

The Burden of Diabetes in New Jersey: A Surveillance Report

Prevalence of Diabetes

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Introduction

Estimating the prevalence of diabetes in New Jersey is a fundamental activity of the Diabetes Control Program. Prevalence figures provide an insight into which population groups are most at risk for diabetes and, thereby, provide a basis for the development of timely and appropriate preventive and treatment measures. These estimates also provide guidance in allocating resources to satisfy current and future needs for diabetes-related health services.

Prevalence estimates in this report are based on both national and state data. Estimates are provided by age group, gender, race and Hispanic ethnicity. Hispanic origin is an ethnic, rather than racial, classification. When ethnicity data are not specified, persons of Hispanic origin are classified according to their race (i.e., white, black or other). With the exception of Hispanic ethnicity, statewide and county level prevalence estimates have been generated for each demographic category. The estimated statewide prevalence of diabetes in the Hispanic population is too small to develop reliable estimates for counties.

Method

Two methods were used to estimate the prevalence of diabetes in New Jersey. In the first method, nationwide prevalence estimates from the National Health Interview Survey (NHIS) of 1994 were used. Age, race, and gender specific estimates from the NHIS were applied to 1994 population estimates from the U.S. Census Bureau for New Jersey and its counties. This

method produces what is known as synthetic estimates. Since results are based on national figures, they do not represent exact estimates for New Jersey. Despite this limitation, these figures can be combined with other estimates to provide a clearer image of the prevalence of diabetes in New Jersey.

The second method of estimation used the results of the Behavioral Risk Factor Surveillance System (BRFSS) which consists of a series of surveys conducted in New Jersey. The New Jersey Department of Health and Senior Services conducts the BRFSS in cooperation with the federal Centers for Disease Control and Prevention (CDC). This survey was administered for the first time in New Jersey in 1991 and has been repeated annually thereafter. The BRFSS is a telephone survey that gathers responses from an average of 144 New Jersey residents each month. Between 1,250 and 3,200 respondents have answered this survey each year from 1991 to 1996. Respondents are adults 18 years and older who answer questions anonymously regarding personal behaviors that may affect their health status. Telephone interviewers ask questions about seat belt use, hypertension, weight control, tobacco use, alcohol consumption, preventive health practices (including questions concerning diabetes and cholesterol), women's health, AIDS, colorectal cancer screening, consumption of fruits and vegetables, dietary fat intake, health insurance, and demographic data.

When the BRFSS was first conducted in New Jersey in 1991, it had two questions on diabetes designed to measure diabetes prevalence. In 1994, a module of 12 diabetes-specific questions was developed by the CDC and has been incorporated into the BRFSS in New Jersey each year since. The continued use of this module on an annual basis is planned. Responses from the BRFSS surveys provide estimates of diabetes prevalence and health behaviors of persons 18 years of age and over who report they have diabetes. To ensure comparability with the 1994 NHIS statewide prevalence estimates, BRFSS data surrounding 1994 (i.e., 1992 through 1996) were utilized to develop the BRFSS-based diabetes prevalence estimates. In assessing "age at time of diagnosis of diabetes," BRFSS diabetes-module responses from 1994 through 1996 were used.

The question used in the BRFSS to estimate diabetes prevalence has been, "Have you ever been told by a doctor that you have diabetes?" Since 1994, a follow-up question asks women if the diabetes was present only during pregnancy. Questions in the diabetes module are asked only of persons indicating that they have non-gestational diabetes. Because the prevalence of diabetes in the population is relatively low and the sample size in BRFSS in any year is small, results from several years were combined to produce prevalence estimates. Sample responses were weighted to represent the demographics of the New Jersey population.

The two estimates of diabetes prevalence among adults in New Jersey developed from the methodologies described above were then used to develop an estimated range. Estimates of diabetes for persons under 18 years of age are based solely on NHIS data.

Estimating Undiagnosed Cases

Some individuals with diabetes have never been diagnosed and, therefore, are unaware that they have diabetes. In this report, estimates of undiagnosed cases of diabetes reflect the latest classification and diagnostic criteria established by the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus of the American Diabetes Association (ADA). The revised classification system replaces the confusing terms insulin-dependent diabetes mellitus and non-insulin-dependent diabetes mellitus with the terms "type 1 diabetes" and "type 2 diabetes." Type 1 diabetes is characterized primarily by an absolute deficiency of insulin. Type 2 diabetes is characterized primarily by insulin resistance and inadequate compensatory insulin secretory response.¹

The fasting plasma glucose test (FPG) and oral glucose tolerance test (OGTT) are both suitable tests for diabetes. The Expert Committee recommended replacing the routine clinical use of OGTT for diagnosing diabetes with the simpler, less expensive FPG testing method. Also recommended, was a lowering of the fasting diagnostic criteria from >140 mg/dl to >126 mg/dl when using the FPG test method.¹

The ADA anticipated that the estimated number of people with diagnosed and undiagnosed diabetes in the United States, 16 million, will not change as a result of the revision of the diagnostic criteria. Since the 126 mg/dl cut point value of the FPG test approximately equals the cut point value of the OGTT test (200mg/dl), the ADA states that the projected number of people with diabetes in the nation (diagnosed and undiagnosed) will remain the same with the change in testing method. Nevertheless, an increase in the number of people moving from an undiagnosed to a diagnosed status is foreseen because the universal use of the FPG will eventually increase the number of people who will be tested and, therefore, increase the number of diagnosed cases.²

The CDC's National Diabetes Fact Sheet, released on November 1, 1997 incorporated these changes into its national prevalence estimates. CDC no longer uses a 1 to 1 ratio in estimating the undiagnosed and diagnosed diabetes cases. Although CDC's estimates still approximate 16 million people with diabetes, the proportion of diagnosed to undiagnosed cases has gone from 50 percent diagnosed and 50 percent undiagnosed to 66 percent diagnosed and 34 percent undiagnosed.

