3	393.9	71.5	70.1	2.1	83.2	2.5
1995	1.9	60.8	241.0	395.0	70.6	68.9	2.1	81.5	2.5
1996	2.6	61.9	241.9	423.6	74.3	71.1	2.1	84.4	2.5

Data Source: Connecticut Dept Public Health, Vital Statistics

* Adjusted to the 1980 U.S. standard million population, using the direct method.

** Adjusted to the 2000 U.S. standard million population, using the direct method.

Table 6.8: **Mortality rates per 100,000 with diabetes as underlying cause and with diabetes as any listed cause, females: Connecticut, 1980-1996**

Cause and Year	Age Specific Rate <45	45-64	65-74	75+	Crude Rate	*Age Adj (1980)	Std Error	**Age Adj (2000)	Std Error
Underlying Cause									
1980	0.5	9.1	37.6	154.5	14.5	11.2	0.7	14.0	0.9
1981	0.4	11.8	51.7	131.5	15.2	11.6	0.7	13.7	0.9
1982	0.8	12.4	51.2	137.6	16.2	12.1	0.8	14.5	0.9
1983	0.7	11.0	48.5	167.7	17.9	12.9	0.8	15.7	0.9
1984	0.5	12.4	51.8	147.4	17.2	12.3	0.7	14.9	0.9
1985	1.4	12.8	42.3	115.2	15.2	11.0	0.7	12.9	0.8
1986	0.8	11.3	34.7	143.4	16.3	10.9	0.7	13.3	0.8
1987	0.9	10.7	43.6	130.2	16.5	11.0	0.7	13.0	0.8
1988	0.8	12.2	46.8	117.4	16.4	10.9	0.7	13.0	0.8
1989	0.5	12.8	46.1	114.2	15.0	10.7	0.7	12.7	0.8
1990	0.6	11.9	49.2	145.0	17.6	12.3	0.7	14.7	0.9
1991	0.8	10.4	41.0	130.3	15.9	10.8	0.7	13.1	0.8
1992	0.9	11.6	50.7	127.1	17.1	11.8	0.7	13.9	0.8
1993	1.0	16.9	47.0	137.9	19.1	13.2	0.8	15.4	0.9
1994	1.0	13.6	68.0	143.6	20.9	13.9	0.8	16.5	0.9
1995	0.9	18.3	51.6	139.7	20.2	13.8	0.8	16.1	0.9
1996	1.0	20.2	59.2	156.3	22.9	15.5	0.8	18.1	0.9
Any listed cause									
1980	1.7	60.8	303.7	1486.7	76.2	59.7	1.7	72.4	2.1
1981	1.5	52.9	301.7	1390.7	73.5	55.4	1.6	67.2	2.0
1982	2.1	57.7	312.4	1352.1	75.4	56.3	1.6	67.6	2.0
1983	1.4	55.5	294.7	1391.1	76.2	55.0	1.6	66.5	1.9
1984	1.9	57.1	323.8	1495.1	84.0	59.7	1.6	72.3	2.0
1985	2.3	60.0	304.3	1349.4	80.1	56.1	1.6	67.5	1.9
1986	1.8	54.1	273.2	1268.7	78.8	52.7	1.5	63.5	1.8
1987	2.0	55.5	259.0	1168.3	77.2	50.9	1.4	61.0	1.7
1988	1.8	44.8	257.9	1042.6	72.8	46.7	1.4	56.3	1.6
1989	1.5	54.2	293.7	1102.7	71.3	50.3	1.5	59.5	1.7
1990	1.4	52.7	299.8	1246.5	77.4	53.5	1.5	64.5	1.8
1991	1.8	42.3	296.0	1164.1	74.7	50.2	1.5	60.4	1.7
1992	2.1	46.1	259.7	1165.8	75.4	49.9	1.5	60.1	1.7
1993	2.1	54.3	289.7	1147.6	79.8	53.1	1.5	63.2	1.7
1994	2.0	45.5	329.9	1073.9	79.1	52.0	1.5	61.8	1.7
1995	2.0	58.8	259.2	1067.7	78.3	51.9	1.5	61.2	1.7
1996	2.0	52.1	268.8	1111.8	82.1	52.5	1.5	62.8	1.7

Data Source: Connecticut Dept Public Health, Vital Statistics

* Adjusted to the 1980 U.S. standard million population, using the direct method.

** Adjusted to the 2000 U.S. standard million population, using the direct method.

Table 6.9: **Mortality rates per 100,000 with diabetes as underlying cause and with diabetes as any listed cause, by race/ethnicity: Connecticut, 1990-1996**

	Race/Ethnicity														
	White[1]					Black[1]					Hispanic				
Cause and Year	**Crude Rate**	***Age Adj (1980)**	**Std Error**	****Age Adj (2000)**	**Std Error**	**Crude Rate**	***Age Adj (1980)**	**Std Error**	****Age Adj (2000)**	**Std Error**	**Crude Rate**	***Age Adj (1980)**	**Std Error**	****Age Adj (2000)**	**Std Error**
Underlying Cause															
1990	15.2	12.0	0.6	14.2	0.7	15.2	27.0	4.2	30.9	5.0	na	na	na	na	na
1991	14.9	11.4	0.6	13.6	0.7	18.8	29.4	4.2	34.7	5.0	na	na	na	na	na
1992	15.2	11.6	0.6	13.8	0.7	21.8	35.6	4.6	40.2	5.3	na	na	na	na	na
1993	17.8	13.4	0.6	15.9	0.7	19.2	31.2	4.2	35.8	5.0	na	na	na	na	na
1994	19.1	14.3	0.6	16.9	0.7	23.5	37.1	4.6	43.5	5.5	na	na	na	na	na
1995	18.5	13.5	0.6	16.0	0.7	21.0	32.0	4.1	35.9	4.8	na	na	na	na	na
1996	21.6	15.6	0.6	18.6	0.7	27.2	41.4	4.7	46.6	5.4	11.5	25.6	4.9	28.8	5.6
Any listed cause															
1990	71.9	55.9	1.2	66.9	1.5	58.0	102.8	8.2	118.4	9.8	19.6	45.2	7.3	49.1	8.2
1991	71.2	54.2	1.2	64.9	1.4	65.0	107.4	8.1	124.4	9.6	22.1	55.1	8.1	66.2	10.1
1992	72.7	54.5	1.2	65.4	1.4	69.3	116.8	8.4	136.6	10.2	26.0	61.9	8.3	73.4	10.1
1993	76.5	56.9	1.2	67.7	1.4	68.8	112.8	8.1	129.8	9.5	24.4	57.7	7.8	67.4	9.4
1994	77.6	57.0	1.2	67.6	1.4	70.8	112.5	8.0	130.7	9.5	29.7	65.4	8.1	74.4	9.4
1995	76.5	55.5	1.2	65.7	1.4	72.5	113.1	7.9	128.2	9.2	27.7	62.6	7.9	68.1	8.7
1996	81.4	58.0	1.2	69.1	1.4	77.2	119.0	8.0	136.1	9.4	32.8	75.4	8.5	87.0	10.0

Data Source: Connecticut Dept Public Health, Vital Statistics

* Adjusted to the 1980 U.S. standard million population, using the direct method.

** Adjusted to the 2000 U.S. standard million population, using the direct method.

na Insufficient numbers for reliable calculations

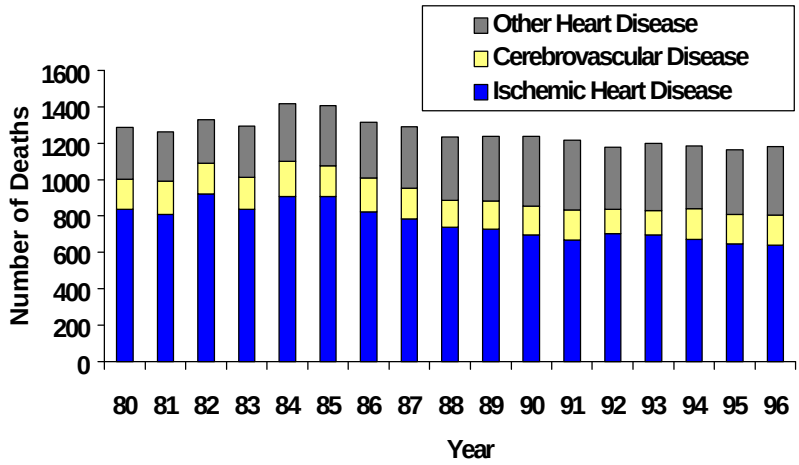
1 Includes those of Hispanic origin

Cardiovascular Disease

Cardiovascular disease (CVD) is a significant cause of morbidity and mortality in people with diabetes. National studies show that people with diabetes are more likely to develop CVD, develop the disease earlier in life and are two to four times more likely to die of CVD than those without diabetes.[6,14] In 1996, half of Connecticut diabetes-related deaths were due to cardiovascular disease.

Figure 7.1

Number of Deaths with Cardiovascular Disease as the Underlying Cause with Diabetes as a Contributing Cause, Connecticut, 1990-1996

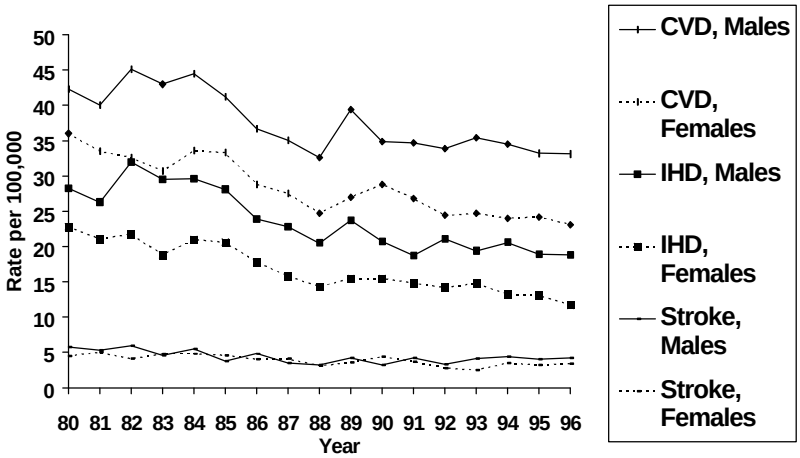


Source: See Tables 7.1, 7.2

In Connecticut, the number of diabetes-related deaths due to CVD increased from 1980 through 1985 then decreased steadily through 1996 (Figure 7.1). Decreasing trends in CVD mortality have also been found among the general population nationally.[13]

Figure 7.2

Mortality Rates of Cardiovascular Disease, Ischemic HD or Stroke as Underlying Cause with Diabetes as a Contributing Cause, By Gender, Connecticut, 1980-1996



Source: See Tables 7.1, 7.2

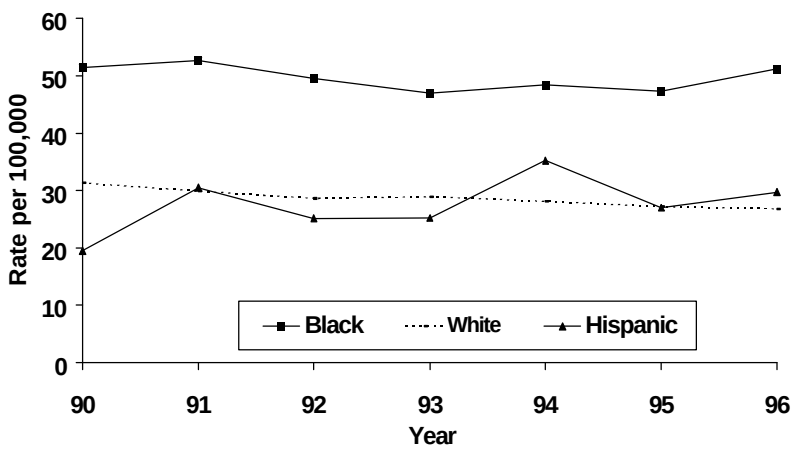
As seen in Figure 7.2, the Connecticut diabetes-related age-adjusted mortality rates (AAMR) due to CVD in general and ischemic heart disease (IHD) in particular decreased significantly for both males and females over the time period of 1980 to 1996. This same trend was not found for diabetes-related AAMRs due to cerebrovascular disease (stroke).

In 1996, Connecticut males had significantly higher rates of diabetes-related deaths due to CVD and due to IHD than females. No significant difference was found between males and females for diabetes-related deaths due to cerebrovascular disease.

The risk of having heart disease increases with age in general; diabetes appears to accelerate the process.[6] The largest number of diabetes-related CVD deaths occurred in the over 75 age group (see Table 7.1).

Figure 7.3

Mortality Rates of Cardiovascular Disease as Underlying Cause with Diabetes as a Contributing Cause, By Race/Ethnicity, Connecticut, 1990-1996

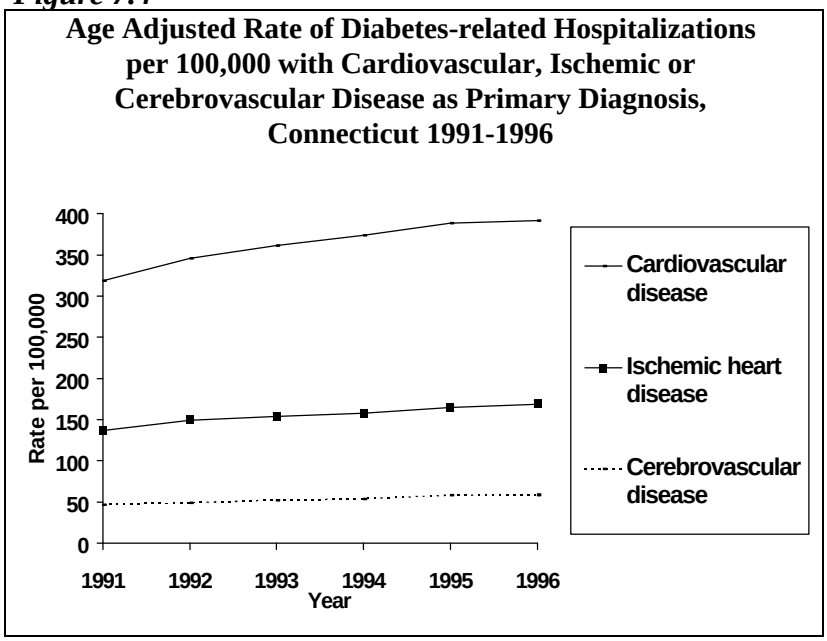


Source: See Table 7.3

The white[+] population in Connecticut had a significant decreasing trend in diabetes-related AAMRs due to CVD over the time period of 1990 to 1996 (Figure 7.3). No significant diabetes-related CVD AAMR trend was found over the same time span for either the black[+] and Hispanic populations. In 1996, the black population had significantly higher diabetes-related CVD AAMRs than whites or Hispanics.

[+] Mortality data includes those of Hispanic origin in these categories.

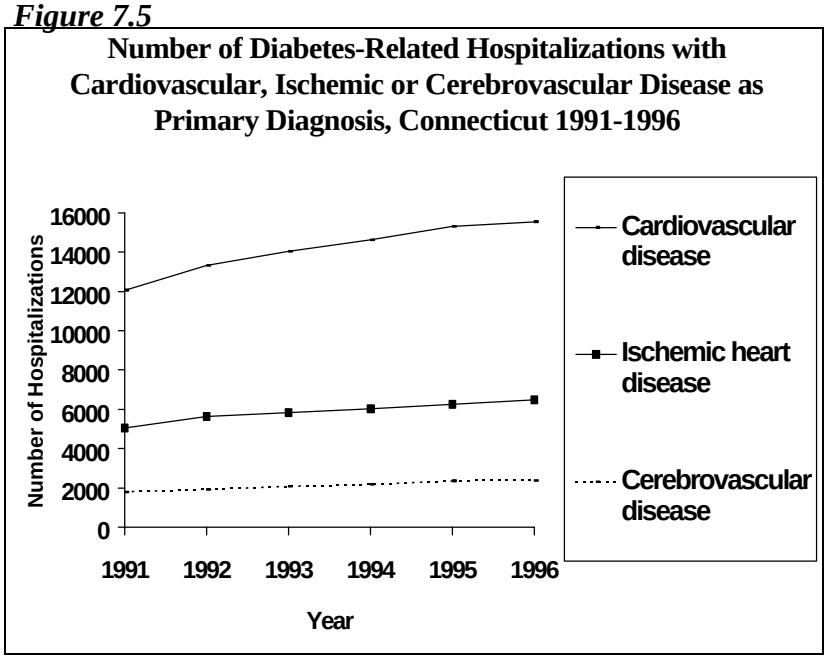
Figure 7.4



Source: See Table 7.4

While deaths rates due to CVD have been decreasing, hospitalization rates have been increasing nationally[13] and, as shown in Figure 7.4, also in Connecticut.

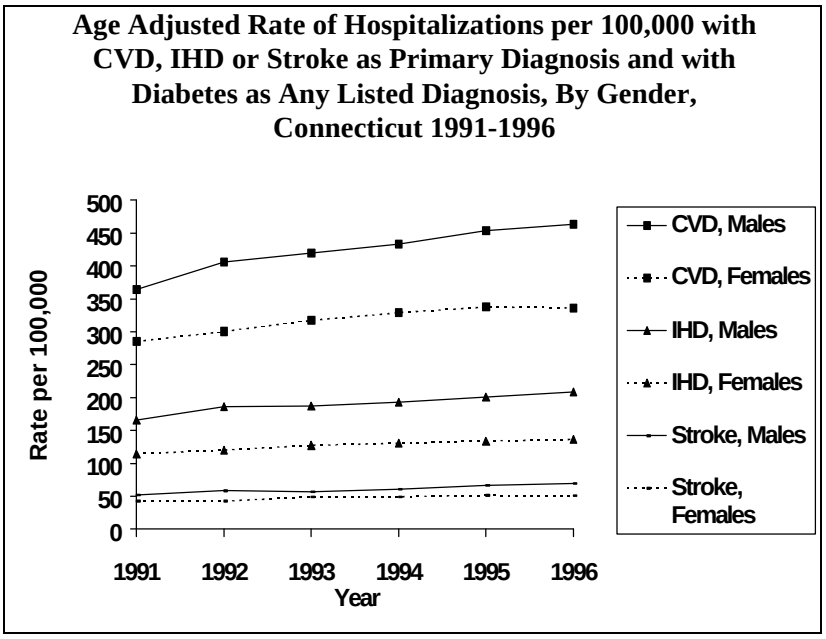
Figure 7.5



Source: See Table 7.4

Figure 7.5 illustrates the rise in the number of Connecticut diabetes-related hospitalizations due to major cardiovascular disease, ischemic heart disease and cerebrovascular disease from 1991 through 1996. Thirty-five percent of Connecticut hospital discharge records with diabetes as any listed diagnosis had cardiovascular disease as the primary diagnosis in 1996. Fourteen percent of diabetes-related hospitalizations listed ischemic heart disease as the primary diagnosis (Table 7.6).

