CHAPTER 40

HEALTH CARE UTILIZATION AND COSTS OF DIABETES

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SUMMARY

People with diabetes visit physician offices and emergency rooms more frequently than people without diabetes and are more likely to be admitted to the hospital and nursing homes and to receive home health care. In 2010, 29.9 million office-based physician visits had a primary diagnosis of diabetes, and 51.1 million office-based physician visits had diabetes as any listed diagnosis. In 2011, almost half of all people with diabetes in the United States had six or more office-based physician visits. Only 4% of people with diabetes did not have any office-based physician visits compared to 13% of people in the general U.S. population. People with diabetes were also more likely to visit the emergency room, with 30% having at least one visit compared to 20% of the general population. Fifty-three percent of people with diabetes had a dental visit in the past year, but 21% had not visited a dentist in more than 5 years. Ten percent of people with diabetes had phone contact with their physician's office in the past 2 weeks, 5% used email to communicate with their physician, and 34% looked up health information on the internet.

In 2010, 6.76 million hospitalizations listed diabetes as one of the discharge diagnoses; these accounted for 34.67 million hospital days. Diabetes was the primary discharge diagnosis for 622,000 hospitalizations. People with diabetes were 2.6 times more likely to be hospitalized in the past year than people without diabetes (21% vs. 8%). Having complications of diabetes was associated with hospitalization. Comorbid diabetic ketoacidosis, cardiovascular disease, and cardiac procedures were frequently present. Multiple hospitalizations were also common. In 2011, almost 30% of people with diabetes who were hospitalized had two or more hospitalizations.

In 2004, 358,500 nursing home residents age ≥55 years had diagnosed diabetes. They accounted for approximately 25% of the nursing home population. Residents with diabetes are more likely to be younger and nonwhite than residents without diabetes. More than 85% have comorbid cardiovascular disease, 63% have mental disorders, and 90% have two or more chronic conditions in addition to diabetes.

Home health care agencies are an increasingly important source of long-term care, and 33% of people receiving home health care in 2007 had diabetes. The prevalence of diabetes is highest for home health care patients age 65–74 years. Home health care patients with diabetes are more likely to be middle-aged and nonwhite than patients without diabetes. More than 75% have comorbid cardiovascular disease, and 14% are receiving post-hospital aftercare. Seventy-two percent of home health care recipients have two or more chronic conditions in addition to diabetes, and limitations in activities of daily living are common.

Because people with diabetes visit physician offices, hospital outpatient departments, and emergency rooms more frequently than people without diabetes and are more likely to be admitted to the hospital and nursing homes and to receive home health care, their medical costs are higher than for people without diabetes. Economic analyses performed by the American Diabetes Association in 2012 suggest that the excess economic costs attributable to diabetes in the United States were $245 billion, including $176 billion related to medical care for diabetes, its complications, and comorbidities and $69 billion related to time lost from work and usual activities due to illness, disability, and premature mortality. The costs of diabetes increased by approximately 200% from 2002 to 2012. While health care costs for inpatient and outpatient care attributable to diabetes have increased steadily over time, costs related to outpatient medications and supplies increased dramatically from 2007 to 2012. Americans with diabetes have direct medical costs 2.3 times higher than those without diabetes at an annual per capita excess cost of $7,888 attributable to their diabetes.

AMBULATORY MEDICAL CARE FOR PEOPLE WITH DIABETES

People with diabetes use health care services more frequently than people without diabetes. The higher rate of utilization is related to diabetes management, as well as surveillance and treatment of diabetes-related microvascular, neuropathic, and macrovascular complications and comorbidities. In this section, national survey data are used to describe rates of and trends in ambulatory medical care for people with diabetes and the characteristics of people with diabetes who use ambulatory medical care.

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NATIONAL SURVEYS AND DATA SOURCES

New analyses describing ambulatory care among people with diabetes were conducted for *Diabetes in America, 3rd edition*. The three major sources of data for these analyses were the National Health Interview Survey (NHIS), the National Ambulatory Medical Care Survey (NAMCS), and the Medical Expenditure Panel Survey (MEPS). Data were analyzed for adults age ≥18 years. This excludes not only the entire pediatric population, but also the increasing number of younger teens with diabetes.

National Health Interview Survey

The National Center for Health Statistics has sponsored the NHIS annually since 1957. It describes the health status of the civilian, noninstitutionalized population of the United States (1). Data are collected through a series of personal household interviews and include a core questionnaire and supplemental questions about current health topics. In the core questionnaire, each person is asked about the presence or absence of specific chronic conditions, including "Have you ever been told by a doctor or other health professional that you have diabetes or sugar diabetes?" and the frequency of medical contacts in the past year, including hospital- and non-hospital-based physician office visits, emergency room visits, and telephone contacts. From this, the frequency of contacts with the medical care system for people with diabetes is calculated. The questionnaire also asks about age at diagnosis of diabetes and treatment for diabetes. From this, people with probable type 1 diabetes are distinguished from people with probable type 2 diabetes. Type 1 diabetes is defined as age at onset <30 years and current use of insulin. All others are considered to have type 2 diabetes. In 2003, a supplemental questionnaire was administered to all individuals who self-reported physician-diagnosed diabetes. It included questions about whether the respondent had one physician he/she usually sees for diabetes, the frequency of contact with that person, and more details regarding the care received.

Self-reported information, such as that provided by the NHIS, has limitations. Self-report of physician-diagnosed diabetes may be incorrect, although the accuracy of self-report has been shown to be very good (2,3). In addition, recall bias may impact the reporting of remote events. For this reason, the NHIS only asks about physician visits and hospitalizations in the past 12 months. Finally, a proxy respondent (generally a spouse or other responsible household adult) may answer questions in the core questionnaire for sample persons who are not available at the time of the interview or are unable to answer for themselves (i.e., children, older adults, and those who are mentally incompetent). In 2010, 95.4% of people with diabetes responded for themselves, and 4.6% had proxy respondents. In general, proxy responses are considered to be of equal quality as non-proxy responses (4).

When looking at data trends over time, it is also important to consider how data collection instruments have changed. In 1997, the National Center for Health Statistics redesigned the sampling frame of the NHIS. This impacted the percentage of people estimated to have diabetes and the comparability of some of the data before and after that date (5).

National Ambulatory Medical Care Survey

The National Center for Health Statistics has conducted the NAMCS annually since 1989. It provides a national probability sample of visits to non-federally employed, office-based physicians who are primarily engaged in direct patient care. Visits to specialists in anesthesiology, pathology, and radiology are excluded (6). The survey assesses patients' demographic characteristics, vital signs, and up to three complaints, symptoms, or other reasons for the visit and the corresponding physicians' diagnoses, diagnostic testing, health education, and the medication and non-medication treatments ordered. The NAMCS codes each physician visit according to the diagnosis most associated with the patient's primary complaint (primary diagnosis). Two additional diagnoses (secondary diagnoses) can be coded corresponding to other reasons for the patient's visit for a maximum of three diagnoses per visit. Medical data and drug coding are performed centrally with rigorous quality control procedures. Physicians' diagnoses are coded according to the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM). Data are presented for people with diabetes (ICD-9-CM codes 250 [all], 357.2, 362.0, 366.41, 648.0, and 775.1) listed as the primary (first-listed) diagnosis or, separately, as any listed diagnosis.

Rates of outpatient visits for people with diabetes were calculated by dividing the number of outpatient visits with diabetes as the primary or any listed diagnosis (in 2010) by the estimated number of people with physician-diagnosed diabetes in the United States in 2010 as determined by the NHIS.

Starting in 2005, check boxes were added to the NAMCS to record the presence of specific chronic medical conditions, including diabetes. People with diabetes can be identified in one of two ways. The first is to identify people with diabetes using the three physicians' diagnoses. This method likely underestimates the true prevalence of diabetes in patients receiving ambulatory care because the diagnoses listed reflect the reason for the visit rather than the patient's full range of medical conditions. The second method is to identify people with diabetes as those with diabetes checked as a chronic medical condition. Unfortunately, there are no published studies validating information provided by the check box, and it is unclear whether a checked box reflects a physician diagnosis, patient self-report, or other less methodologically sound evidence. For analyses presented in this chapter, people with diabetes were defined using the first method. Even though this may miss some people with diabetes seeking care for what are likely to be nondiabetes-related medical issues, it is more likely to capture people with

physician-diagnosed diabetes who are seeking medical care for diabetes. It also makes these estimates comparable to those reported in earlier editions of *Diabetes in America* (7). Because NAMCS data are visit-based and not patient-based, they may overrepresent people who take insulin for their diabetes, since these individuals have more frequent ambulatory care visits than those who are not treated with insulin (7).

Medical Expenditure Panel Survey

The Agency for Healthcare Research and Quality, through the U.S. Department of Health and Human Services, has conducted the MEPS annually since 1996. There are two major components to the MEPS: the Household Component, which collects data from individual households and their medical providers, and the Insurance Component, which collects employer-based health insurance data from employers (8). The Household Component uses a sample of families and individuals drawn from a nationally representative subsample of households that participated in the prior year's NHIS. Data are collected during a series of household interviews covering two full years and include demographic characteristics, health conditions, health status, use of medical services, charges and source of payment, access to care, satisfaction with care, health insurance coverage, income, and employment. Diabetes status in the MEPS is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using ICD-9 codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46.

When looking at data trends over time, it is important to remember that the MEPS started in 1996. Data prior to that time are not available. In addition, while the MEPS represents a subset of the previous year's NHIS respondents, the MEPS takes the additional steps of asking respondents to prospectively record their utilizations and expenditures, thus allowing comparision of the self-reported information with actual medical record and insurance claim data.

NUMBER AND RATES OF OFFICE VISITS

Table 40.1 summarizes the number of visits to office-based physicians in which diabetes was listed as the primary diagnosis between 1990 and 2010. The total number of physician office visits with a primary diagnosis of diabetes almost doubled between 1990 and 2010 from 15.2 million to 29.9 million. The increase in the number of visits was greatest for middle-aged people (45–64 years) and was generally greater for men than women. By race/ethnicity, the increase in the number of visits was greatest for Hispanics: the number of visits increased 3.7-fold from 968,000 in 1990 to over 3.6 million in 2010. This trend may be partially accounted for by the increase in the proportion of Hispanics in the U.S. population in 2010 compared to 1990. The number of visits for non-Hispanic whites and non-Hispanic blacks approximately doubled over the same time period.

Table 40.2 shows the number of visits to office-based physicians in which diabetes was listed as any one of three possible diagnoses in 2010. Diabetes was listed as any diagnosis for 51.1 million visits. Reviewing data from Tables 40.1 and 40.2, it is apparent that diabetes is less likely to be listed as the primary diagnosis as age increases. This is likely due to the increasing numbers of comorbidities in patients of increasing age. Among visits with diabetes listed anywhere, diabetes was listed as the primary diagnosis in 74% of visits for people age 18–44 years, 62% of visits for those age 45–64 years, and 52% of visits for those age ≥65 years. Diabetes was more likely

TABLE 40.1. Number of Visits to Office-Based Physicians in Which Diabetes Was Listed as the Primary (First) Diagnosis Among Adults Age ≥18 Years, by Age, Sex, and Race/Ethnicity, U.S., 1990–2010

CHARACTERISTICS	NUMBER (PERCENT) OF VISITS IN THOUSANDS				
	1990	1995	2000	2005	2010
All persons	15,186 (100.0)	13,047 (100.0)	23,528 (100.0)	24,984 (100.0)	29,920 (100.0)
Age (years)					
18–44	1,953 (12.9)	1,629 (12.5)	3,287 (14.0)	2,514 (10.1)	3,926 (13.1)
45–64	5,578 (36.7)	5,349 (41.0)	10,310 (43.8)	11,217 (44.9)	13,525 (45.2)
≥65	7,655 (50.4)	6,069 (46.5)	9,931 (42.2)	11,253 (45.0)	12,469 (41.7)
Sex, age (years)					
Women	8,150 (100.0)	7,281 (100.0)	11,987 (100.0)	13,660 (100.0)	14,201 (100.0)
18–44	813 (10.0)	800 (11.0)	1,529 (12.8)	1,665 (12.2)	2,125 (15.0)
45–64	2,875 (35.3)	2,988 (41.0)	5,002 (41.7)	4,803 (35.2)	6,119 (43.0)
≥65	4,462 (54.7)	3,493 (48.0)	5,456 (45.5)	7,192 (52.6)	5,957 (42.0)
Men	7,036 (100.0)	5,766 (100.0)	11,540 (100.0)	11,323 (100.0)	15,719 (100.0)
18–44	1,139 (16.2)	828 (14.4)	1,758 (15.2)	849 (7.5)	1,800 (11.5)
45–64	2,703 (38.4)	2,362 (41.0)	5,307 (46.0)	6,413 (56.6)	7,407 (47.1)
≥65	3,194 (45.4)	2,576 (44.6)	4,475 (38.8)	4,061 (35.9)	6,512 (41.4)
Race/ethnicity, age (years)					
Non-Hispanic white	10,889 (100.0)	8,597 (100.0)	11,644 (100.0)	17,086 (100.0)	20,421 (100.0)
18–44	1,605 (14.7)	844 (9.8)	1,074 (9.2)	1,670 (9.8)	2,481 (12.2)
45–64	3,609 (33.1)	3,416 (39.7)	5,661 (48.6)	7,200 (42.1)	8,951 (43.8)
≥65	5,675 (52.2)	4,337 (50.5)	4,909 (42.2)	8,216 (48.1)	8,989 (44.0)
Non-Hispanic black	2,110 (100.0)	2,316 (100.0)	2,794 (100.0)	2,529 (100.0)	4,028 (100.0)
18–44	202 (9.6)	369 (15.9)	314 (11.2)	368 (14.5)	402 (10.0)
45–64	917 (43.4)	993 (42.9)	1,101 (39.4)	1,286 (50.9)	2,307 (57.3)
≥65	991 (47.0)	954 (41.2)	1,379 (49.4)	875 (34.6)	1,319 (32.7)
Hispanic	968 (100.0)	1,597 (100.0)	2,958 (100.0)	3,577 (100.0)	3,637 (100.0)
18–44	31 (3.2)	299 (18.7)	492 (16.6)	414 (11.6)	706 (19.4)
45–64	578 (59.7)	708 (44.4)	1,049 (35.5)	1,724 (48.2)	1,775 (48.8)
≥65	359 (37.1)	590 (36.9)	1,417 (47.9)	1,439 (40.2)	1,156 (31.8)

Number of visits is shown in thousands; numbers in parentheses are percent of total for each age/sex/race group. Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1.

SOURCE: National Ambulatory Medical Care Surveys 1990, 1995, 2000, 2005, 2010

TABLE 40.2. Number of Visits to Office-Based Physicians in Which Diabetes Was Any Listed Diagnosis Among Adults Age ≥18 Years, by Age, Sex, and Race/Ethnicity, U.S., 2010

CHARACTERISTICS	NUMBER OF VISITS (MILLIONS)
All persons	51.1
Age (years)	
18–44	5.3
45–64	21.9
≥65	23.9
Sex, age (years)	
Women	26.0
18–44	3.1
45–64	10.9
≥65	12.0
Men	25.1
18–44	2.2
45–64	11.1
≥65	11.8
Race/ethnicity, age (years)	
Non-Hispanic white	33.9
18–44	3.0
45–64	14.0
≥65	16.9
Non-Hispanic black	7.7
18–44	0.9
45–64	3.9
≥65	2.9
Hispanic	6.2
18–44	0.8
45–64	2.9
≥65	2.5

Numbers include all visits in which diabetes was listed as the first, second, or third diagnosis. Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1

SOURCE: National Ambulatory Medical Care Survey 2010

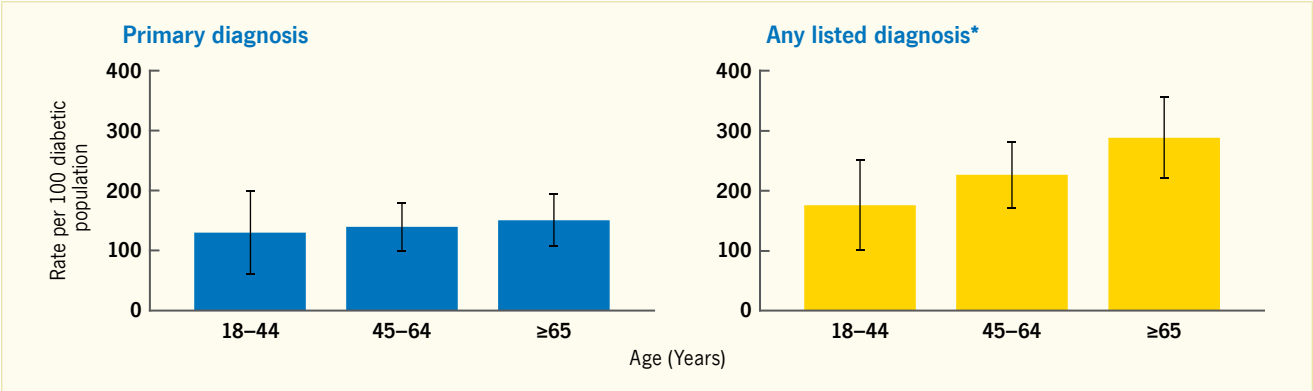
to be listed as the primary diagnosis for men (62%) than women (55%) and less likely to be listed as the primary diagnosis for non-Hispanic blacks (52%) compared to non-Hispanic whites (60%) and Hispanics (59%).

Figure 40.1 uses data from the NAMCS and the NHIS to show the rate of visits to office-based physicians in which diabetes was the primary or any listed diagnosis per 100 people with diabetes by age. When diabetes was the primary diagnosis, there were no differences in rates by age. When diabetes was any listed diagnosis, rates of office visits tended to increase with age. There were no apparent differences in rates between men and women when diabetes was listed as either the primary or as any listed diagnosis (Figure 40.2). When diabetes was listed as the primary diagnosis, non-Hispanic blacks age 18–44 years had a slightly lower rate of office-based physician visits than any other age or racial/ethnic group. However, the confidence intervals are large and overlapping (Figure 40.3). No differences were observed among age or racial/ethnic groups when diabetes was listed as any diagnosis.

The frequency with which diabetes was listed as a diagnosis has increased over time. While the total number of visits for all conditions in all people increased by 21% between 1990 and 2000 and 24% between 2000 and 2010, visits in which diabetes was listed anywhere increased by 60% between 1990 and 2000 and by 30% between 2000 and 2010 (Table 40.3). While the number of visits to office-based physicians has increased over time, the rate of visits to office-based physicians has decreased over time. Figures 40.4 and 40.5 show that when diabetes was the primary or any listed diagnosis, the rate per 100 people with diabetes decreased between 1990 and 2010 for all age groups. When diabetes was listed as the primary diagnosis, the rates of office visits for all age groups decreased over time such that, in 2010, the rates among the various age groups were similiar. In 1990, the rates were 183 visits per 100 people with diabetes age 18–44 years, 237 visits per 100 people with diabetes age 45–64 years, and 275 visits per 100 people with diabetes age ≥65 years. In 2010, the rates were 130, 140, and 151 per 100 people with diabetes, respectively (Figure 40.4). The same general trends over time by age were also apparent when diabetes was listed as any diagnosis (Figure 40.5).

The rates of office visits for diabetes as the primary diagnosis for men were much higher than for women in 1990 (298 and 203 office visits per 100 men and women, respectively) (Figure 40.6). These rates decreased over time such that, by 2010, the rates were almost the

FIGURE 40.1. Rate of Visits to Office-Based Physicians With Diabetes as Primary or Any Listed Diagnosis Per 100 Diabetic Population, by Age, U.S., 2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Error bars represent 95% confidence intervals. Confidence intervals were most likely underestimated because the National Ambulatory Medical Care Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.

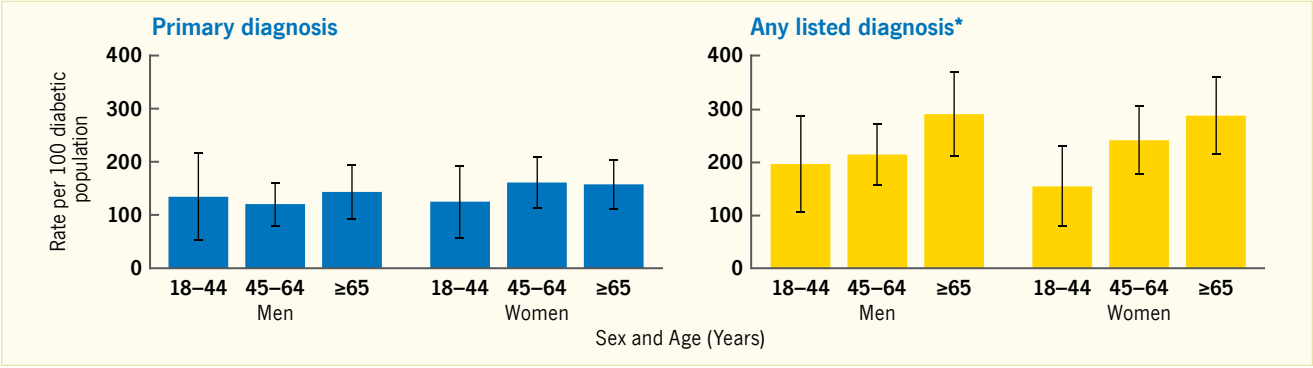
* Based on up to three diagnosis codes.

SOURCE: National Ambulatory Medical Care Survey 2010 and National Health Interview Survey 2010

same in women and men (155 visits per 100 women and 131 visits per 100 men). The same trend over time was observed by sex when diabetes was any listed diagnosis (Figure 40.7).

The rates of office visits for diabetes as the primary diagnosis have decreased over time for non-Hispanic whites, non-Hispanic blacks, and Hispanics. There were only minor differences in the rates observed among racial/ethnic groups in 1990 and 2010 (Figure 40.8). The same is true when diabetes was identified as any listed diagnosis (Figure 40.9).

FIGURE 40.2. Rate of Visits to Office-Based Physicians With Diabetes as Primary or Any Listed Diagnosis Per 100 Diabetic Population, by Age and Sex, U.S., 2010

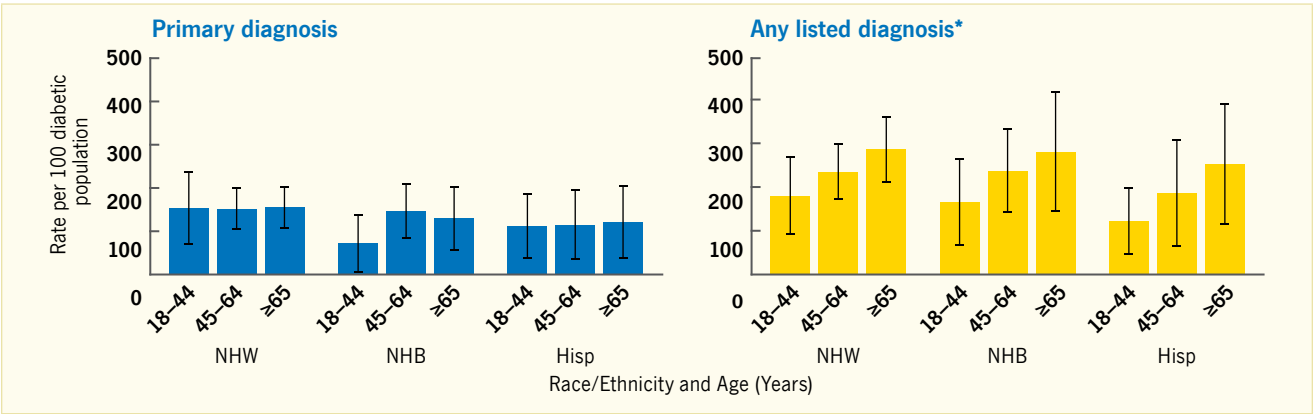


Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Error bars represent 95% confidence intervals. Confidence intervals were most likely underestimated because the National Ambulatory Medical Care Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.

* Based on up to three diagnosis codes.

SOURCE: National Ambulatory Medical Care Survey 2010 and National Health Interview Survey 2010

FIGURE 40.3. Rate of Visits to Office-Based Physicians With Diabetes as Primary or Any Listed Diagnosis Per 100 Diabetic Population, by Age and Race/Ethnicity, U.S., 2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Error bars represent 95% confidence intervals. Confidence intervals were most likely underestimated because the National Ambulatory Medical Care Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design. Hisp, Hispanic; NHB, non-Hispanic black; NHW, non-Hispanic white.

* Based on up to three diagnosis codes.

SOURCE: National Ambulatory Medical Care Survey 2010 and National Health Interview Survey 2010

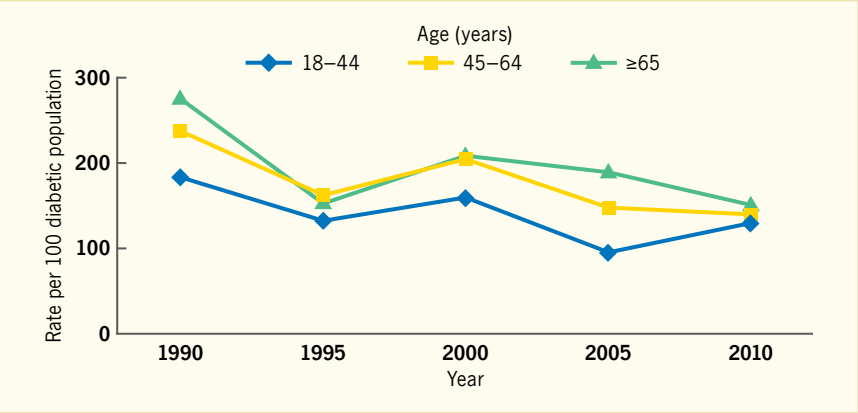
TABLE 40.3. Number of Visits to Office-Based Physicians for Any Diagnoses and for Diabetes Diagnoses Among Adults Age ≥18 Years, U.S., 1990–2010

YEAR	TOTAL NUMBER OF VISITS (THOUSANDS)	NUMBER OF VISITS IN THOUSANDS (PERCENT OF TOTAL) WITH PHYSICIAN DIAGNOSIS OF DIABETES AS:		
		Primary Diagnosis	Second or Third Diagnosis	Any Diagnosis
1990	547,560	15,186 (2.8)	10,839 (2.0)	24,702 (4.5)
1995	546,731	13,047 (2.4)	11,514 (2.1)	23,136 (4.2)
2000	660,083	23,528 (3.6)	19,239 (2.9)	39,590 (6.0)
2005	778,431	24,984 (3.2)	23,701 (3.0)	44,422 (5.7)
2010	817,302	29,920 (3.7)	23,669 (2.9)	51,083 (6.3)

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Visits with physician diagnosis of diabetes include visits in which diabetes was listed as the diagnosis most associated with the patient's primary complaint (primary diagnosis) or was the second or third diagnosis (secondary diagnosis); a maximum of three diagnoses could be coded for each visit. Values for any diagnosis of diabetes are less than the sum of primary plus secondary diagnoses because diabetes was listed more than once for some visits.