Analysis

National Prevalence Estimates

The 1998 CDC National Diabetes Fact Sheet indicates that 15.7 million people, or 5.9 percent of the United States population, have diabetes. Of this number, it is estimated that 10.3 million people, or 66 percent, have been diagnosed as having diabetes and 5.4 million, or 34 percent, are undiagnosed. Nationally, people 20 years or older show a prevalence rate of 8.2 percent (15.6 million people) and individuals under the age of 20 show a rate of 0.16 percent, or about

123,000 people. Individuals 65 years or older had a prevalence rate of diabetes estimated at 18.4 percent, or about 6.3 million people. The prevalence of diabetes in people 20 years or older by race/ethnicity is estimated at 11.3 million Non-Hispanic whites (7.8% of that age-race group), 2.3 million Non-Hispanic blacks (10.8%), and 1.2 million Mexican-Americans (10.6%). Data for other Hispanic or Latino groups were not available. With regard to gender, an estimated 8.2 percent or 7.5 million American males 20 years of age or older have diabetes. An estimated 8.1 million or 8.2 percent of American females within the same age group have diabetes.

New Jersey Prevalence Estimates

Synthetic Estimates Developed from the National Health Interview Survey

Synthetic estimates of diabetes prevalence indicate that in 1994 about 251,432 New Jerseyans had been diagnosed with diabetes. These estimates are based on the 1994 National Health Interview Survey and population estimates for New Jersey produced by the U.S. Bureau of the Census. Of this number, about 113,860 were males and 137,572 females. The number of white individuals diagnosed with diabetes is estimated at 189,923, the number of blacks at 50,727 and the number of persons of other races at 10,782. Of the population under 20 years of age, 3,886 are estimated to have been diagnosed with diabetes. There are an additional 40,061 persons diagnosed with diabetes who are 20 through 44 years of age. The remaining estimates by age group, using this methodology, were: 45 through 64 years - 105,959; 65 through 74 years - 60,731; 75 through 84 years - 34,959; and 85 years and over - 5,836 (Table 1).

Table 1
Estimated Number of Persons with Diagnosed Diabetes by Age, Gender and Race*
New Jersey, 1994

Age	Male			Female			Total***
	White	Black	Other	White	Black	Other	
Under 20	2,001	351	**	1,535	**	**	3,886
20-44	13,629	3,335	**	14,247	5,462	3,388	40,061
45-64	36,686	10,662	3,328	35,734	18,070	1,479	105,959
65-74	23,552	2,072	995	28,077	6,034	**	60,731
75-84	13,232	1,569	301	16,369	2,342	1,146	34,959
85 & Over	1,552	451	145	3,309	379	**	5,836
Total	90,652	18,439	4,769	99,271	32,288	6,013	251,432

* Synthetic estimates calculated from N.J. population estimates from the U.S. Bureau of the Census 1994 population estimates and diabetes prevalence estimates for the United States from the 1994 National Health Interview Survey (NHIS).

** The estimated number of New Jersey residents in this group was too small to derive reliable prevalence estimates.

***Numbers may not add to total because of rounding.

According to national estimates derived from the NHIS data, about 32.7 persons per 1,000 population had been diagnosed with diabetes in 1994. National survey results from the NHIS yield prevalence estimates for diagnosed diabetes that are higher in females than in males. Females diagnosed with diabetes were estimated at 33.7 per 1,000 female residents. Males with diagnosed diabetes were estimated to be 29.8 per 1,000 male residents. It is possible that factors related to gender alone do not explain the difference between the rates for males and females.³

According to NHIS findings, blacks had a higher estimated prevalence rate of diagnosed diabetes than whites, with an overall rate of 44.7 per 1,000 black residents. Whites showed a diabetes prevalence rate of 29.7 individuals per 1,000 white residents of the state. The prevalence of diabetes among individuals racially classified as other was 29.0 per 1,000. Among blacks, the age group with the highest prevalence rate was 75 through 84. This age group's prevalence rate was estimated at 161.3 cases per 1,000. The prevalence in whites within the same age group was slightly more than half that of the blacks, 90.5 cases per 1,000. The highest prevalence rate in whites was in the age group 65 through 74, at 94.6 cases per 1,000. For individuals racially classified as "other," the highest prevalence rate was recorded in the 75 through 84 age group. Persons in the "other" race classification had a rate of diagnosed diabetes of 295.6 per 1,000 individuals aged 75 through 84. This is the highest estimated diabetes prevalence rate found among all age/race groups (Table 2).

Table 2
Estimated Number and Rate of Persons Diagnosed with Diabetes by Age, Gender and Race*
New Jersey, 1994

Gender/ Race	Age						Total**
	Under 20	20-44	45-64	65-74	75-84	85 & Over	
Male							
Population	1,086,750	1,516,773	789,483	267,025	134,191	29,611	3,823,833
Diagnosed	2,352	16,964	50,676	26,619	15,102	2,148	113,860
Rate***	2.2	11.2	64.2	99.7	112.5	72.5	29.8

Female Population Diagnosed Rate***	1,035,080 1,535 1.5	1,545,293 23,097 14.9	852,793 55,283 64.8	345,220 34,112 98.8	222,151 19,857 89.4	79,626 3,688 46.3	4,080,163 137,572 33.7
White Population Diagnosed Rate***	1,621,076 3,535 2.2	2,430,875 27,876 11.5	1,371,527 72,421 52.8	545,955 51,630 94.6	327,202 29,601 90.5	101,188 4,861 48.0	6,397,823 189,923 29.7
Black Population Diagnosed Rate***	383,930 351 0.9	464,486 8,797 18.9	200,763 28,732 143.1	53,692 8,106 151.0	24,244 3,911 161.3	7,156 830 116.0	1,134,271 50,727 44.7
Other Race Population Diagnosed Rate***	116,824 **** ****	166,705 3,388 20.3	69,986 4,806 68.7	12,598 995 79.0	4,896 1,447 295.6	893 145 162.5	371,902 10,782 29.0
NJ Total Population Diagnosed Rate***	2,121,830 3,886 1.8	3,062,066 40,061 13.1	1,642,276 105,959 64.5	612,245 60,731 99.2	356,342 34,959 98.1	109,237 5,836 53.4	7,903,996 251,432 31.8

* Synthetic estimates calculated from N.J. population estimates from the U.S. Bureau of the Census 1994 population estimates and diabetes prevalence estimates for the United States from the 1994 National Health Interview Survey (NHIS).