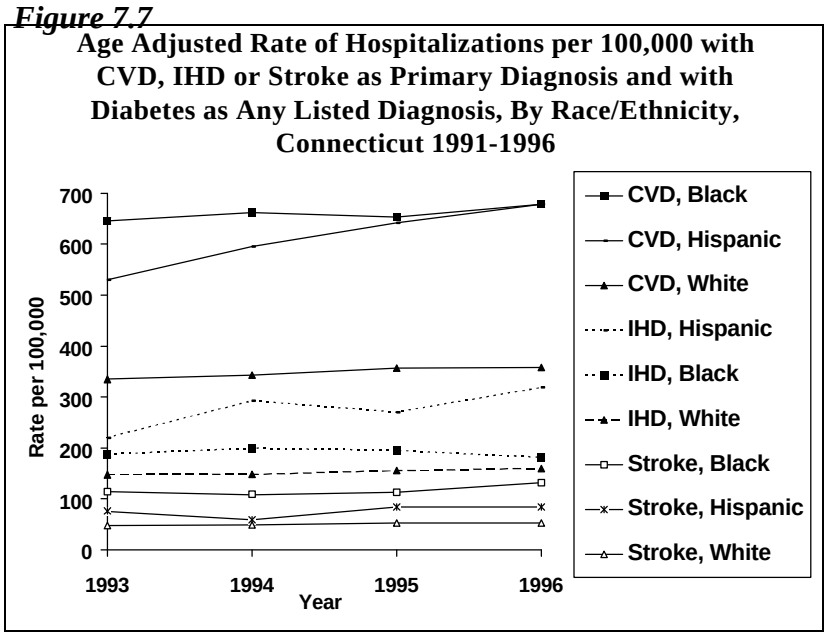
Figure 7.6



Source: See Table 7.4

Diabetes-related hospitalization rates due to CVD, IHD and stroke increased significantly for both males and females over the years 1991 to 1996 and rose faster among males. Males also had significantly higher hospitalization rates than females for all the three categories of heart disease listed (Figure 7.6). People with diabetes aged 65 and older are much more likely to be hospitalized with heart disease than those younger than 65. Over 65% of the diabetes-related hospitalizations with heart disease as primary cause were among the 65 and older age group (Table 7.6).

Figure 7.7



Source: See Table 7.5

From 1993 to 1996, Connecticut diabetes-related hospitalization rates with heart disease and ischemic heart disease listed as the primary diagnosis rose significantly among the white[+] and Hispanic populations. The rate for hospitalizations due to stroke also increased among the white population (Figure 7.7).

The diabetes-related hospitalization rates due to ischemic heart disease among Hispanics rose dramatically from 1993 to 1996 and were significantly higher than both the white and black populations. Both Hispanics and blacks had significantly higher hospitalization rates due to stroke than the whites (Figure 7.7). Nationally, the black diabetic population has been found to have an increased risk of stroke. This is largely due to the higher prevalence of hypertension in this population.[6]

[+] In this report, hospitalization race/ethnicity categories of white and black exclude those of Hispanic origin.

Table 7.1: **Number of deaths, age-specific, crude and age-adjusted mortality rates per 100,000 for deaths with cardiovascular disease[1] as the underlying cause and with diabetes as a contributing cause, by gender: Connecticut 1980-1996**

	Age Group													
	0-44		45-64		65-74		75+		All Ages					
Gender and Year	Number	Age-Specific	Number	Age Specific	Number	Age Specific	Number	Age Specific	Number	Crude Rate	1980* AAMR	Std Error	2000** AAMR	Std Error
Both Sexes														
1980	16	0.8	258	38.3	376	171.1	636	438.2	1,286	41.4	38.8	1.1	46.1	1.3
1981	14	0.7	234	35.0	357	158.8	659	431.0	1,264	40.5	36.6	1.0	43.9	1.3
1982	12	0.6	266	40.1	379	96.6	673	429.2	1,330	42.5	37.9	1.0	44.9	1.3
1983	10	0.5	249	29.5	362	152.8	674	417.0	1,295	41.3	36.0	1.0	43.0	1.2
1984	12	0.6	246	37.1	424	171.2	737	446.5	1,419	44.8	38.4	1.0	45.8	1.2
1985	12	0.6	269	40.8	401	158.1	726	422.5	1,408	44.0	37.0	1.0	44.2	1.2
1986	11	0.5	220	33.1	378	143.8	705	376.8	1,314	40.5	32.6	0.9	38.7	1.1
1987	19	0.9	216	32.4	349	128.7	708	359.3	1,292	39.4	30.9	0.9	36.9	1.0
1988	16	0.7	187	27.5	364	130.0	667	320.1	1,234	37.1	28.4	0.8	33.9	1.0
1989	17	0.8	229	35.2	353	139.0	640	344.7	1,239	37.7	32.0	0.9	37.8	1.1
1990	13	0.6	173	26.7	363	142.0	691	367.5	1,240	37.7	31.3	0.9	37.7	1.1
1991	15	0.7	158	24.3	357	139.8	686	351.3	1,216	37.0	30.1	0.9	36.1	1.0
1992	16	0.7	172	25.8	291	113.8	698	346.9	1,177	35.9	28.6	0.9	34.6	1.0
1993	14	0.7	180	27.0	325	127.8	681	329.1	1,200	36.6	29.1	0.9	34.7	1.0
1994	14	0.7	149	22.2	351	138.9	672	316.7	1,186	36.2	28.4	0.8	33.7	1.0
1995	10	0.5	182	19.5	310	123.9	663	305.4	1,165	35.6	28.0	0.8	32.9	1.0
1996	12	0.6	161	23.5	299	121.5	709	317.1	1,181	36.1	27.5	0.8	32.8	1.0
Males														
1980	8	--	131	40.7	197	207.8	212	435.3	548	36.6	42.3	1.8	49.5	2.2
1981	6	--	145	45.4	185	190.5	201	394.3	537	35.8	40.0	1.8	46.7	2.1
1982	5	--	170	53.6	199	113.2	242	259.9	616	40.9	45.1	1.8	52.7	2.3
1983	6	--	162	51.3	189	105.5	241	252.2	598	39.6	43.0	1.8	50.7	2.2
1984	6	--	156	37.9	220	202.4	255	254.9	637	41.7	44.5	1.8	52.0	2.2
1985	5	--	163	51.7	206	184.3	233	407.3	607	39.3	41.2	1.7	48.1	2.1
1986	14	--	137	43.1	202	174.6	233	362.3	580	37.1	36.7	1.5	42.3	1.8
1987	11	0.2	127	39.8	183	152.9	252	366.7	573	36.3	35.1	1.5	41.3	1.8
1988	10	0.9	118	36.2	202	162.8	227	307.8	557	34.7	32.6	1.4	37.7	1.6
1989	11	1.0	141	45.0	182	164.4	252	399.8	586	36.8	39.4	1.6	46.6	2.0
1990	7	--	92	29.4	182	163.3	243	380.1	524	32.9	34.9	1.5	41.8	1.9
1991	7	--	92	29.3	179	160.5	257	382.6	535	33.6	34.7	1.5	41.2	1.9
1992	9	--	100	30.9	171	153.1	255	365.2	535	33.7	33.9	1.5	40.3	1.8
1993	8	--	109	33.8	167	149.3	275	382.1	559	35.2	35.4	1.5	42.0	1.8
1994	9	--	93	28.6	180	161.4	274	368.7	556	35.0	34.5	1.5	40.6	1.8
1995	5	--	103	31.4	169	152.6	261	339.8	538	33.9	33.2	1.4	38.7	1.7
1996	7	--	100	30.1	171	156.4	267	332.4	545	34.2	33.1	1.4	38.6	1.7
Females														
1980	8	--	127	36.1	179	143.3	424	439.6	738	45.9	36.0	1.3	43.3	1.6
1981	8	--	89	20.4	172	134.6	458	449.4	726	44.9	33.5	1.3	41.1	1.5
1982	10	--	96	27.7	180	3.5	431	575.5	714	44.0	32.6	1.2	39.4	1.5
1983	4	--	87	25.3	173	3.4	433	562.3	697	42.8	30.7	1.2	37.3	1.4
1984	6	--	90	35.0	204	146.8	482	612.4	782	47.7	33.6	1.2	40.9	1.5
1985	7	--	106	30.8	195	137.4	493	430.1	801	48.4	33.3	1.2	40.6	1.5
1986	3	--	83	24.0	176	119.6	472	384.5	734	43.7	28.8	1.1	35.0	1.3
1987	8	--	89	25.6	166	109.7	456	355.4	719	42.3	27.5	1.1	33.3	1.3
1988	14	--	69	14.5	162	103.9	440	326.8	677	39.3	24.7	1.0	30.2	1.2
1989	6	--	88	19.2	171	119.3	388	316.4	653	38.6	27.0	1.1	32.0	1.3
1990	6	--	81	24.2	181	125.5	448	234.5	715	42.2	28.8	1.1	35.0	1.3
1991	8	--	66	19.6	178	123.7	429	218.5	681	40.2	26.8	1.1	32.4	1.3
1992	7	--	72	20.9	120	83.4	443	337.2	642	38.0	24.4	1.0	30.0	1.2
1993	6	--	71	20.7	158	110.9	406	300.9	641	37.9	24.7	1.0	29.7	1.2
1994	5	--	56	16.2	171	121.2	398	288.7	630	37.3	24.0	1.0	28.7	1.2
1995	5	--	79	22.6	141	101.1	402	286.6	627	37.2	24.2	1.0	28.7	1.2
1996	5	--	61	17.3	128	93.6	442	308.5	636	37.8	23.1	1.0	28.3	1.1

Data Source: Connecticut Dept Public Health, Vital Statistics

*Adjusted to the 1980 U.S. standard million population, using the direct method.

**Adjusted to the 2000 U.S. standard million population, using the direct method

1 Deaths with cardiovascular disease as the underlying cause includes all certificates which list ICD9-CM codes of 390-448 as the underlying cause.

Table 7.2: **Number of deaths and age-adjusted mortality rates per 100,000 for deaths with ischemic heart disease [1] or cerebrovascular disease[2] as the underlying cause of death and with diabetes as a contributing cause, by gender: Connecticut, 1980-1996**

Year	Both sexes					Males					Females				
	Number	1980* AAMR	Std Error	2000** AAMR	Std Error	Number	1980* AAMR	Std Error	2000** AAMR	Std Error	Number	1980* AAMR	Std Error	2000** AAMR	Std Error
Ischemic heart disease															
1980	835	25.3	0.9	29.5	1.0	371	28.2	1.5	32.3	1.8	464	22.8	1.1	27.2	1.3
1981	807	23.5	0.8	27.8	1.0	356	26.3	1.4	30.1	1.7	451	21.1	1.0	25.6	1.2
1982	920	26.3	0.9	31.0	1.0	442	32.0	1.5	36.7	1.9	478	21.8	1.0	26.4	1.2
1983	836	23.4	0.8	27.5	1.0	414	29.5	1.5	34.1	1.8	422	18.8	0.9	22.6	1.1
1984	909	24.7	0.8	29.2	1.0	425	29.6	1.5	34.4	1.8	484	21.0	1.0	25.5	1.2
1985	906	23.9	0.8	28.3	1.0	413	28.1	1.4	32.9	1.7	493	20.6	1.0	24.9	1.1
1986	824	20.6	0.7	24.2	0.9	377	23.9	1.2	27.5	1.5	447	17.8	0.9	21.4	1.0
1987	784	18.8	0.7	22.3	0.8	371	22.8	1.2	26.7	1.4	413	15.8	0.8	19.1	1.0
1988	739	17.1	0.6	20.2	0.8	351	20.5	1.1	23.8	1.3	388	14.3	0.8	17.3	0.9
1989	726	18.9	0.7	22.0	0.8	356	23.7	1.3	27.5	1.5	370	15.5	0.8	18.1	1.0
1990	694	17.5	0.7	21.1	0.8	311	20.7	1.2	24.8	1.5	383	15.5	0.8	18.7	1.0
1991	668	16.5	0.7	19.9	0.8	287	18.7	1.1	22.3	1.4	381	14.8	0.8	18.1	1.0
1992	703	17.2	0.7	20.6	0.8	334	21.1	1.2	24.9	1.4	369	14.2	0.8	17.3	0.9
1993	695	16.8	0.7	20.0	0.8	309	19.4	1.1	22.9	1.3	386	14.8	0.8	17.8	0.9
1994	672	16.3	0.6	19.1	0.7	331	20.6	1.1	24.1	1.4	341	13.2	0.8	15.6	0.9
1995	647	15.6	0.6	18.2	0.7	304	18.9	1.1	22.1	1.3	343	13.1	0.8	15.5	0.9
1996	639	14.8	0.6	17.6	0.7	311	18.8	1.1	21.9	1.3	328	11.7	0.7	14.5	0.8
Cerebrovascular disease															
1980	166	5.0	0.4	6.3	0.5	69	5.8	0.7	7.3	0.9	97	4.5	0.5	5.7	0.6
1981	183	5.2	0.4	6.5	0.5	69	5.3	0.6	6.4	0.8	114	5.0	0.5	6.4	0.6
1982	169	4.8	0.4	5.9	0.5	77	5.9	0.7	7.4	0.9	92	4.1	0.4	5.1	0.5
1983	176	4.8	0.4	6.1	0.5	61	4.6	0.6	5.8	0.8	115	4.8	0.5	6.2	0.6
1984	192	5.1	0.4	6.5	0.5	74	5.5	0.7	7.0	0.9	118	4.8	0.5	6.1	0.6
1985	171	4.4	0.3	5.6	0.4	55	3.8	0.5	4.6	0.7	116	4.6	0.4	5.9	0.6
1986	183	4.5	0.3	5.5	0.4	74	4.8	0.6	5.7	0.7	109	4.0	0.4	5.1	0.5
1987	170	4.0	0.3	5.0	0.4	57	3.5	0.5	4.3	0.6	113	4.1	0.4	5.2	0.5
1988	147	3.3	0.3	4.1	0.3	54	3.2	0.4	3.8	0.5	93	3.1	0.3	4.1	0.4
1989	155	3.9	0.3	4.8	0.4	62	4.2	0.5	5.1	0.7	93	3.6	0.4	4.5	0.5
1990	160	4.0	0.3	4.9	0.4	48	3.2	0.5	4.0	0.6	112	4.4	0.4	5.5	0.5
1991	164	3.9	0.3	4.9	0.4	65	4.2	0.5	5.3	0.7	99	3.7	0.4	4.6	0.5
1992	132	3.0	0.3	3.9	0.3	51	3.3	0.5	4.1	0.6	81	2.8	0.3	3.7	0.4
1993	135	3.2	0.3	3.9	0.3	64	4.1	0.5	4.9	0.6	71	2.5	0.3	3.2	0.4
1994	169	3.9	0.3	4.8	0.4	71	4.4	0.5	5.3	0.6	98	3.5	0.4	4.4	0.5
1995	162	3.7	0.3	4.5	0.4	67	4.0	0.5	4.8	0.6	95	3.2	0.4	4.2	0.4
1996	167	3.8	0.3	4.6	0.4	69	4.2	0.5	5.0	0.6	98	3.4	0.4	4.2	0.4

Data Source: Connecticut Dept Public Health, Vital Statistics

* Adjusted to the 1980 U.S. standard million population, using the direct method.

** Adjusted to the 2000 U.S. standard million population, using the direct method.

1 Deaths with ischemic heart disease as the underlying cause includes all certificates which list ICD9-CM codes of 410-414 as the underlying cause.

2 Deaths with cerebrovascular disease as the underlying cause includes all certificates which list ICD9-CM codes of 430-438 as the underlying cause.

Table 7.3: **Number of deaths and age-adjusted mortality rates per 100,000 for deaths with cardiovascular disease[1] as the underlying cause and with diabetes as a contributing cause, by race/ethnicity: Connecticut 1980-1996**

	Race/Ethnicity														
	White[2]					Black[2]					Hispanic				
Year	Number	1980* AAMR	Std Error	2000** AAMR	Std Error	Number	1980* AAMR	Std Error	2000** AAMR	Std Error	Number	1980* AAMR	Std Error	2000** AAMR	Std Error
1980	1,216	--	--	--	--	70	--	--	--	--	6	--	--	--	--
1981	1,199	--	--	--	--	62	--	--	--	--	10	--	--	--	--
1982	1,272	--	--	--	--	56	--	--	--	--	10	--	--	--	--
1983	1,232	--	--	--	--	59	--	--	--	--	16	--	--	--	--
1984	1,351	--	--	--	--	64	--	--	--	--	17	--	--	--	--
1985	1,317	--	--	--	--	87	--	--	--	--	16	--	--	--	--
1986	1,229	--	--	--	--	82	--	--	--	--	24	--	--	--	--
1987	1,209	--	--	--	--	83	--	--	--	--	19	--	--	--	--
1988	1,137	--	--	--	--	93	--	--	--	--	14	--	--	--	--
1989	1,135	--	--	--	--	93	--	--	--	--	35	--	--	--	--
1990	1,150	31.3	0.9	37.4	1.1	84	51.4	5.7	62.4	7.2	19	19.5	4.7	21.4	5.2
1991	1,117	29.9	0.9	35.7	1.1	92	52.7	5.6	61.2	6.7	27	30.5	6.0	36.6	7.3
1992	1,086	28.6	0.9	34.5	1.1	85	49.5	5.5	58.4	6.6	25	25.1	5.2	30.4	6.4
1993	1,109	28.9	0.9	34.6	1.0	86	46.9	5.1	53.9	6.0	28	25.2	5.0	29.9	6.0
1994	1,091	28.1	0.9	33.4	1.0	91	48.4	5.2	55.9	6.1	41	35.2	5.8	41.8	7.0
1995	1,065	27.2	0.8	32.4	1.0	93	47.3	5.0	54.8	5.9	31	27.0	5.0	30.9	5.8
1996	1,073	26.8	0.8	32.1	1.0	101	51.2	5.2	60.5	6.3	33	29.7	5.3	35.3	6.4

Data Source: Connecticut Dept Public Health, Vital Statistics

* Adjusted to the 1980 U.S. standard million population, using the direct method.

** Adjusted to the 2000 U.S. standard million population, using the direct method.

1 Deaths with cardiovascular disease as the underlying cause includes all certificates which list ICD9-CM codes of 390-448 as the underlying cause.

2 Includes those of Hispanic origin

Table 7.4: **Number of hospitalizations and age-adjusted rates per 100,000 for deaths with cardiovascular disease[1] or ischemic heart disease[2] or cerebrovascular disease[3] as the primary diagnosis and with diabetes as any listed diagnosis, by gender: Connecticut 1991-1996**

	Cardiovascular Disease					Ischemic Heart Disease					Cerebrovascular Disease				
Year	Total	1980 AAR*	Std Error	2000 AAR**	Std Error	Total	1980 AAR*	Std Error	2000 AAR**	Std Error	Total	1980 AAR*	Std Error	2000 AAR**	Std Error
Both Sexes															
1991	12,058	318.8	2.9	361.8	3.3	5,047	136.3	1.9	152.1	2.2	**1,795**	46.6	1.1	53.9	1.3
1992	13,321	345.6	3.0	392.8	3.4	5,637	149.4	2.0	167.4	2.2	**1,926**	48.9	1.1	56.5	1.3
1993	14,035	361.6	3.1	410.4	3.5	5,827	153.7	2.0	172.2	2.3	**2,087**	52.2	1.2	60.4	1.3
1994	14,632	374.2	3.1	424.3	3.5	6,030	158.1	2.1	176.8	2.3	**2,179**	53.8	1.2	62.7	1.3
1995	15,297	388.7	3.2	440.1	3.6	6,263	164.4	2.1	182.5	2.3	**2,364**	58.1	1.2	67.3	1.4
1996	15,542	391.6	3.2	442.8	3.6	6,496	169.0	2.1	187.7	2.3	**2,377**	58.5	1.2	66.9	1.4
Males															
1991	5,764	364.1	4.8	414.6	5.5	2,627	165.4	3.2	185.4	3.7	821	52.1	1.8	60.6	2.2
1992	6,563	406.1	5.0	463.9	5.8	3,018	186.2	3.4	208.8	3.8	936	58.1	1.9	67.0	2.2
1993	6,844	419.9	5.1	476.9	5.8	3,049	186.9	3.4	209.7	3.8	922	56.6	1.9	65.5	2.2
1994	7,150	433.6	5.1	492.1	5.9	3,180	193.0	3.4	216.1	3.9	998	60.3	1.9	70.5	2.3
1995	7,557	454.0	5.2	513.5	5.0	3,326	200.7	3.5	222.3	3.9	1,114	66.6	2.0	76.9	2.3
1996	7,815	463.3	5.3	523.9	6.0	3,500	208.8	3.5	232.0	3.9	1,181	69.6	2.0	80.0	2.3
Females															
1991	6,294	285.2	3.7	323.7	4.1	2,420	114.1	2.4	127.1	2.6	974	42.7	1.4	49.3	1.6
1992	6,758	300.5	3.7	342.2	4.2	2,619	120.4	2.4	135.3	2.7	990	42.4	1.4	49.2	1.6
1993	7,191	317.4	3.8	361.3	4.3	2,778	127.4	2.5	143.0	2.8	1,165	49.2	1.5	56.9	1.7
1994	7,482	329.1	3.9	374.1	4.4	2,850	130.6	2.5	146.4	2.8	1,181	49.3	1.5	57.4	1.7
1995	7,740	337.7	4.0	383.9	4.4	2,937	133.9	2.5	149.5	2.8	1,250	51.4	1.5	59.9	1.7
1996	7,727	336.2	4.0	381.4	4.4	2,996	136.3	2.6	151.9	2.8	1,196	50.7	1.5	57.9	1.7

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Adjusted to the 1980 U.S. standard million population, using the direct method.