SOURCE: National Ambulatory Medical Care Surveys 1990, 1995, 2000, 2005, 2010

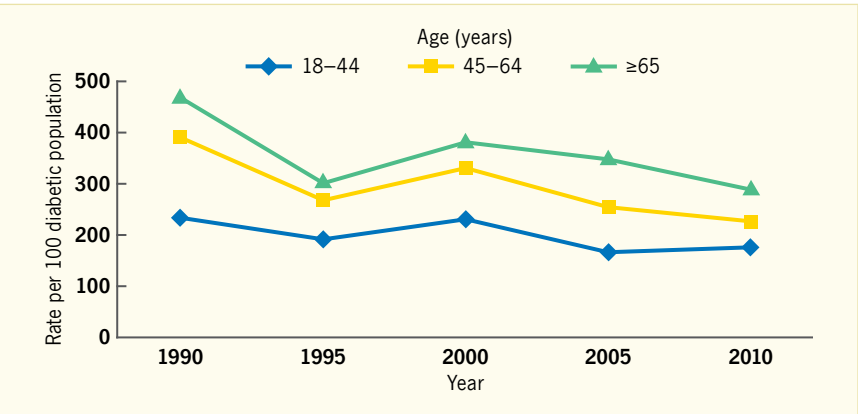
FIGURE 40.4. Time Trend in the Rate of Visits to Office-Based Physicians With Diabetes Listed as the Primary Diagnosis Among Adults Age ≥18 Years, by Age, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1.

SOURCE: National Ambulatory Medical Care Surveys and National Health Interview Surveys 1990, 1995, 2000, 2005, 2010

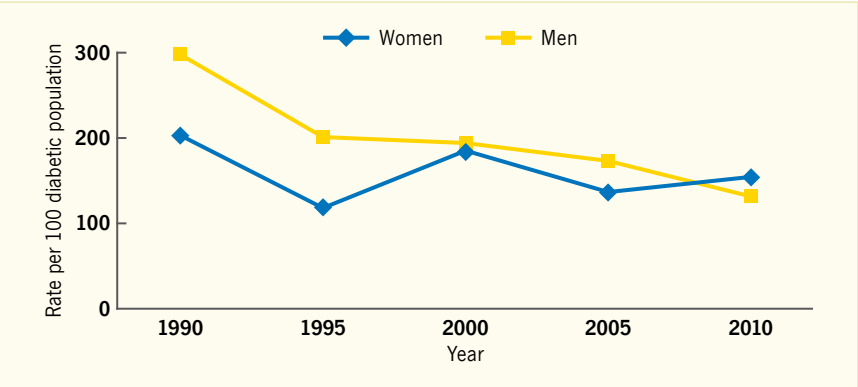
FIGURE 40.5. Time Trend in the Rate of Visits to Office-Based Physicians With Diabetes Listed as Any Listed Diagnosis Among Adults Age ≥18 Years, by Age, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1.

SOURCE: National Ambulatory Medical Care Surveys and National Health Interview Surveys 1990, 1995, 2000, 2005, 2010

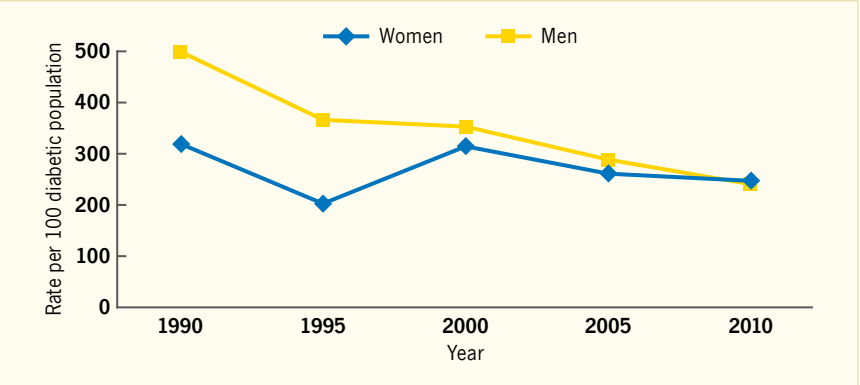
FIGURE 40.6. Time Trend in the Rate of Visits to Office-Based Physicians With Diabetes Listed as the Primary Diagnosis Among Adults Age ≥18 Years, by Sex, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1.

SOURCE: National Ambulatory Medical Care Surveys and National Health Interview Surveys 1990, 1995, 2000, 2005, 2010

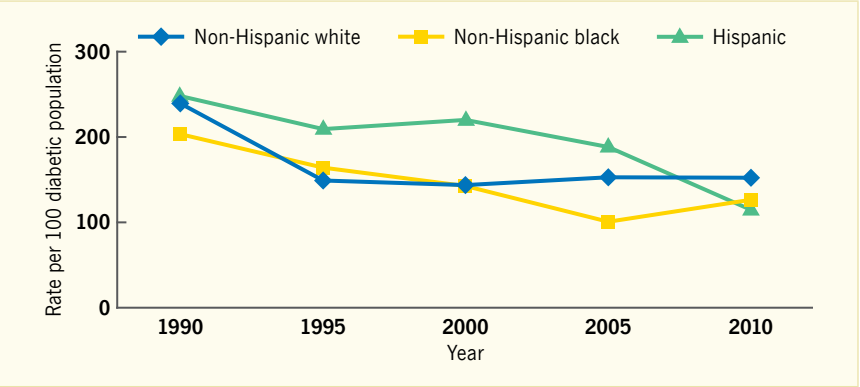
FIGURE 40.7. Time Trend in the Rate of Visits to Office-Based Physicians With Diabetes Listed as Any Listed Diagnosis Among Adults Age ≥18 Years, by Sex, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1.

SOURCE: National Ambulatory Medical Care Surveys and National Health Interview Surveys 1990, 1995, 2000, 2005, 2010

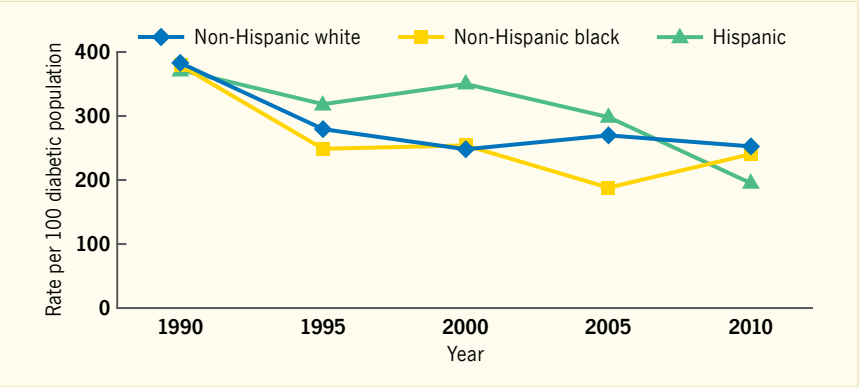
FIGURE 40.8. Time Trend in the Rate of Visits to Office-Based Physicians With Diabetes Listed as the Primary Diagnosis Among Adults Age ≥18 Years, by Race/Ethnicity, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1.

SOURCE: National Ambulatory Medical Care Surveys and National Health Interview Surveys 1990, 1995, 2000, 2005, 2010

FIGURE 40.9. Time Trend in the Rate of Visits to Office-Based Physicians With Diabetes Listed as Any Listed Diagnosis Among Adults Age ≥18 Years, by Race/Ethnicity, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1.

SOURCE: National Ambulatory Medical Care Surveys and National Health Interview Surveys 1990, 1995, 2000, 2005, 2010

FREQUENCY OF OUTPATIENT VISITS

The NHIS 2011 found that 19.4 million people with diabetes reported at least one outpatient visit to a physician in the preceding 12 months, and nearly half of them (47.1%) reported six or more visits (Table 40.4). The proportion of patients with 6–12 or ≥13 visits was slightly greater for women than men. The proportion of patients with no visits or only 1–3 visits in the past 12 months decreased with age, and the proportion of patients with 6–12 or ≥13 visits increased with age (Figure 40.10). The number of physician visits was similar across racial/ethnic groups; however, non-Hispanic whites were less likely to have no outpatient physician visits (2.6%) compared to Hispanics (9.9%) and Mexican Americans (10.7%) (Figure 40.11).

The MEPS 2012 found that 23.4 million people with diabetes reported at least one outpatient visit to a physician in the preceeding 12 months. People with diabetes who reported one or more outpatient visits reported a mean of 10.5 visits (Table 40.5). The proportion of patients who reported at least one outpatient visit was greater for women than men, and the mean number of visits was also greater for women than men. Like the NHIS 2011, the MEPS 2012 showed that the proportion of people with diabetes with no visits or 1–5 visits in the past 12 months decreased with age, and the proportion of people with diabetes with 6–12 or ≥13 visits increased with age (Figure 40.12). In contrast to the NHIS 2011, the MEPS 2012 showed that for people with diabetes

TABLE 40.4. Number of People With Diabetes and Percent Distribution of Outpatient Visits to Physicians in the Past 12 Months Among Adults With Diabetes Age ≥18 Years, by Age, Sex, and Race/Ethnicity, U.S., 2011

CHARACTERISTICS	NUMBER OF PEOPLE	PERCENT (STANDARD ERROR) Number of Outpatient Physician Visits					
		None	1	2–3	4–5	6–12	≥13
All persons	20,249,268	4.2 (0.39)	5.8 (0.48)	19.7 (0.85)	23.2 (0.88)	31.1 (1.04)	16.0 (0.83)
Age (years)							
18–44	2,697,340	5.7 (1.17)	7.5 (1.48)	25.7 (2.59)	22.2 (2.41)	25.3 (2.52)	13.6 (1.97)
45–64	9,555,880	4.6 (0.66)	6.1 (0.71)	20.5 (1.34)	21.6 (1.31)	30.9 (1.56)	16.3 (1.21)
≥65	7,996,048	3.0 (0.54)	5.0 (0.73)	16.7 (1.16)	25.4 (1.35)	33.4 (1.51)	16.5 (1.24)
Sex, age (years)							
Women	10,060,846	3.3 (0.51)	5.7 (0.65)	17.6 (1.11)	22.5 (1.20)	32.5 (1.44)	18.4 (1.24)
18–44	1,451,149	3.9 (1.27)[1]	7.1 (1.87)	22.2 (3.24)	19.9 (3.27)	28.8 (3.66)	18.1 (3.02)
45–64	4,522,395	3.9 (0.89)	5.1 (0.97)	19.4 (1.82)	21.5 (1.89)	32.7 (2.19)	17.4 (1.76)
≥65	4,087,302	2.5 (0.67)	5.9 (1.06)	13.9 (1.40)	24.5 (1.78)	33.5 (2.00)	19.7 (1.84)
Men	10,188,422	5.0 (0.62)	6.0 (0.68)	21.7 (1.28)	23.8 (1.35)	29.8 (1.45)	13.7 (1.10)
18–44	1,246,191	7.8 (1.95)	8.0 (2.37)	29.7 (3.95)	24.9 (3.39)	21.2 (3.66)	8.4 (2.35)
45–64	5,033,485	5.4 (0.99)	7.0 (1.06)	21.5 (1.92)	21.6 (1.98)	29.2 (2.25)	15.3 (1.62)
≥65	3,908,746	3.5 (0.85)	4.1 (0.89)	19.6 (1.75)	26.3 (2.13)	33.3 (2.30)	13.2 (1.75)
Race/ethnicity, age (years)							
Non-Hispanic white	12,960,567	2.6 (0.45)	5.9 (0.61)	19.1 (1.06)	22.9 (1.17)	32.9 (1.36)	16.6 (1.11)
18–44	1,260,972	1.7 (0.86)[2]	8.2 (2.39)	25.9 (4.27)	21.8 (3.76)	27.3 (4.17)	15.1 (3.08)
45–64	6,033,788	3.3 (0.80)	6.2 (0.92)	20.5 (1.75)	20.6 (1.67)	31.4 (2.01)	18.0 (1.69)
≥65	5,665,807	2.1 (0.56)	5.0 (0.89)	16.2 (1.33)	25.6 (1.74)	35.7 (1.93)	15.4 (1.48)
Non-Hispanic black	3,147,546	4.3 (0.89)	4.3 (0.92)	22.7 (1.97)	23.3 (2.13)	27.8 (2.15)	17.6 (1.76)
18–44	625,284	7.2 (2.71)[1]	5.9 (2.59)[2]	35.0 (5.54)	16.3 (3.83)	22.0 (4.65)	13.6 (4.08)[1]
45–64	1,516,400	3.5 (1.26)[1]	4.4 (1.42)[1]	22.1 (2.83)	23.4 (3.33)	29.6 (3.28)	17.0 (2.49)
≥65	1,005,862	3.6 (1.41)[1]	3.1 (1.10)[1]	15.9 (2.88)	27.7 (3.36)	28.8 (3.11)	20.9 (3.27)
Hispanic	3,012,252	9.9 (1.41)	6.4 (1.29)	19.3 (2.13)	22.1 (1.86)	28.8 (2.52)	13.5 (1.77)
18–44	655,125	12.8 (3.75)	9.2 (3.16)[1]	18.6 (4.33)	20.6 (4.23)	25.6 (4.64)	13.2 (3.94)
45–64	1,504,460	9.9 (1.94)	6.6 (1.99)	18.4 (3.27)	21.1 (2.91)	31.0 (3.91)	13.0 (2.51)
≥65	852,667	7.5 (2.59)[1]	3.7 (1.26)[1]	21.3 (4.18)	25.2 (3.49)	27.4 (3.68)	14.9 (3.32)
Mexican American*	1,952,287	10.7 (1.82)	4.8 (1.45)[1]	21.0 (2.88)	21.6 (2.51)	26.0 (3.02)	15.9 (2.36)
18–44	499,219	16.9 (5.00)	[3]	20.3 (4.94)	18.6 (4.57)	24.4 (5.22)	15.8 (5.10)[1]
45–64	980,432	10.4 (2.44)	6.0 (2.47)[2]	17.8 (4.34)	24.3 (3.88)	26.8 (4.22)	14.7 (3.36)
≥65	472,636	[3]	3.2 (1.57)[2]	28.2 (6.34)	19.2 (4.35)	26.0 (5.06)	18.4 (5.09)
Non-Hispanic Asian	869,782	4.3 (1.91)[2]	6.7 (2.14)[1]	17.5 (3.58)	30.1 (3.83)	29.0 (4.45)	12.4 (3.03)
18–44	122,841	[3]	[3]	10.1 (4.97)[2]	54.7 (12.17)	26.7 (11.65)[2]	[3]
45–64	413,470	[3]	[3]	23.0 (6.61)	31.2 (6.92)	29.6 (6.49)	5.7 (2.56)[2]
≥65	333,471	[3]	9.4 (3.88)[2]	13.5 (3.16)	19.7 (5.02)	29.1 (7.00)	23.5 (6.44)

Outpatient visits include visits to a physician at a doctor's office, a clinic, or some other place (does not include overnight hospital stays, visits to emergency rooms, home visits, dental visits, or telephone calls). Data are based on self-report. Numbers are NHIS weighted estimates.

* Mexican American is a subset of Hispanic.

[1] Relative standard error >30%–40%

[2] Relative standard error >40%–50%

[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

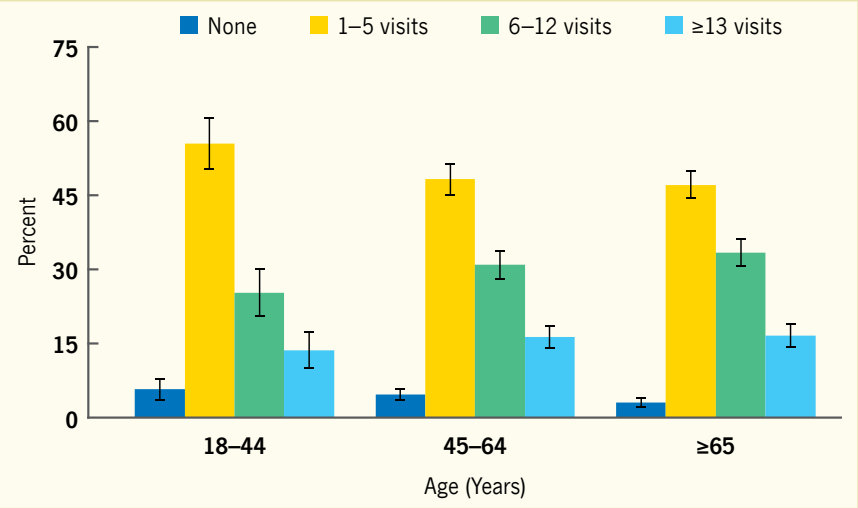
SOURCE: National Health Interview Survey (NHIS) 2011

age ≥65 years, there were similiar proportions of people with 1–5, 6–12, and ≥13 visits. The distribution of the number of physician visits was also similar across the non-Hispanic black, Hispanic, and non-Hispanic other racial/ethnic groups. However, the non-Hispanic white group had a slightly lower percentage of people with no visits or 1–5 vists and a higher percentage of people with ≥13 visits (Figure 40.13).

A large number of the outpatient visits to physicians made by people with diabetes may be related to the treatment of diabetes and its complications and comorbidities. The excess ambulatory care for people with diabetes relative to the general population can be estimated by comparing utilization data for people with diabetes to that of the total population after adjusting for age and sex (Figure 40.14). The percentage of people with no visits in the past year was more than three times lower in the population with diabetes compared to the general population (4% vs. 13%). Similarly, the percentage of people with 6–12 or ≥13 visits in the past year was substantially higher for people with diabetes compared to the general population (31% vs. 20% and 16% vs. 9%, respectively). These trends were the same for women and men. The MEPS 2012 showed similar trends when utilization data for people with diabetes were compared to that of the total population after adjusting for age and sex (Figure 40.15).

When respondents to the NHIS 2003 Diabetes Supplement were asked about the nature and frequency of their contacts with medical doctors, 84% indicated that they had one physician whom they saw for most of their diabetes care (Table 40.6). This finding was true for all age and sex groups. Hispanic and Mexican American people with diabetes, especially those in the younger age groups, were more likely to report not having a physician for diabetes care than non-Hispanic whites, non-Hispanic blacks, and non-Hispanic Asians. Among people who reported having a regular physician for diabetes care, the average individual reported seeing his or her physician about six times in the previous year. This was true for women of all ages and men age ≥45 years (Table 40.7). Men age <45 years reported fewer visits. Hispanics had the most frequent visits (10.5 visits in the past year), followed by non-Hispanic blacks (7.8 visits) and non-Hispanic Asians (7.9 visits), Mexican Americans (6.1 visits), and non-Hispanic whites (4.8 visits). People with type 2 diabetes who were taking insulin tended to have more frequent visits than those with type 2 diabetes who were not taking insulin or persons with type 1 diabetes. This observation may reflect the greater age and more frequent comorbidities among people with type 2 diabetes taking insulin.

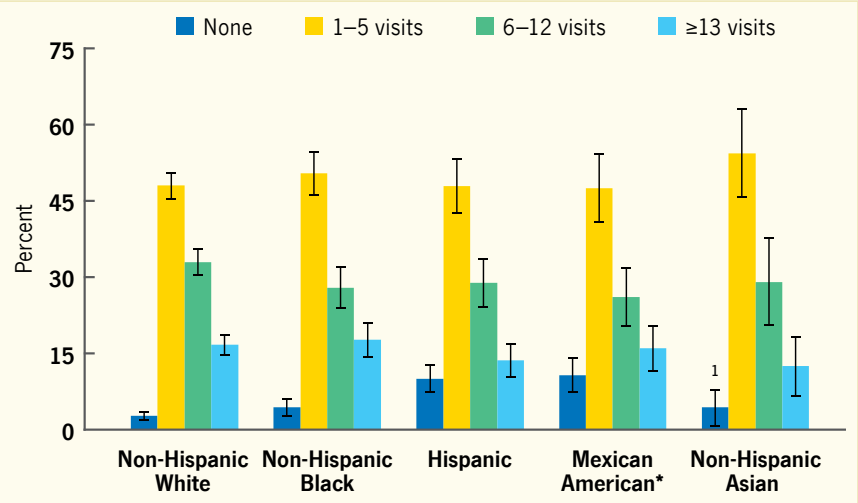
FIGURE 40.10. Distribution of Outpatient Visits to Physicians Among Adults With Diabetes Age ≥18 Years, by Age, U.S., 2011



Outpatient visits include visits to a physician at a doctor's office, a clinic, or some other place (does not include overnight hospital stays, visits to emergency room, home visits, dental visits, or telephone calls). Data are based on self-report. Error bars represent 95% confidence intervals.

SOURCE: National Health Interview Survey 2011

FIGURE 40.11. Distribution of Outpatient Visits to Physicians Among Adults With Diabetes Age ≥18 Years, by Race/Ethnicity, U.S., 2011



Outpatient visits include visits to a physician at a doctor's office, a clinic, or some other place (does not include overnight hospital stays, visits to emergency room, home visits, dental visits, or telephone calls). Data are based on self-report. Error bars represent 95% confidence intervals.

* Mexican American is a subset of Hispanic.

[1] Relative standard error >40%–50%

SOURCE: National Health Interview Survey 2011

TABLE 40.5. Percent and Mean Number of Outpatient Visits to Physicians in the Past 12 Months Among Adults With Diabetes Age ≥18 Years, by Age, Sex, and Race/Ethnicity, U.S., 2012

CHARACTERISTICS	PERCENT (STANDARD ERROR) OF OUTPATIENT VISITS		MEAN NUMBER (STANDARD ERROR) OF OUTPATIENT VISITS
	No Outpatient Visits	≥1 Outpatient Visits	
All persons (n=25.5M)	8.4 (0.65)	91.6 (0.65)	10.5 (0.45)
Age (years)			
18–44 (n=3.3M)	12.6 (1.82)	87.4 (1.82)	7.5 (0.79)
45–64 (n=11.4M)	9.5 (1.10)	90.5 (1.10)	9.4 (0.53)
≥65 (n=10.8M)	6.0 (0.77)	94.0 (0.77)	12.6 (0.82)
Sex, age (years)			
Women (n=12.7M)	6.1 (0.71)	93.9 (0.71)	11.4 (0.61)
18–44 (n=1.8M)	8.6 (1.65)	91.4 (1.65)	10.2 (1.32)
45–64 (n=5.3M)	6.3 (1.33)	93.7 (1.33)	10.4 (0.69)
≥65 (n=5.6M)	5.1 (0.86)	94.9 (0.86)	12.8 (1.07)
Men (n=12.8M)	10.7 (1.13)	89.3 (1.13)	9.6 (0.61)
18–44 (n=1.6M)	17.1 (3.41)	82.9 (3.41)	4.4 (0.66)
45–64 (n=6.0M)	12.3 (1.79)	87.7 (1.79)	8.4 (0.77)
≥65 (n=5.2M)	6.9 (1.30)	93.1 (1.30)	12.5 (1.19)
Race/ethnicity, age (years)			
Non-Hispanic white (n=15.5M)	5.8 (0.83)	94.2 (0.83)	11.9 (0.65)
18–44 (n=1.7M)	6.7 (2.60)[1]	93.3 (2.60)	7.9 (1.18)
45–64 (n=6.7M)	7.2 (1.52)	92.8 (1.52)	10.2 (0.74)
≥65 (n=7.1M)	4.3 (0.95)	95.7 (0.95)	14.4 (1.14)
Non-Hispanic black (n=3.9M)	10.6 (1.31)	89.4 (1.31)	8.5 (0.69)
18–44 (n=0.6M)	15.5 (3.59)	84.5 (3.59)	6.1 (1.02)
45–64 (n=1.8M)	10.6 (1.84)	89.4 (1.84)	8.8 (1.11)
≥65 (n=1.5M)	8.8 (1.58)	91.2 (1.58)	9.1 (1.66)
Non-Hispanic other (n=2.0M)	15.9 (2.98)	84.1 (2.98)	9.1 (1.66)
18–44 (n=0.3M)	26.8 (9.42)[1]	73.2 (9.42)	11.3 (4.79)[2]
45–64 (n=0.8M)	14.5 (4.93)[1]	85.5 (4.93)	8.4 (2.40)
≥65 (n=0.9M)	14.1 (4.00)	85.9 (4.00)	9.2 (2.46)
Hispanic (n=4.2M)	12.5 (1.29)	87.5 (1.29)	7.9 (0.60)
18–44 (n=0.8M)	18.1 (3.40)	81.9 (3.40)	6.3 (1.20)
45–64 (n=2.0M)	14.2 (1.71)	85.8 (1.71)	7.4 (0.92)
≥65 (n=1.4M)	6.2 (1.48)	93.8 (1.48)	9.6 (0.99)

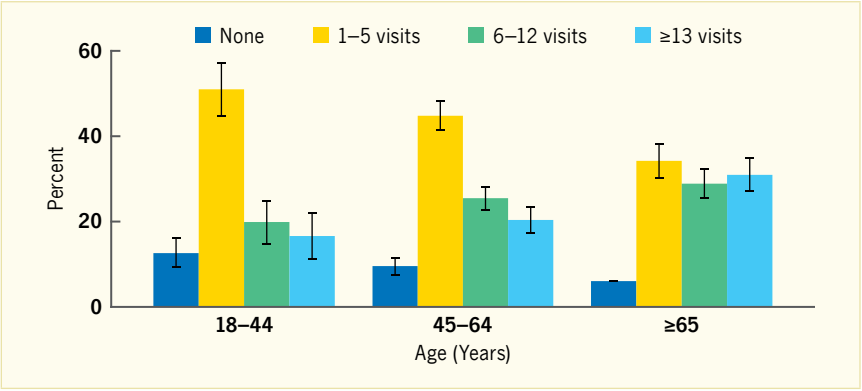
Outpatient visits include visits to a physician at a doctor's office, a clinic, or some other place (does not include overnight hospital stays, visits to emergency room, home visits, dental visits, or telephone calls). Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46. Numbers (n) are MEPS weighted estimates, M = $x10^6$.