** Numbers may not add to total because of rounding.

*** Rate/1000 population.

**** The estimated number of New Jersey residents in this group was too small to provide reliable prevalence estimates.

In using the ratio of 66 percent diagnosed and 34 percent undiagnosed cases to estimate the total number of persons with diabetes in New Jersey, a figure of 380,958 cases is calculated. This estimate implies a rate of 48.2 individuals per 1,000 residents of New Jersey with diabetes. The total prevalence in whites, diagnosed and undiagnosed, is estimated at 287,761 or 45.0 per 1,000 white persons and in blacks 76,860 or 67.8 per 1,000 black persons. Persons racially classified as other accounted for 16,337 persons with diabetes or 43.9 per 1,000.

For the state's male population, the prevalence is estimated at 172,516 or 45.1 per 1,000 males, and for females 208,442 or 51.1 per 1,000. A major finding is that about 129,526 people, or nearly 2 percent of New Jersey's population, may have diabetes but not know they have it. In other words, about one in every 50 New Jerseyans may have undiagnosed diabetes (Table 3).

Table 3
Estimated Prevalence* of Diabetes by Gender, Race, Diagnosis Status and Rate
New Jersey, 1994

Gender & Race	NJ Population	Estimated Diagnosed	Estimated Undiagnosed	Total Prevalence**	
				Number	Rate***
Male	3,823,833	113,860	58,655	172,516	45.1
Female	4,080,163	137,572	70,870	208,442	51.1
White	6,397,823	189,923	97,839	287,761	45.0
Black	1,134,271	50,727	26,132	76,860	67.8
Other Race	371,902	10,782	5,555	16,337	43.9
NJ Total	7,903,996	251,432	129,526	380,958	48.2

* Synthetic estimates calculated from N.J. population estimates from the U.S. Bureau of the Census 1994 population estimates and diabetes prevalence estimates for the United States from the 1994 National Health Interview Survey (NHIS).

** Numbers may not add to total because of rounding.

*** Rate/1000 population.

Prevalence rates per 1,000 population are highest for males aged 75 through 84 and for females aged 65 through 74 (170.5 and 149.7 respectively). This difference may indicate that diabetes is diagnosed at younger ages in females than in males. The total prevalence rates for males and females combined is highest in the 65 through 74 age group. Individuals under 20 years of age are estimated to have a total prevalence of about 2.8 per 1,000 population and among persons 20 through 44 years of age, the estimate is 19.8 per 1,000. The rate is estimated at 97.8 per 1,000 persons for people 45-64 and 150.3 per 1,000 persons for those 65 through 74 years old. People 75 through 84 have an estimated rate of 148.6 per 1,000 persons and for those 85 years and older the rate is 80.9. These findings imply that about one out of every seven New Jerseyans 65 years and older has diagnosed or undiagnosed diabetes. The estimated prevalence of diabetes in individuals under 45 years of age is much lower than in individuals 45 and over. In New Jersey, as in the nation, about one out of every three people with diabetes is unaware she/he has this disease (Table 4).

Table 4
Estimated Prevalence* of Diagnosed and Undiagnosed Diabetes by Age, Gender, and Rate
New Jersey, 1994

	Age	
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Gender and Diagnosis Status	Under 20	20-44	45-64	65-74	75-84	85 & Over	Total**
Male							
Population							
Diagnosed							
Undiagnosed	1,086,750	1,516,773	789,483	267,025	134,191	29,611	3,823,833
Total	2,352	16,964	50,676	26,619	15,102	2,148	113,860
Prevalence	1,211	8,739	26,106	13,713	7,780	1,106	58,655
Prevalence	3,563	25,702	76,782	40,332	22,882	3,254	172,516
Rate***	3.3	16.9	97.3	151.0	170.5	109.9	45.1
Female							
Population							
Diagnosed							
Undiagnosed	1,035,080	1,545,293	852,793	345,220	22,151	79,626	4,080,163
Total	1,535	23,097	55,283	34,112	19,857	3,688	137,572
Prevalence	791	11,899	28,479	17,573	10,230	1,900	70,870
Prevalence	2,325	34,996	83,762	51,684	30,087	5,588	208,442
Rate***	2.2	22.6	98.2	149.7	135.4	70.2	51.1
N.J. Total							
Population							
Diagnosed							
Undiagnosed	2,121,830	3,062,066	1,642,276	612,245	356,342	109,237	7,903,996
Total	3,886	40,061	105,959	60,731	34,959	5,836	251,432
Prevalence	2,002	20,638	54,585	31,286	18,009	3,006	129,526
Prevalence	5,888	60,699	160,544	92,016	52,969	8,842	380,958
Rate***	2.8	19.8	97.8	150.3	148.6	80.9	48.2
* Synthetic estimates calculated from New Jersey population estimates from the U.S. Bureau of the Census 1994 population estimates and diabetes prevalence estimates for the United States from the 1994 National Health Interview Survey (NHIS). ** Numbers may not add to total because of rounding. *** Rate/1000 population.							

The size of the overall population in a county is the primary determinant of the number of persons with diabetes in that county. Other influencing factors are racial, ethnic, and age distributions of the population. Estimates show eight counties have over 15,000 people diagnosed with diabetes. In descending order, Essex had the highest estimated number of persons with diabetes, 28,621; Bergen was second with 28,139; and Middlesex third with 20,270. Monmouth ranked fourth with 17,635; Union had 17,456, ranking fifth; and Hudson was sixth with 17,232 cases. In seventh and eighth places were Ocean with 16,452 and Camden with 15,401, respectively.