** Adjusted to the 2000 U.S. standard million population, using the direct method.

1 Hospitalizations with cardiovascular disease as the primary diagnosis includes all discharges which list ICD9-CM codes of 390-448 as the primary diagnosis.

2 Hospitalizations with ischemic heart disease as the primary diagnosis includes all discharges which list ICD9-CM codes of 410-414 the primary diagnosis.

3 Hospitalizations with cerebrovascular disease as the primary diagnosis includes all discharges which list ICD9-CM codes of 430-438 as the primary diagnosis.

Table 7.5: **Number of hospitalizations and age-adjusted rates per 100,000 for discharges with cardiovascular disease[1] or ischemic heart disease[2] or cerebrovascular disease[3] as the primary diagnosis and with diabetes as any listed diagnosis, by race/ethnicity: Connecticut 1993-1996**

	Race/Ethnicity														
	White[a]					Black[a]					Hispanic				
Year	Total	1980 AAR*	Std Error	2000 AAR**	Std Error	Total	1980 AAR*	Std Error	2000 AAR**	Std Error	Total	1980 AAR*	Std Error	2000 AAR**	Std Error
Major cardiovascular disease															
1993	11,974	334.7	3.1	380.6	3.5	1,275	645.8	18.5	727.6	21.2	614	529.8	22.4	594.1	25.4
1994	12,342	342.8	3.1	389.6	3.5	1,354	661.4	18.4	743.7	21.1	723	594.9	23.2	667.3	26.2
1995	12,917	356.9	3.2	405.2	3.6	1,367	653.4	18.1	732.1	20.6	796	641.5	23.9	714.6	26.8
1996	13,009	357.7	3.2	405.3	3.6	1,421	678.7	18.4	767.8	21.1	877	677.6	24.0	752.4	26.8
Ischemic heart disease															
1993	5,098	147.4	2.1	165.1	2.3	389	187.9	9.7	210.6	11.1	259	219.8	14.3	244.5	16.0
1994	5,136	148.0	2.1	165.6	2.3	417	199.4	10.0	221.9	11.3	361	292.8	16.2	325.5	18.1
1995	5,374	155.3	2.2	172.6	2.4	420	195.0	9.7	215.0	10.9	358	270.3	15.1	298.6	16.8
1996	5,555	159.8	2.2	177.4	2.4	390	181.5	9.4	204.7	10.7	426	318.7	16.2	350.8	17.9
Cerebrovascular disease															
1993	1,757	47.3	1.1	54.8	1.3	213	114.6	8.0	129.1	9.2	84	76.1	8.6	87.2	10.1
1994	1,860	49.3	1.2	57.7	1.3	218	108.5	7.5	124.3	8.8	68	58.9	7.2	65.9	8.5
1995	2,002	53.0	1.2	61.6	1.4	226	112.8	7.6	128.6	8.9	110	83.8	8.9	95.1	10.2
1996	1,972	52.4	1.2	60.2	1.4	266	131.4	8.2	150.0	9.6	95	83.4	8.4	91.5	9.3

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Adjusted to the 1980 U.S. standard million population, using the direct method.

** Adjusted to the 2000 U.S. standard million population, using the direct method.

1 Hospitalizations with cardiovascular disease as the primary diagnosis includes all discharges which list ICD9-CM codes of 390-448 as the primary diagnosis.

2 Hospitalizations with ischemic heart disease as the primary diagnosis includes all discharges which list ICD9-CM codes of 410-414 as the primary diagnosis.

3 Hospitalizations with cerebrovascular disease as the primary diagnosis includes all discharges which list ICD9-CM codes of 430-438 as the primary diagnosis.

a Excludes those of Hispanic origin

Table 7.6: **Number of hospitalizations and age-specific rates per 10,000 population for discharges with cardiovascular disease[1] or ischemic heart disease[2] or cerebrovascular disease[3] as the primary diagnosis and with diabetes as any listed diagnosis, by age: Connecticut 1993-1996**

	Age Group								
Diagnosis	**All Ages**	**0-44**		**45-64**		**65-74**		**75+**	
and Year	**Number**	**Number**	**ASR***	**Number**	**ASR***	**Number**	**ASR***	**Number**	**ASR***
Major cardiovascular disease									
1991	12,058	314	2.9	3,329	105.8	4,199	376.6	4,216	627.6
1992	13,321	277	2.6	3,722	115.2	4,554	407.7	4,768	682.9
1993	14,035	332	3.1	3,815	118.3	4,789	428.2	5,099	708.5
1994	14,632	359	3.3	4,047	124.3	4,904	439.6	5,322	716.2
1995	15,297	388	3.6	4,187	127.6	5,108	461.4	5,614	731.0
1996	15,542	371	3.5	4,178	125.7	5,197	475.2	5,796	721.6
Ischemic heart disease									
1991	5,047	173	1.6	1,696	53.9	1,818	163.1	1,360	202.5
1992	5,637	134	1.2	1,958	60.6	1,956	175.1	1,589	227.6
1993	5,827	168	1.6	1,996	61.9	1,979	176.9	1,684	234.0
1994	6,030	194	1.8	2,078	63.8	2,020	181.1	1,738	233.9
1995	6,263	237	2.2	2,155	65.7	2,164	195.5	1,707	222.3
1996	6,496	204	1.9	2,200	66.2	2,251	205.8	1,841	229.2
Cerebrovascular disease									
1991	1795	29	0.3	420	13.4	583	52.3	763	113.6
1992	1926	18	0.2	427	13.2	654	58.6	827	118.4
1993	2,087	25	0.2	410	12.7	707	63.2	945	131.3
1994	2179	31	0.3	465	14.3	654	58.6	1029	138.5
1995	2364	22	0.2	505	15.4	741	66.9	1096	142.7
1996	2377	42	0.4	495	14.9	800	73.2	1040	129.5

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Age Specific Rate per 10,000 population

1 Hospitalizations with cardiovascular disease as the primary diagnosis includes all discharges which list ICD9-CM codes of 390-448 as the primary diagnosis.

2 Hospitalizations with ischemic heart disease as the primary diagnosis includes all discharges which list ICD9-CM codes of 410-414 as the primary diagnosis.

3 Hospitalizations with cerebrovascular disease as the primary diagnosis includes all discharges which list ICD9-CM codes of 430-438 as the primary diagnosis.

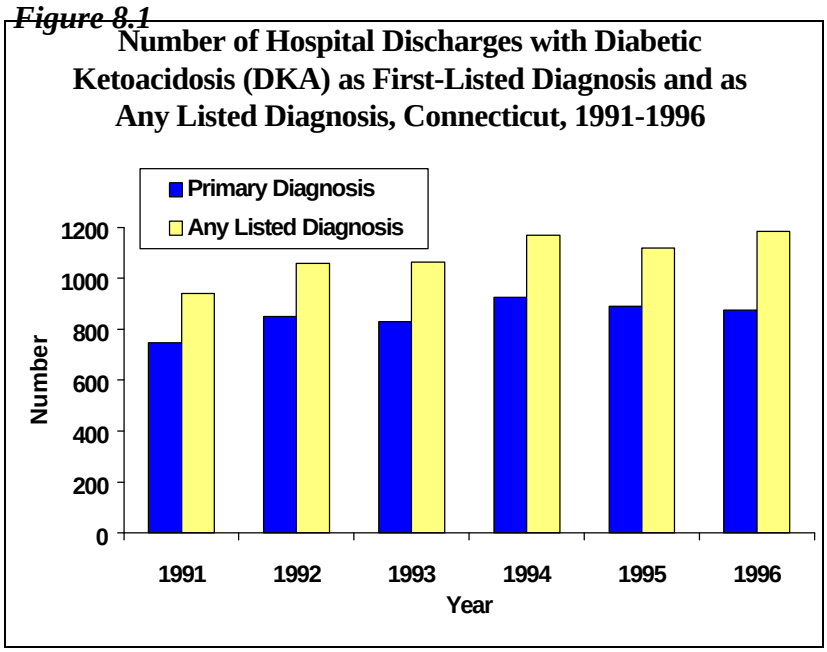
Complications of Diabetes

People with diabetes can experience a number of complications, both acute (those that can occur at any time and can usually be corrected) and long term (those that may take decades to develop). Long-term complications of diabetes include cardiovascular disease (discussed in the previous chapter), microvascular disease and neuropathy. Microvascular complications include diabetic retinopathy and kidney disease, which if untreated, may progress to blindness and renal failure. Loss of sensation in the legs and feet due to neuropathy or impeded blood supply to these areas resulting from peripheral vascular damage may lead to lower extremity ulcers and amputations. Among the acute metabolic complications of diabetes, diabetic ketoacidosis is one of the most serious.[6,14]

Diabetic Ketoacidosis

A major acute complication of diabetes, diabetic ketoacidosis (DKA), is a potential consequence of insulin deficiency. DKA usually occurs in people with type 1 diabetes. Studies indicate that 20-30% of all DKA cases among people with type 1 diabetes may be the initial manifestation of the disease. People with type 2 diabetes are not generally prone to DKA unless severely physically stressed such as during illness or infection.[6] DKA can be life threatening but is preventable through patient education, improved self-care and improved access to care.[6,14]

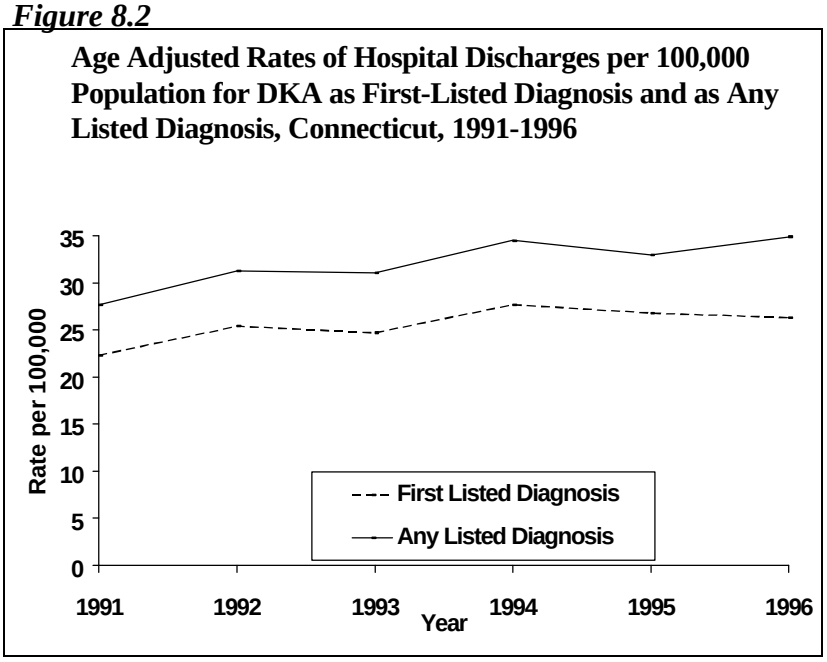
Figure 8.1



Source: See Table 8.1

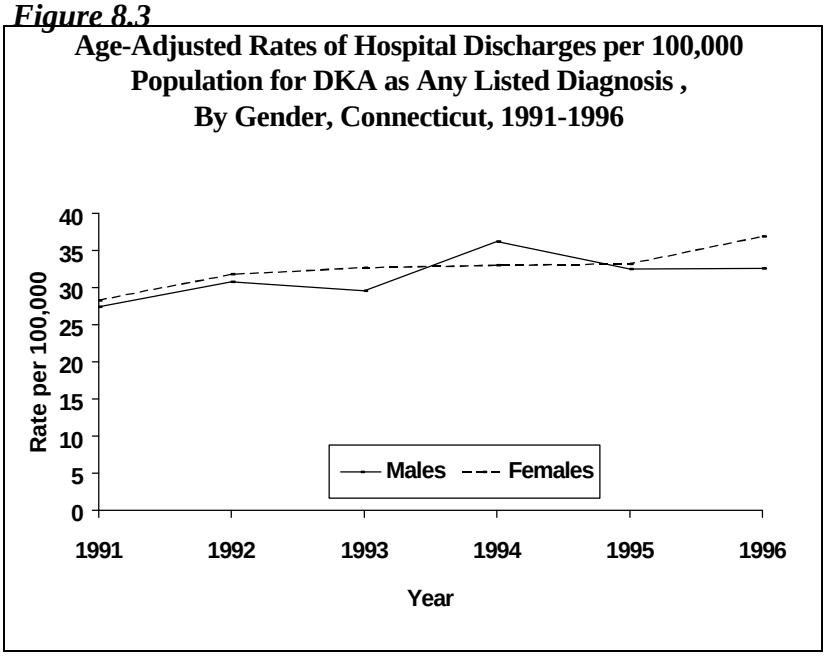
Figures 8.1 and 8.2 show that the number and age-adjusted hospitalization rates for DKA. These rates have increased from 1991 to 1996 whether DKA was listed as a primary or contributory diagnosis. DKA was listed on approximately 3% of all diabetes-related hospitalizations.

Figure 8.2



Source: See Table 8.1

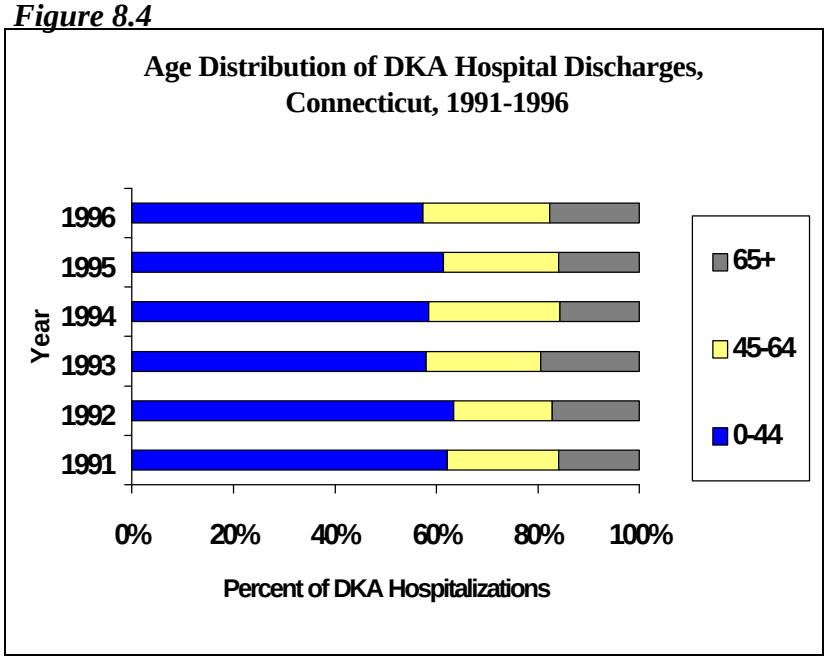
Figure 8.3



Source: See Table 8.3

A significant increase was found among females but not males for DKA-related age-adjusted hospitalization rates. In 1996, the rates for males and females were not significantly different (Figure 8.3). This is in contrast to national findings of females being 50% more likely to be hospitalized with DKA than males.[14]

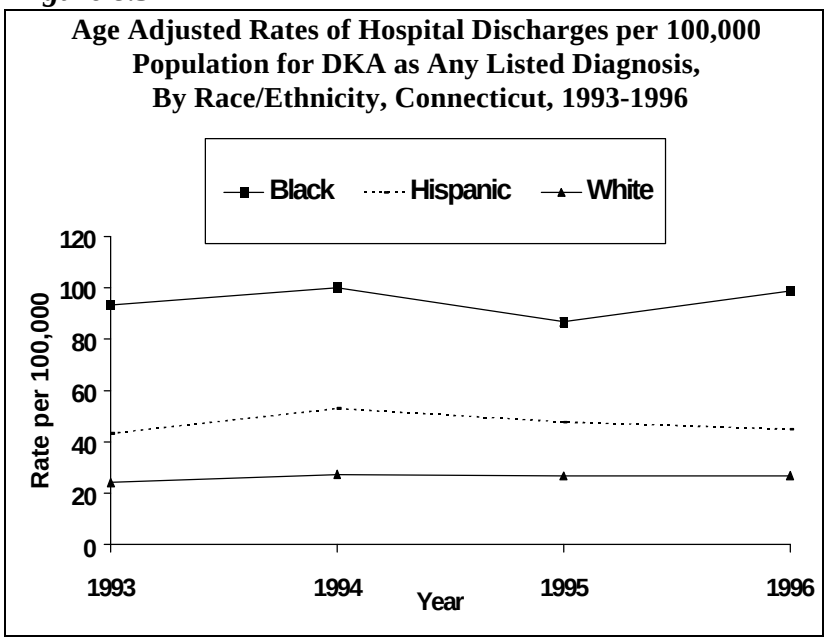
Figure 8.4



Source: See Table 8.2

From 1991 to 1996, approximately 60% of the DKA hospitalizations were among those aged less than 45 years (Figure 8.4).

Figure 8.5



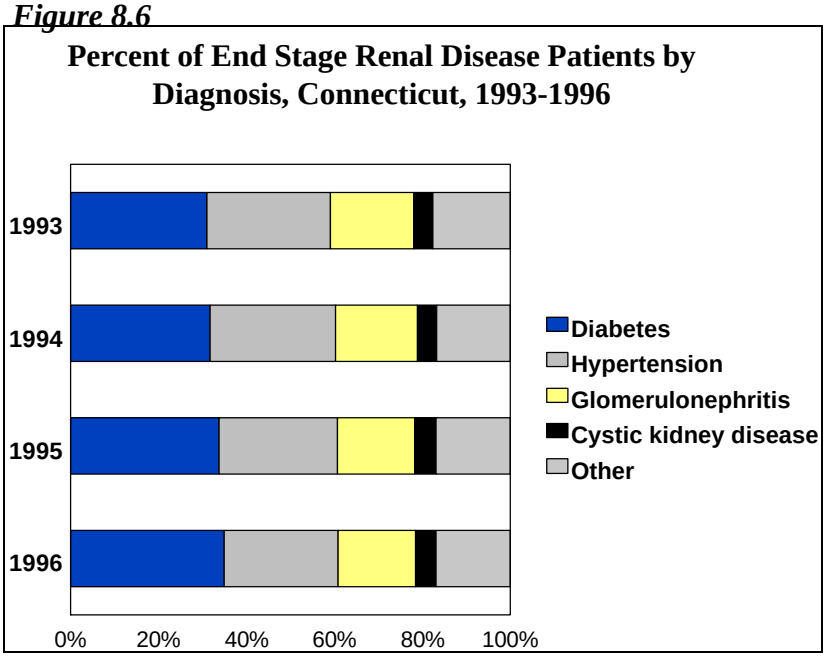
Source: See Table 8.4

Figure 8.5 illustrates that DKA hospitalization age-adjusted rates are highest among the black population compared to the Hispanic and white populations. Both the black and Hispanic rates in 1996 were significantly higher than the white rate.