[1] Relative standard error >30%–40%

[2] Relative standard error >40%–50%

SOURCE: Medical Expenditure Panel Survey (MEPS) 2012

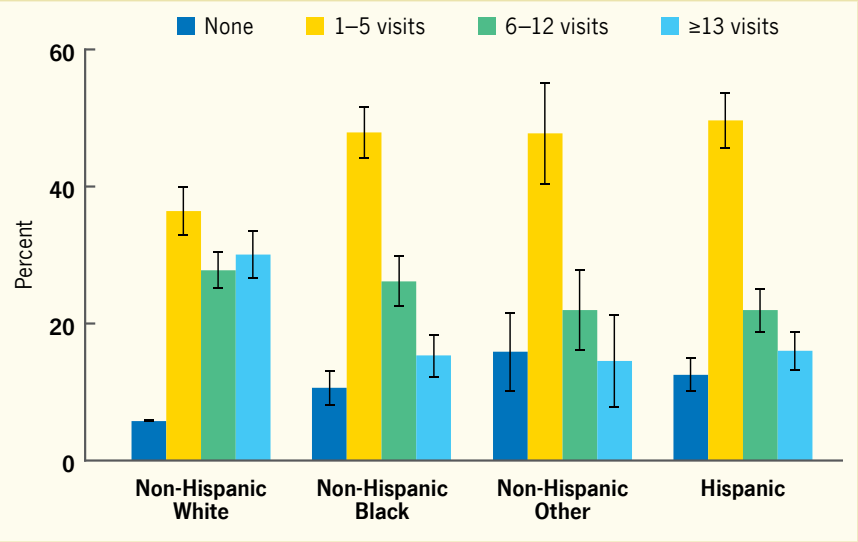
FIGURE 40.12. Distribution of Outpatient Visits to Physicians Among Adults With Diabetes Age ≥18 Years, by Age, U.S., 2012



Outpatient visits include visits to a physician at a doctor's office, a clinic, or some other place (does not include overnight hospital stays, visits to emergency room, home visits, dental visits, or telephone calls). Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46. Error bars represent 95% confidence intervals.

SOURCE: Medical Expenditure Panel Survey 2012

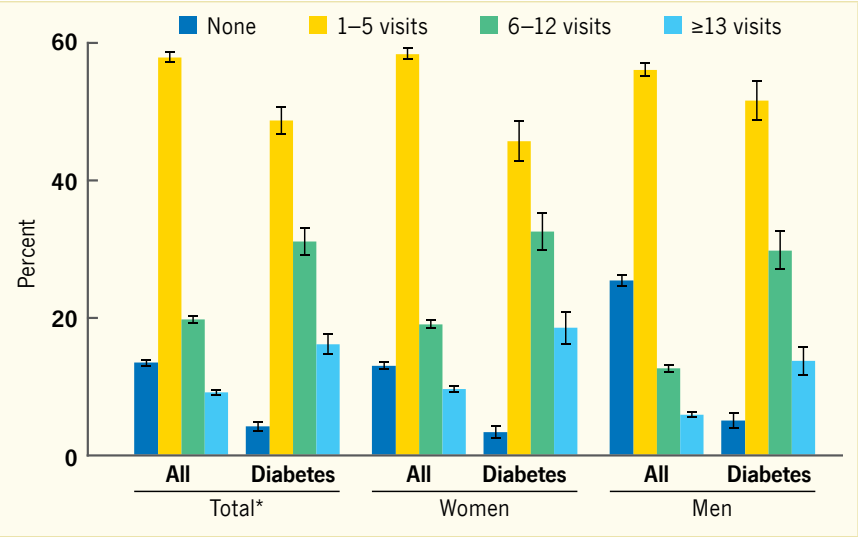
FIGURE 40.13. Distribution of Outpatient Visits to Physicians Among Adults With Diabetes Age ≥18 Years, by Race/Ethnicity, U.S., 2012



Outpatient visits include visits to a physician at a doctor's office, a clinic, or some other place (does not include overnight hospital stays, visits to emergency room, home visits, dental visits, or telephone calls). Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46. Error bars represent 95% confidence intervals.

SOURCE: Medical Expenditure Panel Survey 2012

FIGURE 40.14. Age- and Sex-Standardized Distribution of Outpatient Visits to Physicians Among Adults With Diabetes Age ≥18 Years and All Adults Age ≥18 Years, by Sex, U.S., 2011

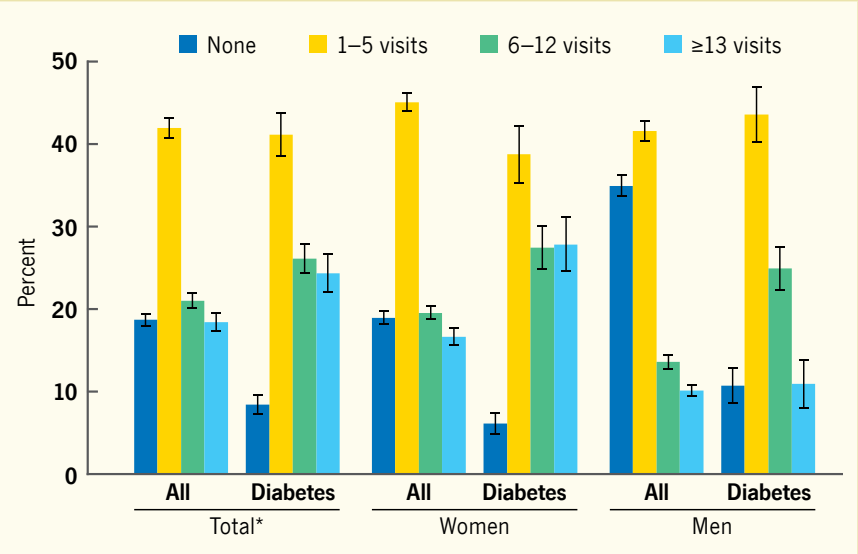


Outpatient visits include visits to a physician at a doctor's office, a clinic, or some other place (does not include overnight hospital stays, visits to emergency room, home visits, dental visits, or telephone calls). Data are based on self-report. Error bars represent 95% confidence intervals.

* Total estimates are age- and sex-standardized to the National Health Interview Survey 2011 diabetic population using age categories 18–44, 45–64, and ≥65 years.

SOURCE: National Health Interview Survey 2011

FIGURE 40.15. Age- and Sex-Standardized Distribution of Outpatient Visits to Physicians Among Adults With Diabetes Age ≥18 Years and All Adults Age ≥18 Years, by Sex, U.S., 2012



Outpatient visits include visits to a physician at a doctor's office, a clinic, or some other place (does not include overnight hospital stays, visits to emergency room, home visits, dental visits, or telephone calls). Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46. Error bars represent 95% confidence intervals.

* Total estimates are age- and sex-standardized to the Medical Expenditure Panel Survey 2012 diabetic population, using age categories 18–44, 45–64, and ≥65 years.

SOURCE: Medical Expenditure Panel Survey 2012

TABLE 40.6. Frequency of Visits to a Physician for Diabetes Care Among Adults With Diabetes Age ≥18 Years, by Age, Sex, and Race/Ethnicity, U.S., 2003

CHARACTERISTICS	PERCENT (STANDARD ERROR)					
	Report Having a Physician* for Diabetes Care	Frequency of Visits in Past Year Among Those Who Report Having a Physician for Diabetes Care				No Physician for Diabetes Care
		0–1	2–3	4–6	>6	
All persons	83.9 (0.94)	9.5 (0.88)	31.0 (1.29)	40.7 (1.40)	18.8 (1.08)	16.1 (0.94)
Age (years)						
18–44	81.3 (2.57)	12.5 (3.23)	34.3 (3.76)	36.6 (3.88)	16.6 (2.53)	18.7 (2.57)
45–64	84.9 (1.35)	9.5 (1.17)	31.1 (1.97)	39.1 (2.03)	20.3 (1.78)	15.1 (1.35)
≥65	83.8 (1.41)	8.3 (1.21)	29.8 (1.98)	44.0 (2.01)	17.9 (1.56)	16.2 (1.41)
Sex, age (years)						
Women	84.1 (1.20)	9.1 (1.01)	25.3 (1.66)	43.0 (1.76)	22.6 (1.53)	15.9 (1.20)
18–44	78.1 (3.43)	10.0 (2.88)	29.3 (5.63)	34.0 (5.04)	26.7 (4.11)	21.9 (3.43)
45–64	85.8 (1.79)	9.8 (1.58)	26.2 (2.66)	42.8 (2.77)	21.2 (2.36)	14.2 (1.79)
≥65	84.8 (1.78)	8.0 (1.47)	22.6 (2.26)	46.7 (2.76)	22.7 (2.32)	15.2 (1.78)
Men	83.8 (1.34)	9.8 (1.35)	36.9 (1.97)	38.4 (2.10)	14.9 (1.42)	16.2 (1.34)
18–44	85.3 (3.31)	15.4 (5.17)[1]	39.7 (5.33)	39.5 (5.94)	5.4 (2.13)[1]	14.7 (3.31)
45–64	84.2 (2.05)	9.3 (1.72)	35.6 (2.86)	35.5 (3.01)	19.6 (2.54)	15.8 (2.05)
≥65	82.8 (2.10)	8.6 (1.92)	37.2 (3.14)	41.3 (2.93)	12.9 (1.89)	17.2 (2.10)
Race/ethnicity, age (years)						
Non-Hispanic white	84.6 (1.17)	10.2 (1.12)	33.8 (1.62)	40.8 (1.73)	15.2 (1.22)	15.4 (1.17)
18–44	83.7 (3.18)	13.5 (4.31)[1]	34.7 (5.31)	37.7 (5.24)	14.1 (3.02)	16.3 (3.18)
45–64	85.6 (1.74)	10.8 (1.60)	34.6 (2.53)	38.9 (2.62)	15.7 (2.08)	14.4 (1.74)
≥65	83.9 (1.64)	8.5 (1.47)	32.8 (2.38)	43.6 (2.36)	15.1 (1.66)	16.1 (1.64)
Non-Hispanic black	85.4 (1.88)	8.3 (1.75)	24.4 (2.61)	44.4 (2.94)	22.9 (2.60)	14.6 (1.88)
18–44	85.0 (4.88)	[3]	32.6 (7.65)	45.0 (7.84)	11.9 (4.57)[1]	15.0 (4.88)[1]
45–64	84.8 (2.64)	7.1 (2.01)	24.8 (3.60)	42.8 (4.33)	25.3 (3.58)	15.2 (2.64)
≥65	86.5 (2.90)	8.8 (2.80)[1]	19.3 (4.44)	46.3 (4.93)	25.6 (4.74)	13.5 (2.90)
Hispanic	78.7 (2.34)	8.4 (1.70)	24.8 (3.14)	36.4 (3.20)	30.4 (3.30)	21.3 (2.34)
18–44	72.2 (6.52)	12.4 (4.67)[1]	31.3 (7.18)	26.2 (7.21)	30.1 (6.72)	27.8 (6.52)
45–64	80.2 (3.50)	7.2 (2.30)[1]	22.4 (4.27)	36.4 (4.77)	34.0 (5.13)	19.8 (3.50)
≥65	81.3 (3.93)	7.5 (2.24)	24.4 (5.50)	44.5 (5.76)	23.6 (5.50)	18.7 (3.93)
Mexican American†	77.4 (3.15)	10.0 (2.18)	30.1 (4.25)	28.5 (3.60)	31.4 (4.43)	22.6 (3.15)
18–44	73.4 (7.91)	15.2 (6.01)[1]	40.0 (8.95)	26.3 (9.39)[1]	18.5 (5.44)	26.6 (7.91)
45–64	78.2 (4.47)	6.6 (1.96)	28.6 (5.86)	29.4 (5.35)	35.4 (6.72)	21.8 (4.47)
≥65	80.6 (5.99)	12.4 (4.40)[1]	22.6 (7.21)[1]	28.4 (6.75)	36.6 (7.64)	19.4 (5.99)[1]
Non-Hispanic Asian	81.6 (6.93)	[3]	23.6 (8.25)[1]	27.1 (7.00)	44.1 (9.84)	18.4 (6.93)[1]
18–44	90.1 (10.21)	[3]	[3]	[3]	[3]	[3]
45–64	84.0 (9.16)	[3]	31.5 (14.39)[2]	[3]	35.3 (16.48)[2]	[3]
≥65	77.0 (12.27)	[3]	[3]	35.2 (11.85)[1]	54.4 (12.71)	[3]

Data are based on self-report.

* Defined as the physician the patient saw for most of his or her diabetes care; frequency of visits was defined as a self-report of how many times the patient saw that physician in the past year.

† Mexican American is a subset of Hispanic.

[1] Relative standard error >30%–40%

[2] Relative standard error >40%–50%

[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Health Interview Survey 2003

TABLE 40.7. Mean Number of Visits to a Diabetes Care Physician Among Adults With Diabetes Age ≥18 Years, by Age, Sex, and Race/Ethnicity, U.S., 2003

CHARACTERISTICS	MEAN NUMBER (STANDARD ERROR) OF VISITS			
			Type 2 Diabetes	
	All Diabetes	Type 1 Diabetes*	Not Taking Insulin	Taking Insulin
All persons	5.9 (0.39)	5.0 (0.63)	5.2 (0.29)	8.3 (1.36)
Age (years)				
18–44	4.8 (0.37)	5.0 (0.72)	4.4 (0.44)	6.4 (0.77)
45–64	6.2 (0.52)	3.9 (0.56)	5.5 (0.56)	8.6 (1.31)
≥65	6.0 (0.74)	7.6 (3.78)[2]	5.1 (0.25)	8.2 (2.60)[1]
Sex, age (years)				
Women	6.2 (0.34)	6.2 (0.71)	5.5 (0.27)	8.3 (1.18)
18–44	6.1 (0.61)	7.5 (1.09)	5.3 (0.76)	6.8 (1.24)
45–64	6.4 (0.64)	4.5 (0.60)	5.3 (0.37)	10.5 (2.69)
≥65	6.0 (0.35)	3.3 (0.61)	5.8 (0.42)	6.7 (0.67)
Men	5.6 (0.69)	3.7 (1.00)	4.9 (0.52)	8.2 (2.39)
18–44	3.4 (0.29)	2.7 (0.48)	3.3 (0.26)	6.1 (0.92)
45–64	5.9 (0.79)	2.2 (0.88)[1]	5.6 (1.04)	7.1 (1.07)
≥65	6.0 (1.47)	[3]	4.5 (0.25)	[3]
Race/ethnicity, age (years)				
Non-Hispanic white	4.8 (0.15)	4.8 (0.83)	4.5 (0.15)	5.5 (0.42)
18–44	4.6 (0.48)	4.7 (0.96)	4.3 (0.65)	5.3 (0.78)
45–64	4.7 (0.25)	3.4 (0.62)	4.4 (0.22)	6.2 (0.84)
≥65	4.8 (0.22)	[3]	4.7 (0.22)	4.9 (0.39)
Non-Hispanic black	7.8 (1.01)	4.4 (1.11)	6.3 (0.69)	11.3 (2.66)
18–44	4.5 (0.49)	4.0 (1.34)[1]	4.5 (0.46)	5.8 (0.96)
45–64	9.3 (1.90)	6.8 (1.44)	6.2 (0.76)	15.7 (5.26)[1]
≥65	7.4 (1.10)	[3]	7.5 (1.57)	7.4 (1.51)
Hispanic	10.5 (3.10)	6.6 (1.04)	7.7 (2.16)	[3]
18–44	6.0 (0.92)	7.6 (1.54)	4.8 (1.09)	11.2 (2.50)
45–64	9.6 (3.00)[1]	5.3 (1.07)	10.0 (3.99)[1]	8.8 (0.80)
≥65	[3]	[3]	5.2 (0.55)	[3]
Mexican American†	6.1 (0.57)	4.4 (0.94)	5.4 (0.62)	10.3 (0.90)
18–44	4.5 (0.69)	4.2 (1.04)	3.9 (0.66)	15.9 (1.92)
45–64	6.6 (0.83)	5.3 (2.42)[2]	6.1 (0.97)	9.3 (1.08)
≥65	6.5 (0.80)	[3]	5.0 (0.69)	11.3 (1.77)
Non-Hispanic Asian	7.9 (1.36)	8.1 (3.54)[2]	8.7 (2.08)	6.3 (1.15)
18–44	6.6 (2.88)[2]	8.1 (3.54)[2]	2.3 (0.64)	[3]
45–64	8.0 (2.68)[1]	[3]	9.8 (4.37)[2]	5.7 (1.29)
≥65	8.1 (1.06)	[3]	8.6 (1.19)	7.4 (2.05)

Data are among persons reporting having a regular physician he/she usually sees for diabetes care. Data are based on self-report.

* Type 1 diabetes is defined by age at onset <30 years who currently use insulin; all other persons with a physician diagnosis of diabetes were considered to have type 2 diabetes.

† Mexican American is a subset of Hispanic.

[1] Relative standard error >30%–40%

[2] Relative standard error >40%–50%

[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Health Interview Survey 2003

TYPES OF OUTPATIENT VISITS

Approximately 869,000 people reported that they were newly diagnosed with diabetes in 2010. This represented 4.2% of all people with diabetes in 2010. The percentage of people who reported being newly diagnosed with diabetes has fluctuated from 4.2% to 9.8% between 1990 and 2010 (data not shown). The 1997 redesign of the NHIS sampling frame influenced the percentage of people estimated to have diabetes (5), as well as the number and percentage of people who reported being diagnosed with diabetes within the past year.

Table 40.8 shows the types of providers seen by all patients with diabetes for diabetes-related visits in 2010 based on data from the NAMCS. Almost 65% of visits were made to primary care physicians, and approximately 35% were made to specialist physicians. Patients with diabetes were equally likely to see Internal Medicine and General/Family Medicine providers for primary care. Data from the NHIS 2011 show that although 89% of patients with diabetes had at least one visit to a primary care physician in the past year, only 57% saw an eye doctor, 53% saw a dentist, and 23% saw a podiatrist (Figure 40.16). As age increased, the percentage of people having at least one visit to a primary care physician increased, as did the percentage of people having at least one visit to an eye doctor or podiatrist (Table 40.9). The data are similar for women and men and among all racial/ethnic groups with the exception that fewer Hispanic and Mexican Americans saw an eye doctor or a dentist in the past year. Additional data on visits to primary care physicians or specialists are provided in Chapter 20 *Peripheral Arterial Disease, Foot Ulcers, Lower Extremity Amputations, and Diabetes*, Chapter 21 *Epidemiology of Ocular Functions and Diseases in Persons With Diabetes*, Chapter 31 *Oral Health and Diabetes*, Chapter 39 *Medication Use and Self-Care Practices in Persons With Diabetes*, and Chapter 41 *Quality of Care in People With Diabetes*.

Table 40.10 shows the frequency of reported visits to dentists in 2011 for people with diabetes. Over half (53%) reported having had a dental visit in the past year. Fewer than 1% reported having not seen a dentist in their lifetime, and 21% reported having not seen a dentist for more than 5 years. Of people who had at least one dental visit in their lifetime, non-Hispanic Asians (compared to all racial/ethnic groups) were least likely to report having their most recent visit >5 years ago.

Table 40.11 shows the frequency of visits to dentists in 2012, according to the MEPS, for people with diabetes. Only 35% of people with diabetes had a dental visit in the past year, but of those who did, the mean number of visits was 2.3. Non-Hispanic whites (compared to all other racial/ethnic groups) were most likely to have at least one dental visit in the past year.

In 2010, 47% of visits to office-based physicians in which diabetes was the primary diagnosis were ≤15 minutes

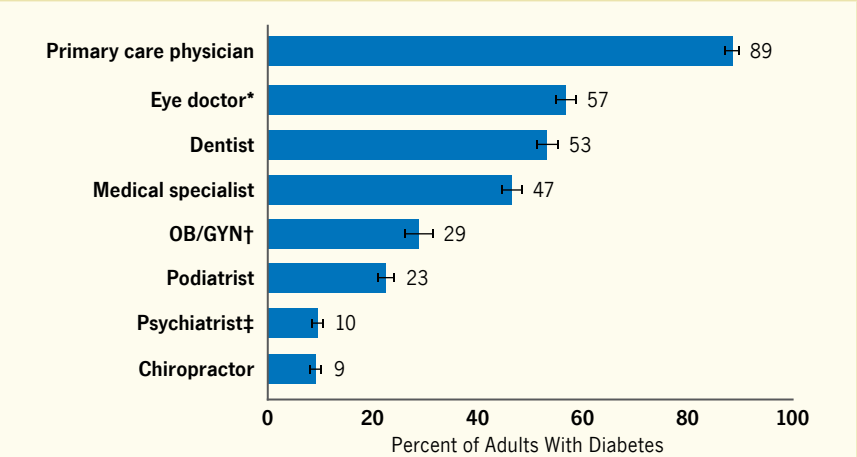
TABLE 40.8. Distribution of Provider Types for Ambulatory Care Visits for Diabetes Among Adults With Diabetes Age ≥18 Years, U.S., 2010

PROVIDER TYPE	PERCENT OF VISITS (STANDARD ERROR)
Primary care physicians	64.7 (5.54)
Internal medicine	32.0 (4.57)
General/Family medicine	32.2 (4.16)
Pediatrics	[3]
Specialist physicians	35.3 (5.54)
Ophthalmology	10.8 (2.02)
Cardiovascular disease	3.4 (0.91)
Surgical specialties	1.8 (0.75)[2]
Obstetrics and gynecology	1.2 (0.38)[1]
Neurology	0.7 (0.29)[2]
Urology	0.4 (0.16)[2]
Psychiatry	[3]
All other*	17.0 (6.22)[1]

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Visits include all visits in which diabetes was listed as the primary or secondary diagnosis.
* Includes endocrinologists.
[1] Relative standard error >30%–40%
[2] Relative standard error >40%–50%
[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Ambulatory Medical Care Survey 2010

FIGURE 40.16. Percent of Adults With Diabetes Age ≥18 Years Who Had at Least One Visit to a Health Care Provider in the Past Year, by Provider Type, U.S., 2011



Data are based on self-report. Error bars represent 95% confidence intervals.
* Eye doctor is defined as a visit to an optometrist, ophthalmologist, or eye doctor (someone who prescribes eye glasses).
† OB/GYN, Obstetrician/Gynecologist; percentage for women only.
‡ Psychiatrist includes psychologist, psychiatric nurse, or clinical social worker.

SOURCE: National Health Interview Survey 2011

TABLE 40.9. Percent of Adults With Diabetes Age ≥18 Years Who Had at Least One Visit to a Health Care Provider in the Past Year, by Type of Provider and Age, Sex, and Race/Ethnicity, U.S., 2011

CHARACTERISTICS	PERCENT (STANDARD ERROR) OF AT LEAST ONE VISIT TO A HEALTH CARE PROVIDER IN PAST YEAR							
	Primary Care Physician	Eye Doctor*	Dentist	Medical Specialist	OB/GYN†	Podiatrist	Psychiatrist‡	Chiropractor
Age (years)								
18–44	81.0 (2.43)	40.5 (2.79)	52.6 (3.05)	37.9 (2.80)	47.6 (4.03)	9.9 (1.72)	14.4 (2.15)	10.0 (1.59)
45–64	87.4 (1.07)	54.5 (1.72)	52.7 (1.73)	47.0 (1.71)	31.4 (1.98)	19.8 (1.23)	11.8 (1.02)	10.1 (0.90)
≥65	92.3 (0.87)	65.4 (1.54)	54.0 (1.58)	49.8 (1.63)	19.1 (1.80)	30.1 (1.44)	5.2 (0.66)	7.8 (0.94)
Sex, age (years)								
Women								
18–44	80.2 (3.46)	43.0 (4.11)	58.4 (3.82)	42.1 (4.11)	47.6 (4.03)	8.4 (2.02)	16.6 (2.99)	9.7 (2.32)
45–64	88.4 (1.42)	53.9 (2.08)	51.0 (2.28)	47.9 (2.52)	31.4 (1.98)	18.0 (1.72)	12.5 (1.34)	8.6 (1.11)
≥65	92.7 (1.00)	67.2 (1.99)	51.2 (2.12)	46.6 (2.23)	19.1 (1.80)	32.3 (2.03)	4.9 (0.94)	6.5 (1.15)
Men								
18–44	82.1 (3.30)	37.5 (4.26)	46.1 (4.73)	32.1 (3.75)		11.8 (2.83)	11.5 (2.75)	10.0 (2.39)
45–64	86.3 (1.56)	54.7 (3.45)	54.2 (2.30)	45.4 (2.38)		21.5 (1.75)	11.2 (1.43)	11.3 (1.36)
≥65	92.1 (1.26)	63.3 (2.20)	57.3 (2.26)	52.6 (2.26)		27.4 (1.94)	5.5 (0.88)	9.2 (1.41)
Race/ethnicity, age (years)								
Non-Hispanic white								
18–44	82.6 (3.71)	47.1 (4.42)	54.7 (4.58)	44.5 (4.11)	46.4 (6.11)	9.6 (2.72)	15.9 (3.40)	10.6 (2.60)
45–64	88.9 (1.46)	58.5 (2.30)	55.2 (2.23)	52.4 (2.15)	29.8 (2.70)	19.9 (1.64)	12.8 (1.35)	11.3 (1.11)
≥65	94.0 (1.00)	67.0 (1.85)	56.8 (1.92)	52.6 (1.95)	16.8 (2.19)	29.7 (1.85)	5.1 (0.82)	9.1 (1.23)
Non-Hispanic black								
18–44	82.6 (4.48)	33.1 (5.09)	55.2 (6.02)	34.1 (5.53)	49.1 (6.60)	12.6 (3.80)[1]	17.5 (4.46)	11.2 (2.65)
45–64	87.9 (2.06)	46.9 (3.43)	50.1 (3.53)	44.2 (3.57)	31.7 (3.92)	24.7 (3.03)	13.2 (2.20)	6.4 (1.52)
≥65	91.4 (1.94)	64.5 (3.47)	46.3 (3.67)	46.7 (3.60)	20.9 (3.72)	37.8 (3.61)	5.5 (1.58)	3.1 (1.03)[1]
Hispanic								
18–44	75.8 (4.90)	33.4 (4.93)	46.3 (5.66)	31.4 (5.38)	48.1 (8.08)	9.7 (2.53)	11.0 (3.98)[1]	9.3 (3.56)[1]
45–64	80.4 (2.81)	46.0 (3.80)	44.1 (3.89)	32.1 (3.54)	36.3 (4.84)	18.8 (3.15)	8.7 (2.06)	9.2 (3.04)[1]
≥65	80.6 (3.36)	55.7 (4.08)	46.2 (4.10)	38.8 (4.03)	31.4 (4.38)	30.5 (3.91)	5.0 (1.66)[1]	6.0 (1.87)[1]
Mexican American§								
18–44	72.8 (5.88)	27.1 (5.46)	46.6 (6.45)	30.3 (6.34)	44.9 (9.49)	8.3 (3.02)[1]	13.1 (5.09)[1]	12.0 (4.60)[1]
45–64	77.4 (3.98)	48.6 (4.92)	46.2 (5.02)	31.3 (4.47)	29.6 (5.48)	17.8 (4.01)	7.8 (2.74)[1]	10.3 (4.32)[2]
≥65	84.6 (4.51)	45.6 (5.31)	36.2 (5.49)	34.0 (6.01)	24.2 (5.50)	29.5 (5.61)	1.2 (0.81)[3]	2.2 (1.51)[3]
Non-Hispanic Asian								
18–44	83.9 (8.68)	49.2 (12.09)	52.3 (12.22)	24.1 (10.07)[2]	51.9 (17.56)[1]	[3]	[3]	[3]
45–64	88.5 (4.68)	53.4 (7.55)	55.9 (7.10)	31.7 (7.95)	32.9 (9.69)	3.8 (1.93)[3]	4.2 (2.39)[3]	9.2 (3.77)[2]
≥65	95.4 (2.59)	66.4 (6.46)	49.4 (6.79)	39.6 (5.56)	15.9 (8.07)[3]	13.4 (4.20)[1]	4.8 (3.34)[3]	2.9 (2.10)[3]

Data are based on self-report.
* Eye doctor is defined as a visit to an optometrist, ophthalmologist, or eye doctor (someone who prescribes eye glasses).
† OB/GYN, Obstetrician/Gynecologist; women only
‡ Psychiatrist includes psychologist, psychiatric nurse, or clinical social worker.
§ Mexican American is a subset of Hispanic.
[1] Relative standard error >30%–40%
[2] Relative standard error >40%–50%
[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Health Interview Survey 2011

duration, and 89% were ≤30 minutes duration (Figure 40.17). Between 1990 and 2010, the mean duration of office visits for diabetes has tended to increase (Table 40.12), especially for General/Family Medicine practitioners (who see 32% of patients with diabetes) (Table 40.8). The mean duration of an office visit for diabetes to a General/Family Medicine physician increased from 14.7 minutes in 1990 to 23.6 minutes in 2010. Visits by new patients tended to be longer in duration (26.3 minutes in 2010) than return visits for established patients (22.2 minutes in 2010), though the difference is relatively small. In general, the length of return visits has increased, while that of new patient visits has not.