Ranking of counties by prevalence per 1000 population produces a somewhat different ordering of counties. Essex county had the highest estimated rate of people diagnosed with diabetes, 37.4 per 1,000 population; followed by Ocean 36.0; Cape May 35.3; Union 35.2; Atlantic 33.5; Salem and Bergen with 33.4 each; and Mercer with 32.6 cases per 1,000 population (Table 5).

Table 5 Estimated Prevalence* of Diagnosed Diabetes by County and Rate, New Jersey, 1994			
County	Population	Diagnosed	Rate**
Atlantic	232,231	7,771	33.5
Bergen	842,383	28,139	33.4
Burlington	398,812	11,725	29.4
Camden	506,585	15,401	30.4
Cape May	97,774	3,451	35.3
Cumberland	138,803	4,353	31.4
Essex	765,348	28,621	37.4
Gloucester	241,527	6,727	27.9
Hudson	552,387	17,232	31.2
Hunterdon	115,210	3,039	26.4
Mercer	329,431	10,745	32.6
Middlesex	692,869	20,270	29.3
Monmouth	578,509	17,635	30.5
Morris	438,471	12,457	28.4
Ocean	456,518	16,452	36.0
Passaic	461,782	14,269	30.9
Salem	64,786	2,161	33.4
Somerset	260,677	7,536	28.9
Sussex	138,261	3,296	23.8
Union	496,230	17,456	35.2
Warren	95,403	2,697	28.3

Total	7,903,997	251,432	31.8
* Synthetic estimates calculated from New Jersey population estimates from the U.S. Bureau of the Census 1994 population estimates and diabetes prevalence estimates for the United States from the 1994 National Health Interview Survey (NHIS). ** Rate/1000 population.			

In estimating the total (diagnosed and undiagnosed) prevalence of diabetes by county, the CDC's ratio of 66%/34% was employed. Since this ratio acted as a constant in the equation, the ranking of counties according to numbers and rates of diagnosed and undiagnosed cases of diabetes remains the same as the ranking for diagnosed cases alone. Therefore, Essex remains the county with the largest number and rate of persons with diagnosed and undiagnosed diabetes (43,366 or 56.7 per 1,000 persons). In descending order, the other counties having more than 50 people with diabetes per 1,000 population were: Ocean 54.6; Cape May 53.5; Union 53.3; Atlantic 50.7; Bergen 50.6; and Salem with 50.5 cases per 1,000 persons. The high prevalence rates observed in Ocean and Cape May counties reflect their ranking as first and second, respectively, in the percentage of persons age 65 and over in the state. Bergen and Essex are the most densely populated counties in the state. In 1994, these two counties combined accounted for about one-fourth of the estimated total number of diagnosed and undiagnosed cases of diabetes for the entire state. This figure is 86,001 or about 23 percent of all cases (Table 6 and Figures 1 and 2).

Table 6
Estimated Prevalence* of Diagnosed and Undiagnosed Diabetes
by County and Rate, New Jersey, 1994

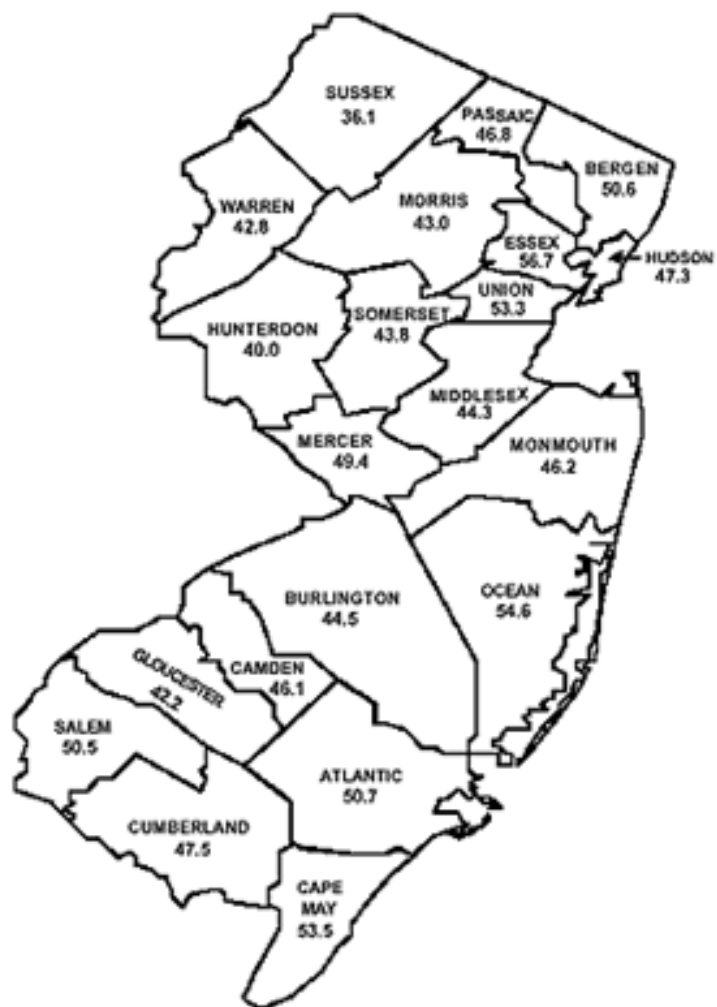
County	Population	Diagnosed	Undiagnosed	Total**	
				Prevalence	Rate***
Atlantic	232,231	7,771	4,003	11,774	50.7
Bergen	842,383	28,139	14,496	42,635	50.6
Burlington	398,812	11,725	6,040	17,766	44.5
Camden	506,585	15,401	7,934	23,335	46.1
Cape May	97,774	3,451	1,778	5,229	53.5
Cumberland	138,803	4,353	2,243	6,596	47.5
Essex	765,348	28,621	14,744	43,366	56.7
Gloucester	241,527	6,727	3,466	10,193	42.2
Hudson	552,387	17,232	8,877	26,109	47.3

Hunterdon	115,210	3,039	1,565	4,604	40.0
Mercer	329,431	10,745	5,535	16,280	49.4
Middlesex	692,869	20,270	10,442	30,712	44.3
Monmouth	578,509	17,635	9,085	26,720	46.2
Morris	438,471	12,457	6,417	18,874	43.0
Ocean	456,518	16,452	8,475	24,928	54.6
Passaic	461,782	14,269	7,351	21,620	46.8
Salem	64,786	2,161	1,113	3,274	50.5
Somerset	260,677	7,536	3,882	11,418	43.8
Sussex	138,261	3,296	1,698	4,994	36.1
Union	496,230	17,456	8,992	26,448	53.3
Warren	95,403	2,697	1,389	4,086	42.8
New Jersey	7,903,997	251,432	129,526	380,958	48.2

* Synthetic estimates calculated from the U.S. Bureau of the Census 1994 population estimates for New Jersey, and diabetes prevalence estimates for the United States from the 1994 National Health Interview Survey (NHIS).