Kidney Disease

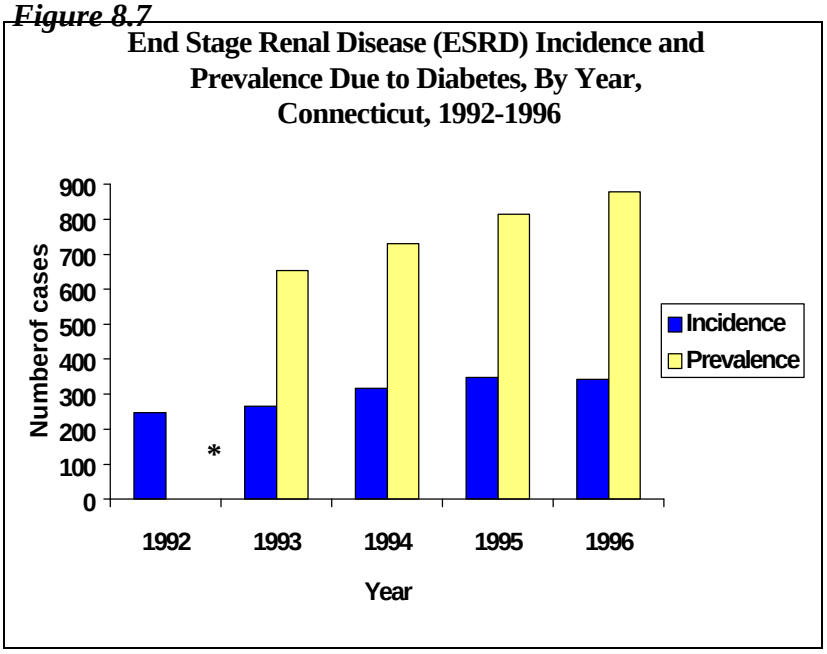
People with diabetes are 17 times more likely to develop kidney disease (diabetic nephropathy) than those without diabetes.[11] Nationwide, diabetes accounts for over 35% of all new cases of end-stage renal disease (ESRD), the severest form of kidney disease.[6] Two factors are highly associated with the risk of developing kidney disease - poor glycemic control and duration of diabetes. Evidence also indicates that hypertension contributes to the progression and possibly the development of diabetic nephropathy.[6,14]

Figure 8.6



Source: See Table 8.5

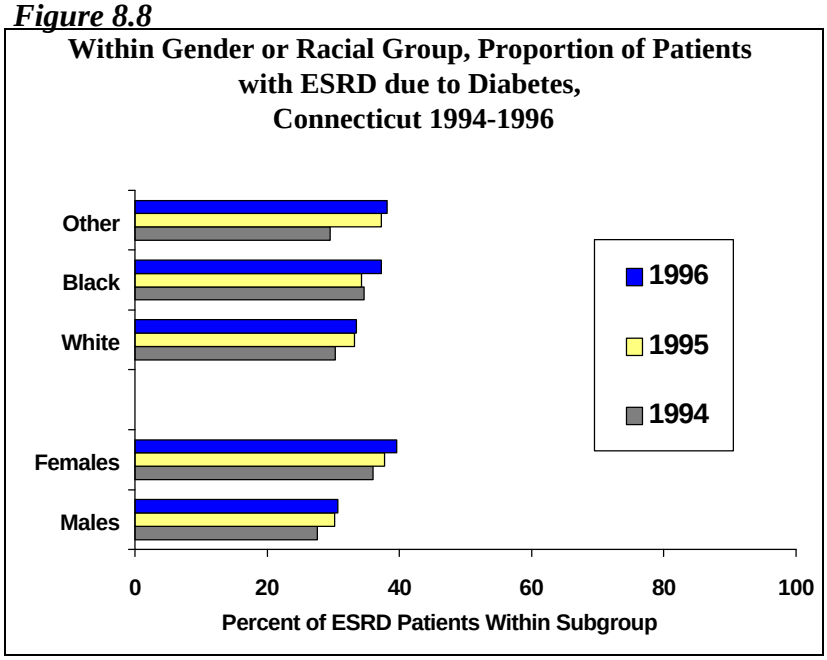
Figure 8.7



Source: See Table 8.5

As is found nationally, approximately 35% of ESRD cases in Connecticut are due to diabetes (Figure 8.6) and the number of cases has been rising (Figure 8.7). Over 85% of the cases of ESRD due to diabetes are among those aged 45 and older (Table 8.6).

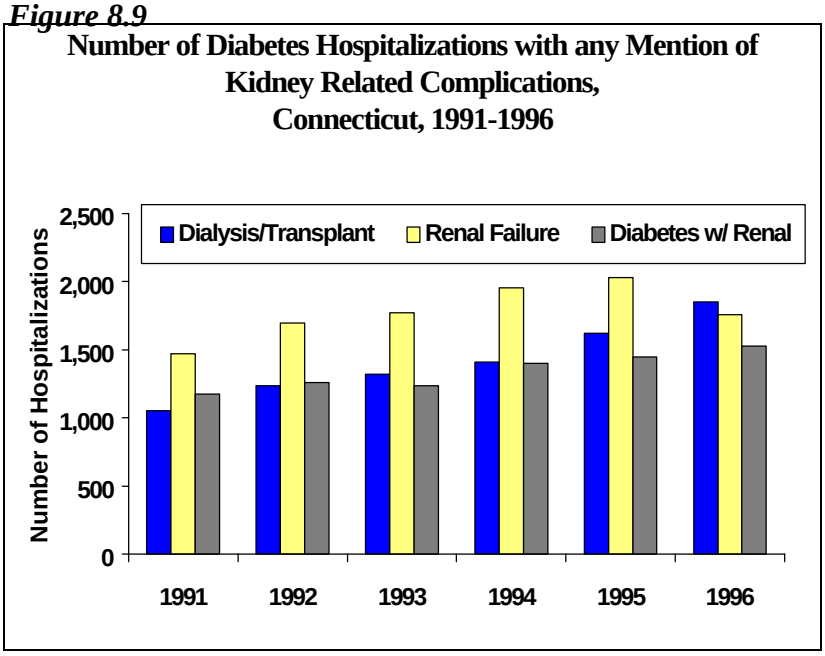
Figure 8.8



Source: See Table 8.6

In Connecticut, a higher proportion of females had ESRD due to diabetes than males as seen in Figure 8.8. It is unclear from the available ESRD data if differences exist between race/ethnicity groups in Connecticut (Figure 8.8 and Table 8.6).

Figure 8.9



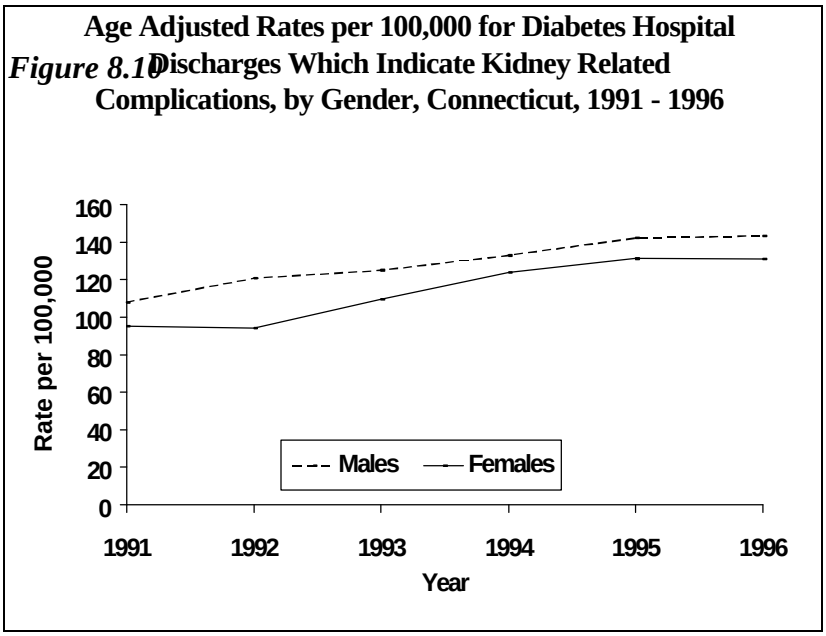
Source: See Table 8.7

Hospitalization data also provide a means of assessing the impact of kidney disease among people with diabetes. Of the Connecticut diabetes-related hospitalizations in 1996, 11% indicated either

Figure 8.11

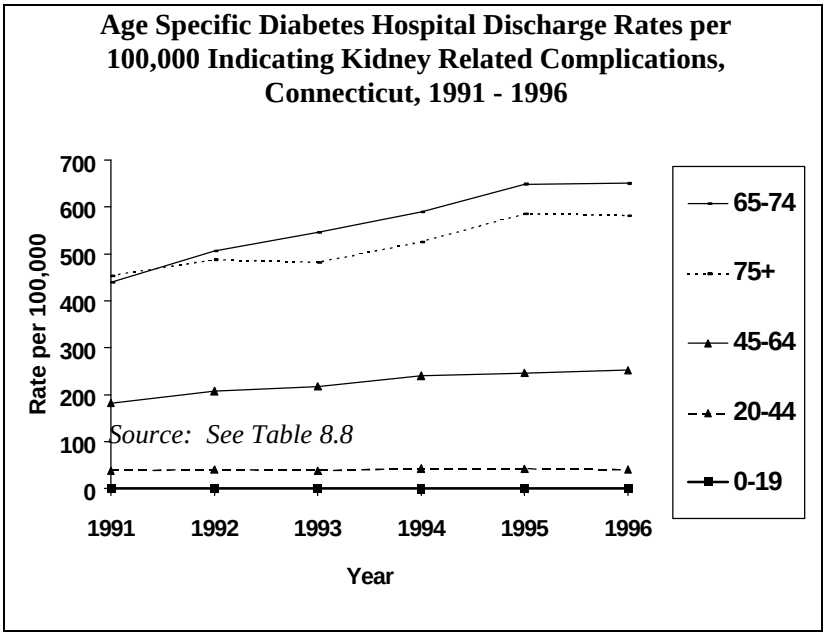
a procedure code of dialysis or kidney transplant, renal failure or diabetes with renal manifestations. These are collectively referred to in this document as kidney related complications. Figure 8.9 shows the relative number of hospitalizations for each of these complications. All three complications rose in number from 1991 to 1996 with renal failure mentioned as a complication most often except in 1996.

Figure 8.10



Source: See Table 8.8

Age-adjusted diabetes hospitalization rates for kidney-related complications rose significantly from 1991-1996 overall and for both genders. A significant difference was found between the male and female age-adjusted rates in 1996 (Figure 8.10).



Source: See Table 8.8

Generally, the rate of diabetes-related hospitalizations indicating kidney complications rises with increasing age up to the age group of 65-74 years then declines slightly for those aged 75 and older (Figure 8.11).

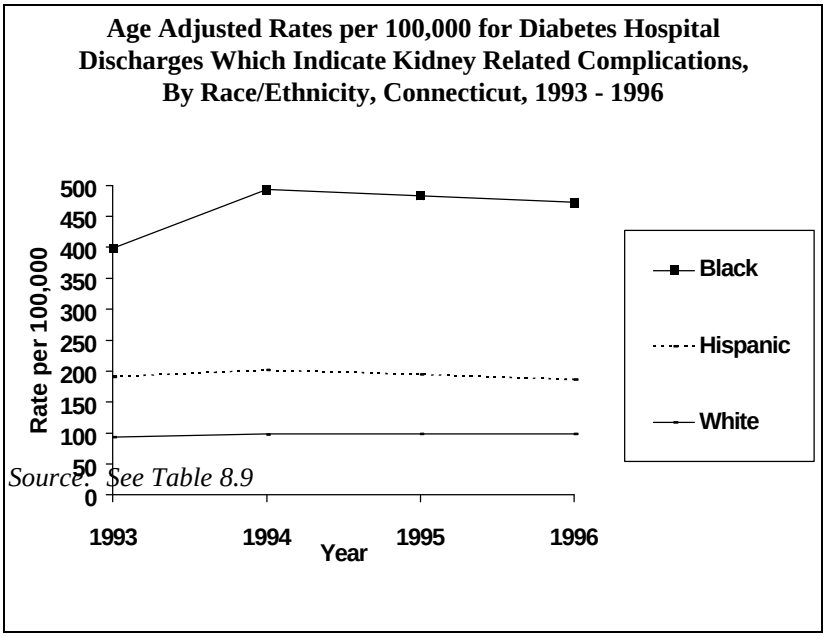


Figure 8.12

As is seen in Figure 8.12, diabetes age-adjusted hospitalization rates for kidney related complications are dramatically higher for the black population than the white or Hispanic populations. This is consistent with national findings and has been attributed to the higher prevalence of hyperglycemia and hypertension among the black population.[6]

Lower Extremity Ulcer/Amputation

Approximately 15% of all individuals with diabetes are affected by lower extremity ulcers (LEU). Two of the primary causes of diabetes related LEUs are peripheral neuropathy and peripheral vascular disease. Peripheral neuropathy reduces sensation in the feet which may lead to ulcerated pressure points. Peripheral vascular disease reduces blood supply to the feet and legs and may lead to bone inflammation or gangrene. Interventions such as patient education and regular foot exams have been linked with a decreased risk of lower extremity complications.[6]

Source: See Table 8.10

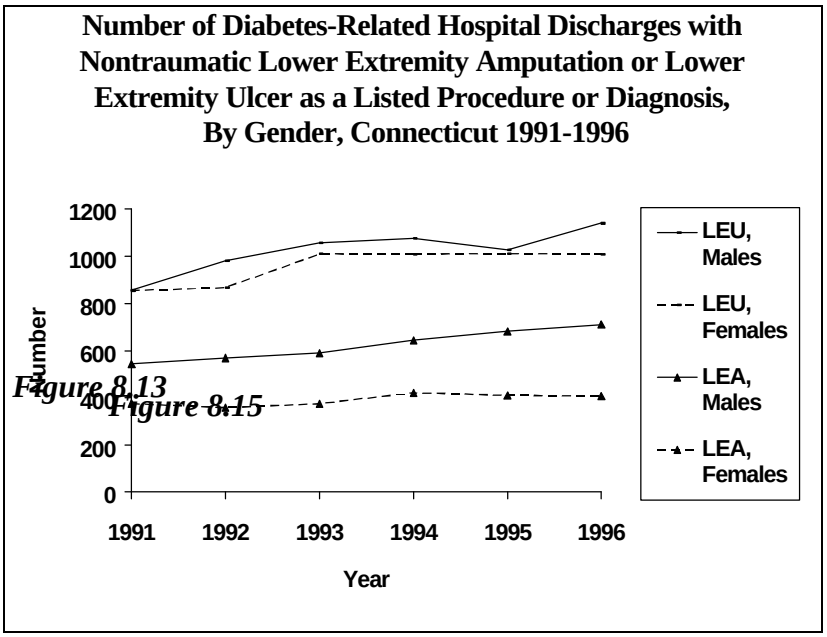
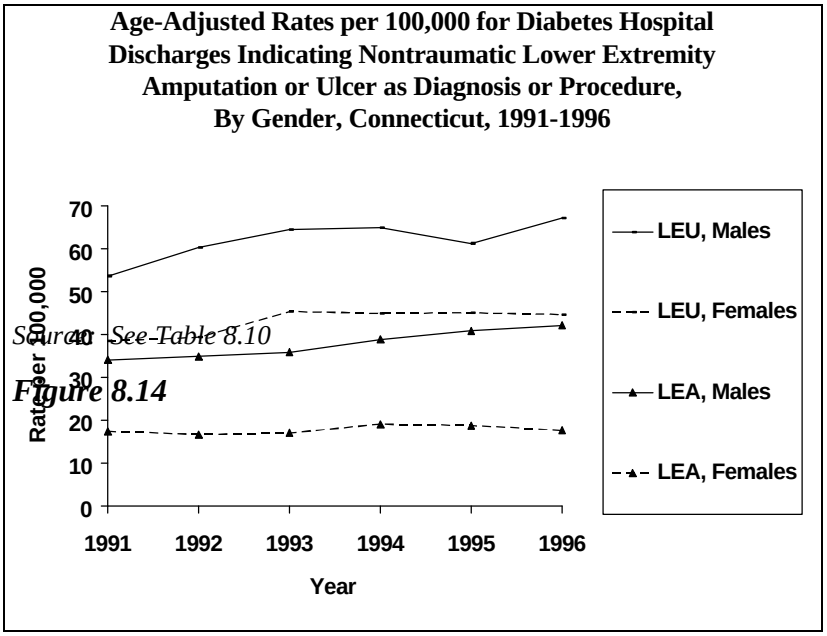


Figure 8.13

Figure 8.15

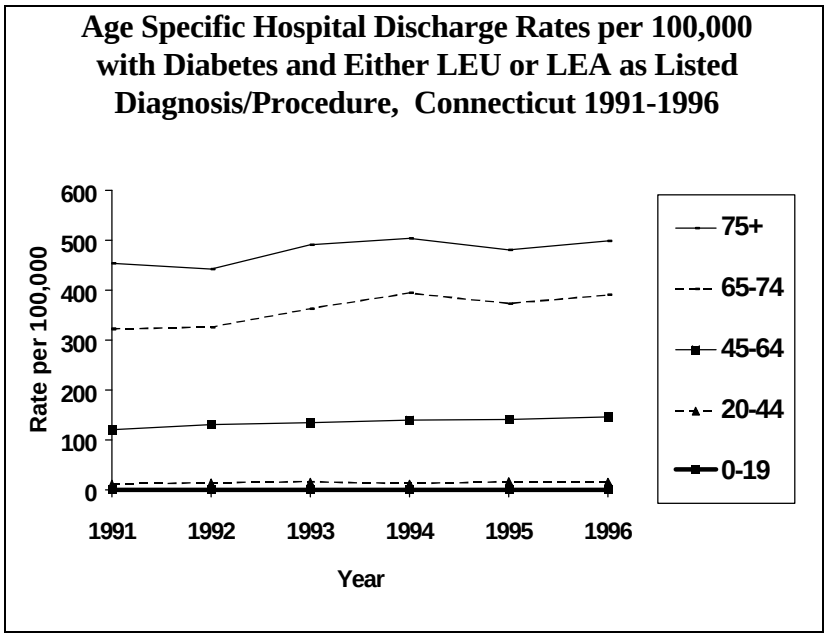


Source: See Table 8.10

Figure 8.14

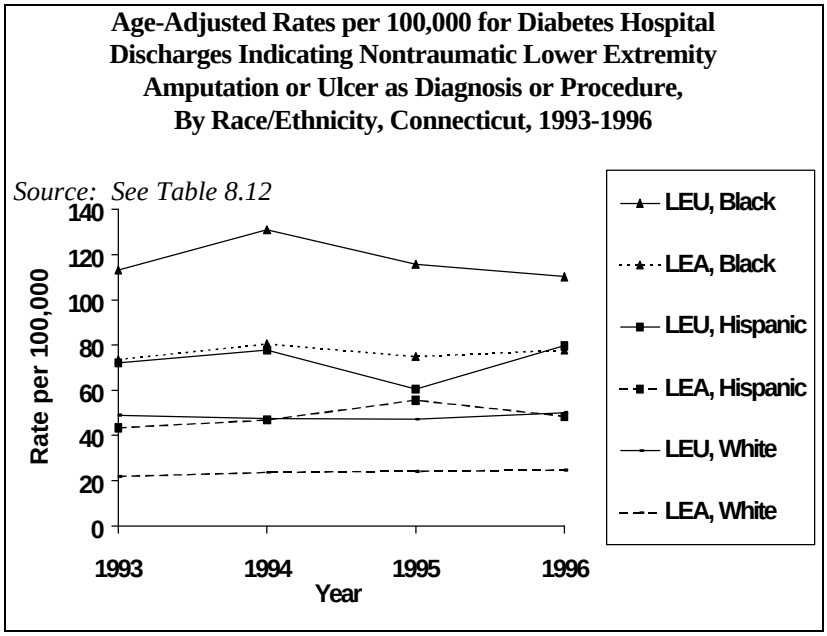
National studies indicate that about 85% of nontraumatic lower extremity amputations (LEA) among people with diabetes are preceded by LEUs.[6] In Connecticut, approximately 70% of all amputations occur to people with diabetes. As seen in Figures 8.13 and 8.14, the number and age-adjusted diabetes-related hospitalization rates listing either LEU or LEA as a diagnosis or procedure increased from 1991 to 1996. LEU and LEA rates increased significantly overall and for males. A significant increase was also found for LEAs among females but not for LEUs.