The counseling and diagnostic services provided during visits tend to be related to the primary diagnosis for the visit. As Table 40.13 shows, the services provided differ at visits when diabetes was listed as the primary diagnosis compared to visits for all diagnoses. Blood pressure checks, foot exams, and blood tests were more likely to be performed when diabetes was the primary diagnosis. Similarly, patients with diabetes were counseled on diet, smoking cessation, and physical activity much more frequently when diabetes was the primary diagnosis.

TABLE 40.10. Frequency of Dental Visits Among Adults With Diabetes Age ≥18 Years, by Age, Sex, and Race/Ethnicity, U.S., 2011

CHARACTERISTICS	NUMBER OF PEOPLE	PERCENT (STANDARD ERROR)					
		Frequency of Dental Visits					
		Never	≤6 Months	>6 Months to 1 Year	>1 Year to 2 Years	>2 Years to 5 Years	>5 Years
All persons	20,021,865	0.6 (0.17)	38.1 (1.03)	15.1 (0.83)	11.8 (0.63)	13.3 (0.72)	21.1 (0.94)
Age (years)							
18–44	2,652,707	1.3 (0.63)[2]	32.1 (2.56)	20.5 (2.60)	15.1 (2.19)	15.7 (2.04)	15.3 (2.15)
45–64	9,489,675	0.4 (0.17)[2]	38.1 (1.64)	14.6 (1.19)	13.4 (1.05)	14.6 (1.13)	18.9 (1.28)
≥65	7,879,483	0.7 (0.27)[2]	40.2 (1.60)	13.8 (1.06)	8.8 (0.83)	10.7 (0.90)	25.8 (1.38)
Sex, age (years)							
Women	10,060,273	0.4 (0.15)[1]	37.0 (1.38)	15.1 (1.10)	11.2 (0.89)	14.7 (1.06)	21.6 (1.24)
18–44	1,439,634	[3]	37.7 (3.61)	20.7 (3.27)	10.1 (2.23)	17.9 (3.04)	13.0 (2.93)
45–64	4,516,650	[3]	35.4 (2.10)	15.6 (1.63)	13.0 (1.55)	16.6 (1.67)	19.2 (1.78)
≥65	4,103,989	[3]	38.5 (2.12)	12.7 (1.39)	9.5 (1.22)	11.7 (1.24)	27.1 (1.82)
Men	10,218,828	1.0 (0.32)[1]	39.3 (1.51)	15.1 (1.11)	12.4 (0.91)	11.6 (0.97)	20.6 (1.24)
18–44	1,246,191	[3]	26.3 (3.63)	19.8 (4.17)	21.2 (3.78)	13.2 (2.80)	17.4 (3.18)
45–64	5,060,787	[3]	40.4 (2.34)	13.8 (1.59)	13.7 (1.45)	12.8 (1.45)	18.7 (1.70)
≥65	3,911,850	1.1 (0.53)[2]	42.1 (2.27)	15.2 (1.66)	7.9 (1.10)	9.7 (1.31)	24.0 (2.01)
Race/ethnicity, age (years)							
Non-Hispanic white	12,986,615	[3]	41.8 (1.39)	14.0 (1.05)	9.6 (0.72)	12.3 (0.93)	22.2 (1.28)
18–44	1,245,694	[3]	33.5 (3.95)	21.1 (4.24)	8.7 (2.30)	21.7 (3.81)	15.0 (3.59)
45–64	6,058,688	[3]	42.1 (2.19)	13.2 (1.44)	11.8 (1.25)	12.7 (1.40)	20.1 (1.79)
≥65	5,682,233	[3]	43.3 (1.99)	13.5 (1.33)	7.4 (0.97)	9.8 (1.11)	25.9 (1.73)
Non-Hispanic black	3,148,140	[3]	31.4 (2.16)	18.5 (1.84)	15.3 (1.54)	14.1 (1.61)	20.1 (1.72)
18–44	629,047	[3]	24.7 (5.18)	30.5 (5.38)	17.6 (4.73)	6.8 (2.96)[2]	19.9 (4.59)
45–64	1,513,057	[3]	32.9 (3.35)	17.1 (2.64)	16.7 (2.58)	16.0 (2.40)	17.0 (2.33)
≥65	1,006,036	[3]	33.2 (3.82)	13.1 (2.36)	11.8 (2.25)	16.0 (2.62)	25.0 (3.02)
Hispanic	3,032,506	2.3 (0.83)[1]	29.0 (2.52)	16.1 (1.89)	15.6 (1.88)	16.3 (1.79)	20.7 (2.14)
18–44	655,125	[3]	33.9 (5.48)	12.4 (3.60)	24.0 (4.84)	12.5 (3.25)	14.1 (3.46)
45–64	1,504,460	[3]	27.0 (3.71)	17.1 (2.75)	14.0 (2.71)	21.5 (2.98)	18.7 (2.81)
≥65	872,921	[3]	29.0 (4.00)	17.2 (2.86)	12.0 (2.69)	10.0 (2.00)	29.0 (4.09)
Mexican American*	1,953,783	3.1 (1.26)[2]	26.1 (3.12)	17.8 (2.49)	14.0 (2.14)	17.8 (2.30)	21.2 (2.66)
18–44	499,219	[3]	32.2 (6.15)	14.5 (4.58)[1]	19.3 (5.27)	13.0 (3.79)	17.4 (4.44)
45–64	980,432	[3]	26.7 (4.80)	19.5 (3.73)	11.5 (2.97)	22.1 (3.44)	18.0 (3.40)
≥65	474,132	[3]	18.3 (5.11)	17.9 (3.66)	13.6 (4.10)[1]	14.1 (3.37)	31.7 (6.19)
Non-Hispanic Asian	854,604	[3]	38.7 (4.62)	14.2 (2.96)	20.0 (3.96)	14.2 (2.97)	10.0 (2.64)
18–44	122,841	[3]	45.2 (12.02)	[3]	[3]	18.8 (8.88)[2]	[3]
45–64	413,470	[3]	38.8 (7.04)	17.1 (5.01)	22.8 (6.66)	12.9 (4.50)[1]	8.4 (3.45)[2]
≥65	318,293	[3]	36.0 (7.30)	13.4 (4.64)[1]	16.7 (5.30)[1]	13.9 (3.92)	16.1 (5.12)[1]

Dental visits include visits to dentists, orthodontists, oral surgeons, and all other dental specialists, including dental hygienists. Numbers are NHIS weighted estimates. Data are based on self-report.

* Mexican American is a subset of Hispanic.

[1] Relative standard error >30%–40%

[2] Relative standard error >40%–50%

[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Health Interview Survey (NHIS) 2011

TABLE 40.11. Percent and Mean Number of Dental Visits Among Adults With Diabetes Age ≥18 Years, by Age, Sex, and Race/Ethnicity, U.S., 2012

CHARACTERISTICS	PERCENT (STANDARD ERROR) OF DENTAL VISITS		MEAN NUMBER (STANDARD ERROR) OF DENTAL VISITS	
	No Dental Visits	≥1 Dental Visit	Among Those With Any Visit	Among Total Sample
All persons (n=25.5M)	64.6 (1.16)	35.4 (1.16)	2.3 (0.08)	0.8 (0.04)
Age (years)				
18–44 (n=3.3M)	70.5 (2.84)	29.5 (2.84)	1.9 (0.20)	0.6 (0.08)
45–64 (n=11.4M)	62.4 (2.02)	37.6 (2.02)	2.4 (0.01)	0.9 (0.06)
≥65 (n=10.8M)	65.2 (1.99)	34.9 (1.99)	2.4 (0.13)	0.8 (0.06)
Sex, age (years)				
Women (n=12.7M)	63.6 (1.56)	36.4 (1.56)	2.2 (0.09)	0.8 (0.05)
18–44 (n=1.8M)	66.3 (3.81)	33.7 (3.81)	1.7 (0.20)	0.6 (0.10)
45–64 (n=5.4M)	59.3 (2.67)	40.7 (2.67)	2.4 (0.15)	1.0 (0.08)
≥65 (n=5.5M)	66.9 (2.62)	33.1 (2.62)	2.2 (0.15)	0.7 (0.07)
Men (n=12.8M)	65.7 (1.82)	34.3 (1.82)	2.4 (0.11)	0.8 (0.06)
18–44 (n=1.6M)	75.1 (4.16)	24.9 (4.16)	2.1 (0.40)	0.5 (0.13)
45–64 (n=6.0M)	65.4 (2.70)	34.8 (2.70)	2.3 (0.13)	0.8 (0.07)
≥65 (n=5.2M)	63.3 (2.60)	36.7 (2.60)	2.6 (0.18)	0.9 (0.09)
Race/ethnicity, age (years)				
Non-Hispanic white (n=15.5)	58.3 (1.65)	41.8 (1.65)	2.4 (0.11)	1.0 (0.06)
18–44 (n=1.7M)	62.5 (4.62)	37.5 (4.62)	1.7 (0.21)	0.6 (0.10)
45–64 (n=6.7M)	56.2 (3.08)	43.9 (3.08)	2.5 (0.14)	1.1 (0.10)
≥65 (n=7.1M)	59.2 (2.75)	40.8 (2.75)	2.5 (0.16)	1.0 (0.08)
Non-Hispanic black (n=3.9M)	75.8 (2.00)	24.2 (2.02)	2.1 (0.15)	0.5 (0.06)
18–44 (n=0.6M)	78.2 (4.95)	21.8 (4.95)	2.6 (0.84)	0.6 (0.08)
45–64 (n=1.8M)	70.6 (3.23)	29.4 (3.23)	2.2 (0.14)	0.6 (0.08)
≥65 (n=1.5M)	81.2 (3.02)	18.8 (3.02)	1.7 (0.16)	0.3 (0.06)
Non-Hispanic other (n=2.0M)	67.2 (3.83)	32.8 (3.83)	2.3 (0.22)	0.8 (0.12)
18–44 (n=0.3M)	76.4 (10.8)	23.6 (10.8)[1]	3.5 (0.74)	[2]
45–64 (n=0.8M)	62.6 (5.41)	37.4 (5.39)	2.2 (0.23)	0.8 (0.14)
≥65 (n=0.9M)	69.1 (5.77)	30.9 (5.77)	2.2 (0.34)	0.7 (0.17)
Hispanic (n=4.2M)	76.9 (2.00)	23.2 (2.00)	1.8 (0.11)	0.4 (0.04)
18–44 (n=0.8M)	79.2 (4.17)	20.9 (4.17)	1.6 (0.18)	0.3 (0.07)
45–64 (n=2.0M)	76.2 (2.63)	23.8 (2.63)	1.9 (0.19)	0.5 (0.06)
≥65 (n=1.3M)	76.4 (3.54)	23.6 (3.54)	1.7 (0.15)	0.4 (0.06)

Dental visits includes visits to dentists, orthodontists, oral surgeons, and all other dental specialists, including dental hygienists. Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46. Numbers (n) are MEPS weighted estimates, M = x10^6.

[1] Relative standard error >40%–50%

[2] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: Medical Expenditure Panel Survey 2012

FIGURE 40.17. Duration of Office-Based Physician Visits in Which Diabetes Was Listed as the Primary Diagnosis, U.S., 2010

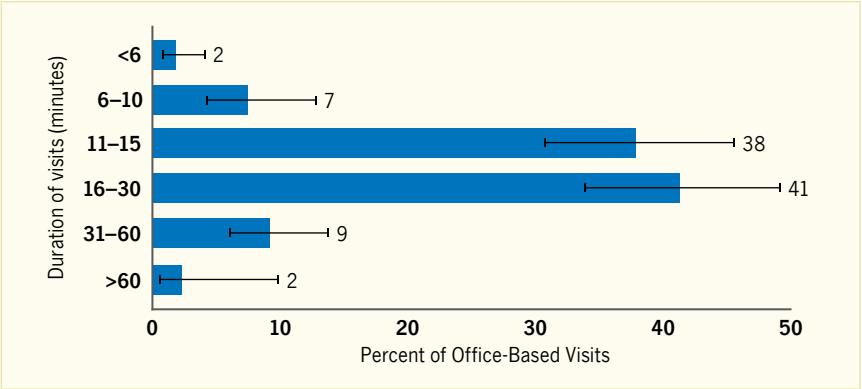


Figure shows the percent distribution of duration of visits to office-based physicians in which diabetes was the diagnosis most associated with the patient's primary complaint. Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Error bars represent 95% confidence intervals.

SOURCE: National Ambulatory Medical Care Survey 2010

Table 40.14 shows the frequency of diabetes-related diagnostic services received by patients with diabetes in 2012 according to the MEPS. Most patients with diabetes received a blood test for cholesterol (84%) and a glycosylated hemoglobin (A1c) measurement (60%) in the past year. Approximately 65%–70% of people with diabetes reported having received an eye exam, foot exam, and flu shot in the past year.

TABLE 40.12. Mean Duration (Minutes) of Face-to-Face Visits to Office-Based Physicians Among Adults Age ≥18 Years Listing Diabetes as the Primary Diagnosis, U.S., 1990–2010

	MEAN DURATION (STANDARD ERROR) IN MINUTES				
	1990	1995	2000	2005	2010
All physicians	17.5 (0.63)	18.0 (1.25)	19.2 (0.82)	19.8 (1.00)	22.7 (1.36)
Internal medicine	20.4 (1.35)	14.9 (1.63)	18.2 (1.27)	20.0 (1.12)	20.2 (1.49)
General/Family medicine	14.7 (0.62)	16.0 (1.27)	18.6 (1.43)	19.7 (1.63)	23.6 (2.78)
Prior-visit status*					
New patient	30.3 (2.79)	40.3 (6.74)	24.5 (3.76)	23.2 (3.17)	26.3 (1.54)
Established patient	16.6 (0.62)	17.0 (1.13)	18.9 (0.85)	19.6 (0.98)	22.2 (1.54)

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1.
* Only for visits to primary care physicians (defined as General/Family practice and Internal medicine)

SOURCE: National Ambulatory Medical Care Surveys 1990, 1995, 2000, 2005, 2010

TABLE 40.13. Percent of Adults Age ≥18 Years Receiving Diagnostic and Counseling Services During Single Visits to Office-Based Physicians Listing Diabetes as the Primary Diagnosis and as Any Diagnosis, U.S., 2010

	PERCENT (STANDARD ERROR)	
	Diabetes as Primary Diagnosis	Diabetes as Any Diagnosis
Diagnostic and screening services		
Eye exam	2.3 (0.88)[1]	1.2 (0.24)
Blood pressure checks	86.3 (2.65)	66.5 (1.66)
Foot exam	24.5 (7.19)	4.0 (0.63)
Urinalysis	10.6 (2.12)	8.3 (0.62)
Cholesterol measure	28.5 (3.10)	9.3 (0.66)
Other blood tests	52.7 (3.11)	21.7 (0.99)
None	4.9 (1.61)[1]	6.3 (1.01)
Counseling or treatment services		
Weight reduction*	32.5 (8.85)	15.1 (1.96)
Diet and nutrition	36.1 (5.30)	11.2 (0.86)
Smoking cessation†	35.4 (6.64)	19.1 (1.42)
Physical activity	23.8 (4.86)	9.3 (0.83)
Flu shot	2.1 (0.94)[2]	1.0 (0.18)
Psychotherapy/mental health counseling	[3]	2.7 (0.34)
Other counseling/advice	[3]	0.3 (0.05)
None	41.1 (3.97)	57.8 (1.66)

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1.
* Among persons with body mass index (BMI) >30 kg/m^2
† Among current smokers
[1] Relative standard error >30%–40%
[2] Relative standard error >40%–50%
[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Ambulatory Medical Care Survey 2010

TABLE 40.14. Percent of Adults Age ≥18 Years With Diabetes Receiving Diagnostic Services in Visits to Office-Based Physicians, U.S., 2012

DIAGNOSTIC SERVICE	PERCENT (STANDARD ERROR)
Eye exam	65.9 (1.44)
Foot exam	68.8 (1.30)
Cholesterol measure	83.6 (1.02)
A1c measure	60.0 (1.45)
Flu shot	64.8 (1.21)

Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46. A1c, glycosylated hemoglobin.

SOURCE: Medical Expenditure Panel Survey 2012 (diabetes supplement)

SOURCES OF PAYMENT FOR OUTPATIENT VISITS

The distribution of primary sources of payment for visits to office-based physicians in which diabetes was listed as the primary diagnosis is shown in Table 40.15. Private insurance was the most common primary source of payment for people age 18–64 years, and Medicare was the most common primary source of payment for people age ≥65 years. Among people age 18–64 years, the percentage of visits for which some payment was received from the patient (self-pay) decreased over time between 1990 and 2010, and the percentage that was paid for by private insurance increased over time. It is important to note that the methods used in 2000 to determine source of payment were different from the other years. The trends seen in the primary sources of payment for visits to office-based physicians are similar in data from the MEPS (Table 40.16).

Additional information on health insurance coverage in persons with diabetes is provided in Chapter 42 *Health Insurance and Diabetes*.

TABLE 40.15. Primary Sources of Payment for Visits to Office-Based Physicians Among Adults Age ≥18 Years for Which Diabetes Was Listed as the Primary Diagnosis, by Age, U.S., 1990–2010

SOURCE OF PAYMENT	PERCENT (STANDARD ERROR) OF TOTAL VISITS				
	1990*	1995*	2000†	2005*	2010*
Age 18–64 years					
Private insurance	44.8 (3.21)	52.0 (3.95)	71.2 (3.44)	67.0 (4.37)	62.0 (3.91)
Medicare	12.4 (1.97)	10.3 (2.13)	7.6 (1.71)	13.3 (3.32)	15.3 (2.54)
Medicaid	8.5 (1.81)	12.0 (2.90)	9.8 (2.58)	7.9 (1.88)	11.6 (2.24)
Self-pay	28.7 (2.98)	10.7 (2.20)	2.6 (1.02)[1]	5.2 (1.65)[1]	4.2 (1.84)[2]
Other‡	5.7 (1.4)	15.0 (3.02)	8.8 (2.09)	6.6 (2.20)[1]	6.9 (2.48)[1]
Age ≥65 years					
Private insurance	9.4 (1.83)	8.6 (2.23)	21.9 (3.96)	5.6 (1.64)	17.0 (3.85)
Medicare	80.1 (2.58)	78.9 (3.36)	64.5 (4.20)	88.2 (2.40)	77.8 (4.33)
Medicaid	1.9 (0.80)[2]	2.6 (1.14)[2]	8.6 (3.44)[2]	4.1 (1.71)[2]	3.1 (1.30)[2]
Self-pay	7.7 (1.82)	4.3 (1.80)[2]	[3]	[3]	[3]
Other‡	[3]	5.7 (1.89)[1]	4.2 (1.89)[2]	[3]	[3]

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1.

* Primary source was determined based on all reported sources of payment using the following hierarchy: Medicare, Medicaid, private insurance, workers' compensation, self-pay, no charge, other, unknown.

† Primary source was determined by the doctor.

‡ Includes workers' compensation, unknown, and other sources of payment.

[1] Relative standard error >30%–40%

[2] Relative standard error >40%–50%

[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Ambulatory Medical Care Surveys 1990, 1995, 2000, 2005, 2010

TABLE 40.16. Distribution of Sources of Payment for Visits to Office-Based Physicians Among Adults With Diabetes Age ≥18 Years, by Age, U.S., 1997–2012

SOURCE OF PAYMENT	PERCENT (STANDARD ERROR) OF TOTAL VISITS			
	1997	2002	2007	2012
Age 18–64 years				
Private insurance*	40.2 (3.76)	41.0 (3.77)	50.9 (3.37)	50.4 (3.00)
Medicare	13.5 (2.73)	12.4 (1.95)	14.9 (2.89)	17.1 (2.52)
Medicaid	14.4 (2.09)	12.7 (1.99)	9.3 (2.16)	10.3 (1.51)
Self-pay	18.8 (1.78)	12.7 (1.43)	12.9 (1.57)	11.4 (0.92)
Other†	13.1 (3.17)	21.3 (5.12)	12.0 (1.88)	10.8 (2.09)
Age ≥65 years				
Private insurance*	30.8 (9.18)	17.6 (1.96)	16.6 (1.44)	20.8 (2.15)
Medicare	52.6 (4.45)	64.7 (1.90)	63.6 (2.12)	61.7 (2.43)
Medicaid	3.6 (1.20)[1]	3.1 (0.48)	2.5 (0.73)	2.5 (0.88)[1]
Self-pay	7.8 (2.37)[1]	6.3 (0.59)	6.6 (0.54)	6.6 (0.71)
Other†	5.3 (1.90)[1]	8.4 (1.28)	10.7 (1.80)	8.4 (1.86)

Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46.

* Private insurance includes TRICARE.

† Other sources of payment include VA/CHAMPVA, other Federal, other State or Local, workers' compensation, or other unclassified source.