** Numbers may not add to total because of rounding.

*** Rate/1000 population.



**Estimated Rate* of Diagnosed and
Undiagnosed Diabetes by County
New Jersey, 1994****



**Estimated Prevalence of Diagnosed and Undiagnosed Diabetes by County
New Jersey, 1994***

Behavioral Risk Factors Surveillance System (BRFSS)

Data from the 1992 through 1996 BRFSS surveys (mid-point 1994) were used to develop a second set of prevalence estimates for comparing and confirming the preceding NHIS-based New Jersey estimates. Since the number of persons responding "Yes" to the BRFSS question "Have you ever been told by a doctor that you have diabetes?" is not large enough to produce stable estimates for individual years, the responses from consecutive years have been aggregated to provide the BRFSS estimates reported here.

From the BRFSS surveys of 1992 through 1996, it is estimated that New Jersey had an average of 259,538 persons 18 years old and older who had been diagnosed with diabetes. This figure represents 4.3 percent of the state's population in this age group. Based on these numbers and on the national ratio of diagnosed to undiagnosed cases, it is estimated that New Jersey had about 133,702 people with undiagnosed diabetes. When the estimated diagnosed and undiagnosed cases are summed, it is estimated that 393,240 persons 18 and over had diabetes during 1992-1996. This represents 6.5 percent of New Jersey's population in the 18 and older age group or 65.4 per 1,000 persons (Tables 7 and 8).

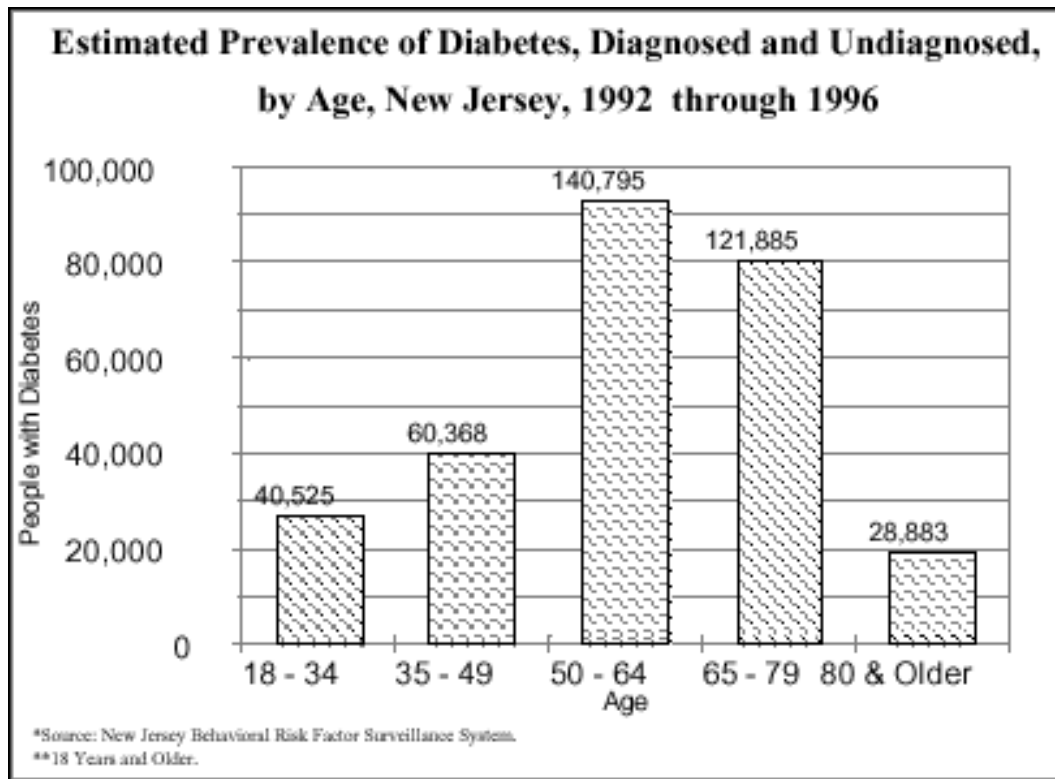
Table 7 Estimated Number of Persons 18 Years and Older with Diagnosed Diabetes, New Jersey BRFSS, 1992 through 1996				
Frequency	BRFSS Sample Size	New Jersey Population 18 and Older	Persons with Diabetes Total	Percent of Yes Responses
Maximum	3,149	6,108,969	304,523	5.1%
Minimum	1,251	5,919,394	216,322	3.6%
Average	1,776	6,007,971	259,538	4.3%
Source: New Jersey Behavioral Risk Factor Surveillance System.				

Table 8 Estimated Number and Rate of Persons 18 Years and Older with Diabetes New Jersey, 1992 through 1996					
Frequency	Population 18 and Older	Diagnosed	Undiagnosed	Total Prevalence	Rate*
Maximum	6,108,969	304,523	156,875	461,398	77.1
Minimum	5,919,394	216,322	111,439	327,761	54.8
Average	6,007,971	259,538	133,702	393,240	65.4
Source: New Jersey Behavioral Risk Factor Surveillance System.					
*Rate/1000 population.					