Connecticut males had significantly higher age-adjusted diabetes related hospitalizations indicating LEA or LEU than females in 1996 which is consistent with national findings.[6]



Source: See Table 8.11

The risk of LEA has been found to increase with age and duration of diabetes with the highest rates found among those aged 45-64 years.[6] Figure 8.15 shows that similar trend was found in Connecticut.



Age-adjusted diabetes related hospitalization rates with LEU as a listed diagnosis or LEA as a listed procedure were dramatically higher for the black population than the white population (Figure 8.16) and significantly higher in 1996. The Hispanic population also had significantly higher rates for both LEA and LEU in 1996 than the white population.

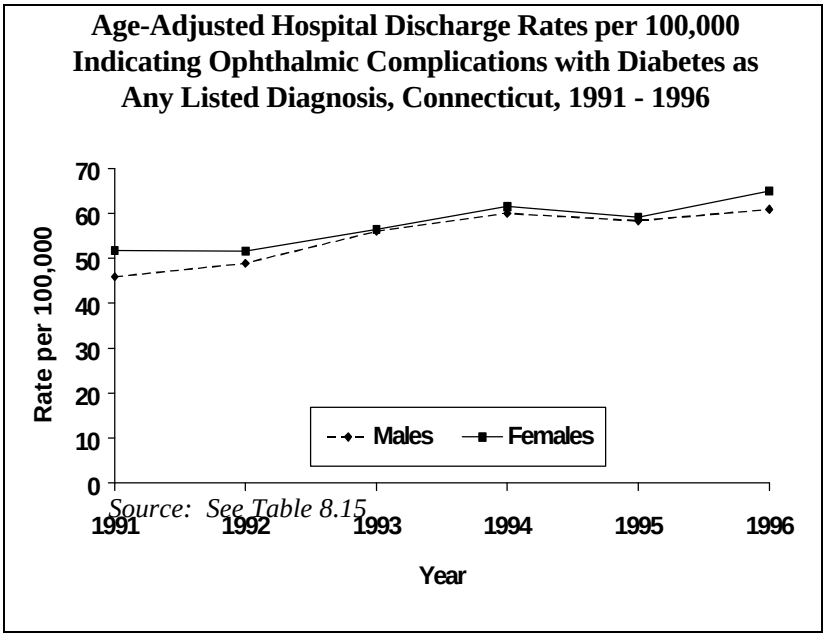
Figure 8.17

Ophthalmic Complications

People with diabetes are 25 times more likely to become blind than people without diabetes[16] because people with diabetes are at higher risk of developing glaucoma, cataract and diabetic retinopathy. The most common of these conditions, diabetic retinopathy, causes alterations in the blood vessels of the retina and is the leading cause of blindness in those aged 20-74.[6]

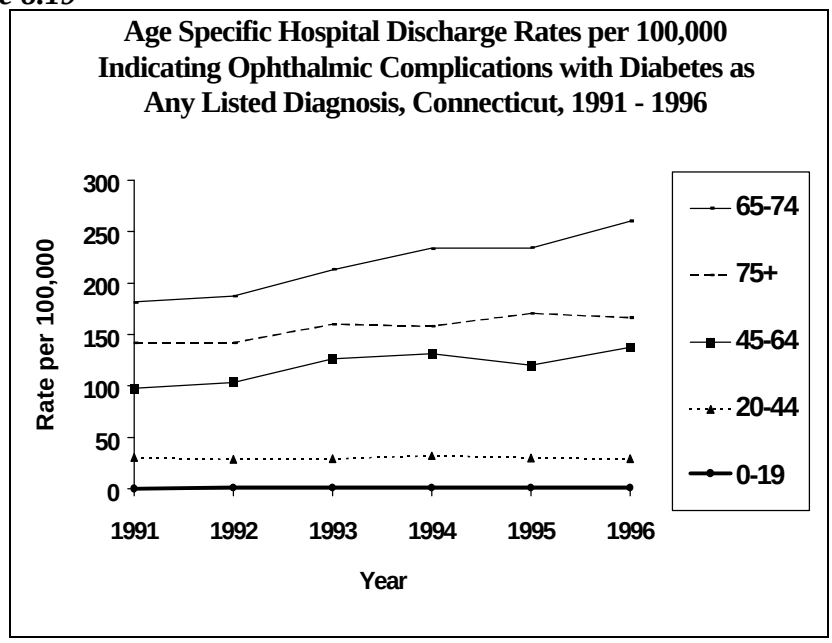
Diabetes Control and Complications Trial (DCCT) data and other epidemiologic studies suggest that hyperglycemia increases the risk of developing diabetic retinopathy. Early age at onset of diabetes, longer duration of diabetes and high blood pressure are also associated with increased risk of progression to diabetic retinopathy.[6] A substantial proportion of visual loss caused by diabetes is preventable with early detection of diabetic retinopathy and timely treatment with laser photocoagulation.[17]

From 1991 to 1996, age-adjusted rates of diabetes related hospitalizations in Connecticut indicated that either diabetes with ophthalmic manifestations or diabetic retinopathy as a concomitant diagnosis rose significantly overall and by gender. No significant differences were found between the male and female rates (Figure 8.17).



Source: See Table 8.15

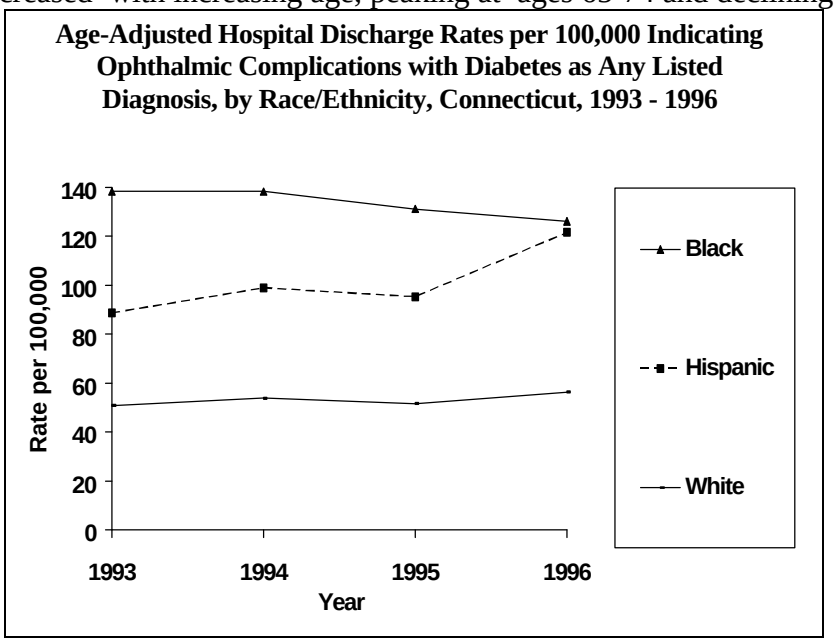
Figure 8.19



Source: See Table 8.14

Figure 8.18

Figure 8.18 shows that diabetes related rates of hospitalizations indicating ophthalmic complications increased with increasing age, peaking at ages 65-74 and declining in older ages.



Nationally, the frequency of severe visual impairment has been found to be up to 40% higher in the black population than the white population.[6] Similarly, as shown in Figure 8.19, the Connecticut black population was disproportionately impacted by diabetes related visual impairment. Age-adjusted rates were higher for the black population, significantly in 1996, than the white population. A significant difference was also found between the Hispanic and white populations in 1996.

Connecticut specific data concerning the prevalence and incidence of blindness among people with diabetes are not available. The Connecticut Board of Education and Services for the Blind

Figure 8.20

(BESB) provides rehabilitation services to Connecticut residents who are blind. In 1996, diabetes was the major cause of blindness for an estimated 2,200 legally blind people registered with BESB. Another 2,000 BESB registered blind persons reported diabetes as a secondary condition.[19]

Oral Health Complications

People with diabetes are at higher risk for periodontal disease. Poor glycemic control elevates glucose levels in the mouth and provides an environment in which the bacteria responsible for gum disease can thrive. Additionally, diabetes causes blood vessels to thicken, slowing the removal of wastes and flow of nutrients to tissues in the mouth. This weakens resistance to infection and gum disease. Severe cases of periodontal disease can result in tooth loss.[18]

Connecticut information concerning diabetes related oral health complications is found in the 1996 oral health module of the Behavioral Risk Factor Surveillance System (BRFSS) survey. The module included questions on time since last dental visit, reason for not visiting the dentist, number of teeth removed due to tooth decay or gum disease, type of insurance coverage and work days lost due to dental problems.

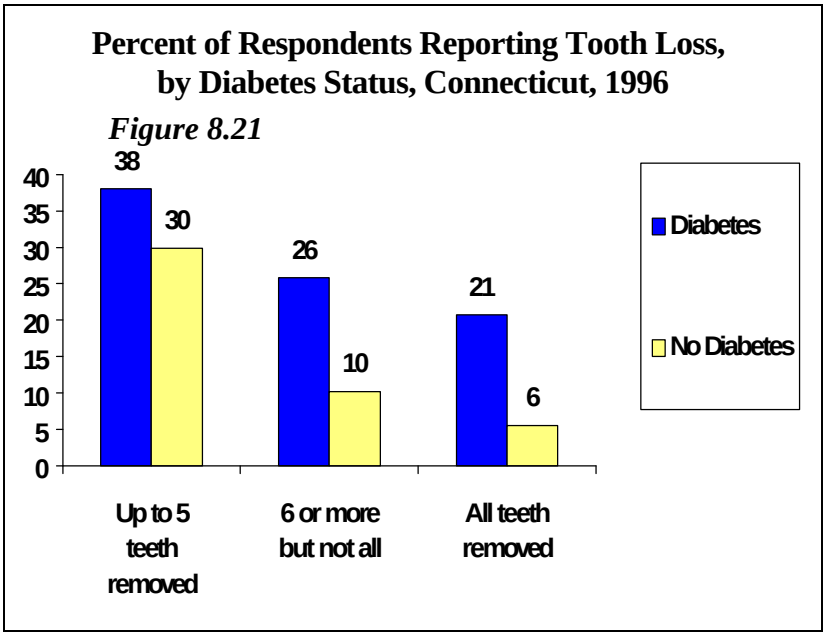
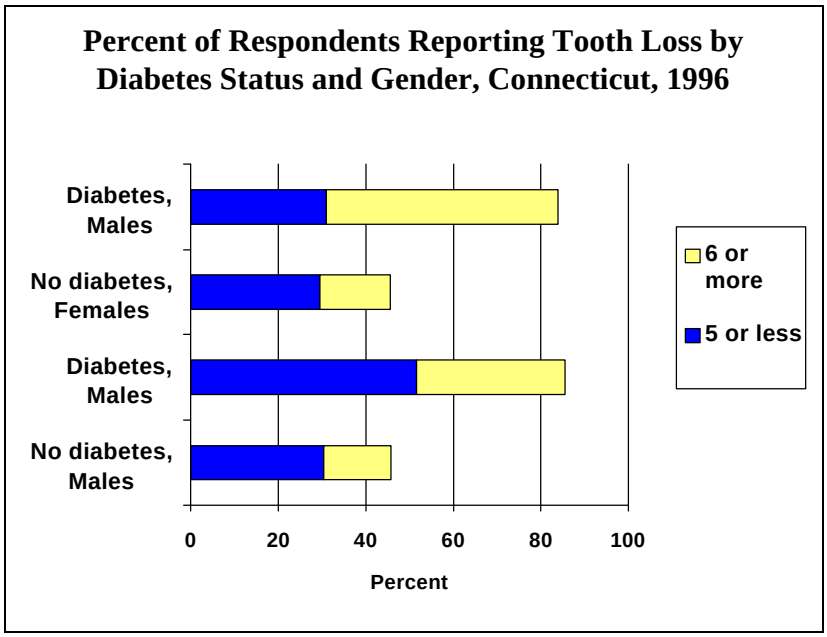


Figure 8.20 clearly shows that a higher proportion of people with diabetes reported having more teeth removed than those not reporting diabetes. The same result is found when the data are controlled for age.



Source: See Table 8.16

More females with diabetes reported having 6 or more teeth removed than males with diabetes (Figure 8.21) but a slightly higher percentage of males reported having teeth removed regardless of the number of teeth removed.

Pregnancy Related Complications

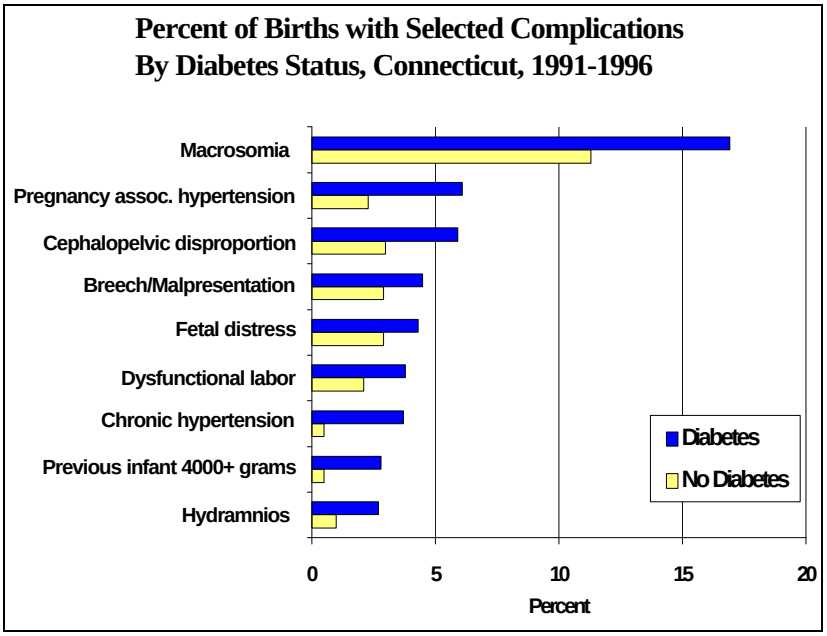
Pregnancies may be complicated by either type 1, type 2 or gestational diabetes. Nationally, approximately 0.1-0.3% of all pregnancies are complicated by preexisting diabetes and another 2-5% of all pregnancies are complicated by gestational diabetes.[6]

Among pregnancies complicated by preexisting diabetes, poorly controlled maternal blood glucose prior to conception or during the first trimester increases the risk of spontaneous abortion and major congenital anomalies. Poor glycemic control during the second or third trimester increases the risk of stillbirth, and perinatal mortality. Preexisting maternal complications such as diabetic retinopathy and nephropathy are likely to worsen with poor glycemic control[6]. Preconception counseling and frequent self-monitoring of blood glucose levels are recommended to reduce the complications of preexisting diabetes.[9]

Among all pregnancies complicated by diabetes, there is an increased risk of macrosomia (birthweight of greater than 4000 grams). Macrosomia occurs 2 to 3 times more often in diabetic pregnancies than in the general population. Macrosomatic babies are more likely to be born via cesarean section and more likely to experience birth trauma than babies of lower birthweights. Offspring of mothers who experience pregnancy related diabetes are at higher risk of developing diabetes than those born to mothers without diabetes.[6,14]

Source: See Table 8.16

Increased maternal risks in pregnancies complicated by diabetes are hydramnios and toxemia. Good glycemic control during the entire pregnancy can reduce the risk of these complications. Mothers who develop gestational diabetes are also more likely to develop overt diabetes later in life than those who do not have diabetes.[14]

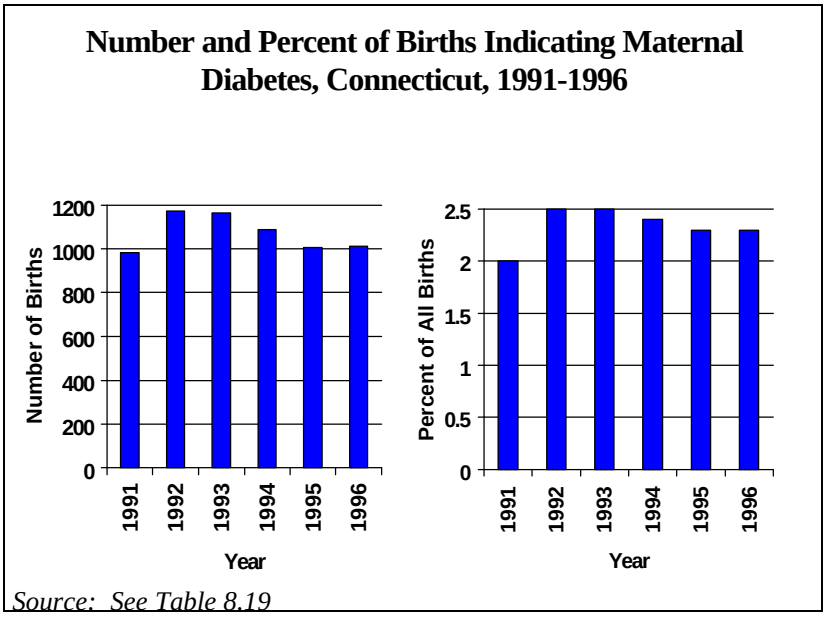


As seen in Figure 8.22, among births to Connecticut residents, a higher proportion of pregnancies complicated by diabetes indicated macrosomia, birth trauma, maternal hydramnios and maternal toxemia than pregnancies without diabetes as a complication.

The number of births to mothers with diabetes decreased from 1991 to 1996 primarily due to the a general decline in birth rates in Connecticut during this time period. The percentage of births complicated by diabetes during this time period ranged from 2.0% in 1991 to 2.3% in 1996 (Figure 8.23).

Source: See Table 8.17

Figure 8.22



Prevalence of diabetes increased with increasing age and was slightly higher among the black and Hispanic populations (Figure 8.24).

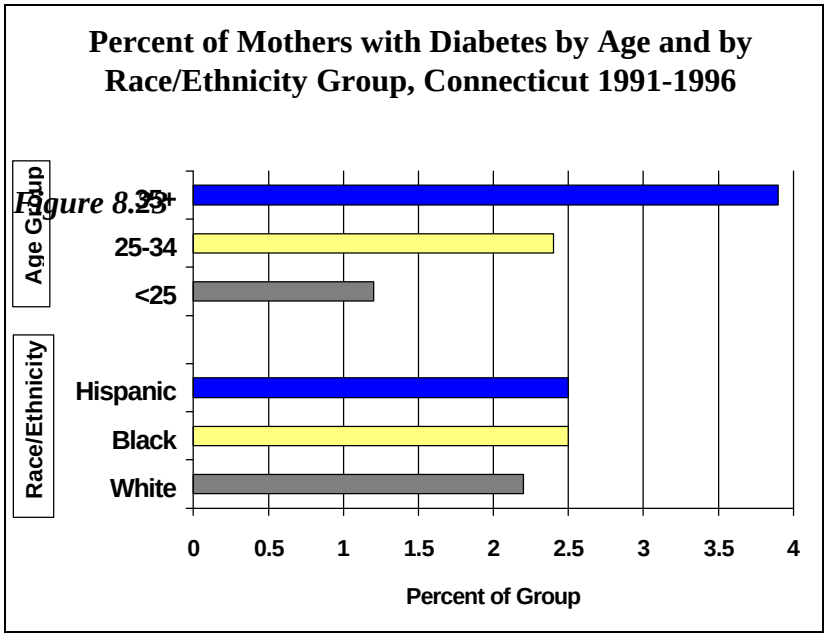


Figure 8.24

Source: See Table 8.18

Table 8.1: **Number, crude rate and age adjusted hospital discharge rates per 100,000 with diabetic ketoacidosis* as primary diagnosis and diabetic ketoacidosis as any listed diagnosis: Connecticut, 1991 - 1996**

	Primary Diagnosis						Any Listed Diagnosis					
Year	Number	Crude Rate	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error	Number	Crude Rate	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error
1991	748	22.8	22.3	0.8	22.4	0.8	940	28.6	27.7	0.9	28.2	0.9
1992	850	25.9	25.4	0.9	25.5	0.9	1,059	32.3	31.3	1.0	31.7	1.0
1993	829	25.3	24.7	0.9	24.9	0.9	1,062	32.4	31.1	1.0	31.8	1.0
1994	925	28.2	27.7	0.9	28.0	0.9	1,170	35.7	34.5	1.0	35.3	1.0
1995	890	27.2	26.8	0.9	26.9	0.9	1,119	34.2	33.0	1.0	33.7	1.0
1996	875	26.7	26.3	0.9	26.5	0.9	1,183	36.1	34.9	1.0	35.6	1.0

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Discharges with diagnosis of diabetes with ketoacidosis (ICD9-CM 250.1-250.19)

1 Hospital Discharge Rates (per 100,000) were adjusted to the 1980 U.S. standard million population, using the direct method.