[1] Relative standard error >30%–40%

SOURCE: Medical Expenditure Panel Surveys 1997, 2002, 2007, 2012

TELEPHONE, EMAIL, AND INTERNET-BASED CONTACTS

With the growing importance of electronic communications, the National Center for Health Statistics added questions regarding the use of these forms of communication to the NHIS in 2011. Table 40.17 shows the reported use of telephone, email, and internet communications by patients with diabetes. In 2011, 10% of respondents with diabetes reported that they had used the telephone to get medical advice or test results from their physician in the past 2 weeks. This percentage was slightly higher for the oldest age group (11.8%) and tended to be higher for women compared to men in each age group. Non-Hispanic whites tended to have a higher percentage of telephone contacts than all other racial/ethnic groups. Communication with a provider via email was more common for patients with diabetes in the younger (18–44 years) age group, and use of email for communication tended to decrease with increasing age. Men were slightly more likely to have email contact with their physician than women. Non-Hispanic whites were approximately twice as likely and non-Hispanic Asians approximately three times as likely to have email contacts compared to other racial/ethnic groups. Four percent of the population reported scheduling an appointment using a computer in the past year. As with email communications, the percentage of patients scheduling appointments using computers tended to decrease with age for both sexes and for all racial/ethnic groups. Non-Hispanic

TABLE 40.17. Percent of Adults With Diabetes Age ≥18 Years Who Reported Telephone, Email, or Internet-Based Contacts in the Past Year, by Age, Sex, and Race/Ethnicity, U.S., 2011

CHARACTERISTICS	PERCENT (STANDARD ERROR) BY TYPE OF CONTACT					
	Telephone, Past 2 Weeks*	Email†	Scheduled an Appointment Using a Computer	Filled a Prescription Using a Computer	Looked Up Health Information on Internet	Participated in Health-Related Online Chat Group
All persons	10.3 (0.62)	5.5 (0.51)	4.0 (0.46)	9.9 (0.73)	34.3 (1.02)	2.9 (0.38)
Age (years)						
18–44	9.1 (1.51)	10.0 (1.92)	7.3 (1.70)	8.8 (1.63)	53.1 (2.89)	6.0 (1.34)
45–64	9.3 (0.83)	5.7 (0.78)	4.6 (0.76)	11.7 (1.21)	40.5 (1.51)	2.4 (0.46)
≥65	11.8 (1.09)	3.9 (0.73)	2.3 (0.52)	8.1 (0.99)	20.6 (1.32)	2.3 (0.57)
Sex, age (years)						
Women	11.5 (0.94)	5.1 (0.72)	4.0 (0.62)	7.6 (0.82)	35.0 (1.41)	3.4 (0.55)
18–44	10.1 (2.24)	12.1 (2.97)	7.9 (2.39)[1]	7.3 (2.03)	57.9 (4.06)	8.6 (2.32)
45–64	9.4 (1.19)	5.0 (0.97)	5.3 (1.07)	11.2 (1.53)	44.5 (2.07)	3.1 (0.79)
≥65	14.1 (1.63)	2.7 (0.80)	1.4 (0.50)[1]	3.7 (0.85)	16.7 (1.66)	1.9 (0.60)[1]
Men	9.1 (0.83)	6.0 (0.74)	4.1 (0.63)	12.2 (1.13)	33.5 (1.42)	2.4 (0.48)
18–44	8.0 (1.88)	7.6 (2.20)	6.6 (2.19)[1]	10.5 (2.53)	47.5 (4.03)	3.0 (1.23)[2]
45–64	9.2 (1.22)	6.3 (1.13)	4.0 (1.00)	12.1 (1.80)	36.9 (2.24)	1.8 (0.53)
≥65	9.4 (1.34)	5.1 (1.20)	3.3 (0.94)	12.8 (1.75)	24.7 (2.08)	2.8 (0.96)[1]
Race/ethnicity, age (years)						
Non-Hispanic white	11.0 (0.83)	6.5 (0.71)	4.2 (0.60)	12.5 (1.00)	39.0 (1.40)	2.8 (0.50)
18–44	10.1 (2.60)	14.4 (3.49)	6.8 (2.52)[1]	9.4 (2.57)	60.1 (4.30)	7.8 (2.29)
45–64	9.5 (1.07)	6.6 (1.06)	5.6 (0.99)	15.4 (1.63)	48.4 (2.07)	2.1 (0.57)
≥65	12.7 (4.41)	4.6 (1.01)	2.2 (0.60)	10.1 (1.36)	24.3 (1.69)	2.4 (0.74)[1]
Non-Hispanic black	8.7 (1.23)	3.1 (0.83)	3.2 (0.87)	3.9 (0.86)	29.6 (2.20)	2.9 (0.86)[1]
18–44	5.6 (2.28)[2]	4.5 (2.00)[2]	6.0 (2.86)[2]	6.8 (2.63)[1]	60.6 (5.33)	6.1 (3.02)[2]
45–64	9.4 (1.90)	3.9 (1.44)[1]	2.1 (0.84)[1]	3.3 (1.10)[1]	27.6 (3.01)	2.7 (1.17)[2]
≥65	9.4 (2.14)	[3]	[3]	2.9 (1.37)[2]	13.5 (2.65)	[3]
Hispanic	9.7 (1.52)	3.2 (0.98)[1]	3.7 (1.47)[2]	5.8 (1.51)	21.7 (2.17)	1.5 (0.46)[1]
18–44	10.3 (3.65)[1]	[3]	[3]	6.6 (3.27)[2]	31.2 (5.57)	[3]
45–64	10.2 (2.40)	[3]	[3]	7.5 (2.91)[1]	23.9 (3.49)	1.5 (0.60)[2]
≥65	8.5 (2.14)	[3]	[3]	[3]	10.7 (2.67)	[3]
Mexican American‡	8.9 (1.71)	2.5 (1.16)[2]	[3]	4.7 (2.12)[2]	20.2 (2.69)	1.3 (0.56)[2]
18–44	10.4 (4.14)[1]	[3]	[3]	[3]	28.6 (6.21)	[3]
45–64	7.6 (2.31)[1]	[3]	[3]	[3]	21.9 (4.35)	[3]
≥65	10.0 (3.19)[1]	[3]	[3]	[3]	7.8 (2.75)[1]	[3]
Non-Hispanic Asian	9.7 (2.85)	8.8 (2.37)	7.2 (2.47)[1]	9.9 (2.78)	28.4 (4.77)	9.1 (2.95)[1]
18–44	[3]	15.2 (6.96)[2]	28.8 (11.21)[1]	26.5 (10.92)[2]	57.5 (12.71)	[3]
45–64	[3]	9.8 (3.97)[2]	[3]	[3]	33.2 (7.73)	[3]
≥65	14.0 (4.58)[1]	[3]	[3]	8.4 (3.83)[2]	12.3 (4.26)[1]	[3]

Data are based on self-report.

* Telephone includes getting medical advice or test results and does not include making appointments, billing questions, or prescription refills; telephone is the only type of contact that was asked over the past 2 weeks, rather than the past year.

† Email is any communication with a health care provider via email.

‡ Mexican American is a subset of Hispanic.

[1] Relative standard error >30%–40%

[2] Relative standard error >40%–50%

[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Health Interview Survey 2011

Asians tended to be the most likely to report scheduling appointments using a computer (7%). About 10% of patients used a computer to fill a prescription in the past year; however, unlike email and appointment scheduling, older people age 45–64 years were most likely to use a computer to fill a prescription. Men were more likely than women to fill prescriptions using computers, and non-Hispanic whites and non-Hispanic Asians were more likely to use computers to fill prescriptions than non-Hispanic blacks, Hispanics, and Mexican Americans. Using the internet to look up health information was by far the most frequently reported use of electronic communications: 34% of patients reported doing so in the past year. The frequency of internet use decreased with age for both sexes and for all racial/ethnic groups. The percentage of men and women who used the internet to look up health information was similar, but non-Hispanic whites were more likely to do so than all other racial/ethnic groups. Very few people (3%) reported participating in health-related online chat groups in the past year.

EMERGENCY DEPARTMENT VISITS

In 2011, 70% of people with diabetes reported no emergency department visits in the past 12 months, 17% reported one emergency department visit, and 13% reported two or more emergency department visits (Table 40.18). More women than men reported at least one emergency department visit overall and within each age group. The youngest age group was least likely to report no emergency department visits, and the percentage of patients with 1–5, 6–12, and ≥13 emergency department visits tended to be highest in the youngest age group (Figure 40.18). The distributions of number of emergency department visits were similar across racial/ethnic groups, except non-Hispanic blacks tended to be more likely to have multiple visits (Figure 40.19).

TABLE 40.18. Frequency of Emergency Department Visits Among Adults With Diabetes Age ≥18 Years, by Age, Sex, and Race/Ethnicity, U.S., 2011

CHARACTERISTICS	PERCENT (STANDARD ERROR) Number of Emergency Room Visits					
	None	1	2–3	4–5	6–12	≥13
All persons	69.7 (0.96)	16.8 (0.80)	8.6 (0.63)	2.5 (0.31)	1.9 (0.31)	0.5 (0.13)
Age (years)						
18–44	63.1 (3.04)	18.0 (2.47)	9.2 (1.76)	4.3 (1.32)[1]	4.2 (1.22)	1.2 (0.57)[2]
45–64	72.1 (1.41)	14.8 (1.12)	8.6 (0.90)	2.2 (0.46)	1.9 (0.43)	0.4 (0.18)[2]
≥65	69.3 (1.41)	18.9 (1.25)	8.2 (0.82)	2.1 (0.40)	1.2 (0.37)	[3]
Sex, age (years)						
Women	66.0 (1.32)	18.4 (1.04)	9.5 (0.87)	3.1 (0.48)	2.3 (0.51)	0.7 (0.24)[1]
18–44	57.2 (4.26)	20.9 (3.60)	9.1 (2.15)	6.1 (2.13)[1]	4.9 (1.76)[1]	[3]
45–64	70.0 (1.95)	16.1 (1.60)	9.4 (1.30)	2.3 (0.61)	1.8 (0.68)[1]	[3]
≥65	64.6 (2.04)	20.2 (1.68)	9.7 (1.24)	2.9 (0.68)	2.0 (0.68)[1]	[3]
Men	73.5 (1.39)	15.2 (1.15)	7.6 (0.86)	1.8 (0.41)	1.6 (0.34)	0.3 (0.12)[2]
18–44	69.8 (4.16)	14.6 (3.04)	9.4 (2.70)	[3]	3.5 (1.71)[2]	[3]
45–64	74.0 (2.00)	13.5 (1.57)	7.9 (1.34)	2.2 (0.69)[1]	2.0 (0.52)	[3]
≥65	74.1 (1.94)	17.5 (1.79)	6.7 (1.08)	1.3 (0.41)[1]	[3]	[3]
Race/ethnicity, age (years)						
Non-Hispanic white	70.9 (1.29)	16.3 (1.04)	8.3 (0.78)	2.3 (0.41)	1.7 (0.41)	0.5 (0.19)[1]
18–44	59.9 (4.71)	17.4 (3.78)	10.4 (2.79)	5.0 (2.01)[2]	5.9 (2.39)[2]	[3]
45–64	74.1 (1.84)	14.2 (1.45)	7.5 (1.05)	2.1 (0.63)	1.6 (0.55)[1]	[3]
≥65	70.0 (1.71)	18.2 (1.55)	8.6 (1.05)	2.0 (0.49)	0.8 (0.42)[2]	[3]
Non-Hispanic black	60.1 (2.26)	19.5 (2.13)	12.6 (1.59)	3.2 (0.77)	3.9 (0.83)	0.7 (0.23)[1]
18–44	52.4 (5.85)	26.7 (5.61)	11.0 (3.39)[1]	[3]	5.5 (2.01)[1]	[3]
45–64	58.8 (3.26)	17.6 (2.70)	16.9 (2.74)	2.4 (0.81)[1]	3.6 (1.22)[1]	0.7 (0.33)[2]
≥65	66.8 (3.75)	18.0 (3.44)	7.2 (1.93)	4.4 (1.40)[1]	3.2 (1.22)[1]	[3]
Hispanic	73.1 (2.27)	15.2 (1.78)	7.2 (1.31)	2.8 (0.84)[1]	1.4 (0.55)[1]	[3]
18–44	73.3 (4.86)	12.3 (3.38)	7.5 (2.83)[1]	[3]	[3]	[3]
45–64	74.8 (3.18)	14.3 (2.44)	6.8 (1.91)	2.6 (1.17)[2]	1.5 (0.76)[2]	[3]
≥65	69.9 (3.93)	19.0 (3.51)	7.8 (2.27)	[3]	[3]	[3]
Mexican American*	73.2 (2.92)	15.2 (2.15)	7.6 (1.79)	2.4 (1.18)[2]	[3]	[3]
18–44	73.9 (5.50)	10.3 (3.27)[1]	9.3 (3.64)[1]	[3]	[3]	[3]
45–64	76.4 (4.04)	14.6 (3.14)	6.0 (2.49)[2]	[3]	[3]	[3]
≥65	65.7 (5.88)	21.8 (5.23)	9.1 (3.63)[1]	[3]	[3]	[3]
Non-Hispanic Asian	74.7 (4.42)	20.5 (4.16)	3.8 (1.47)[1]	[3]	[3]	[3]
18–44	89.2 (7.27)	[3]	[3]	[3]	[3]	[3]
45–64	81.8 (5.46)	14.4 (4.73)[1]	[3]	[3]	[3]	[3]
≥65	60.7 (8.27)	31.4 (8.24)	7.1 (3.40)[2]	[3]	[3]	[3]

Data are based on self-report.

* Mexican American is a subset of Hispanic.

[1] Relative standard error >30%–40%

[2] Relative standard error >40%–50%

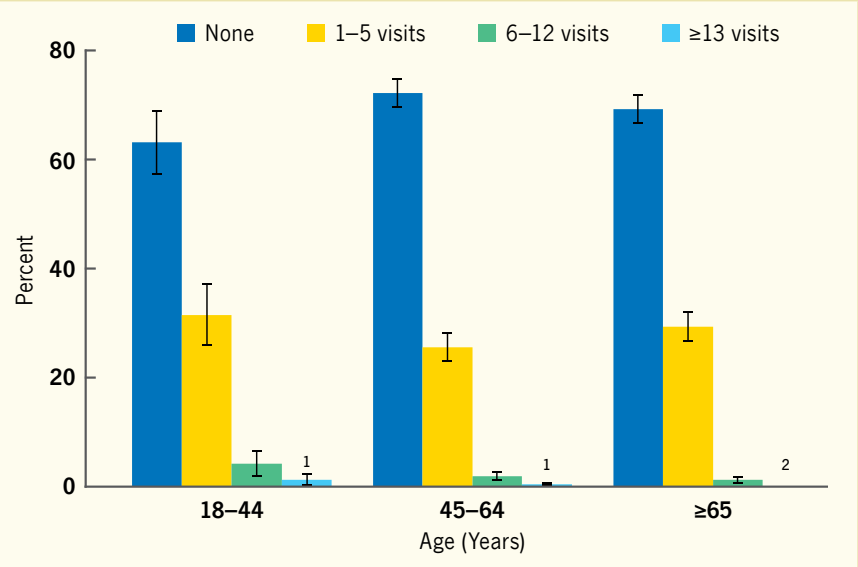
[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Health Interview Survey 2011

Like the NHIS 2011, the MEPS 2012 found that 76% of people with diabetes had no emergency department visits in the past 12 months (Table 40.19). Of those who had at least one visit, the mean number of visits in the past year was 1.5. With the exception of the 45–64-years age group, slightly more women than men in each age group had at least one emergency department visit. The distribution of number of visits to the emergency department was similar across age and racial/ethnic groups in the MEPS 2012 (Figures 40.20 and 40.21).

Emergency department visits among people with diabetes may be related to acute glycemic complications (hyperglycemia and hypoglycemia) and to the complications and comorbidities of diabetes. The excess emergency department utilization by people with diabetes relative to the general population can be estimated by comparing the frequency of use for those with diabetes and for all persons after adjusting for age and sex (Figure 40.22). People with diabetes were less likely to report no emergency department visits in the last year than the general population (70% vs. 80%) and were more likely to report 1–5 and 6–12 emergency department visits in the past year compared to people in the general population (28% vs. 20% and 2% vs. 1%, respectively). This pattern was the same for women and men. A similar pattern was observed in the MEPS 2012 (Figure 40.23). The percentage of adults with diabetes who reported none or 1–5 visits to the emergency department has been consistent over time in both the NHIS and the MEPS (Tables 40.20 and 40.21).

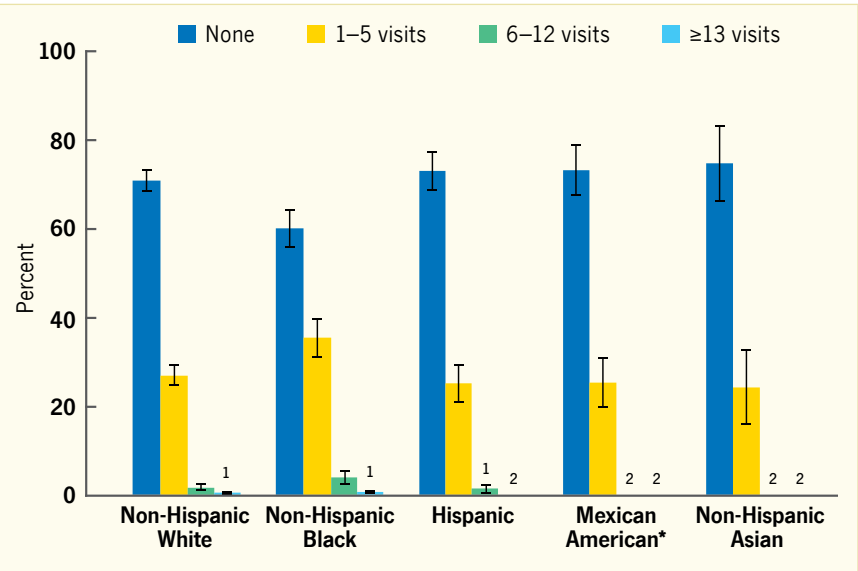
FIGURE 40.18. Frequency of Emergency Department Visits Among Adults With Diabetes Age ≥18 Years, by Age, U.S., 2011



Data are based on self-report. Error bars represent 95% confidence intervals.
[1] Relative standard error >40%–50%
[2] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Health Interview Survey 2011

FIGURE 40.19. Frequency of Emergency Department Visits Among Adults With Diabetes Age ≥18 Years, by Race/Ethnicity, U.S., 2011



Data are based on self-report. Error bars represent 95% confidence intervals.
* Mexican American is a subgroup of Hispanic.
[1] Relative standard error >30%–40%
[2] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Health Interview Survey 2011

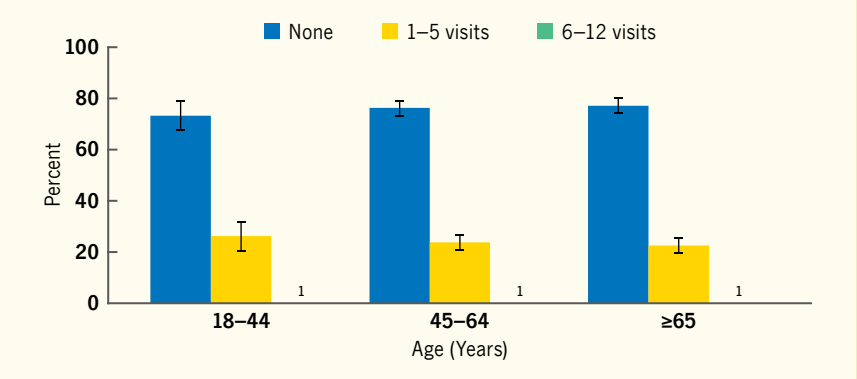
TABLE 40.19. Percent and Mean Number of Emergency Department Visits Among Adults With Diabetes Age ≥18 Years, by Age, Sex, and Race/Ethnicity, U.S., 2012

CHARACTERISTICS	PERCENT (STANDARD ERROR) OF EMERGENCY VISITS		MEAN NUMBER (STANDARD ERROR) OF EMERGENCY VISITS	
	No Emergency Visits	≥1 Emergency Visit	For Those With Any Visits	For Sample Population
All persons (n=25.5M)	76.2 (1.07)	23.8 (1.07)	1.5 (0.04)	0.4 (0.02)
Age (years)				
18–44 (n=3.3M)	73.2 (3.04)	26.8 (3.04)	1.7 (0.14)	0.5 (0.06)
45–64 (n=11.4M)	76.2 (1.62)	23.8 (1.62)	1.5 (0.07)	0.4 (0.03)
≥65 (n=10.8M)	77.2 (1.62)	22.8 (1.62)	1.4 (0.07)	0.3 (0.03)
Sex, age (years)				
Women (n=12.7M)	74.9 (1.33)	25.1 (1.33)	1.6 (0.06)	0.4 (0.03)
18–44 (n=1.8M)	68.6 (4.14)	31.4 (4.14)	1.9 (0.20)	0.6 (0.09)
45–64 (n=5.4M)	76.5 (1.94)	23.5 (1.94)	1.7 (0.11)	0.4 (0.04)
≥65 (n=5.5M)	75.3 (2.30)	24.7 (2.30)	1.5 (0.09)	0.4 (0.04)
Men (n=12.8M)	77.5 (1.50)	22.5 (1.50)	1.4 (0.05)	0.3 (0.02)
18–44 (n=1.6M)	78.2 (4.18)	21.8 (4.18)	1.4 (0.13)	0.3 (0.06)
45–64 (n=6.0M)	75.9 (2.56)	24.1 (2.56)	1.3 (0.07)	0.3 (0.03)
≥65 (n=5.2M)	79.2 (2.19)	20.8 (2.19)	1.4 (0.08)	0.3 (0.04)
Race/ethnicity, age (years)				
Non-Hispanic white (n=15.5)	74.3 (1.57)	25.7 (1.57)	1.5 (0.06)	0.4 (0.03)
18–44 (n=1.7M)	72.4 (5.34)	27.6 (5.34)	1.6 (0.17)	0.4 (0.08)
45–64 (n=6.7M)	74.3 (2.48)	25.7 (2.48)	1.5 (0.09)	0.4 (0.04)
≥65 (n=7.1M)	74.8 (2.13)	25.2 (2.13)	1.5 (0.09)	0.4 (0.04)
Non-Hispanic black (n=3.9M)	77.3 (1.87)	22.7 (1.87)	1.7 (0.11)	0.4 (0.04)
18–44 (n=0.6M)	63.0 (4.80)	37.0 (4.80)	1.9 (0.30)	0.7 (0.15)
45–64 (n=1.8M)	78.5 (2.52)	21.5 (2.52)	1.8 (0.19)	0.4 (0.06)
≥65 (n=1.5M)	81.5 (2.71)	18.5 (2.71)	1.4 (0.13)	0.3 (0.05)
Non-Hispanic other (n=2.0M)	84.8 (3.06)	15.2 (3.06)	1.3 (0.13)	0.2 (0.05)
18–44 (n=0.3M)	80.0 (11.3)	20.0 (11.3)	1.5 (0.31)	0.3 (0.20)
45–64 (n=0.8M)	82.9 (4.71)	17.1 (4.71)	1.2 (0.13)	0.2 (0.06)
≥65 (n=0.9M)	88.0 (4.87)	12.0 (4.87)	1.4 (0.23)	0.2 (0.09)
Hispanic (n=4.2M)	78.3 (1.97)	21.7 (1.97)	1.4 (0.09)	0.3 (0.03)
18–44 (n=0.8M)	79.8 (3.87)	20.2 (3.87)	1.9 (0.36)	0.4 (0.11)
45–64 (n=2.0M)	77.7 (2.69)	22.3 (2.69)	1.4 (0.07)	0.3 (0.04)
≥65 (n=1.3M)	78.3 (3.06)	21.8 (3.06)	1.3 (0.09)	0.3 (0.04)

Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46. Numbers (n) are MEPS weighted estimates, M = x10^6.

SOURCE: Medical Expenditure Panel Survey (MEPS) 2012

FIGURE 40.20. Frequency of Emergency Department Visits Among Adults With Diabetes Age ≥18 Years, by Age, U.S., 2012



Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46. Error bars represent 95% confidence intervals.

[1] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: Medical Expenditure Panel Survey 2012

TABLE 40.20. Frequency of Emergency Department Visits Among Adults Age ≥18 Years With Diabetes, U.S., 2000, 2005, and 2010

	PERCENT (STANDARD ERROR)		
VISITS	2000	2005	2010
None	66.5 (1.20)	68.2 (1.02)	67.2 (1.10)
1–5	30.7 (1.20)	28.8 (0.99)	31.2 (1.11)
6–12	1.8 (0.37)	2.3 (0.39)	1.2 (0.22)
≥13	1.1 (0.26)	0.7 (0.20)	0.4 (0.14)[1]

Data are based on self-report.
[1] Relative standard error >30%–40%

SOURCE: National Health Interview Surveys 2000, 2005, 2010

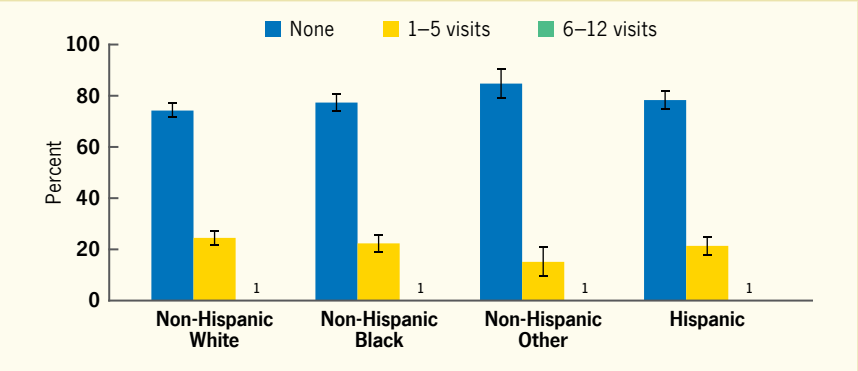
TABLE 40.21. Frequency of Emergency Department Visits Among Adults Age ≥18 Years With Diabetes, U.S., 2002, 2007, and 2012

	PERCENT (STANDARD ERROR)		
VISITS	2002	2007	2012
None	75.6 (1.06)	78.9 (1.05)	76.2 (1.07)
1–5	24.2 (1.07)	20.9 (1.04)	23.5 (1.07)
6–12	0.3 (0.15)[2]	0.3 (0.10)[1]	0.3 (0.11)[1]

Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46.
[1] Relative standard error >30%–40%
[2] Relative standard error >40%–50%

SOURCE: Medical Expenditure Panel Surveys 2002, 2007, 2012

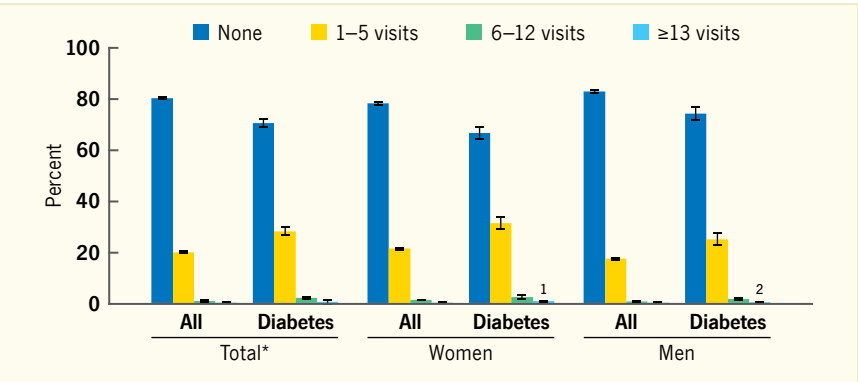
FIGURE 40.21. Distribution of Emergency Department Visits Among Adults With Diabetes Age ≥18 Years, by Race/Ethnicity, U.S., 2012



Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46. Error bars represent 95% confidence intervals.
[1] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: Medical Expenditure Panel Survey 2012

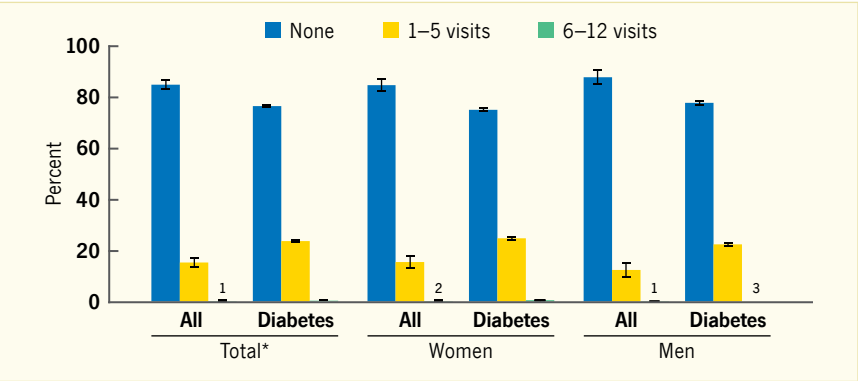
FIGURE 40.22. Age- and Sex-Standardized Frequency of Emergency Department Visits Among Adults With Diabetes Age ≥18 Years and All Adults Age ≥18 Years, by Sex, U.S., 2011



Data are based on self-report. Error bars represent 95% confidence intervals.
* Total estimates are age- and sex-standardized to the National Health Interview Survey 2011 diabetic population using age categories 18–44, 45–64, and ≥65 years.
[1] Relative standard error >30%–40%
[2] Relative standard error >40%–50%

SOURCE: National Health Interview Survey 2011

FIGURE 40.23. Age- and Sex-Standardized Distribution of Emergency Department Visits Among Adults With Diabetes Age ≥18 Years and All Adults Age ≥18 Years, by Sex, U.S., 2012



Data are based on self-report. Error bars represent 95% confidence intervals.
* Total group is age- and sex-standardized to the Medical Expenditure Panel Survey 2012 diabetic population using age categories 18–44, 45–64, and ≥65 years.
[1] Relative standard error >30%–40%
[2] Relative standard error >40%–50%
[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: Medical Expenditure Panel Survey 2012

DIABETES-RELATED HOSPITALIZATIONS AND HOSPITAL UTILIZATION

People with diabetes are hospitalized more frequently than people without diabetes. In this section, national survey data are used to describe rates of and trends in diabetes-related hospitalizations and the characteristics of people with diabetes who are hospitalized.