The BRFSS data from 1992 through 1996 show that an estimated 1.3 percent of New Jersey residents in the age group 18 through 34 years had been diagnosed with diabetes (26,747 persons). In the same period, an estimated 2.3 percent of New Jerseyans in the age group 35 through 49 years had been told by a doctor that they have diabetes (39,834 persons). Among people 50 through 64 years, an estimated 8.4 percent, or 92,924 individuals, had this diagnosis, as did 9.0 percent, or 80,444, of those aged 65 through 79. The highest estimated prevalence rate of diagnosed diabetes was in the oldest age group, 80 years and over. The rate in this age group was estimated to be 11.4 percent or 19,063 persons. The number of surveyed individuals with diagnosed diabetes who refused to give their age was 526.

In general, the BRFSS data of 1992 through 1996 indicated that about 259,538 people, or 4.3 percent of New Jersey's population over 18 years old, were diagnosed with diabetes. When the estimates of undiagnosed persons are added to these numbers, the combined total of diagnosed and undiagnosed persons is 40,525 in the 18 through 34 age range; 60,368 in the age group 35

through 49 years; 140,795 among those 50 through 64 years old; 121,885 in the age group 65 through 79; and 28,883 among those 80 years and older. In summary, the estimated number of New Jerseyans 18 years old and older with diagnosed or undiagnosed diabetes was 393,240, with 34 percent (133,702) not knowing they have this disease (Figure 3).



The estimated number of white non-Hispanic individuals with diabetes (diagnosed and undiagnosed) was 297,673. Black non-Hispanics with diagnosed and undiagnosed diabetes are estimated at 64,045. Hispanics with diabetes accounted for 18,837 people, and persons of other races 9,362. Since the number of Hispanics in the sample and the number of Hispanics answering "yes" to the diabetes question in the BRFSS survey are small, the sample estimates may not adequately represent this segment of the population. This situation highlights the need for increasing the size of the BRFSS sample, and in particular the benefits that could be gained from over-sampling Hispanics and other minorities (Table 9).

Table 9
Estimated Diabetes Prevalence in Persons 18 Years and Older by Race/Ethnicity, New Jersey, 1992 through 1996

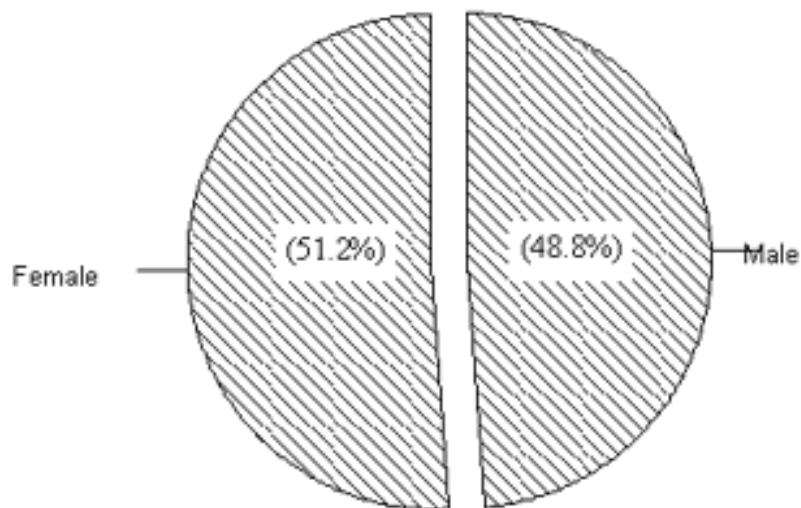
Race/Ethnicity	Diagnosed	Undiagnosed	Total
White, Non-Hispanic	196,464	101,209	297,673
Black, Non-Hispanic	42,270	21,775	64,045
Hispanic	12,433	6,405	18,837

Other	6,179	3,183	9,362
Refused or Unknown	2,193	1,130	3,323
Total	259,538	133,701	393,240
Source: New Jersey Behavioral Risk Factor Surveillance System. * Numbers might not add to total because of rounding.			

The BRFSS results from 1992 through 1996, inflated by the estimated number of undiagnosed cases, lead to an estimated rate of 67.3 people per 1,000 males and 63.8 per 1,000 females over the age of 17. There is a clear difference between the NHIS and BRFSS rate estimates by gender. In the NHIS, diagnosed diabetes prevalence in females is higher than in males (29.8 per 1,000 for males and 33.7 per 1,000 for females). Since survival rates are higher for females than for males and since prevalence rates are higher for older age groups, a higher prevalence rate of diabetes for females than males is a credible expectation. Although BRFSS estimates yield higher rates among males than females (51.2% versus 48.8%), the majority of diagnosed and undiagnosed cases are found among females. It is likely that these gender differences between surveys are caused by fluctuations in sampling and/or differing distributions of risk factors among the surveyed populations (Table 10 and Figure 4).³

Table 10 Estimated Prevalence of Diagnosed and Undiagnosed Diabetes in Individuals 18 Years Old and Older by Gender, Average Number and Average Rate New Jersey, 1992 through 1996					
Gender	Average Population 18 Years/Older	Average Diagnosed	Average Undiagnosed	Total Average	Rate*
Male	2,853,212	126,729	65,285	192,014	67.3
Female	3,154,760	132,809	68,417	201,226	63.8
Total	6,007,971	259,539	133,702	393,240	65.5
Source: New Jersey Behavioral Risk Factor Surveillance System. * Rate per 1,000 population.					

**Estimated Prevalence of Diagnosed and Undiagnosed Diabetes
by Gender, Persons 18 and Over, New Jersey, 1992 through 1996**



Source: New Jersey Behavioral Risk Factor Surveillance System.

According to the New Jersey BRFSS estimates from the 1994 through 1996 surveys, the mean age at diagnosis for persons 18 years and older was 49.5 years for males and 48.7 years for females. The estimated mean age of diagnosis is younger for minorities than for whites. The reason for this earlier age of diagnosis may be related to genetic, medical, and life style risk factors which lead to the need for medical attention and to diagnosis of diabetes.³ The average age at diagnosis was reported as 50.9 years for white non-Hispanics, 43.4 years for black non-Hispanics, 41.9 years for Hispanics and 45.2 years for persons of other races (Table 11).