2 Hospital Discharge Rates (per 100,000) were adjusted to the 2000 U.S. standard million population, using the direct method.

Table 8.2: **Number and age-specific[1] hospital discharge rates per 100,000 with diabetic ketoacidosis as any listed diagnosis, by age: Connecticut, 1991-1996**

	Age Group											
	0-19		20-44		45-64		65-74		75+		All Ages	
Year	Number	Rate/ 100,000	Number	Rate/ 100,000	Number	Rate/ 100,000	Number	Rate/ 100,000	Number	Rate/ 100,000	Number	1980 [2] Age-Adj
1991	155	7785.0	429	50.6	206	15.4	76	11.7	74	29.0	940	27.7
1992	181	9086.3	490	57.9	206	15.7	102	15.3	80	31.3	1,059	31.3
1993	149	7476.2	467	54.5	240	18.5	121	18.2	85	33.4	1,062	31.1
1994	162	8124.4	522	60.5	303	23.8	100	14.9	83	32.8	1,170	34.5
1995	168	8421.1	519	59.5	254	20.2	78	11.5	100	40.0	1,119	33.0
1996	145	7264.5	533	61.0	296	23.8	127	18.5	82	33.3	1,183	34.9

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Discharges with any diagnosis of diabetes with ketoacidosis (ICD9-CM 250.1-250.19)

1 Age specific discharge rates are calculated per 100,000 population using CT population estimates for the given year.

2 Hospital Discharge Rates (per 100,000) were adjusted to the 1980 U.S. standard million population, using the direct method.

Table 8.3: **Number, crude rate and age adjusted hospital discharge rates per 100,000 with diabetic ketoacidosis* as any listed diagnosis, by gender: Connecticut, 1991 - 1996**

	Males						Females					
Year	Number	Crude Rate	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error	Number	Crude Rate	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error
1991	449	28.2	27.4	1.3	28.1	1.3	491	29.0	28.3	1.3	28.6	1.3
1992	504	31.7	30.8	1.4	31.4	1.4	555	32.8	31.8	1.4	31.9	1.4
1993	484	30.5	29.6	1.3	30.2	1.4	578	34.2	32.7	1.4	33.2	1.4
1994	593	37.4	36.2	1.5	37.2	1.5	577	34.2	33.0	1.4	33.7	1.4
1995	530	33.4	32.5	1.4	33.0	1.4	589	34.9	33.2	1.4	34.0	1.4
1996	536	33.7	32.6	1.4	33.5	1.5	647	38.5	36.9	1.5	37.5	1.5

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Discharges with any diagnosis of diabetes with ketoacidosis (ICD9-CM 250.1-250.19)

1 Hospital Discharge Rates (per 100,000) were adjusted to the 1980 U.S. standard million population, using the direct method.

2 Hospital Discharge Rates (per 100,000) were adjusted to the 2000 U.S. standard million population, using the direct method.

Table 8.4: **Number, crude rate and age adjusted hospital discharge rates per 100,000 with diabetic ketoacidosis* as any listed diagnosis, by race/ethnicity: Connecticut, 1993 - 1996**

Year	Number	Crude Rate	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error
White						
1993	698	25.8	24.1	0.9	24.7	0.9
1994	766	28.4	27.3	1.0	27.8	1.0
1995	744	27.8	26.7	1.0	27.2	1.0
1996	760	28.5	26.8	1.0	27.4	1.0
Black						
1993	263	90.0	93.2	5.9	95.6	6.2
1994	276	94.0	100.1	6.2	104.3	6.6
1995	247	83.6	86.7	5.7	90.5	6.1
1996	282	94.6	98.7	6.0	102.7	6.4
Hispanic						
1993	88	37.7	43.3	5.1	44.1	5.3
1994	99	41.4	53.0	6.0	55.4	6.4
1995	99	40.4	47.7	5.4	49.6	5.9
1996	106	41.9	44.9	4.7	45.6	4.8

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Discharges with any diagnosis of diabetes with ketoacidosis (ICD9-CM 250.1-250.19)

** Excludes those of Hispanic origin

1 Hospital Discharge Rates (per 100,000) were adjusted to the 1980 U.S. standard million population, using the direct method.

2 Hospital Discharge Rates (per 100,000) were adjusted to the 2000 U.S. standard population, using the direct method.

Table 8.5: **End stage renal disease incidence and prevalence by diagnosis: Connecticut, 1992-1996**

	New Cases per Year					Prevalence per Year				
Diagnosis	**1992**	**1993**	**1994**	**1995**	**1996**	**1992**	**1993**	**1994**	**1995**	**1996**
Diabetes	246	266	317	347	341	na	654	730	814	878
Hypertension	166	170	220	191	206	na	591	658	649	652
Glomerulonephritis	137	137	138	103	139	na	398	431	421	444
Cystic Kidney Disease	18	27	32	39	35	na	92	101	115	116
Other	133	136	139	164	168	na	371	385	409	426
Unknown	3	4	4	8	0	na	15	8	8	4
Total	703	740	850	852	889	na	2121	2313	2416	2520

Date Source: End Stage Renal Disease Network of New England, Inc.

* Primary Renal Failure

***Table 8.6*: Number and percent** of end stage renal disease patients with diabetes by race, and by gender, and by age: Connecticut, 1994 - 1996**

Category and Year	1993 Diabetic*	1993 Total	1993 Percent of Total	1994 Diabetic*	1994 Total	1994 Percent of Total	1995 Diabetic*	1995 Total	1995 Percent of Total	1996 Diabetic*	1996 Total	1996 Percent of Total
Race/ethnicity												
Black	--	--	--	233	674	34.6	244	711	34.3	288	773	37.3
White	--	--	--	465	1534	30.3	529	1595	33.2	553	1650	33.5
Other	--	--	--	26	88	29.5	41	110	37.3	37	97	38.1
Gender												
Male	--	--	--	339	1227	27.6	395	1307	30.2	415	1352	30.7
Female	--	--	--	385	1069	36.0	419	1109	37.8	463	1168	39.6
Age group												
0-34	--	--	--	29	172	16.9	30	168	17.9	32	172	12.1
35-44	--	--	--	69	272	25.4	77	299	25.8	58	264	15.4
45-54	--	--	--	109	340	32.1	118	358	33.0	127	376	27.5
55-64	--	--	--	194	448	43.3	217	451	48.1	220	461	31.5
65-74	--	--	--	237	628	37.7	267	651	41.0	300	698	54.6
75+	--	--	--	86	436	19.7	105	489	21.5	141	549	25.7
Total	654	2121	30.8	724	2296	31.5	814	2416	33.7	878	2520	34.8

Date Source: End Stage Renal Disease Network of New England, Inc.

* Primary Renal Failure

** Percent within subgroup

Table 8.7: **Number of hospital discharges indicating kidney related complications with diabetes* as any listed diagnosis, by gender and by race/ethnicity: Connecticut, 1991 - 1996**

Category and Year	Dialysis or Kidney Transplant[1]			Renal Failure[2]			Diabetes with Renal Manifestations[3]		
Gender									
	Total	**Males**	**Females**	**Total**	**Males**	**Females**	**Total**	**Males**	**Females**
1991	1,054	497	557	1,473	701	772	1,174	549	549
1992	1,237	578	659	1,694	834	860	1,260	565	695
1993	1,321	644	677	1,772	877	895	1,235	535	700
1994	1,408	640	768	1,956	945	1,011	1,400	617	783
1995	1,621	767	854	2,029	980	1,049	1,445	628	817
1996	1,850	831	1,019	1,755	890	865	1,529	699	830
Race/ethnicity									
	White**	**Black****	**Hispanic**	**White****	**Black****	**Hispanic**	**White****	**Black****	**Hispanic**
1993	877	349	64	1,358	298	90	946	184	93
1994	855	425	103	1,481	356	91	1,019	275	90
1995	1,046	419	123	1,546	343	107	1,070	242	122
1996	1,166	503	154	1,304	256	172	1,103	287	116

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Discharges with any diagnosis of diabetes (ICD9-CM 250.0 - 250.9)

** Excludes those of Hispanic origin.

1 Discharges with any diagnosis of diabetes and any procedure code for dialysis or kidney transplant (ICD9-CM 39.95, 55.6-55.69)

2 Discharges with any diagnosis diabetes and any diagnosis of renal failure (ICD9-CM 585.0-586.9). Excludes discharges with procedure codes for dialysis or kidney transplant.

3 Discharges with any diagnosis of diabetes with renal complications. (ICD9-CM 250.4). Excludes discharges with procedure codes for dialysis or kidney transplant or discharges with any diagnosis of renal failure.

Table 8.8: **Age adjusted rates[4] per 100,000 for hospital discharges indicating kidney related complications with diabetes* as any listed diagnosis, by gender, by race/ethnicity: Connecticut, 1993 - 1996**

Year	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error
Gender												
		Both Sexes				**Males**				**Females**		
1991	100.2	1.7	110.7	1.8	108.0	2.6	120.4	2.9	95.2	2.2	104.9	2.4
1992	112.2	1.7	123.7	1.9	120.7	2.7	134.6	3.1	94.1	2.2	103.5	2.4
1993	115.8	1.8	127.4	1.9	125.0	2.8	138.1	3.1	109.5	2.3	120.4	2.6
1994	126.8	1.9	139.6	2.0	132.9	2.8	147.8	3.2	123.8	2.5	135.5	2.7
1995	134.6	1.9	148.3	2.1	142.3	2.9	158.9	3.3	131.3	2.6	143.6	2.8
1996	135.1	1.9	148.8	2.1	143.3	2.9	160.6	3.2	131.2	2.6	143.1	2.8
Race/ethnicity												
		White**				**Black****				**Hispanic**		
1993	93.7	1.7	103.0	1.8	397.8	14.1	441.6	16.0	191.1	13.0	208.5	14.2
1994	98.1	1.7	108.2	1.9	493.0	15.5	542.7	17.4	201.8	12.7	221.1	14.0
1995	98.2	1.7	108.0	1.9	483.2	15.2	531.4	17.0	194.6	12.3	213.1	13.5
1996	98.3	1.7	107.9	1.9	472.4	14.9	519.0	16.6	186.4	11.7	204.2	12.9

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Discharges with any diagnosis of diabetes with renal complications (ICD9-CM 250.4) or any procedure code for dialysis or kidney transplant (ICD9-CM 39.95, 55.6-55.69) or any diagnosis of renal failure (ICD9-CM 585.0-586.9)

** Excludes those of Hispanic origin.

1 Hospital Discharge Rates (per 100,000) were adjusted to the 1980 U.S. standard million population, using the direct method.

2 Hospital Discharge Rates (per 100,000) were adjusted to the 2000 U.S. standard million population, using the direct method.

Table 8.9: **Number and age specific hospital discharge rates[4] per 100,000 indicating kidney related complications with diabetes* as any listed diagnosis, by age: Connecticut, 1991 - 1996**

		Age Group					
Year	**Kidney Related Complication**	**0-19**	**20-44**	**45-64**	**65-74**	**75+**	**All Ages**
1991							
	Dialysis or Kidney Transplant[1]	0	158	395	351	150	1,054
	Renal Failure[2]	<10	133	404	437	498	~1,472
	Diabetes with Renal Manifestations[3]	<10	214	385	334	238	~1,174
	Age Specific Rate per 100,000	**<1**	**37.8**	**182.0**	**439.3**	**453.7**	
1992							
	Dialysis or Kidney Transplant[1]	0	155	489	395	198	1,237
	Renal Failure[2]	<10	160	419	552	560	~1,691
	Diabetes with Renal Manifestations[3]	<10	213	476	346	223	~1,258
	Age Specific Rate per 100,000	**<1**	**40.3**	**207.3**	**505.8**	**487.6**	
1993							
	Dialysis or Kidney Transplant[1]	0	160	498	429	234	1,321
	Renal Failure[2]	0	134	497	602	539	1,772
	Diabetes with Renal Manifestations[3]	<10	198	453	358	224	~1,233
	Age Specific Rate per 100,000	**<1**	**38.0**	**217.5**	**546.0**	**481.9**	
1994							
	Dialysis or Kidney Transplant[1]	0	153	541	459	255	1,408
	Renal Failure[2]	<10	177	559	621	598	~1,955
	Diabetes with Renal Manifestations[3]	0	213	515	410	262	1,400
	Age Specific Rate per 100,000	**<1**	**42.6**	**240.4**	**589.7**	**525.5**	
1995							
	Dialysis or Kidney Transplant[1]	0	154	615	572	280	1,621
	Renal Failure[2]	0	155	546	633	695	2,029
	Diabetes with Renal Manifestations[3]	<10	221	507	418	296	~1,442
	Age Specific Rate per 100,000	**<1**	**42.1**	**246.3**	**648.8**	**585.5**	
1996							
	Dialysis or Kidney Transplant[1]	<10	169	680	630	370	~1,849
	Renal Failure[2]	0	127	487	538	603	1,755
	Diabetes with Renal Manifestations[3]	<10	203	560	433	328	~1,524
	Age Specific Rate per 100,000	**<1**	**40.0**	**252.2**	**650.3**	**581.8**	

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Discharges with any diagnosis of diabetes (ICD9-CM 250.0 - 250.9)

1 Discharges with any diagnosis of diabetes and any procedure code for dialysis or kidney transplant (ICD9-CM 39.95, 55.6-55.69)

2 Discharges with any diagnosis diabetes and any diagnosis of renal failure (ICD9-CM 585.0-586.9). Excludes discharges with procedure codes for dialysis or kidney transplant.

3 Discharges with any diagnosis of diabetes with renal complications. (ICD9-CM 250.4). Excludes discharges with procedure codes for dialysis or kidney transplant or discharges with any diagnosis of renal failure.

4 Age specific discharge rates are calculated per 100,000 population using CT population estimates for the given year. Included are discharges with any diagnosis of diabetes and any mention of dialysis, kidney transplant, renal failure or diabetes with renal complications.

Table 8.10: **Number and age-adjusted diabetes-related hospital discharge rates per 100,000 indicating nontraumatic lower extremity amputation* or lower extremity ulcer**, by gender: Connecticut, 1991 - 1996**

	Both Sexes					Males					Females				
Year	Number	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error	Number	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error	Number	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error
Lower Extremity Amputation															
1991	920	24.6	0.8	27.6	0.9	544	34.1	1.5	38.4	1.7	376	17.5	0.9	19.8	1.0
1992	927	24.6	0.8	27.5	0.9	569	35.0	1.5	39.4	1.7	358	16.7	0.9	18.7	1.0
1993	964	25.3	0.8	28.5	0.9	589	35.9	1.5	40.6	1.7	375	17.1	0.9	19.3	1.0
1994	1,065	27.7	0.9	31.1	1.0	644	38.9	1.5	44.0	1.7	421	19.1	1.0	21.5	1.1
1995	1,092	28.5	0.9	31.7	1.0	682	40.9	1.6	45.8	1.8	410	18.8	1.0	20.9	1.1
1996	1,118	28.7	0.9	32.1	1.0	711	42.2	1.6	47.2	1.8	407	17.7	0.9	20.1	1.0
Lower Extremity Ulcer															
1991	1,711	45.1	1.1	51.5	1.3	856	53.7	1.8	61.5	2.1	855	38.5	1.3	44.0	1.5
1992	1,849	48.2	1.2	54.8	1.3	982	60.4	1.9	68.7	2.2	867	39.4	1.4	45.0	1.5
1993	2,069	53.4	1.2	60.5	1.3	1,058	64.5	2.0	73.7	2.3	1,011	45.4	1.5	51.2	1.6
1994	2,085	53.4	1.2	60.5	1.3	1,076	65.0	2.0	74.2	2.3	1,009	45.0	1.5	51.0	1.6
1995	2,039	52.0	1.2	59.1	1.3	1,027	61.3	1.9	70.0	2.2	1,012	45.1	1.5	51.1	1.6
1996	2,149	54.6	1.2	61.8	1.3	1,140	67.2	2.0	76.3	2.3	1,009	44.7	1.5	50.7	1.6

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Discharges with any diagnosis of diabetes and any diagnosis of lower extremity amputation (ICD9-CM 84.00-84.19)

** Discharges with any diagnosis of diabetes and any diagnosis code for lower extremity ulcer (ICD9-CM 707.0-707.1).

1 Hospital Discharge Rates (per 100,000) were adjusted to the 1980 U.S. standard million population, using the direct method.

2 Hospital Discharge Rates (per 100,000) were adjusted to the 2000 U.S. standard million population, using the direct method.

Table 8.11: **Number and age-adjusted diabetes related hospital discharge rates per 100,000 indicating nontraumatic lower extremity amputation* or lower extremity ulcer**, by race/ethnicity: Connecticut, 1991 - 1996**

	Race/ethnicity														
	White[a]					Black[a]					Hispanic				
Year	Number	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error	Number	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error	Number	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error
Lower Extremity Amputation															
1993	760	21.9	0.8	24.7	0.9	144	73.6	6.3	83.9	7.3	53	43.4	6.3	45.6	6.5
1994	833	23.7	0.8	26.6	0.9	164	80.5	6.4	91.3	7.4	57	46.9	6.5	51.1	7.1
1995	846	24.2	0.8	26.9	0.9	160	74.9	6.1	84.1	6.9	71	55.6	7.0	60.9	7.6
1996	879	24.7	0.9	27.8	0.9	165	77.8	6.2	87.8	7.1	65	48.4	6.9	53.2	6.9
Lower Extremity Ulcer															
1993	1,740	49.0	1.2	55.8	1.3	230	113.3	7.7	129.0	9.0	80	72.2	8.4	83.2	9.9
1994	1,705	47.6	1.2	54.0	1.3	270	130.5	8.2	149.9	9.6	95	77.9	8.4	87.2	9.4
1995	1,686	47.3	1.2	53.7	1.3	247	115.7	7.6	133.3	8.9	80	60.6	7.2	69.4	8.4
1996	1,787	50.2	1.2	56.8	1.4	238	110.3	7.3	127.8	8.7	106	79.7	8.2	89.0	9.2

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Discharges with any diagnosis of diabetes and any diagnosis of lower extremity amputation (ICD9-CM 84.00-84.19)

** Discharges with any diagnosis of diabetes and any diagnosis code for lower extremity ulcer (ICD9-CM 707.0-707.1).

1 Hospital Discharge Rates (per 100,000) were adjusted to the 1980 U.S. standard million population, using the direct method.