NATIONAL SURVEYS AND DATA SOURCES

New analyses were conducted to describe hospital utilization among people with diabetes for *Diabetes in America*. The three major sources were the NHIS, the National Hospital Discharge Survey (NHDS), and the MEPS.

National Health Interview Survey

In addition to asking about ambulatory care, as described in the preceding section on ambulatory medical care for people with diabetes, the NHIS asks questions about hospitalization, including whether the respondent was hospitalized overnight in the past year, frequency of hospitalization, and number of nights spent in the hospital during each hospitalization.

National Hospital Discharge Survey

The NHDS, conducted between 1965 and 2010, was designed to gather information on a national sample of inpatients discharged from non-federal, short-stay hospitals (9). Data were collected by abstracting hospital records or by reviewing electronically available data files and then extrapolated using statistical techniques to represent all discharges in the United States. Demographic characteristics of the patients, admission and discharge dates, diagnoses (one primary and up to seven [for 1965–2009] or 15 [for 2010] secondary), and procedures were obtained, and medical data were coded according to the ICD-9-CM.

Data are presented for hospitalizations in which diabetes (ICD-9-CM codes 250 [all], 357.2, 362.0, 366.41, 648.0, and 775.1) was listed as the primary (first-listed) diagnosis or, separately, for hospitalizations in which diabetes was listed as any diagnosis. Other conditions were ascertained using ICD-9-CM codes: diabetic ketoacidosis (DKA) or hyperosmolar coma (250.1 or 250.2); stroke (430–438); myocardial infarction (410); congestive heart failure (428); and cardiovascular disease (410–414, 426–438, or 440–448). Procedures were ascertained using ICD-9-CM procedure codes: carotid endarterectomy (38.12); cardiac catheterization (37.21, 37.22, or 37.23); percutaneous coronary intervention (36.01, 36.02, 36.05, 36.06, or 36.07); coronary artery bypass grafting (36.1x); and lower extremity vascular bypass or stenting (39.25 or 39.29).

Rates of hospital discharges for people with diabetes were calculated by dividing the number of hospitalizations with diabetes as the primary or any listed diagnosis (in 2010) by the estimated number of people with physician-diagnosed diabetes in the United States in 2010 as determined by the NHIS.

National hospital discharge data are visit-based, not patient-based. A consequence of visit-based analysis is that if the same person is hospitalized more than once, he or she is counted more than once. Based on the NHIS 2011, multiple hospital admissions in a year were reported by approximately 29% of people who reported being hospitalized. This may be important when examining discharges for events that cluster in individuals, such as DKA. Nevertheless, NHDS data are useful to ascertain the characteristics of people admitted to the hospital and their reasons for admission.

If a patient's admission is not related to his or her diabetes status, then it is unlikely that diabetes will be coded as a diagnosis. Approximately 40% of people with diabetes who are hospitalized do not have diabetes listed on their hospitalization discharge record (10). As a result, it is impossible to ascertain the prevalence of diabetes among people admitted to the hospital. Even given these limitations, NHDS remains the best source of data to estimate diabetes-related hospitalizations, and while the prevalence of diabetes is likely underestimated, the underestimation likely remained constant from 1965 to 2009, allowing one to estimate changes over time.

In 2010, the National Center for Health Statistics redesigned the NHDS to collect data on up to 15 diagnoses, whereas between 1965 and 2009, it collected only seven diagnoses. In this section, when only 2010 data are presented, all 15 diagnoses are used. However, when trends over multiple years are presented, only the first seven diagnoses from 2010 are included to be consistent with earlier surveys.

Only a small percentage of NHDS discharges that list diabetes classify it as the primary diagnosis. The percentage of NHDS discharges with diabetes as any listed diagnosis that list diabetes as the primary diagnosis has declined over time for all age groups (11). Fifteen percent of such discharges listed diabetes as the primary diagnosis in 1990 (7), and 12% listed diabetes as the primary diagnosis in 2010.

Ascertainment of race from the NHDS is problematic because a substantial percentage of discharges are missing racial classification and because the sampling technique does not allow for accurate estimation for some minority groups. In 2010, race was unknown for 14% of all hospital discharges in the NHDS.

Medical Expenditure Panel Survey

In addition to asking questions about ambulatory care, as described in the preceding section on ambulatory medical care for people with diabetes, the MEPS asks questions about hospitalization, including whether the respondent was hospitalized overnight in the past year, the frequency of hospitalization, and the number of nights spent in the hospital during each hospitalization.

A limitation of using the MEPS data for hospital discharges for people with diabetes is the small sample size. When MEPS data are presented in this section, they should be interpreted as the yearly average for the time period 2008–2012.

HOSPITAL DISCHARGE DATA

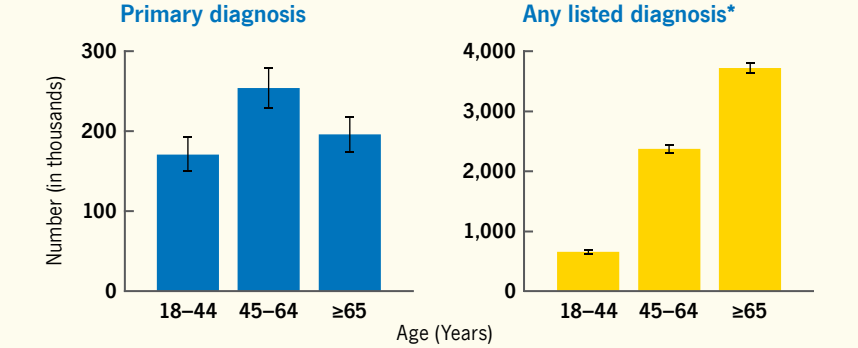
2010 Hospital Discharge Data

In 2010, approximately 622,000 hospitalizations in the United States recorded diabetes as the primary diagnosis on the hospital discharge record (2% of all hospitalizations in the United States), and 6.76 million hospitalizations recorded diabetes as any listed diagnosis (21% of all hospitalizations in the United States). Hospitalizations with a primary diagnosis of diabetes accounted for 2.84 million hospital days, and those with diabetes as any listed diagnosis accounted for 34.67 million hospital days. Approximately 73% of hospitalizations with diabetes as the primary diagnosis occurred in people age ≥45 years (Figure 40.24). For hospitalizations with diabetes as any listed diagnosis, the number of hospitalizations increased with age; approximately 90% were for people age ≥45 years.

Diabetes was listed as the primary diagnosis for 2% of all hospitalizations in the United States. The hospital discharge rate with diabetes as the primary diagnosis (calculated as the number of discharges with diabetes listed as the primary diagnosis per 100 people with diabetes as determined from the NHIS) was more than double for people age 18–44 years compared to people age 45–64 or ≥65 years (Figure 40.25). Younger women tended to have a higher rate of hospitalizations with the primary diagnosis of diabetes compared to younger men. Rates of hospitalization were similar for the two older age groups by sex (Figure 40.26).

Diabetes was included as any listed diagnosis for 21% of all hospitalizations in the United States. The hospitalization rate for diabetes as any listed diagnosis increased with age and was more than double for persons age ≥65 years compared to the youngest age group (Figure 40.25). After stratifying by sex, the hospitalization rate for diabetes as any listed diagnosis increased with age for men. Women in the two younger age groups had similar rates, and both were approximately half the rate in the oldest age group (Figure 40.26).

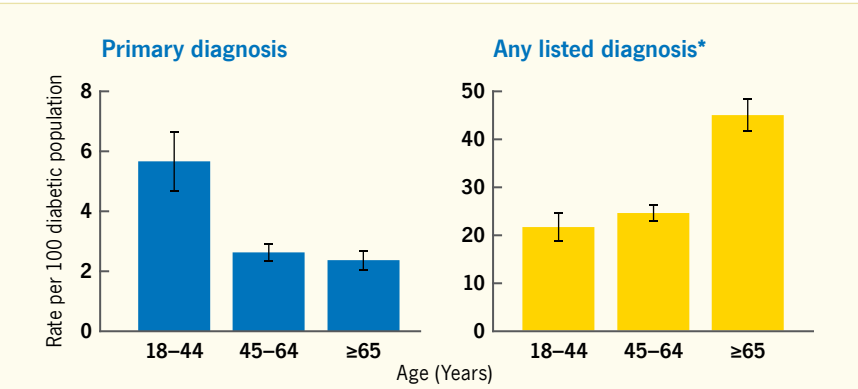
FIGURE 40.24. Number of Hospital Discharges With Diabetes as Primary or Any Listed Diagnosis Among Adults Age ≥18 Years, by Age, U.S., 2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Error bars represent 95% confidence intervals. Confidence intervals were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.
* Based on up to 15 diagnosis codes.

SOURCE: National Hospital Discharge Survey 2010

FIGURE 40.25. Rate of Hospital Discharges With Diabetes as Primary or Any Listed Diagnosis Per 100 Diabetic Population, by Age, U.S., 2010

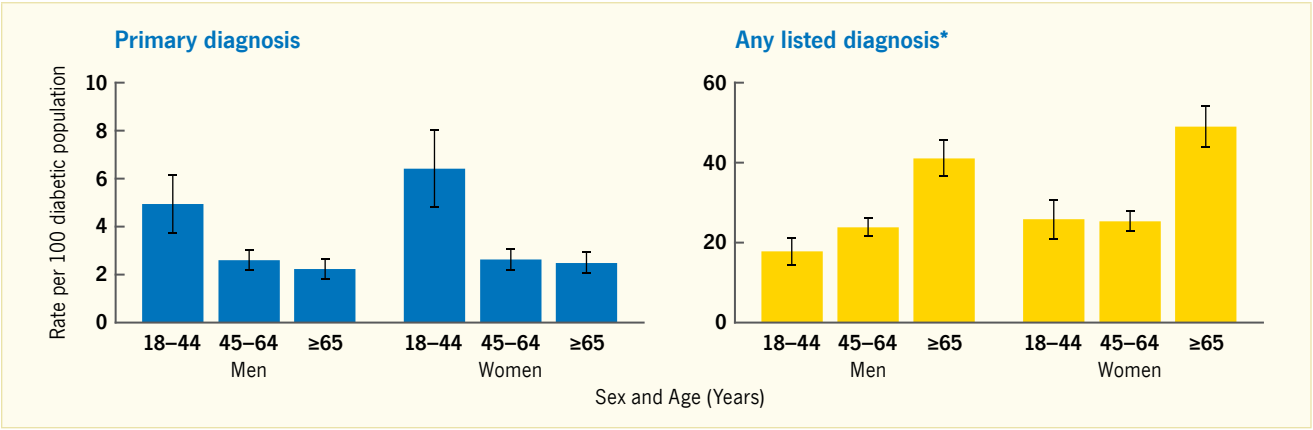


Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Error bars represent 95% confidence intervals. Confidence intervals were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.
* Based on up to 15 diagnosis codes.

SOURCE: National Hospital Discharge Survey 2010 and National Health Interview Survey 2010

Figure 40.27 shows rates of hospitalization with diabetes as the primary or any listed diagnosis by age and race/ethnicity. Rates of hospitalization with diabetes as the primary diagnosis were highest in non-Hispanic blacks. For diabetes as the primary diagnosis, non-Hispanic whites and non-Hispanic blacks in the youngest age group had the highest rates of hospitalization. These differences may in part be due to differences in the prevalence of type 1 diabetes among these racial/ethnic groups. For diabetes as any listed diagnosis, non-Hispanic whites showed rates of hospitalization that increased with age. Non-Hispanic blacks and Hispanics both showed the highest rates of hospitalization in the ≥65 years age group.

FIGURE 40.26. Rate of Hospital Discharges With Diabetes as Primary or Any Listed Diagnosis Per 100 Diabetic Population, by Age and Sex, U.S., 2010

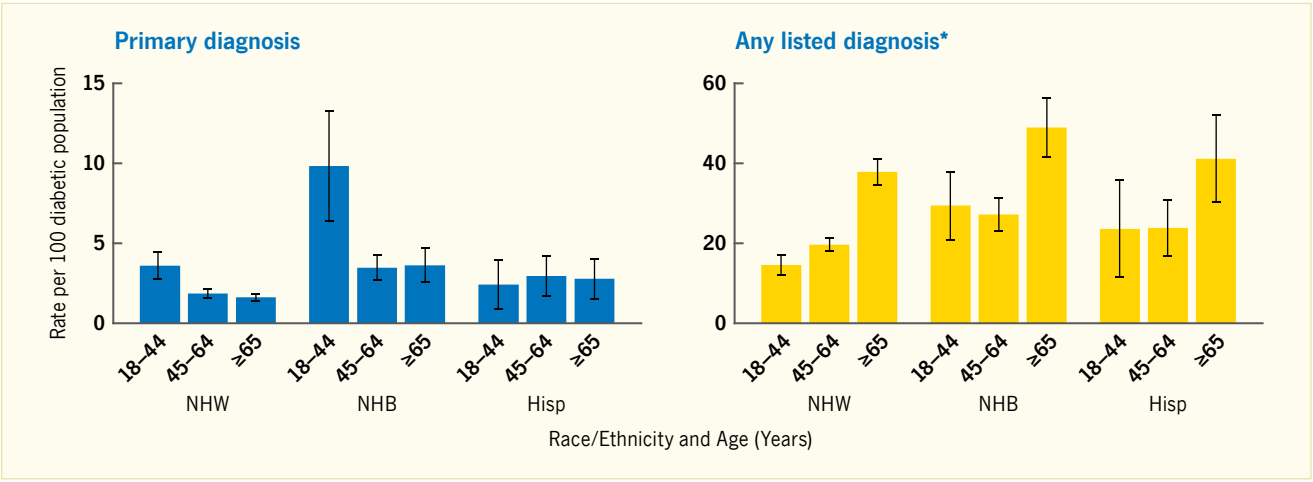


Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Error bars represent 95% confidence intervals. Confidence intervals were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.

* Based on up to 15 diagnosis codes.

SOURCE: National Hospital Discharge Survey 2010 and National Health Interview Survey 2010

FIGURE 40.27. Rate of Hospital Discharges With Diabetes as Primary or Any Listed Diagnosis Per 100 Diabetic Population, by Age and Race/Ethnicity, U.S., 2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Error bars represent 95% confidence intervals. Confidence intervals were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design. Hisp, Hispanic; NHB, non-Hispanic black; NHW, non-Hispanic white.

* Based on up to 15 diagnosis codes.

SOURCE: National Hospital Discharge Survey 2010 and National Health Interview Survey 2010

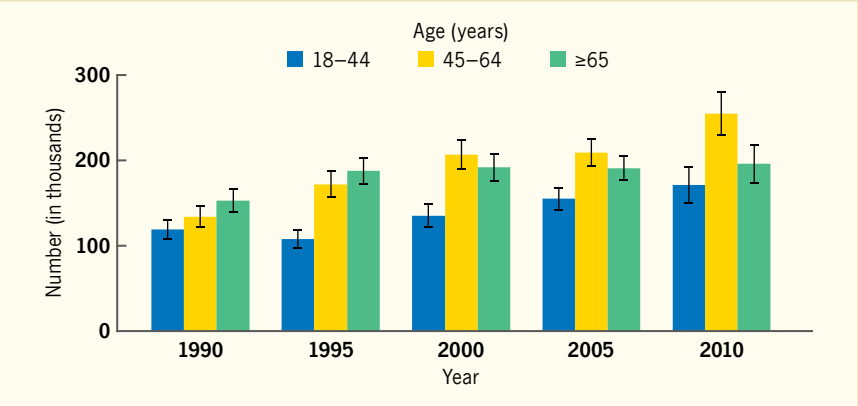
Time Trends in Hospital Discharges Listing Diabetes

Between 1990 and 2010, the proportion of hospitalizations that listed diabetes as the primary diagnosis out of the number of hospitalizations that listed diabetes as any diagnosis decreased from 14.4% to 11.6%. Between 1990 and 2010, the number of hospital discharge records that listed diabetes as the primary diagnosis increased 53% from 406,000 to 622,000. The increase was constant over time, at approximately 2% per year (Appendix 40.1). When the number of hospital discharge records with diabetes listed as the primary diagnosis was stratified by age, the middle age group (45–64 years) had the greatest increase over time, almost doubling between 1990 and 2010. The increases in the other two age groups were less pronounced (Figure 40.28). When stratified by sex, men had a greater increase over time (70%) than women (41%) (Figure 40.29, Appendix 40.1). When stratified by race, whites had the smallest increase (27%), and blacks had a 90% increase (Figure 40.30). Race was missing in 25% of the NHDS 1990–2010 data, so caution must be taken when looking at hospitalization rates by race (Appendix 40.2).

The rate of hospital discharges with diabetes listed as the primary diagnosis per 100 diabetic individuals has decreased over time for all age groups (Figure 40.31). Although the rates for men and women have both decreased over time, women had a slightly greater decrease in hospital discharge rate with diabetes listed as the primary diagnosis compared to men (Figure 40.32). Although rates were higher in blacks than whites, whites and blacks had similar decreases over time (Figure 40.33). The fact that the number of hospital discharges is increasing while the rates of hospital discharges are decreasing indicates a greater increase in the size of the denominator (i.e., the total population of people with diabetes).

The number of hospitalizations with diabetes as any listed diagnosis increased 88% during 1990–2010 from 2.8 million

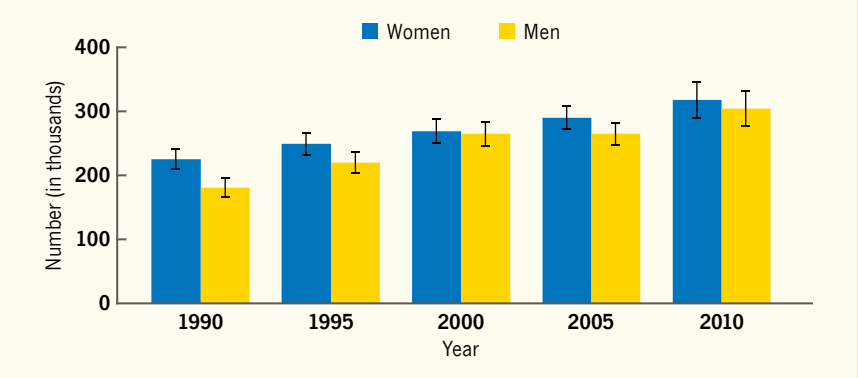
FIGURE 40.28. Time Trend in the Number of Hospital Discharges With Diabetes Listed as the Primary Diagnosis Among Adults Age ≥18 Years, by Age, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Error bars represent 95% confidence intervals. Confidence intervals were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.

SOURCE: National Hospital Discharge Surveys 1990, 1995, 2000, 2005, 2010

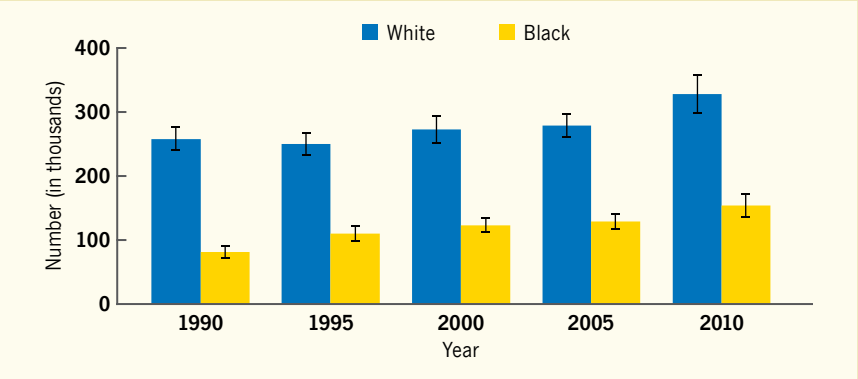
FIGURE 40.29. Time Trend in the Number of Hospital Discharges With Diabetes Listed as the Primary Diagnosis Among Adults Age ≥18 Years, by Sex, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Error bars represent 95% confidence intervals. Confidence intervals were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.

SOURCE: National Hospital Discharge Surveys 1990, 1995, 2000, 2005, 2010

FIGURE 40.30. Time Trend in the Number of Hospital Discharges With Diabetes Listed as the Primary Diagnosis Among Adults Age ≥18 Years, by Race, U.S., 1990–2010



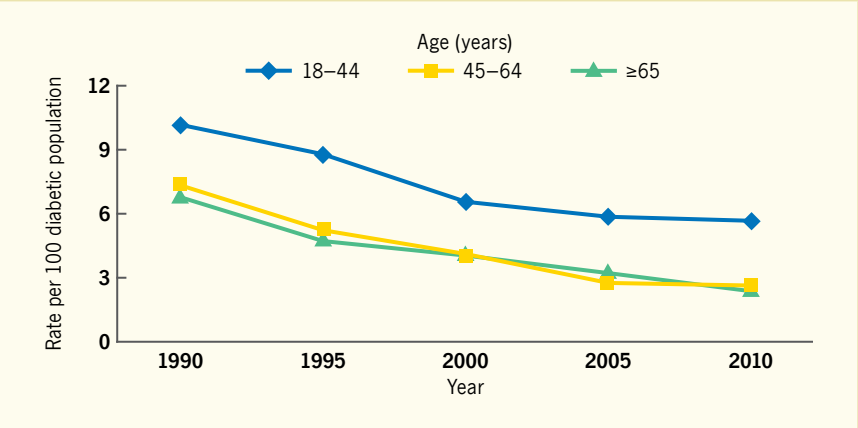
Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Error bars represent 95% confidence intervals. Confidence intervals were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.

SOURCE: National Hospital Discharge Surveys 1990, 1995, 2000, 2005, 2010

to 5.3 million (using the first seven listed diagnoses). The increase from 1990 to 2003 averaged 4.5% per year. After 2004, the percent increase remained stable at approximately 1% per year (Appendix 40.3). The oldest age group (≥65 years) had the largest number of hospital discharges with diabetes as any listed diagnosis. The middle age group (45–64 years) had the greatest increase over time, more than doubling between 1990 and 2010 (Figure 40.34). The increases in the other age groups were less pronounced. Men had a greater increase than women over time (200% vs. 175%), but both sexes showed a steady increase from 1990 to 2003 and then a smaller increase through 2010 (Figure 40.35, Appendix 40.3). Whites had a 70% increase and blacks had a 225% increase in hospitalization with diabetes as any listed diagnosis (Figure 40.36, Appendix 40.4).

The rate of hospital discharges with diabetes as any listed diagnosis per 100 diabetic individuals has decreased over time for all age groups, and this decrease is more pronounced as age increases (Figure 40.37). Although the rates for men and women have both decreased over time, women had a slightly greater decrease in the rate of hospital discharges with diabetes as any listed diagnosis compared to men (Figure 40.38). Whites and blacks had similar decreases over time (Figure 40.39). While the Other race category also showed a decrease in the rate over time, this category again had substantial random variation due to small sample size. Similar to when diabetes is listed as the primary diagnosis, when diabetes is listed as any diagnosis and the number of hospital discharges are increasing while the rates of hospital discharges are decreasing, this implies a rapidly growing denominator (i.e., the total population of people with diabetes).

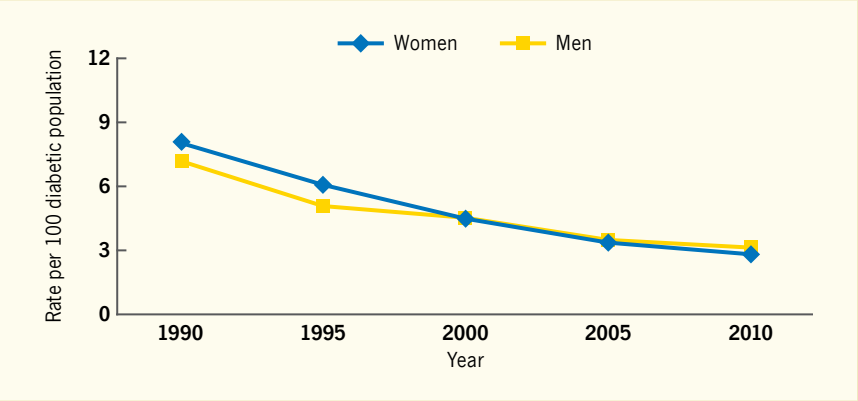
FIGURE 40.31. Time Trend in the Rate of Hospital Discharges With Diabetes Listed as the Primary Diagnosis Among Adults Age ≥18 Years, by Age, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1.