Table 11
Estimated Mean Age at the Time of Diagnosis of Diabetes by Race
and Hispanic Origin, Persons 18 Years and Older
New Jersey, 1994 through 1996

Gender, Race/Ethnicity	Sample Size	Mean Age
Male	101	49.5
Female	132	48.7
Total	233	49.1
White, Non-Hispanic	170	50.9
Black, Non-Hispanic	41	43.4
Hispanic	13	41.9

Other	8	45.2
Total	233	49.1
Source: New Jersey Behavioral Risk Factor Surveillance System		

Estimating a Range

Although estimates were produced by calculating data from two different information sources, time periods, and population samples (NHIS and BRFSS), the results are not very dissimilar. In the 1994 NHIS-based estimate, the prevalence of diagnosed and undiagnosed diabetes in New Jersey for all ages was calculated at 380,958. On the other hand, in the 1992 through 1996 BRFSS-based estimate for the New Jersey population 18 years and older, the prevalence of diagnosed and undiagnosed cases of diabetes was calculated at 393,240. There are 12,282 fewer cases in the NHIS-based estimate than in the BRFSS-based estimate. Since the estimates were calculated for different age groups (all ages and 18 and over, respectively), this comparison is not precise. Nevertheless, this problem is solvable by extracting the estimated number of diagnosed and undiagnosed individuals under 18 years of age from the NHIS-based estimate for all ages. In this manner, diabetes prevalence estimates for the two sources become more comparable.

The 1994 NHIS provides an estimated rate of 1.4 individuals diagnosed with diabetes per 1,000 U.S. inhabitants under 18 years of age. Applying this rate to the 1994 estimates of New Jersey's population under 18 (1,938,895) provides an estimate of 2,714 juveniles diagnosed with diabetes. The number of undiagnosed cases under 18 years has been estimated as zero cases since the symptoms and effects of type 1 diabetes would make it unlikely that a child would go undiagnosed for an extended period of time. After subtracting the estimated number of children with diabetes from the NHIS-based estimates, there remain an estimated 248,718 diagnosed and 129,526 undiagnosed cases of diabetes among New Jerseyans 18 years and over. The total number of people 18 years and older with diabetes in New Jersey is estimated through the NHIS at 378,244.

The two estimates of diabetes prevalence can now be compared. The difference between the estimates is about 14,996. This figure does not represent a major discrepancy. In part, the discrepancy may be attributable to the use of a single year of data (1994) for the NHIS estimates and a span of five years of data (1992-1996) for the BRFSS estimates. By comparing the NHIS and BRFSS estimates, a range is obtained of between 378,244 and 393,240 persons 18 years and older with diabetes in New Jersey. The mid-point in this range is about 386,000 (385,742). Knowing this, it can be said that in 1994, New Jersey had about 386,000 residents with diabetes, with 34 percent (131,614) of them being undiagnosed. The total prevalence rate for diagnosed and undiagnosed diabetes in New Jersey's population 18 years and older is estimated at 6.5 percent (Table 12).

Table 12
Differences in Diabetes Prevalence Estimates for
Population 18 Years and Older, by Information Source, Number and Mid-Points
New Jersey, 1994

Survey	Diagnosed	Undiagnosed	Total*
BRFSS	259,538	133,702	393,240
NHIS	248,718	129,526	378,244
Difference	(10,820)	(4,176)	(14,996)
Mid-Points	254,128	131,614	385,742

Source: Estimated from national rates from the 1994 National Health Interview Survey (NHIS) and the New Jersey Behavioral Risk Factor Surveillance System (BRFSS).

*Numbers may not add to total because of rounding.

Table 13 presents the age, gender and race specific estimates of diagnosed diabetes, from each of the two sources, NHIS and BRFSS. In addition, mid-point estimates are provided for each of the demographic categories.

Table 13
Range of Diagnosed Cases of Diabetes 18 Years Old and Older
Synthetic (NHIS) and Behavioral Risk Factor Surveillance System Estimates
New Jersey, 1994

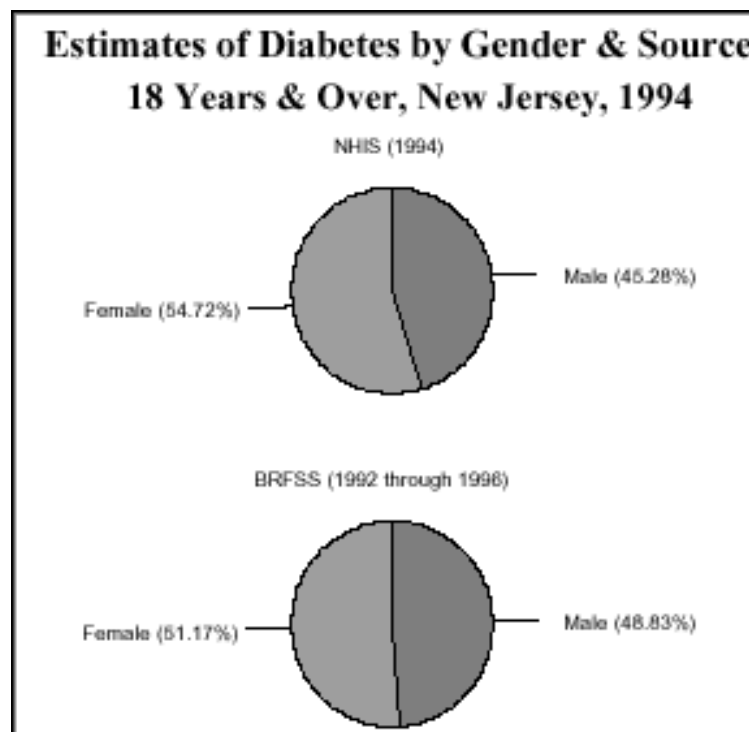
Variable	Synthetic NHIS	New Jersey BRFSS	Mid-point Estimates
Age			
18-44	41,233	46,274	43,754
45-64	105,959	113,558	109,758
65-74	60,731	65,010	62,871
75-84	34,959	30,940	32,949
85 & Over	5,836	3,756	4,796
Total Age	248,718	259,538	254,128
Gender			
Male	112,631	126,729	119,680
Female	136,087	132,809	134,448
Total Gender	248,718	259,538	254,128