2 Hospital Discharge Rates (per 100,000) were adjusted to the 2000 U.S. standard million population, using the direct method.

a Excludes those of Hispanic origin

Table 8.12: **Number and age specific[3] hospital discharge rates per 100,000 with diabetes* as any listed diagnosis and either lower extremity amputation or lower extremity ulcer as a listed procedure or diagnosis, by age: Connecticut, 1991 - 1996**

	Age Group					
Year	**0-19**	**20-44**	**45-64**	**65-74**	**75+**	**All Ages**
1991						
Lower extremity ulcer (LEU)[1]	0	99	490	507	615	920
Lower extremity amputation (LEA)[2]	0	44	290	315	271	1,711
Either LEU or LEA	0	143	780	822	886	2,631
Age Specific Rate per 100,000	**0.0**	**10.7**	**119.9**	**321.8**	**453.7**	
1992						
Lower extremity ulcer (LEU)[1]	<10	135	550	528	634	~1,847
Lower extremity amputation (LEA)[2]	0	47	321	304	255	927
Either LEU or LEA	<10	182	871	832	889	~2,774
Age Specific Rate per 100,000	**<1**	**13.9**	**130.5**	**325.5**	**441.9**	
1993						
Lower extremity ulcer (LEU)[1]	0	155	556	629	729	2,069
Lower extremity amputation (LEA)[2]	0	49	334	294	287	964
Either LEU or LEA	0	204	890	923	1,016	3,033
Age Specific Rate per 100,000	**<1**	**15.8**	**133.7**	**362.8**	**491.1**	
1994						
Lower extremity ulcer (LEU)[1]	0	104	589	649	743	2,085
Lower extremity amputation (LEA)[2]	0	44	349	346	326	1,065
Either LEU or LEA	0	148	938	995	1,069	3,150
Age Specific Rate per 100,000	**<1**	**11.6**	**139.6**	**393.8**	**503.8**	
1995						
Lower extremity ulcer (LEU)[1]	<10	137	607	563	731	~2,038
Lower extremity amputation (LEA)[2]	0	63	349	369	311	1,092
Either LEU or LEA	<10	200	956	932	1,042	~3,133
Age Specific Rate per 100,000	**<1**	**15.9**	**141.2**	**372.6**	**480.0**	
1996						
Lower extremity ulcer (LEU)[1]	<10	146	649	593	760	~2,148
Lower extremity amputation (LEA)[2]	0	50	346	368	354	1,118
Either LEU or LEA	<10	196	995	961	1,114	~3,266
Age Specific Rate per 100,000	**<1**	**15.7**	**145.3**	**390.4**	**498.2**	

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Discharges with any diagnosis of diabetes (ICD9-CM 250.0 - 250.9)

1 Discharges with any diagnosis of diabetes and any diagnosis code for lower extremity ulcer (ICD9-CM 707.0-707.1).
Excludes discharges with procedure code for lower extremity amputation (ICD9-CM 84.00-84.19).

2 Discharges with any diagnosis of diabetes and any procedure code for lower extremity amputation (ICD9-CM 84.00-84.19).
Excludes discharges with diagnosis code for lower extremity ulcer (ICD9-CM 707.0-707.184.00-84.19).

3 Age specific discharge rates are calculated per 100,000 population using CT population estimates for the given year. Rates are calculated for hospital discharges with either a diagnosis code for LEU or a procedure code of LEA.

Table 8.13: **Number of diabetes related* hospital discharges indicating ophthalmic complications, by gender and by race/ethnicity: Connecticut, 1991-1996**

Year	Diabetic Retinopathy[1]			Ophthalmic Manifestations[2]		
Gender						
	Total	**Males**	**Females**	**Total**	**Males**	**Females**
1991	1,416	594	822	366	159	207
1992	1,489	636	853	344	172	172
1993	1,762	770	992	332	156	176
1994	1,891	853	1,038	326	144	182
1995	1,843	834	1,009	305	139	166
1996	1,942	844	1,098	380	178	202
Race/ethnicity						
	White**	**Black****	**Hispanic**	**White****	**Black****	**Hispanic**
1991	na	na	na	na	na	na
1992	na	na	na	na	na	na
1993	1,391	247	102	255	51	18
1994	1,484	268	126	255	41	26
1995	1,451	253	121	232	50	19
1996	1,520	248	148	304	38	35

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Discharges with any diagnosis of diabetes and any diagnosis code for diabetic retinopathy (ICD9-CM 362) and discharges with any diagnosis of diabetes with ophthalmic manifestations (ICD9-CM 250.5)

** Excludes those of Hispanic origin.

1 Hospital Discharge Rates (per 100,000) were adjusted to the 1980 U.S. standard million population, using the direct method.

2 Hospital Discharge Rates (per 100,000) were adjusted to the 2000 U.S. standard million population, using the direct method.

Table 8.14: **Age adjusted rates per 100,000 for diabetes related hospital discharges indicating ophthalmic complications*, by gender and by race/ethnicity: Connecticut, 1991 - 1996**

Category and Year	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error	1980 [1] Age-Adj	Std error	2000 [2] Age-Adj	Std error
Gender												
	Both Sexes				**Males**				**Females**			
1991	49.2	1.2	53.3	1.3	45.9	1.7	49.8	1.8	51.7	1.6	55.9	1.8
1992	50.2	1.2	54.5	1.3	48.9	1.7	53.1	1.9	51.6	1.6	56.0	1.8
1993	57.4	1.3	62.5	1.4	56.0	1.8	61.2	2.0	56.4	1.7	60.5	1.9
1994	60.8	1.3	65.8	1.4	60.0	1.9	65.1	2.1	61.5	1.8	66.7	1.9
1995	58.4	1.3	63.4	1.4	58.3	1.9	64.0	2.1	59.2	1.8	63.8	1.9
1996	63.2	1.3	68.5	1.4	60.9	1.9	66.4	2.1	64.9	1.8	70.1	2.0
Race/ethnicity												
	White**				**Black****				**Hispanic**			
1993	50.9	1.3	55.2	1.4	138.2	8.2	152.4	9.1	88.7	8.6	97.0	9.5
1994	53.8	1.3	58.1	1.4	138.2	8.1	151.3	8.9	99.0	8.5	108.8	9.4
1995	51.7	1.3	55.9	1.4	131.2	7.7	145.5	8.7	95.3	8.6	103.9	9.5
1996	56.4	1.3	61.1	1.4	126.1	7.6	137.1	8.4	121.6	9.5	134.4	10.6

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Discharges with any diagnosis of diabetes and any diagnosis code for diabetic retinopathy (ICD9-CM 362) and discharges with any diagnosis of diabetes with ophthalmic manifestations (ICD9-CM 250.5)

** Excludes those of Hispanic origin.

1 Hospital Discharge Rates (per 100,000) were adjusted to the 1980 U.S. standard million population, using the direct method.

2 Hospital Discharge Rates (per 100,000) were adjusted to the 2000 U.S. standard million population, using the direct method.

Table 8.15: **Number and age specific hospital discharge rates[4] per 100,000 indicating ophthalmic complications with diabetes* as any listed diagnosis, by age: Connecticut, 1991 - 1996**

		Age Group					
Year	**Ophthalmic Complication**	**0-19**	**20-44**	**45-64**	**65-74**	**75+**	**Total**
1991							
	Diabetic Retinopathy[1]	0	341	510	366	199	1,416
	Diabetes with Ophthalmic Manifestations[2]	0	65	125	97	79	366
	Diabetes with Ophthalmic Complications[3]	0	406	635	463	278	1,782
	Age Specific Rate per 100,000	**<1**	30.3	97.6	181.3	142.4	
1992							
	Diabetic Retinopathy[1]	<10	311	579	386	211	~1,487
	Diabetes with Ophthalmic Manifestations[2]	<10	63	112	93	75	~216
	Diabetes with Ophthalmic Complications[3]	<10	374	691	479	286	~1,830
	Age Specific Rate per 100,000	**<1**	28.6	103.5	187.4	142.2	
1993							
	Diabetic Retinopathy[1]	0	326	725	443	268	1,762
	Diabetes with Ophthalmic Manifestations[2]	0	52	117	99	64	332
	Diabetes with Ophthalmic Complications[3]	0	378	842	542	332	2,094
	Age Specific Rate per 100,000	**<1**	29.2	126.5	213.1	160.5	
1994							
	Diabetic Retinopathy[1]	<10	365	753	496	276	~1,890
	Diabetes with Ophthalmic Manifestations[2]	0	45	128	94	59	326
	Diabetes with Ophthalmic Complications[3]	<10	410	881	590	335	~2,216
	Age Specific Rate per 100,000	**<1**	32.1	131.1	233.5	157.9	
1995							
	Diabetic Retinopathy[1]	<10	329	700	505	308	~1,842
	Diabetes with Ophthalmic Manifestations[2]	0	48	114	81	62	305
	Diabetes with Ophthalmic Complications[3]	<10	377	814	586	370	~2,147
	Age Specific Rate per 100,000	**<1**	30.0	120.2	234.3	170.4	
1996							
	Diabetic Retinopathy[1]	<10	322	793	524	301	~1,940
	Diabetes with Ophthalmic Manifestations[2]	0	42	150	117	71	380
	Diabetes with Ophthalmic Complications[3]	<10	364	943	641	372	~2,320
	Age Specific Rate per 100,000	**<1**	29.2	137.7	260.4	166.4	

Data Source: Connecticut Office of Health Care Access, Hospital Discharge Abstract and Billing Data Base

* Discharges with any diagnosis of diabetes (ICD9-CM 250.0 - 250.9)

1 Discharges with any diagnosis of diabetes and any diagnosis code for diabetic retinopathy (ICD9-CM 362). Excludes discharges with any diagnosis of diabetes with ophthalmic manifestations (ICD9-CM 250.5)

2 Discharges with any diagnosis of diabetes and any diagnosis code for diabetes with ophthalmic manifestations (ICD9-CM 250.5). Excludes discharges with any diagnosis of diabetic retinopathy (ICD9-CM 362).

3 Number of discharges with any diagnosis of diabetes w/ophthalmic manifestations or any diagnosis or diabetic retinopathy.

4 Age specific discharge rates are calculated per 100,000 population using CT population estimates for the given year. Included are discharges with any diagnosis of diabetes with ophthalmic manifestations (ICD9-CM 250.5) or any diagnosis of diabetic retinopathy (ICD9-CM 362).

Table 8.16: **Percent of dental visits and number of teeth removed by diabetes status*: Connecticut 1996**

	Adults with Diabetes		Adults No Diabetes	
	%	Std error	%	Std error
Dental visit in previous 2 years[1]	75.6	4.9	83.8	1.1
Males	82.6	8.1	84.9	1.5
Females	72.0	6.2	82.8	1.6
Number of Teeth Removed[2]				
5 or less	38.0	6.1	29.9	1.2
6+ but not all	25.8	5.1	10.2	0.9
All	20.7	4.7	5.5	0.6
Males				
5 teeth or less	51.6	10.5	30.4	1.9
6 teeth or more	34.0	9.9	15.4	1.5
Females				
5 teeth or less	30.9	7.4	29.5	1.6
6 teeth or more	53.1	7.4	16.1	1.8
Age group				
18-44 years				
5 teeth or less	na	na	26.2	1.6
6 teeth or more	na	na	2.8	0.9
45-64 years				
5 teeth or less	36.7	8.4	37.7	2.4
6 teeth or more	55.7	8.7	20.4	1.6
65+ years				
5 teeth or less	8.9	7.8	29.5	2.9
6 teeth or more	58.4	8.1	48.1	3.1

Data Source: Connecticut Dept Public Health, Behavioral Risk Factor Surveillance System

* Based on responses to question "Have you ever been told by a doctor that you have diabetes?"

1 Based on responses to the question: "How long has it been since you last visited the dentist or a dental clinic?"

2 Based on reponses to the question: "How many of your permanent teeth have been removed because of tooth decay or gum disease? Do not include teeth lost for other reasons, such as injury or orthodontics."

Table 8.17: **Number and percent of births indicating maternal diabetes*: Connecticut, 1991-1996**

	Year						
	1991	1992	1993	1994	1995	1996	Total
Number of Births w/ Maternal Diabetes	983	1,171	1,162	1,087	1,005	1,011	6,419
Total Number of Births	48,543	47,574	46,658	45,795	44,388	44,455	277,413
Percent of Total w/ Maternal Diabetes	2.0	2.5	2.5	2.4	2.3	2.3	2.3

Data Source: Connecticut Dept of Public Health, Vital Statistics

* The birth certificate indicated maternal diabetes as a medical risk factor for the pregnancy.

Table 8.18: **Number and percent of mothers with diabetes* within age group and within race/ethnicity group: Connecticut 1991-1996****

Age Group	Number of births w/ maternal diabetes	Percent of group w/ maternal diabetes	Race/Ethnicity Group	Number of births w/ maternal diabetes	Percent of group w/ maternal diabetes
<25	830	1.2	White, nonHispanic	4151	2.2
25-34	3968	2.4	Black, nonHispanic	749	2.5
35+	1620	3.9	Hispanic	805	2.5
Total	**6419**	**2.3**			

Data Source: Connecticut Dept of Public Health, Vital Statistics

* The birth certificate indicated maternal diabetes as a medical risk factor for the pregnancy

** Data pooled over these years.

Table 8.19: **Percentage of births with selected complications among mothers with diabetes: Connecticut, 1991-1996****

Complication	Percent of births indicating maternal diabetes	Percent of births not indicating maternal diabetes
Hypertension, chronic	3.7	<1
Hypertension, pregnancy associated	6.1	2.3
Hydramnios (excessive amount of amniotic fluid)	2.7	1.0
Previous infant 4000+ grams	2.8	<1
Dysfunctional labor	3.8	2.1
Breech/Malpresentation	4.5	2.9
Cephalopelvic disproportion	5.9	3.0
Fetal distress	4.3	2.9
Congenital anomalies of child	<1	<1
Macrosomia (birth weight 4000+ grams)	16.9	11.3
Low birthweight (birth weight <2500 grams)	6.4	7.0

Data Source: Connecticut Dept of Public Health, Vital Statistics

* The birth certificate indicated maternal diabetes as a medical risk factor for the pregnancy

** Data pooled over these years.

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Appendices

Technical Notes

BRFSS: The Behavioral Risk Factor Surveillance System is a random sample telephone survey of non-institutionalized adults (18 years and older) conducted annually by state health departments in collaboration with the Centers for Disease Control and Prevention (CDC). The BRFSS survey includes questions on health issues such as diabetes, tobacco and alcohol use, physical exercise, diet, weight control, seat belt use and use of preventive and other health care services. For this report, a person was assumed to have diabetes if they answered yes to the question: "Have you ever been told by a doctor that you have diabetes?"

Limitations:
BRFSS data omit anyone younger than 18, any Connecticut resident in an institution including nursing homes and prisons, any household that does not have a phone and respondents not able to use a telephone. Results are only as valid as the answers given by the respondent and are subject to recall bias.

Because of the small number of respondents with diabetes each year, much of the analysis in this report is based on combined (pooled) data from several years. BRFSS findings are based on weighted data. To perform multiple year analysis, data must be re-weighted and wording changes must be considered. The computer application SUDAAN was used to create prevalence estimates and standard errors. Prevalence estimates should be regarded as estimates. While scientific survey procedures were followed in all phases of the survey, estimates can fluctuate due to random error. Despite these limitations, the estimates can still be viewed as valuable tools in developing health programs and policy.

Minority prevalence estimates:
Calculation of reliable diabetes prevalence estimates among racial and ethnic groups in Connecticut is limited due to several factors. Annual sample sizes for the survey have ranged from approximately 1500 to 3100. Given that each racial and ethnic population is a relatively small fraction of the total population and that diabetes affects a fraction of that fraction, the number of minority respondents with diagnosed diabetes may be too few in any given sample and even for pooled samples to reliably represent the larger racial and ethnic populations.

Vital Statistics: Birth and death data are collected by the Vital Records unit of the Connecticut Department of Public Health.

Hispanic ethnicity
Refers to people whose origins are from Spain, the Spanish-speaking countries of Central America, South America and the Caribbean or persons of Hispanic origin identifying themselves as Spanish, Spanish-American, Hispanic, Hispano, Latino and so on. In Connecticut, the birth, death and fetal death certificates have a separate line item for the individual's Hispanic status, to attempt to distinguish Hispanic ethnicity from race. Individuals identifying themselves as "Hispanic" can be of any race and are also counted in the race breakdown as either "white", "black" or "other".

Race

A population of individuals who identify themselves from a common history, nationality, or geographical place. When responses in the "race" line item on vital records are associated with the definition of Hispanic origin, they are recoded to "white race" as described in the National Center for Health Statistics instruction manuals for coding vital records. Individuals identifying themselves as "white", "black" or "other" race can be of any ethnic group.

Birth Certificate Data: These data represent all births occurring in Connecticut and all births occurring to Connecticut residents out of state. The data include: parental identifying and demographic information; prenatal history; condition of the newborn; maternal medical risk factors including diabetes; obstetric procedures; and method of delivery.

Limitations:
The usefulness of these data depend on provider completeness and accuracy. Prior to 1998, Connecticut birth certificates had a single check box to note diabetes as a risk factor. In 1998, a second check box was added to the birth certificate enabling differentiation between pre-existing and gestational diabetes.

Death Certificate Data: These data represent all deaths occurring in Connecticut and all deaths occurring to Connecticut residents out of state. Variables include decedent's demographic information, date and place of death, underlying and contributing cause of death.

Limitations:
Death certificates underrepresent the contribution of diabetes to mortality largely because people tend to die from the complications of the disease rather than the disease itself. Other limitations of death certificate data include incomplete reporting of information on the certificates, inaccurate cause of death, variations in physicians' interpretations of the causal sequence leading to death and coding variations at time of data entry.

Cause of Death
All causes of death in this report were coded in accordance with the International Classification of Disease, Ninth Revision (ICD9). The underlying cause is defined as the disease or injury that initiated the sequence of events leading directly to death, or the circumstances of the accident or violence that produced the fatal injury. 'Any mention of diabetes', 'contributing cause', 'diabetes-related deaths' all refer to death certificates on which diabetes is listed as a secondary cause to the underlying cause.

Crude rate
The number of events per a specified number of population (i.e., per 100,000). Crude rates are not adjusted for differences in demographic distributions among populations.

Age adjusted (standardized) rate
Age adjusted rates allow deaths, hospitalizations, etc. to be compared among race/ethnicity and gender because, unlike crude rates, they take into account the effect of difference age distributions in different populations. Statistically, the AAR are weighted averages of the age-specific rates, where the weights represent the fixed population proportions by age. The age-adjusted rates in

this document were computed using the direct method, that is, by applying the age-specific rates to the US population 1980 and 2000 standard millions (see table for values). Age-adjusted rates should not be compared to crude rates.

Age Group	1980 Standard Million	2000 Standard Million
0-4	72419	69136
5-9	73084	72533
10-14	80248	73032
15-19	92869	72169
20-24	94079	66478
25-29	86677	64530
30-34	78122	71044
35-39	61959	80762
40-44	51596	81851
45-49	48617	72118
50-54	51477	62716
55-59	51112	48454
60-64	44643	38793
65-69	38777	34264
70-74	30100	31773
75-79	21241	27000
80-84	12995	17842
85+	9985	15508
	1000000	1000000

Age specific rate

The number of events (deaths, hospitalizations) for a specific age group per 100,000 population of the same age group.

Hospital Discharge: As required by state law, the Connecticut Office of Health Care Access collects and maintains hospital discharge data for the purpose of monitoring the effectiveness of the health care system. The database consists of data from medical record abstracts and hospital bills. Variables available to the CTDCP include: principal and additional diagnoses; principal and additional procedures; charges; primary payer; length of stay and; demographic information. Procedure codes provide information on diabetes-related procedures such as lower-extremity amputations. The ICD9 diagnosis codes of 250.0 to 250.9 were used in this report to identify diabetes discharges.

Limitations:

The quality of the data depends on the accuracy with which the data are coded and transcribed. In addition, since unique personal identifiers are not available to the CTDCP, we are not able to distinguish between multiple hospitalizations for one person and a single hospitalization for many people. Therefore, hospitalization rates reflect the burden on the health care system rather than population disease rates. Data do not include outpatient services, emergency room only visits, long term and federal hospitals.