SOURCE: National Hospital Discharge Surveys and National Health Interview Surveys 1990, 1995, 2000, 2005, 2010

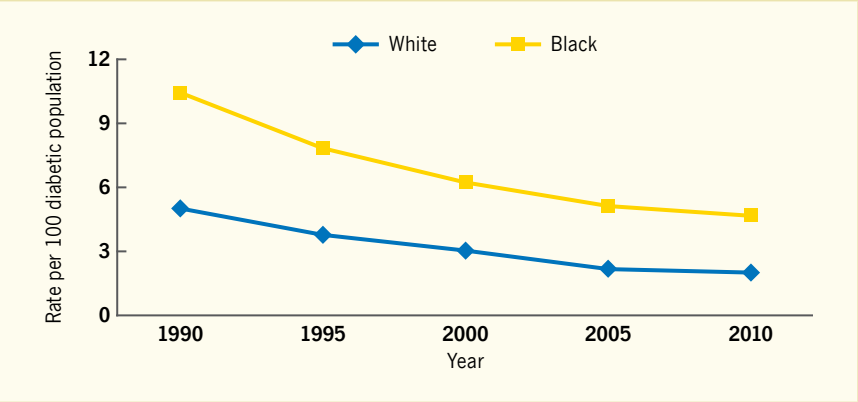
FIGURE 40.32. Time Trend in the Rate of Hospital Discharges With Diabetes Listed as the Primary Diagnosis Among Adults Age ≥18 Years, by Sex, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1.

SOURCE: National Hospital Discharge Surveys and National Health Interview Surveys 1990, 1995, 2000, 2005, 2010

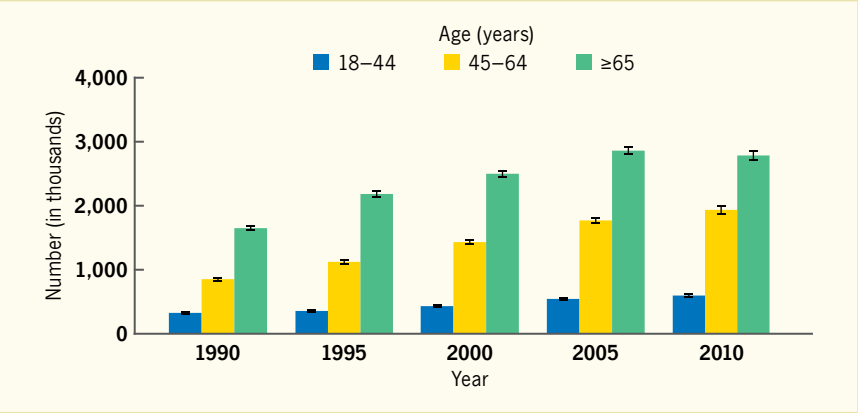
FIGURE 40.33. Time Trend in the Rate of Hospital Discharges With Diabetes Listed as the Primary Diagnosis Among Adults Age ≥18 Years, by Race, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1.

SOURCE: National Hospital Discharge Surveys and National Health Interview Surveys 1990, 1995, 2000, 2005, 2010

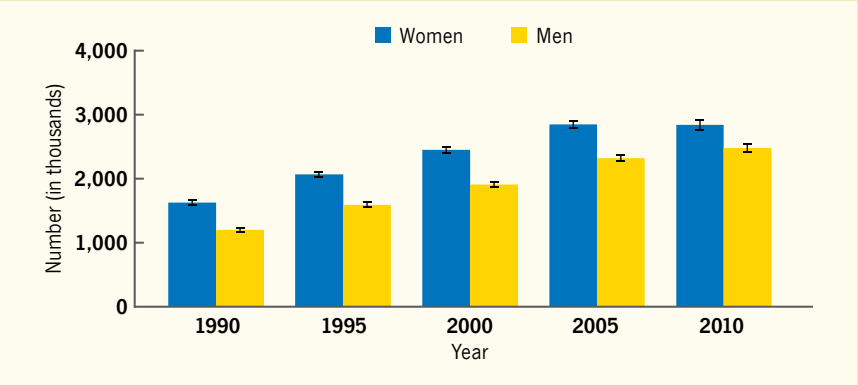
FIGURE 40.34. Time Trend in the Number of Hospital Discharges With Diabetes Listed as Any Diagnosis Among Adults Age ≥18 Years, by Age, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Error bars represent 95% confidence intervals. Confidence intervals were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.

SOURCE: National Hospital Discharge Surveys 1990, 1995, 2000, 2005, 2010

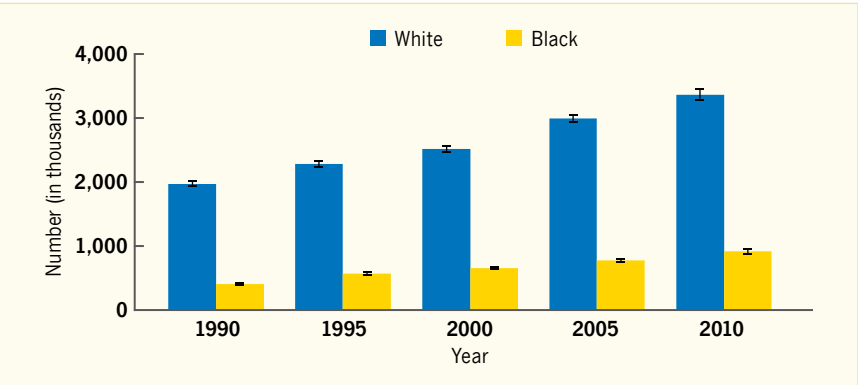
FIGURE 40.35. Time Trend in the Number of Hospital Discharges With Diabetes Listed as Any Diagnosis Among Adults Age ≥18 Years, by Sex, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Error bars represent 95% confidence intervals. Confidence intervals were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.

SOURCE: National Hospital Discharge Surveys 1990, 1995, 2000, 2005, 2010

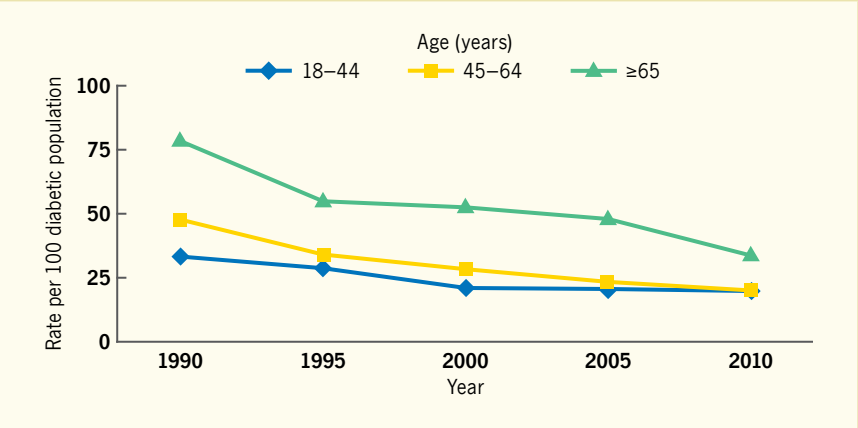
FIGURE 40.36. Time Trend in the Number of Hospital Discharges With Diabetes Listed as Any Diagnosis Among Adults Age ≥18 Years, by Race, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Error bars represent 95% confidence intervals. Confidence intervals were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.

SOURCE: National Hospital Discharge Surveys 1990, 1995, 2000, 2005, 2010

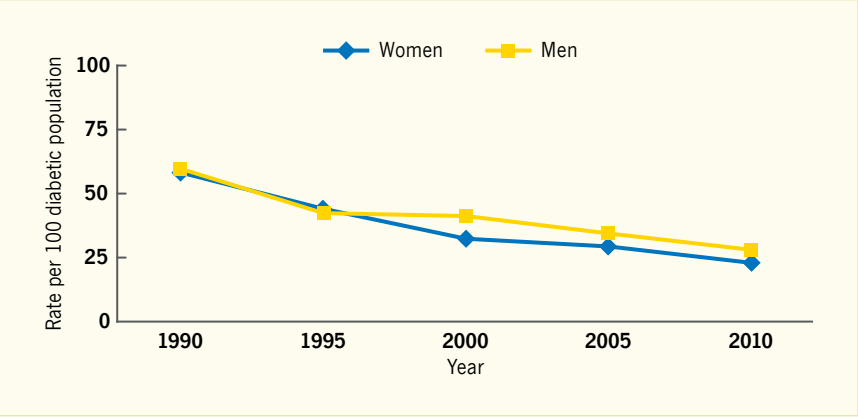
FIGURE 40.37. Time Trend in the Rate of Hospital Discharges With Diabetes as Any Listed Diagnosis Among Adults Age ≥18 Years, by Age, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Diabetes diagnosis is based on the first seven listed diagnosis codes.

SOURCE: National Hospital Discharge Surveys and National Health Interview Surveys 1990, 1995, 2000, 2005, 2010

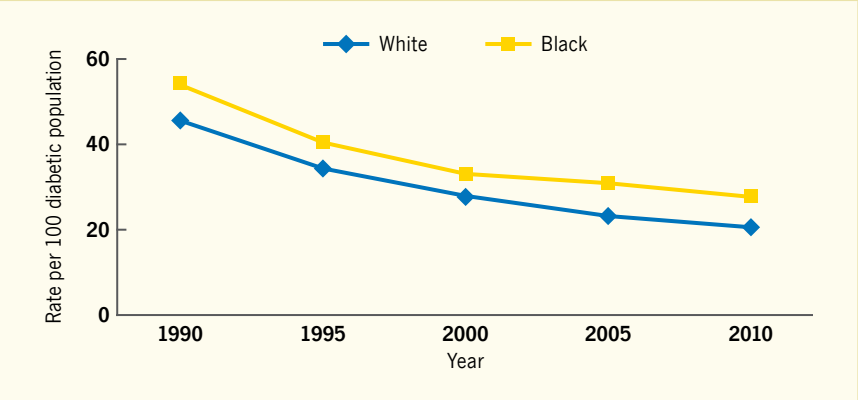
FIGURE 40.38. Time Trend in the Rate of Hospital Discharges With Diabetes as Any Listed Diagnosis Among Adults Age ≥18 Years, by Sex, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Diabetes diagnosis is based on the first seven listed diagnosis codes.

SOURCE: National Hospital Discharge Surveys and National Health Interview Surveys 1990, 1995, 2000, 2005, 2010

FIGURE 40.39. Time Trend in the Rate of Hospital Discharges With Diabetes as Any Listed Diagnosis Among Adults Age ≥18 Years, by Race, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Diabetes diagnosis is based on the first seven listed diagnosis codes.

SOURCE: National Hospital Discharge Surveys and National Health Interview Surveys 1990, 1995, 2000, 2005, 2010

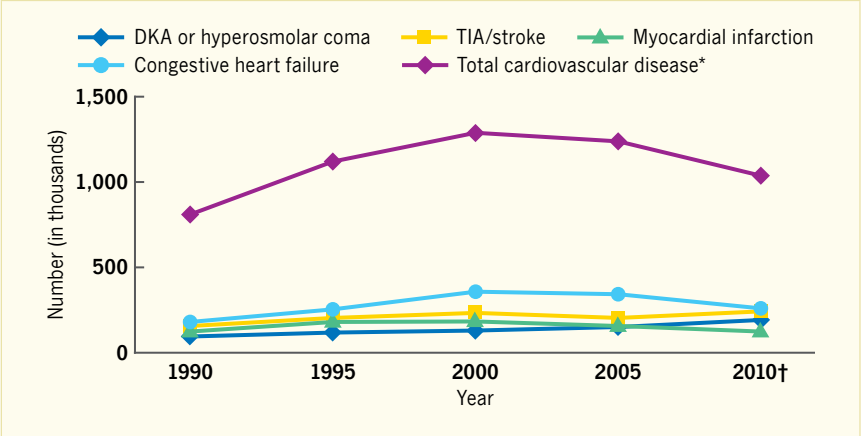
Hospital Discharges Listing Complications of Diabetes

Figure 40.40 and Table 40.22 show time trends in the number of hospital discharges listing complications of diabetes. DKA and hyperosmolar coma are common causes of hospitalization for people with diabetes. In 1990, 95,000 hospital discharges listed DKA or hyperosmolar coma as any diagnosis, and in 2010, 191,000 hospital discharges listed DKA or hyperosmolar coma as any diagnosis. Macrovascular disease remains the most common complication of diabetes. There was a steady increase in hospital discharges listing both diabetes and cardiovascular disease, defined as any listed diagnosis of transient ischemic attack (TIA) or stroke, myocardial infarction, or congestive heart failure, from 809,000 discharges in 1990 to 1,373,000 discharges in 2002. Thereafter, the number of hospital discharges listing both diabetes and cardiovascular disease decreased each year and was the same in 2010 as in 1994. In contrast, the number of discharges with TIA or stroke and diabetes has continued to increase slowly over time.

The rates of hospital discharges listing complications of diabetes have also changed over time. The rate of hospital discharges with any diagnosis of DKA or hyperosmolar coma was approximately 1.5 discharges per 100 persons with diabetes per year until 1997, and since then, it has declined to approximately 0.9 discharges per 100 persons with diabetes per year (Figure 40.41, Table 40.23). Similar trends were seen for TIA or stroke, myocardial infarction, and congestive heart failure, where rates of hospital discharges in 2010 were less than half of what they were in 1990. Rates of discharges for cardiovascular disease (TIA or stroke, myocardial infarction, and congestive heart failure combined) and diabetes reached their peak in 1996 and have declined since, with the most dramatic decline occurring since 2004.

Similar results have been reported by Gregg *et al.* (12) who found that the rates of five major diabetes complications (stroke, acute myocardial infarction, amputation, end-stage renal disease, and death from hyperglycemic coma) have declined significantly between 1990 and 2010.

FIGURE 40.40. Time Trend in the Number of Hospital Discharges Listing DKA or Hyperosmolar Coma, TIA/Stroke, Myocardial Infarction, Congestive Heart Failure, and Total Cardiovascular Disease as Any Diagnosis Among Adults Age ≥18 Years, U.S., 1990–2010



DKA data are for DKA as any listed diagnosis; data for TIA/stroke, myocardial infarction, and congestive heart failure include only discharges in which these conditions were the primary diagnosis and diabetes was a secondary diagnosis. International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes used for diagnosis are: diabetes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1; DKA or hyperosmolar coma (250.1 or 250.2); stroke (430–438); myocardial infarction (410); congestive heart failure (428); and cardiovascular disease (410–414, 426–438, or 440–448). DKA, diabetic ketoacidosis; TIA, transient ischemic attack.

* Total cardiovascular disease is the sum of TIA/stroke, myocardial infarction, and congestive heart failure.

† 2010 data are based on the first seven of up to 15 diagnosis codes to be consistent with 1990–2009, in which only the first seven codes were available.

SOURCE: National Hospital Discharge Surveys 1990, 1995, 2000, 2005, 2010

The number of discharges among people with diabetes that listed carotid endarterectomy more than doubled between 1990 and 1995 but has been relatively stable since 1995 (Table 40.24). The number of discharges among people with diabetes that listed cardiac catheterization has increased over time with a slight decrease since 2002 (Figure 40.42, Table 40.24). The number of discharges among people with diabetes that listed coronary artery bypass graft increased from 1990 to 1999 but decreased from 1999 to 2010. For percutaneous coronary intervention, the number of discharges listing this procedure in people with diabetes more than tripled since 1990 but reached its zenith in 2003 and has declined since. Some of these trends likely reflect changes in clinical practice and whether procedures are performed on an inpatient or outpatient basis. The number of discharges listing lower extremity vascular bypass or stenting procedures in people with diabetes increased between 1990 and 1998 but has decreased since then.

Between 1990 and 2010, the rate of hospital discharges per 100 people with diabetes listing both a diagnosis of diabetes and at least one procedure code for carotid endarterectomy has been relatively stable between 0.4 to 0.1 (Table 40.25). The rate of coronary artery bypass graft has decreased over time and was at a low of 0.2 procedures per 100 persons with diabetes in 2010 (Figure 40.43, Table 40.25). The rate of percutaneous coronary intervention was the same in 2010 as in 1990, and although there has been some fluctuation over time, it has never been higher than 1.3 procedures per 100 persons with diabetes. Procedures for cardiac catheterization and lower extremity vascular bypass or stenting, which remained stable until about 2005, have decreased since then by about half.

TABLE 40.22. Time Trend in the Number of Hospital Discharges Listing DKA or Hyperosmolar Coma, TIA/Stroke, Myocardial Infarction, Congestive Heart Failure, and Total Cardiovascular Disease as Any Diagnosis Among Adults Age ≥18 Years, U.S., 1990–2010

	NUMBER (STANDARD ERROR) OF HOSPITAL DISCHARGES IN THOUSANDS				
YEAR	DKA or Hyperosmolar Coma	Both TIA/Stroke and Diabetes	Both Myocardial Infarction and Diabetes	Both Congestive Heart Failure and Diabetes	Both Total Cardiovascular Disease* and Diabetes
1990	95 (5.6)	156 (7.2)	125 (6.2)	179 (7.6)	809 (16.1)
1991	107 (6.6)	156 (7.6)	160 (7.6)	200 (8.4)	895 (17.4)
1992	106 (5.8)	179 (7.8)	157 (7.3)	250 (9.1)	999 (18.0)
1993	123 (6.7)	175 (7.7)	164 (7.5)	267 (10.0)	1,054 (19.4)
1994	112 (6.3)	180 (7.8)	165 (7.5)	262 (9.9)	1,037 (18.7)
1995	118 (6.4)	205 (8.7)	179 (8.1)	253 (9.4)	1,120 (20.0)
1996	115 (6.8)	203 (8.5)	206 (9.2)	276 (9.7)	1,209 (21.0)
1997	121 (6.1)	225 (9.1)	174 (7.8)	283 (9.9)	1,174 (19.8)
1998	126 (6.6)	229 (9.1)	174 (7.3)	329 (10.6)	1,251 (20.2)
1999	129 (6.6)	220 (9.4)	191 (8.2)	326 (11.1)	1,289 (21.5)
2000	129 (6.6)	234 (9.6)	183 (7.9)	357 (12.2)	1,309 (22.0)
2001	125 (6.5)	220 (8.7)	199 (8.3)	345 (11.2)	1,292 (21.0)
2002	146 (7.3)	221 (9.4)	214 (9.8)	334 (11.0)	1,373 (23.0)
2003	137 (7.0)	229 (9.4)	176 (8.1)	381 (13.1)	1,355 (23.5)
2004	145 (7.1)	205 (8.5)	176 (8.0)	359 (12.1)	1,296 (21.5)
2005	151 (7.4)	203 (8.9)	157 (7.6)	342 (11.7)	1,239 (20.9)
2006	161 (7.8)	222 (9.1)	143 (7.3)	338 (12.0)	1,230 (21.2)
2007	154 (7.1)	183 (7.9)	131 (7.0)	279 (10.7)	1,107 (20.3)
2008	170 (9.6)	220 (11.9)	137 (8.9)	285 (14.3)	1,119 (26.4)
2009	196 (11.0)	221 (12.5)	148 (10.3)	291 (14.3)	1,163 (28.0)
2010†	191 (11.2)	241 (13.3)	124 (9.2)	261 (12.9)	1,037 (26.2)

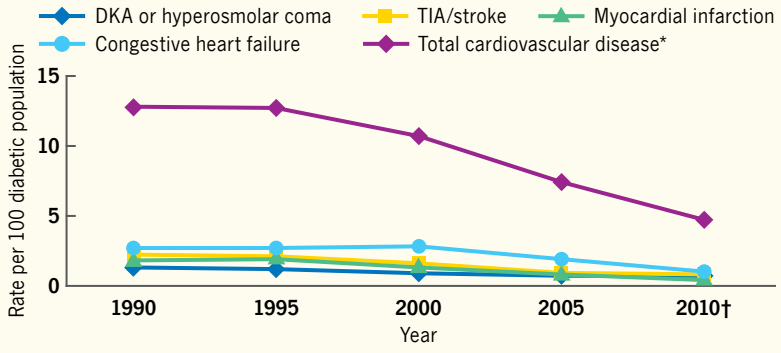
DKA data are for DKA as any listed diagnosis; data for TIA/stroke, MI, and congestive heart failure include only discharges in which these conditions were the primary diagnosis and diabetes was a secondary diagnosis. International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes used for diagnosis are: diabetes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1; DKA or hyperosmolar coma (250.1 or 250.2); stroke (430–438); MI (410); congestive heart failure (428); and cardiovascular disease (410–414, 426–438, or 440–448). Standard errors were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design. DKA, diabetic ketoacidosis; MI, myocardial infarction; TIA, transient ischemic attack.

* Total cardiovascular disease is the sum of TIA/stroke, MI, and congestive heart failure.

† 2010 was based on the first seven of up to 15 diagnosis codes to be consistent with 1990–2009, in which only the first seven codes were available.

SOURCE: National Hospital Discharge Surveys 1990–2010

FIGURE 40.41. Time Trend in the Rate of Hospital Discharges Listing DKA or Hyperosmolar Coma, TIA/Stroke, Myocardial Infarction, Congestive Heart Failure, and Total Cardiovascular Disease as Any Diagnosis Among Adults Age ≥18 Years, U.S., 1990–2010



DKA data are for DKA as any listed diagnosis; data for TIA/stroke, myocardial infarction, and congestive heart failure include only discharges in which these conditions were the primary diagnosis and diabetes was a secondary diagnosis. International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes used for diagnosis are: diabetes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1; DKA or hyperosmolar coma (250.1 or 250.2); stroke (430–438); myocardial infarction (410); congestive heart failure (428); and cardiovascular disease (410–414, 426–438, or 440–448). DKA, diabetic ketoacidosis; TIA, transient ischemic attack.

* Total cardiovascular disease is the sum of TIA/stroke, myocardial infarction, and congestive heart failure.

† 2010 data are based on the first seven of up to 15 diagnosis codes to be consistent with 1990–2009, in which only the first seven codes were available.

SOURCE: National Hospital Discharge Surveys and National Health Interview Surveys 1990, 1995, 2000, 2005, 2010

TABLE 40.23. Time Trend in the Rate of Hospital Discharges Listing DKA or Hyperosmolar Coma, TIA/Stroke, Myocardial Infarction, Congestive Heart Failure, and Total Cardiovascular Disease as Any Diagnosis Among Adults ≥18 Years, U.S., 1990–2010

	NUMBER (STANDARD ERROR) OF HOSPITAL DISCHARGES PER 100 DIABETIC POPULATION				
YEAR	DKA or Hyperosmolar Coma	Both TIA/Stroke and Diabetes	Both Myocardial Infarction and Diabetes	Both Congestive Heart Failure and Diabetes	Both Total Cardiovascular Disease* and Diabetes
1990	1.5 (0.12)	2.5 (0.17)	2.0 (0.14)	2.9 (0.19)	13.0 (0.70)
1991	1.5 (0.11)	2.2 (0.15)	2.2 (0.15)	2.8 (0.17)	12.4 (0.62)
1992	1.4 (0.10)	2.4 (0.15)	2.1 (0.13)	3.4 (0.19)	13.5 (0.62)
1993	1.6 (0.12)	2.2 (0.15)	2.1 (0.15)	3.4 (0.22)	13.5 (0.75)
1994	1.4 (0.10)	2.3 (0.14)	2.1 (0.13)	3.4 (0.20)	13.4 (0.63)
1995	1.4 (0.10)	2.4 (0.15)	2.1 (0.14)	2.9 (0.17)	12.9 (0.65)
1996	1.5 (0.15)	2.7 (0.24)	2.7 (0.24)	3.6 (0.31)	15.8 (1.27)
1997	1.2 (0.07)	2.2 (0.11)	1.7 (0.09)	2.8 (0.13)	11.6 (0.39)
1998	1.2 (0.07)	2.2 (0.11)	1.7 (0.09)	3.1 (0.14)	11.9 (0.41)
1999	1.2 (0.07)	2.0 (0.10)	1.8 (0.09)	3.0 (0.13)	11.9 (0.38)
2000	1.1 (0.06)	1.9 (0.10)	1.5 (0.08)	3.0 (0.13)	10.9 (0.35)
2001	1.0 (0.06)	1.7 (0.08)	1.5 (0.07)	2.6 (0.11)	9.9 (0.30)
2002	1.1 (0.06)	1.6 (0.08)	1.6 (0.08)	2.5 (0.11)	10.2 (0.32)
2003	1.0 (0.06)	1.6 (0.08)	1.2 (0.07)	2.7 (0.12)	9.6 (0.31)
2004	1.0 (0.05)	1.3 (0.07)	1.2 (0.06)	2.4 (0.10)	8.5 (0.26)
2005	0.9 (0.05)	1.2 (0.06)	1.0 (0.05)	2.1 (0.09)	7.6 (0.23)
2006	0.9 (0.05)	1.3 (0.07)	0.8 (0.05)	2.0 (0.09)	7.1 (0.25)
2007	0.9 (0.05)	1.1 (0.06)	0.8 (0.05)	1.6 (0.08)	6.4 (0.24)
2008	0.9 (0.06)	1.2 (0.07)	0.7 (0.05)	1.5 (0.09)	5.9 (0.23)
2009	1.0 (0.06)	1.1 (0.07)	0.7 (0.05)	1.4 (0.08)	5.6 (0.21)
2010†	0.9 (0.06)	1.1 (0.07)	0.6 (0.05)	1.2 (0.07)	4.9 (0.18)

DKA data are for DKA as any listed diagnosis; data for TIA/stroke, MI, and congestive heart failure include only discharges in which these conditions were the primary diagnosis and diabetes was a secondary diagnosis. International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes used for diagnosis are: diabetes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1; DKA or hyperosmolar coma (250.1 or 250.2); stroke (430–438); MI (410); congestive heart failure (428); and cardiovascular disease (410–414, 426–438, or 440–448). Standard errors were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design. DKA, diabetic ketoacidosis; MI, myocardial infarction; TIA, transient ischemic attack.

* Total cardiovascular disease is the sum of TIA/stroke, MI, and congestive heart failure.

† 2010 was based on the first seven of up to 15 diagnosis codes to be consistent with 1990–2009, in which only the first seven codes were available.