Race			
White	187,873	204,870	196,371
Black	50,179	44,785	47,482
Other	10,666	9,089	9,877
Refused	-	794	397
Total Race	248,718	259,538	254,128

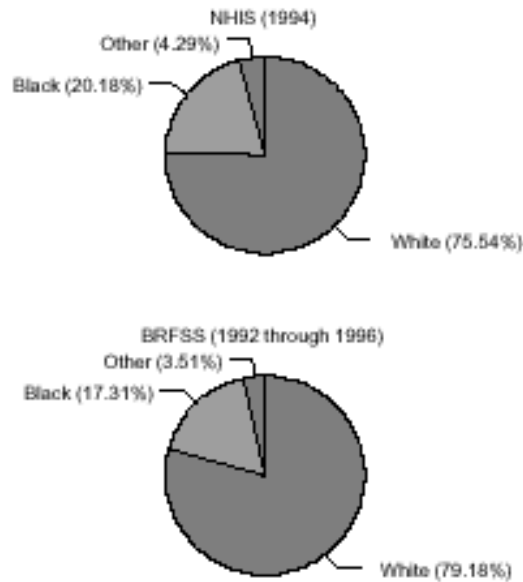
Source: Estimated from national rates from the 1994 National Health Interview Survey (NHIS) and the New Jersey Behavioral Risk Factor Surveillance System (BRFSS) 1992 through 1996.

* Numbers might not add to total because of rounding.

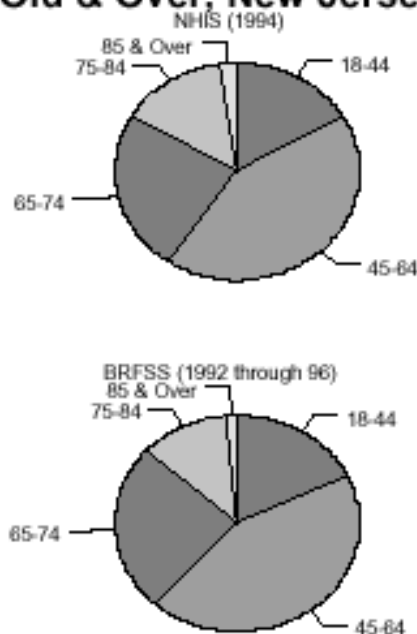
Except for gender distribution, demographic characteristics (i.e., age and race) exhibit similar proportions in the estimates from the two sources. Although the percentage of females is higher in both estimates, in the NHIS the percentage difference is 9.4 percent (54.7% and 45.3% respectively) but only 2.4 percent (51.2% and 48.8% respectively) in the BRFSS estimate (Figures 5, 6 and 7).



Estimates of Diabetes by Race & Source 18 Years & Over, New Jersey, 1994



Estimates of Diabetes by Age & Source 18 Years Old & Over, New Jersey, 1994



Summary

- The National Diabetes Fact Sheet of 1998 provides estimates that about 5.9 percent or 15.7 million Americans have diabetes with 34 percent or 5.4 million of them not knowing they have this disease. The U.S. population 20 years or older has an estimated prevalence of 8.2 percent, and the prevalence in the population under 20 years of age is estimated at 0.2 percent. The prevalence of diabetes in people 20 years or older by race/ethnicity is estimated at 7.8 percent for all non-Hispanic whites, 10.8 percent for all non-

Hispanic blacks, and 10.6 percent for Mexican-Americans. By gender, it is estimated that 8.2 percent of both American males and females 20 years of age or older have diabetes.

- An estimated 386,000 (378,000-393,000) New Jerseyans 18 years old and over had diabetes in 1994. About 131,000 of them did not know they had the disease. Although the prevalence of diagnosed diabetes might be higher in females than in males, there is no evidence that gender itself causes this difference. It is possible that differences are caused by dissimilarities in the risk factors among the surveyed populations. The prevalence of diagnosed and undiagnosed diabetes for New Jerseyans of all ages was estimated through the NHIS at 51.1 per 1,000 for females and for males at 45.1 per 1,000. The BRFSS surveys of 1992 through 1996 showed higher rates for males than for females. The prevalence rate of diagnosed and undiagnosed diabetes among males was estimated at 67.3 per 1,000 and among females at 63.8.
- According to NHIS figures for populations 18 years and over, blacks had higher prevalence rates of diagnosed and undiagnosed diabetes than whites, 67.8 compared to 45.0 per 1,000. In this survey, the highest prevalence of diagnosed diabetes in blacks was in the age group 75 through 84, 161.3 per 1,000 persons. The highest prevalence of diagnosed cases in whites was found in the age group 65 through 74 (94.6 per 1,000). The highest prevalence rate in persons of other races was in the age group 75 through 84 (295.5 per 1,000). For New Jerseyans of all races, diagnosed diabetes was most prevalent among individuals aged 65 through 74. This age group had an overall prevalence rate of 99.2 per 1,000 population.
- Seven counties had a prevalence rate of over 50 cases per 1,000 residents of diagnosed and undiagnosed diabetes. Essex County had the highest prevalence rate, 56.7. Ocean ranked second with 54.6; Cape May third with 53.5; Union followed with 53.3; and Atlantic was next with 50.7. Bergen and Salem Counties were sixth and seventh respectively with rates of 50.6 and 50.5.
- In the BRFSS surveys of 1994 through 1996, the mean age at diagnosis of diabetes of persons 18 years and older was 49.5 years for males and 48.7 years for females. The average age at diagnosis was 50.9 years for white non-Hispanics; 43.3 years for black non-Hispanics; 41.9 years for Hispanics; and 45.2 years for persons of other races.

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