Network of New England, Inc.: The Network of New England, Inc. is one of eighteen End Stage Renal Disease (ESRD) Network organizations under contract with the Health Care Financing Administration (HCFA) to monitor the quality of care given to ESRD patients by providers of dialysis services and transplantation. The network maintains a patient specific data management system.

Population Estimates: Connecticut population estimates were obtained from the Connecticut Department of Public Health, Office of Policy, Planning and Evaluation. Population estimates by age, sex, race and Hispanic origin were obtained from the US Census Bureau Estimates, PE-57, 12/97. *http://www.census.gov/population/estimates/states/sasrh/sashr_rl.txt*

Statistical significance: The 95 percent confidence interval for the difference between rates was used to determine whether two rates were significantly different from each other. Determination of statistical significance was based on non-overlapping 95 percent confidence intervals.

Glossary

Blindness[4]: Severe impairment (legal blindness) is defined as visual acuity of 20/200 or worse.

Body Mass Index (BMI) [3]: A measurement which describes relative weight for height and is significantly correlated with total body fat content. BMI is calculated as weight (kilogram) / height squared (meters^2). To estimate BMI using pounds and inches, use: [weight (pounds) / height (inches)^2] x 704.5.

Breech/Malpresentation[2]: An abnormality of delivery where the fetus presents a part of the anatomy other than the head.

Cardiovascular disease[4] (CVD): Disease affecting the cardiovascular system which consists of the heart and blood vessels.

Cephalopelvic disproportion[2]: The condition during delivery in which the infant's head is too large to pass through the mother's pelvis.

Cerebrovascular disease: Damage to the blood vessels in the brain, resulting in stroke. The blood vessels become blocked because of fat deposits or they become thick and hard, blocking the flow of blood to the brain. Sometimes, the blood vessels may burst resulting in hemorraghic stroke.

Certified Diabetes Educator (C.D.E.): A health care professional who is qualified by the American Association of Diabetes Educators to teach people with diabetes how to manage their condition.

Cholesterol: A fat-like substance found in the body. The body makes and needs some cholesterol. Too much cholesterol, however, may cause fat to build up in the artery walls and cause disease that slows or stops the flow of blood.

Congenital anomalies (defects) [2]: Anatomical malformation(s) of the infant .

Diabetes Control and Complications Trial (DCCT): A 10 year study (1983-1993) funded by the National Institute of Diabetes and Digestive and Kidney Diseases to assess the effects of intensive therapy on the long-term complications of type 1 diabetes. The study proved that intensive management of insulin-dependent diabetes prevents or slows the development of eye, kidney, and nerve damage caused by diabetes.

Diabetic ketoacidosis (DKA)[2,4]: A life-threatening but reversible complication characterized by severe disturbances in protein, fat and carbohydrate metabolism resulting from blood glucose levels that are too high and insulin levels that are too low.

Dialysis: A method of removing waste such as urea from the blood when the kidneys can no longer do the job.

Dilated eye (pupil) exam: An eye examination in which eye drops are administered to enlarge the pupils enabling the doctor to view the back of the eye for damage.

Dysfunctional labor[2]: Delivery of a fetus in which problems arise during the birth process.

Dyslipidemia[4]: Abnormal serum lipid concentrations.

End stage renal disease (ESRD): The final stage of kidney disease treated by dialysis or kidney transplantation.

Epidemiology: The study of disease that deals with how many people have it, where they are, how many new cases develop and how to control the disease.

Fetal distress[2]: A clinical diagnosis indicating a pathological condition of the fetus.

Gangrene: The death of body tissue. It is most often caused by a loss of blood flow.

Glaucoma: An eye disease associated with increased pressure within the eye. Glaucoma can damage the optic nerve and cause impaired vision and blindness.

Glomerulonephritis[2]: An inflammation of the kidneys, often secondary to a severe infection elsewhere in the body.

Glycosylated hemoglobin test (HbA1C): A blood test that measure a person's average blood glucose (sugar) level for the 2 to 3 month period before the test.

High blood pressure (Hypertension): When the blood flows through the vessels at greater than normal force. High blood pressure strains the heart, harms the arteries, and increases the risk of heart attack, stroke and kidney problems.

High density lipids (HDL) [2]: Plasma lipids bound to albumin, consisting of lipoproteins that contain more protein than low density lipoproteins.

Hydramnios[4]: A condition in which excess fluid surrounds the unborn child.

Hyperglycemia: Too high a level of glucose (sugar) in the blood. A sign that diabetes is not well controlled.

Hyperlipidemia: Too high a level of fats (lipids) in the blood.

Impaired glucose tolerance (IGT), Impaired fasting glucose (IFG) [4]: Blood glucose (sugar) levels higher than normal but not high enough to be called diabetes.

Incidence[4]: The frequency of new cases of a disease.

Insufficient physical activity[4]: Exercise fewer than three days per week or less than 20 minutes at a time.

Insulin resistance: The body's lack of response to the action of insulin.

Insulin: A hormone produced by the pancreas that helps the body use glucose (sugar) for energy.

Ischemic heart disease[2]: Disease of the heart characterized by local and temporary deficiency of blood supply due to obstruction of circulation.

Lower extremity ulcer (LEU): People with diabetes may get ulcers from minor scrapes on the feet or legs, from cuts that heal slowly or from rubbing of shoes that don't fit well. Ulcers can become infected.

Macrosomia: Abnormally large babies that may be born to women with diabetes.

Managed care[5]: A system of health care delivery that influences utilization and cost of services and measures performance. The goal is a system that delivers value by giving people access to quality, cost-effective health care.

Medicaid (Title XIX)[5]: A Federally aided, state-operated and administered program which provides medical benefits for certain indigent or low-income persons in need of health and medical care. The program authorized by Title XIX of the Social Security Act, is basically for the poor. It does not cover all of the poor, however, but only persons who meet specified eligibility criteria.

Medicare[5]: A federally funded nationwide hospital and medical-care insurance program for the elderly (over age 65) and some people with disabilities.

Nephropathy: Disease of the kidneys caused by damage to the small blood vessels or to the units in the kidneys that clean the blood.

Neuropathy: Disease of the nervous system. The most common form of neuropathy in a people with diabetes is peripheral neuropathy which mainly affects the feet and legs. Causes pain, numbness or a tingling feeling.

Nontraumatic lower extremity amputation (LEA)[4]: Surgical removal of disease affected portions of a leg or foot.

Obesity[3]: Body mass index (BMI) of ≥ 30 kg/m^2 .

Optometrist: A person professionally trained to test the eyes and to detect and treat eye problems and some diseases by prescribing and adapting corrective lenses and other optical aids.

Overweight[3]: Body mass index (BMI) of 25 to 29.9 kg/m^2

Perinatal mortality[4]: In this report defined as death of an infant under 28 days of life.

Periodontal disease: Damage to the gums.

Peripheral vascular disease: Disease in the large blood vessels of the arms, legs and feet.

Photocoagulation (laser): Using a laser to seal off bleeding blood vessels in the eye. The laser can also burn away blood vessels that should not have grown in the eye.

Podiatrist: A doctor who treats and takes care of people's feet.

Prevalence: The number of people in a given group or population who are reported to have a disease.

Registered Dietitian (R.D., Nutritionist): An expert in nutrition who assists people with special health needs plan the kinds and amounts of foods to eat.

Renal failure[2]: Failure of the kidney to perform its essential functions.

Risk factor: Anything that raises the chance that a person will get a disease.

Stroke (cerebrovascular disease): Disease caused by damage to blood vessels in the brain.

Toxemia[4]: A condition in pregnant women in which poisons such as the body's own waste products build up and may cause harm to both the mother and baby.

Triglyceride (serum triglycerides): A type of blood fat. The body needs insulin to remove this type of fat from the blood. When diabetes is under controlled and a person's weight is at healthy weight, the level of triglycerides in the blood is usually normal.

References for Glossary:

All entries except those identified by a superscript numeral are from:

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Connecticut Legislation Concerning Diabetes

Public Act No. 99-284 (sections 43 & 44): An Act Concerning Managed Care Accountability

Summary: This act makes a number of changes to the regulation of managed care companies addressing coverage, procedural protections and standards, mental health parity, medical record information privacy, the selling or disclosure of medical records information, consumer representation, and unfair acts and practices. The act establishes coverage requirements, under specified conditions for experimental treatments and drugs, chronic illnesses, diabetes self-management training, prostate cancer screening, Lyme disease, and inpatient dental care services for certain children and the developmentally disables. The act creates an Office of Managed Care Ombudsman to assist health care consumers in their dealings with managed care plans. The act establishes various procedures and time frames for coverage determination, prompt claims payment, and complaints and grievances.

Effective Date: October 1, 1999 except that (1) the mental health parity provisions and the various health insurance coverage requirements take effect January 1, 2000, and (2) the medical records sections take effect July 1, 2000.

Further Explanation

Diabetes Training

The act requires individual and group health insurance policies to cover outpatient self-management training for the treatment of insulin-dependent, insulin-using, gestational, and non-insulin-using forms of diabetes. After a diabetes diagnosis, the policies must cover medically necessary training visits as follows: (1) up to 10 hours of initial training visits, including nutrition counseling and the proper use of equipment and supplies; (2) up to four hours of training and education after a doctor's subsequent diagnosis show that a change in symptoms or conditions requires modification of the self-management program; and (3) up to four hours of training and education because of new techniques and treatments for diabetes. These benefits must be subject to the same terms and conditions as other policy benefits. the coverage requirement applies to hospital and medical services offered by HMOs and health insurance policies that cover (1) basic hospital expenses, (2) basic medical-surgical expenses, (3) major medical expenses, or (4) hospital or medical services expenses. The coverage must be in policies or plans delivered, issued for delivery, renewed, or continued in the state beginning January 1, 2000.

http:// www.cga.state.ct.us/ps99/sum/htm/1999sum0284.htm

CGS 38a-492d. Mandatory coverage for diabetes testing and treatment.
(formerly Public Act No. 97-268 section 4 : An Act Concerning Continuation Of Health Benefits Under Group Health Plans And Requiring Health Insurance Coverage For Diabetes Treatment)

(a) Each individual health insurance policy providing coverage of the type specified in subdivisions (1), (2), (4), (11) and (12) of section 38a-469 delivered, issued for delivery or renewed in this state on or after October 1, 1997, shall provide coverage for laboratory and diagnostic tests for all types of diabetes.

(b) Notwithstanding the provisions of section 38a-492a, each individual health insurance policy providing coverage of the type specified in subdivisions (1), (2), (4), (11) and (12) of section 38a-469 delivered, issued for delivery or renewed in this state on or after October 1, 1997, shall provide medically necessary coverage for the treatment of insulin-dependent diabetes, insulin-using diabetes, gestational diabetes and non-insulin-using diabetes. Such coverage shall include medically necessary plan, drugs and supplies prescribed by a prescribing practitioner, as defined in section 20-571.

CGS 19a-79 Section (a)(2). Regulations. Exemptions.
(formerly Public Act No. 99-125: An Act Concerning The Department Of Public Health's Authority Over Certain Laboratory Fees, Full-Time Health Directors, The Submission Of Part-Time Public Health Budgets, Operating Youth Camps Without A License And Regulations Monitoring Diabetes And Medications At Youth Camps)

(a) The Commissioner of Public Health shall adopt regulations, in accordance with the provisions of chapter 54, to further the purposes of sections 19a-77 to 19a-80, inclusive, and 19a-82 to 19a-87, inclusive, and to assure that child day care centers and group day care homes shall meet the health, educational and social needs of children utilizing such centers and group day care homes. Such regulations shall (1) specify that before being permitted to attend any child day care center or group day care home, each child must be protected as age-appropriate by adequate immunization against diphtheria, pertussis, tetanus, poliomyelitis, measles, mumps, rubella, hemophilus influenzae type B and any other vaccine required by the schedule of active immunization adopted pursuant to section 19a-7f including appropriate exemptions for children whom such immunization is medically contraindicated and for children whose parents object to such immunization on religious grounds, (2) specify conditions under which child day care center directors and teachers and group day care home providers may administer tests to monitor glucose levels in a child with diagnosed diabetes mellitus, and administer medicinal preparations, including controlled drugs specified in the regulations by the commissioner, to a child receiving child day care services at such center or group day care home pursuant to the written order of a physician licensed to practice medicine or a dentist licensed to practice dental medicine in this or another state, or an advanced practice registered nurse licensed to prescribe in accordance with section 20-94a, or a physician assistant licensed to prescribe in accordance with section 20-12d, and the written authorization of a parent or guardian of such child, (3) specify that an operator of a child day care center or group day care home, licensed before January 1, 1986, or an operator who receives a license after January 1, 1986, for a facility licensed prior to January 1,1986, shall provide a minimum of thirty square feet per child of total indoor usable space, free of furniture except that needed for the children's purposes**,** exclusive of toilet rooms, bathrooms, coatrooms, kitchens, halls, isolation room or other rooms used for the purposes other than the activities of the children, and (4) specify that a child day care center or group day care home licensed after January 1, 1986, shall provide thirty-five square feet per child of total indoor usable space.

(b) The Commission of Public Health may adopt regulations, pursuant to chapter 54, to establish civil penalties of not more than one hundred dollars per day for each day of violation and other disciplinary remedies that may be imposed, following a contested-case hearing, upon the holder of a license issued under section 19a-80 to operate a child day care center or group day care home or upon the holder of a license issued under section 19a-87b to operate a family day care home.

(c) The Commission of Public Health shall exempt Montessori schools accredited by the American Montessori Society or the Association Montessori Internationale from any provision in the regulations adopted pursuant to subsection (a) of this section which sets requirements on group size or child to staff ratios or the provision of cots.

Diabetes Resources

The following is a list of organizations from which either diabetes related data or informational materials may be obtained.

Organization Name	Address	Phone	Internet address
American Association of Diabetes Educators	444 N. Michigan Ave. Suite 1240 Chicago, IL 60611	1-800-338-3633	http://www.aadenet.org/
American Diabetes Association Eastern Division Connecticut Area	300 Research Parkway Meriden, CT 06450	1-800-842-6323	
American Diabetes Association, National Office	1701 North Beauregard ST Alexandria, VA 22311	1-800-342-2383	http://www.diabetes.org/
American Dietetic Association Diabetes Care & Education Practice Group	216 W. Jackson Boulevard, Suite 800 Chicago, IL 60606-6995	1-800-366-1655	http://www.eatright.org/
American Heart Association	7272 Greenville Avenue Dallas, TX 75231	(214) 373-6300	http://www.amhrt.org/
Behavioral Risk Factor Surveillance System	CT Dept. Public Health P.O. Box 340308, MS#11PSI Hartford, CT 06134-0308	(860) 509-7662	http://www.cdc.gov/nccdphp/brfss/
Centers for Disease Control and Prevention Division of Diabetes Translation	4770 Buford Highway, NE MS K-13 Atlanta, GA 30341-3724	1-877-232-3422	http://www.cdc.gov/diabetes/
Children with Special Health Care Needs Connecticut Department of Public Health	410 Capitol Avenue P.O. Box 340308 Hartford, CT 06134-0308	(860) 509-8074	http://www.state.ct.us/
Connecticut Association of Diabetes Educators	To locate a diabetes education program or diabetes support group near you call:	1-877-638-2337	
Connecticut Board of Education and Services for the Blind	184 Windsor Avenue Windsor, CT 06095	(860) 602-4000	htttp://www.besb.state.ct.us/
Connecticut Department of Social Services	25 Sigourney Street Hartford, CT 06106	1-800-842-1508	http://www.dss.state.ct.us/
Connecticut Department of Insurance	153 Market Street, 11th Floor Hartford, CT 06103	(860) 297-3800	http://www.state.ct.us/cid/
Connecticut Department of Public Health Diabetes Control Program	410 Capitol Avenue, MS #11HLS P.O. Box 340308 Hartford, CT 06134-0308	(860) 509-7802	http://www.state.ct.us/dph/
Connecticut Office of Health Care	410 Capitol Avenue	1-800-797-9688	http://www.state.ct.us/ohca/

Access	P.O. Box 430308, MS#13HCA Hartford, CT 06134-0308		
Connecticut Primary Care Association	30 Arbor Street, South Hartford, CT 06106-1209	(860) 232-3319	http://www.ctpca.org/
Department of Veterans Affairs Veterans Health Administration Diabetes Program, Headquarters	810 Vermont Avenue NW Washington, DC 20420	(202) 273-8490	http://www.va.gov/health/diabetes/
End Stage Renal Disease Network of New England, Inc.	P.O. Box 9484 New Haven, CT 06534	(203) 387-9332	
Health Care Finance Administration			http:// hcfa.gov/stats/
Health Resources and Services Administration			http://www.hrsa.dhhs.gov/
HealthFinder	A gateway consumer health and human services information web site		http://healthfinder.gov/
Healthy People 2010	Office of Disease Prevention and Health Promotion US Department of Health and Human Services Room 738G Hubert Humphrey Building 200 Independence Ave, SW Washington, DC 20201	1-800-367-4725	http://www.health.gov/healthypeople/
Indian Health Service Diabetes Program	5300 Homestead Road, NE Albuquerque, NM 87110	(505) 248-4182	http://www.ihs.gov/
Juvenile Diabetes Foundation International Diabetes Research Foundation Greater Hartford Chapter	18 N. Main Street West Hartford, CT 06107	(860) 561-1153	http://www. jdfcure.com/
Connecticut Library for the Blind	198 Weston Street Rocky Hill, CT	1-800-842-4516	
Lower Extremity Amputation Prevention Program	Gillis W. Long Hansen's Disease Center 5445 Point Clair Road Carville, LA 70721	(504) 642-4714	http://www.bphc.hrsa.dhhs.gov/leap/
Medicare Information			http://www.medicare.gov/
National Center for Health Statistics			http://www.cdc.gov/nchs/
National Certification Board for Diabetes Educators	435 North Michigan Avenue, Suite 1717 Chicago, IL 60611	(312) 644-0828	http://www.ncbde.org/
National Committee for Quality Assurance			http://www.ncqa.org/pages/policy/hedis/maps/
National Council of La Raza	1111 19th NW, Suite 1000 Washington, DC 20036		http://www.nclr.org/
National Eye Institute	National Institutes of Health	(301) 496-5248	http://www.nei.nih.gov/

	2020 Vision Place Bethesda, MD 20892-3655		
National Federation for the Blind	1800 Johnson Street Baltimore, MD 21230	(410)-659-9314	http://www.nfb.org/
National Heart, Lung, and Blood Institute Information Center	P.O. Box 30105 Rockville, MD 20824-0105	(301) 251-1222	http://www.nhlbi.nih.gov/
National Institute on Aging	National Institutes of Health Bethesda, MD 20892	1-800-222-2225	http://www.nih.gov/nia/
National Oral Health Information Clearinghouse	National Institute of Oral Health 1 NOHIC Way Bethesda, MD 2082-3500	(301) 402-7364	http://www.aerie.com/ nohicweb/
NOAH (New York Online Access to Health)	New York Online Access to Health provides full-text health information for consumers about diabetes in both English & Spanish.		http://www.noah.cuny.edu/ diabetes/diabetes.html
Office of Minority Health Resource Center	P.O. Box 37337 Washington, DC 20013-7337	1-800- 444-6472	http://www.omhrc.gov/
Prevent Blindness America	500 East Remington Road Schaumburg, Illinois 60173	1-800-331-2020	http://www.prevent-blindness.org/
Qualidigm (Connecticut Peer Review Organization)	100 Roscommon Drive Middletown, CT 06457-1591	(203) 632-2008	
US Census Bureau			http://www.census.gov/
US Renal Data System			http://www.usrds.org/
Veterans Administration	950 Campbell Avenue West Haven, CT 06516	(203) 932-5711	