SOURCE: National Hospital Discharge Surveys and National Health Interview Surveys 1990–2010

TABLE 40.24. Time Trend in the Number of Hospital Discharges Listing Both a Diagnosis of Diabetes and at Least One Cardiovascular Procedure Among Adults Age ≥18 Years, U.S., 1990–2010

	NUMBER (STANDARD ERROR) OF HOSPITAL DISCHARGES IN THOUSANDS				
YEAR	Carotid Endarterectomy	Coronary Artery Bypass Graft	Cardiac Catheterization	Percutaneous Coronary Intervention	Lower Extremity Vascular Bypass or Stenting
1990	13 (2.0)	50 (3.8)	141 (6.6)	35 (3.3)	30 (2.8)
1991	11 (2.2)	55 (4.0)	178 (7.3)	49 (4.0)	32 (3.0)
1992	18 (2.7)	68 (4.6)	191 (7.7)	71 (4.7)	33 (3.1)
1993	15 (2.0)	63 (4.2)	211 (8.8)	75 (5.0)	30 (2.9)
1994	21 (2.4)	69 (4.4)	193 (7.5)	80 (4.8)	38 (3.4)
1995	31 (3.3)	85 (5.4)	209 (8.3)	82 (4.8)	37 (3.0)
1996	26 (2.5)	91 (5.2)	243 (9.5)	100 (6.0)	41 (3.6)
1997	28 (3.3)	86 (5.0)	226 (7.7)	96 (5.0)	36 (2.8)
1998	26 (2.6)	73 (4.1)	246 (8.0)	113 (5.6)	41 (3.7)
1999	31 (3.5)	98 (5.3)	280 (9.6)	137 (6.8)	35 (3.1)
2000	33 (3.2)	78 (4.6)	279 (9.5)	121 (5.7)	35 (3.7)
2001	32 (3.2)	80 (4.9)	281 (9.2)	126 (5.8)	31 (3.0)

Table 40.24 continues on the next page.

TABLE 40.24. (continued)

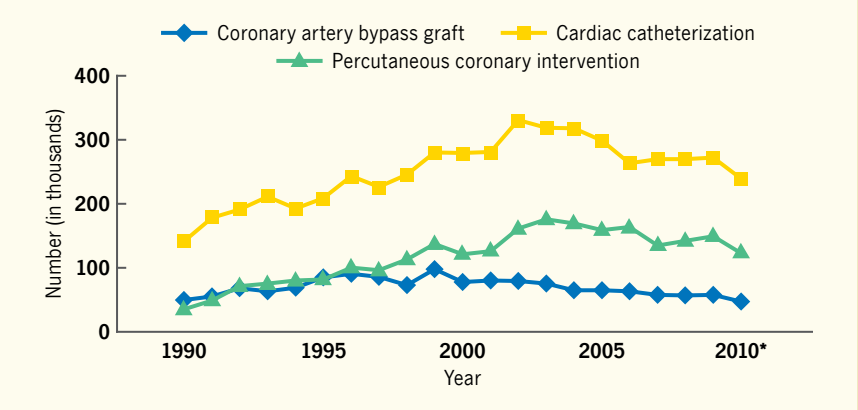
YEAR	NUMBER (STANDARD ERROR) OF HOSPITAL DISCHARGES IN THOUSANDS				
	Carotid Endarterectomy	Coronary Artery Bypass Graft	Cardiac Catheterization	Percutaneous Coronary Intervention	Lower Extremity Vascular Bypass or Stenting
2002	26 (2.8)	79 (5.2)	331 (11.4)	161 (7.9)	32 (3.1)
2003	32 (3.1)	75 (5.0)	319 (11.3)	176 (8.5)	29 (3.4)
2004	27 (2.9)	65 (4.5)	318 (9.7)	169 (7.0)	30 (2.9)
2005	26 (2.8)	65 (5.3)	299 (9.9)	159 (6.6)	25 (2.6)
2006	32 (3.7)	63 (4.7)	263 (9.2)	164 (7.3)	17 (2.2)
2007	21 (2.2)	58 (4.8)	270 (9.8)	135 (6.9)	23 (2.9)
2008	31 (4.5)	57 (6.1)	270 (13.4)	142 (8.6)	24 (3.9)
2009	23 (3.5)	58 (6.9)	272 (13.8)	149 (10.1)	19 (4.4)
2010*	30 (5.2)	47 (6.1)	239 (12.5)	123 (9.1)	15 (2.4)

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Procedures are defined using ICD-9-CM procedure codes: carotid endarterectomy (38.12); coronary artery bypass grafting (36.1x); cardiac catheterization (37.21, 37.22, or 37.23); percutaneous coronary intervention (36.01, 36.02, 36.05, 36.06, or 36.07); and lower extremity vascular bypass or stenting (39.25 or 39.29). Standard errors were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.

* 2010 was based on the first seven of up to 15 diagnosis codes to be consistent with 1990–2009, in which only the first seven codes were available.

SOURCE: National Hospital Discharge Surveys 1990–2010

FIGURE 40.42. Time Trend in the Number of Hospital Discharges Listing Both a Diagnosis of Diabetes and at Least One Cardiovascular Procedure Among Adults Age ≥18 Years, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Procedures are defined using ICD-9-CM procedure codes: cardiac catheterization (37.21, 37.22, or 37.23); percutaneous coronary intervention (36.01, 36.02, 36.05, 36.06, or 36.07); and coronary artery bypass grafting (36.1x).

* 2010 was based on the first seven of up to 15 diagnosis codes to be consistent with 1990–2009, in which only the first seven codes were available.

SOURCE: National Hospital Discharge Surveys 1990–2010

TABLE 40.25. Time Trend in the Rate of Hospital Discharges Listing Both a Diagnosis of Diabetes and at Least One Cardiovascular Procedure Among Adults Age ≥18 Years, U.S., 1990–2010

YEAR	NUMBER (STANDARD ERROR) OF HOSPITAL DISCHARGES PER 100 DIABETIC POPULATION				
	Carotid Endarterectomy	Coronary Artery Bypass Graft	Cardiac Catheterization	Percutaneous Coronary Intervention	Lower Extremity Vascular Bypass or Stenting
1990	0.2 (0.03)	0.8 (0.07)	2.3 (0.15)	0.6 (0.06)	0.5 (0.05)
1991	0.2 (0.03)	0.8 (0.07)	2.5 (0.15)	0.7 (0.06)	0.4 (0.05)
1992	0.2 (0.04)	0.9 (0.07)	2.6 (0.15)	1.0 (0.08)	0.4 (0.05)
1993	0.2 (0.03)	0.8 (0.07)	2.7 (0.18)	1.0 (0.08)	0.4 (0.04)
1994	0.3 (0.03)	0.9 (0.07)	2.5 (0.15)	1.0 (0.08)	0.5 (0.05)
1995	0.4 (0.04)	1.0 (0.08)	2.4 (0.15)	0.9 (0.07)	0.4 (0.04)

Table 40.25 continues on the next page.

TABLE 40.25. (continued)

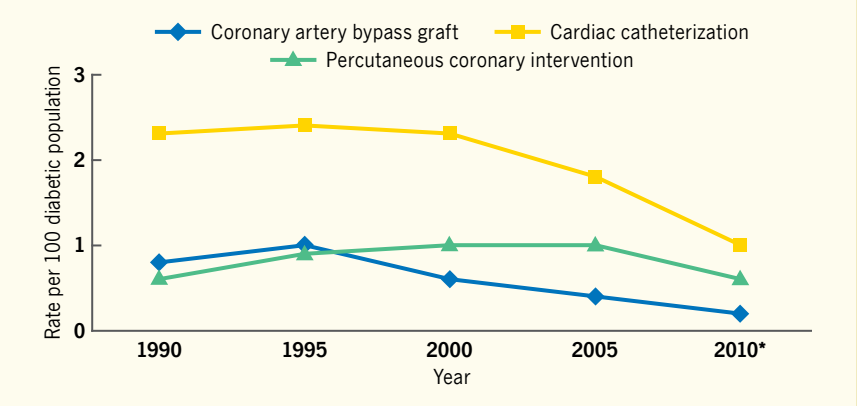
YEAR	NUMBER (STANDARD ERROR) OF HOSPITAL DISCHARGES PER 100 DIABETIC POPULATION				
	Carotid Endarterectomy	Coronary Artery Bypass Graft	Cardiac Catheterization	Percutaneous Coronary Intervention	Lower Extremity Vascular Bypass or Stenting
1996	0.3 (0.04)	1.2 (0.12)	3.2 (0.28)	1.3 (0.13)	0.5 (0.06)
1997	0.3 (0.03)	0.9 (0.06)	2.2 (0.10)	1.0 (0.06)	0.4 (0.03)
1998	0.2 (0.03)	0.7 (0.04)	2.3 (0.10)	1.1 (0.06)	0.4 (0.04)
1999	0.3 (0.03)	0.9 (0.06)	2.6 (0.11)	1.3 (0.07)	0.3 (0.03)
2000	0.3 (0.03)	0.6 (0.04)	2.3 (0.10)	1.0 (0.05)	0.3 (0.03)
2001	0.2 (0.03)	0.6 (0.04)	2.1 (0.09)	1.0 (0.05)	0.2 (0.02)
2002	0.2 (0.02)	0.6 (0.04)	2.5 (0.11)	1.2 (0.07)	0.2 (0.02)
2003	0.2 (0.02)	0.5 (0.04)	2.3 (0.10)	1.3 (0.07)	0.2 (0.03)
2004	0.2 (0.02)	0.4 (0.03)	2.1 (0.08)	1.1 (0.05)	0.2 (0.02)
2005	0.2 (0.02)	0.4 (0.03)	1.8 (0.08)	1.0 (0.05)	0.2 (0.02)
2006	0.2 (0.02)	0.4 (0.03)	1.5 (0.07)	0.9 (0.05)	0.1 (0.01)
2007	0.1 (0.01)	0.3 (0.03)	1.6 (0.08)	0.8 (0.05)	0.1 (0.02)
2008	0.2 (0.03)	0.3 (0.03)	1.4 (0.08)	0.8 (0.05)	0.1 (0.02)
2009	0.1 (0.02)	0.3 (0.03)	1.3 (0.08)	0.7 (0.05)	0.1 (0.02)
2010*	0.1 (0.03)	0.2 (0.03)	1.0 (0.06)	0.6 (0.05)	0.1 (0.01)

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Procedures are defined using ICD-9-CM procedure codes: carotid endarterectomy (38.12); coronary artery bypass grafting (36.1x); cardiac catheterization (37.21, 37.22, or 37.23); percutaneous coronary intervention (36.01, 36.02, 36.05, 36.06, or 36.07); and lower extremity vascular bypass or stenting (39.25 or 39.29). Standard errors were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.

* 2010 was based on the first seven of up to 15 diagnosis codes to be consistent with 1990–2009, in which only the first seven codes were available.

SOURCE: National Hospital Discharge Surveys and National Health Interview Surveys 1990–2010

FIGURE 40.43. Time Trend in the Rate of Hospital Discharges Listing Both a Diagnosis of Diabetes and at Least One Cardiovascular Procedure Among Adults Age ≥18 Years, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Procedures are defined using ICD-9-CM procedure codes: cardiac catheterization (37.21, 37.22, or 37.23); percutaneous coronary intervention (36.01, 36.02, 36.05, 36.06, or 36.07); and coronary artery bypass grafting (36.1x).

* 2010 data are based on the first seven of up to 15 diagnosis codes to be consistent with 1990–2009, in which only the first seven codes were available.

SOURCE: National Hospital Discharge Surveys and National Health Interview Surveys 1990, 1995, 2000, 2005, 2010

HOSPITAL USE BY ADULTS WITH DIABETES

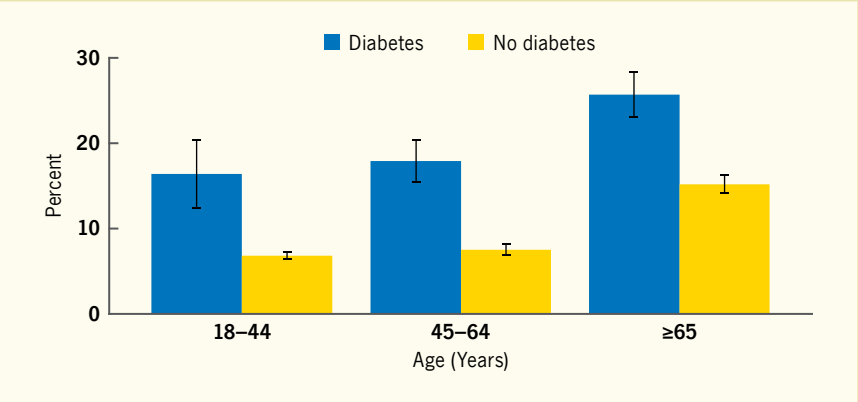
Proportion of Adults Hospitalized in the Past Year

Using self-reported data from the NHIS, Figure 40.44 and Appendix 40.5 show the percentages of adults with and without diabetes who reported being hospitalized at least once during the past year. In 2011, 20.8% of people with diabetes and 8.3% of those without diabetes reported being hospitalized. The percentage of people with or without diabetes who reported being hospitalized increased with age. People with diabetes were 2.5 times more likely to report being hospitalized in the previous year than people without diabetes. The difference was greatest for people age 18–44 years and decreased with age such that in the oldest age group, the rate in people with diabetes was only 1.7 times that in people without diabetes. With increasing age, the proportion of nondiabetic adults who reported being hospitalized in the past year increased 2.2-fold, from 6.8% at age 18–44 years to 15.2% at age ≥65 years. The proportion of diabetic adults who reported being hospitalized in the past year increased 1.6-fold, from 16.4% at age 18–44 years to 25.7% at age ≥65 years. MEPS data showed similar trends for 2008–2012 (Figure 40.45).

Hospitalization of Adults With Type 1 and Type 2 Diabetes

Figure 40.46 and Appendix 40.5 show the percentage of adults with type 1 and type 2 diabetes who reported being hospitalized at least once during the past year. In each age group, the percentage of adults who reported being hospitalized in the past year was highest for people with type 1 diabetes, followed by people with type 2 diabetes treated with insulin, and lowest for people with type 2 diabetes not treated with insulin. Among people with type 1 diabetes, the proportion of adults hospitalized tended to increase with age.

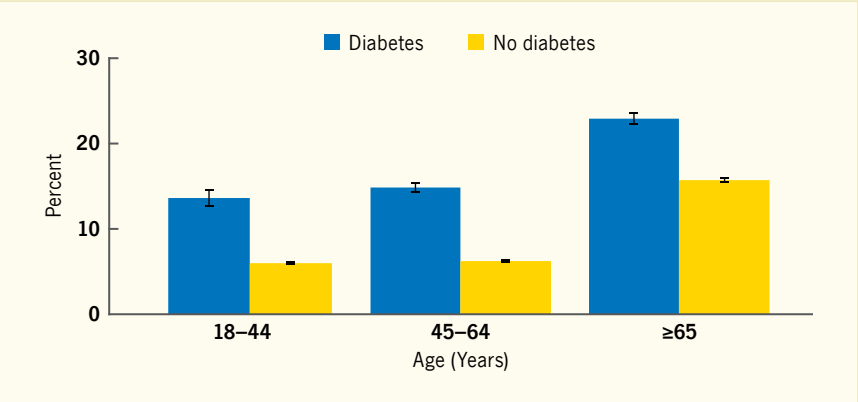
FIGURE 40.44. Percent of Adults Age ≥18 Years Who Report Being Hospitalized in the Past Year, by Diabetes Status and Age, U.S., 2011



Data are based on self-report. Error bars represent 95% confidence intervals.

SOURCE: National Health Interview Survey 2011

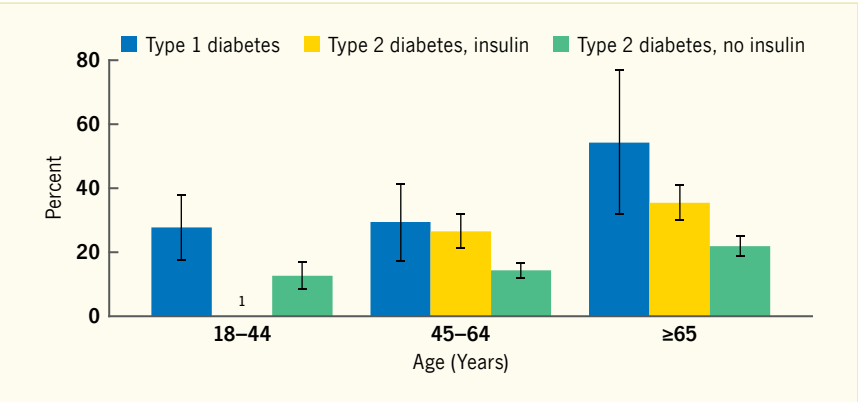
FIGURE 40.45. Percent of Adults Age ≥18 Years Who Report Being Hospitalized in the Past Year, by Diabetes Status and Age, U.S., 2008–2012



Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46. Error bars represent 95% confidence intervals.

SOURCE: Medical Expenditure Panel Surveys 2008–2012

FIGURE 40.46. Percent of Adults Age ≥18 Years Who Report Being Hospitalized in the Past Year, by Type of Diabetes and Age, U.S., 2011



Type 1 diabetes is defined as diabetes diagnosed at age <30 years and current insulin use; all other persons with a physician diagnosis of diabetes are considered to have type 2 diabetes. Data are based on self-report. Error bars represent 95% confidence intervals.

[1] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

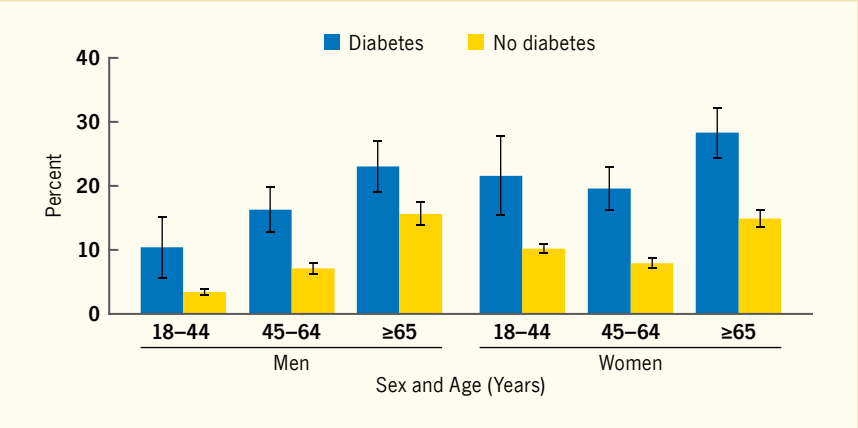
SOURCE: National Health Interview Survey 2011

Percentage of Adults Hospitalized by Diabetes Status, Age, Sex, and Race/Ethnicity

Figure 40.47 and Appendix 40.5 show the percentage of adults with and without diabetes who reported being hospitalized at least once in the past year by age and sex. Those with diabetes were more likely to report being hospitalized than those without diabetes, and older people were more likely to report being hospitalized than younger people. Women age 45–64 years both with and without diabetes were an exception. Women age 18–44 years were more likely to report being hospitalized than women age 45–64 years. This finding may reflect more frequent hospitalization for pregnancy and childbirth in women in the youngest age group. Trends in rates of hospitalization were similar in MEPS 2008–2012 data; however, the percentages were lower in each age/sex group in the MEPS compared to the NHIS 2011 data (Figure 40.48).

People with diabetes were more likely to report being hospitalized than people without diabetes across all racial/ethnic groups (Figure 40.49, Appendix 40.5). Trends in hospitalization by race/ethnicity were similar in the NHIS 2011 and the MEPS 2008–2012 data; however, the percentages were higher in the NHIS data than in the MEPS data in each age, race, and ethnic group (Figure 40.50). Women of all races/ethnicities in all age groups were more likely to report being hospitalized than men (Appendices 40.6 and 40.7).

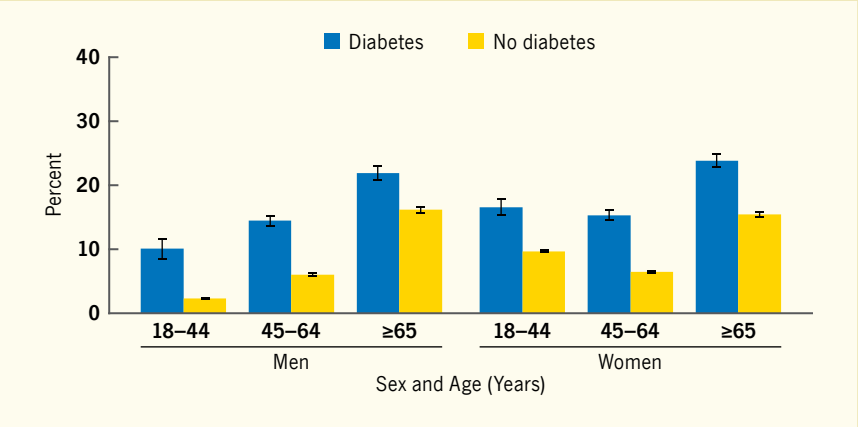
FIGURE 40.47. Percent of Adults Age ≥18 Years Who Report Being Hospitalized in the Past Year, by Diabetes Status, Age, and Sex, U.S., 2011



Data are based on self-report. Error bars represent 95% confidence intervals.

SOURCE: National Health Interview Survey 2011

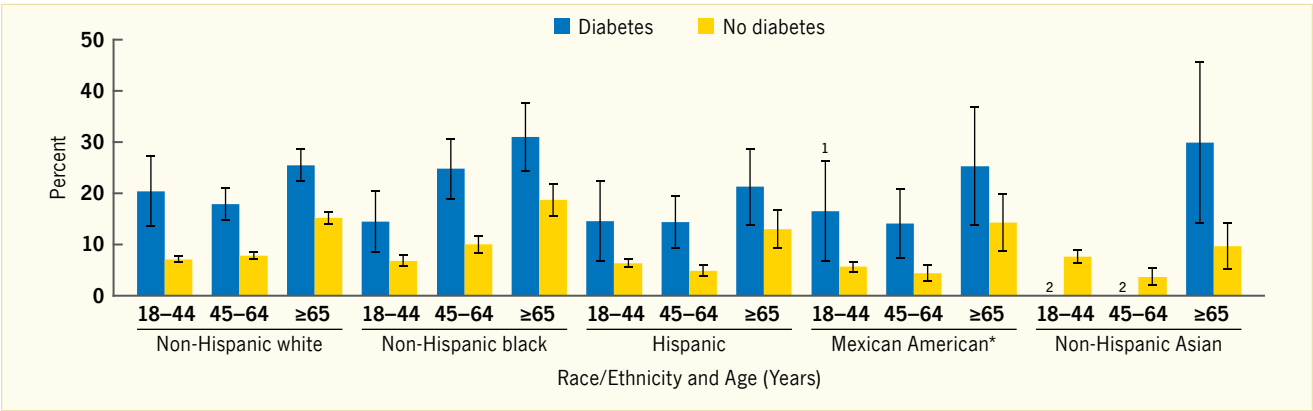
FIGURE 40.48. Percent of Adults Age ≥18 Years Who Report Being Hospitalized in the Past Year, by Diabetes Status, Age, and Sex, U.S., 2008–2012



Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46. Error bars represent 95% confidence intervals.

SOURCE: Medical Expenditure Panel Surveys 2008–2012

FIGURE 40.49. Percent of Adults Age ≥18 Years Who Report Being Hospitalized in the Past Year, by Diabetes Status, Age, and Race/Ethnicity, U.S., 2011



Data are based on self-report. Error bars represent 95% confidence intervals.

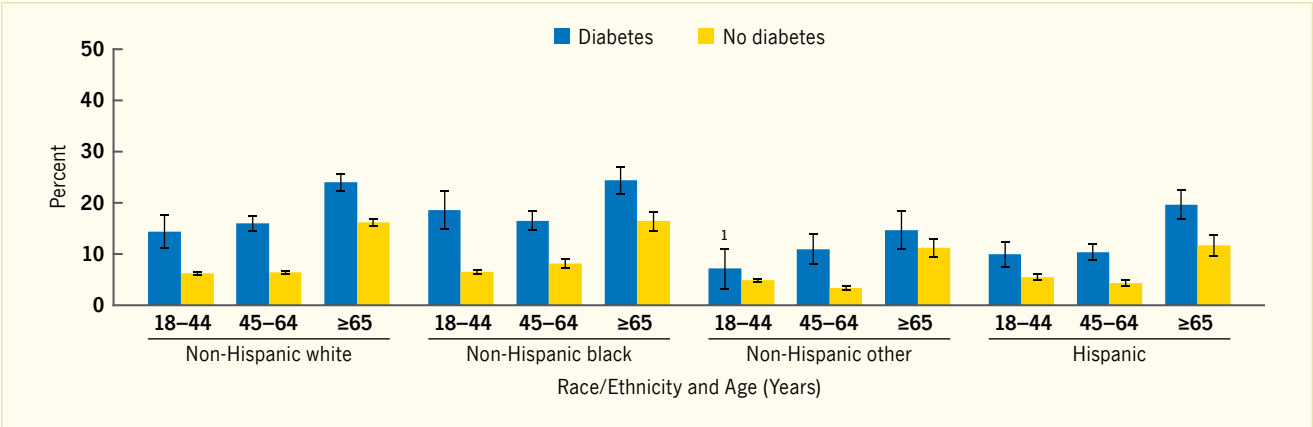
* Mexican American is a subset of Hispanic.

[1] Relative standard error >30%–40%

[2] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Health Interview Survey 2011

FIGURE 40.50. Percent of Adults Age ≥18 Years Who Report Being Hospitalized in the Past Year, by Diabetes Status, Age, and Race/Ethnicity, U.S., 2008–2012



Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46. Error bars represent 95% confidence intervals.

[1] Relative standard error >40%–50%

SOURCE: Medical Expenditure Panel Surveys 2008–2012

Hospitalization by Duration of Diabetes

For people with type 1 diabetes, hospitalization tended to be most frequent for those with duration <5 years (Table 40.26). For people with type 2 diabetes, hospitalization was most frequent for those with duration ≥15 years (Table 40.26). Among people with type 2 diabetes who were hospitalized in the past year and treated with insulin, 15% had a duration of diabetes <5 years, 37% had a duration of 5–14 years, and 48% had a known duration of ≥15 years (Figure 40.51). People with type 2 diabetes who were hospitalized in the past year but were not treated with insulin did not differ significantly with respect to diabetes duration. Thirty-six percent of those with type 2 diabetes who were were hospitalized and not treated with insulin had known duration of diabetes <5 years, 38% had a duration of 5–14 years, and 26% had a duration of ≥15 years.

TABLE 40.26. Percent of Adults With Diabetes Age ≥18 Years Who Report Being Hospitalized Overnight at Least Once in the Past Year, by Type and Duration of Diabetes, U.S., 2011

TYPE OF DIABETES	PERCENT (STANDARD ERROR)			
		Duration of Diabetes (Years)*		
	Total	<5	5–14	≥15
Type 1 diabetes†	31.5 (3.95)	39.2 (18.46)[2]	23.6 (7.89)[1]	33.1 (4.76)
Type 2 diabetes, all	19.9 (0.95)	18.3 (1.56)	18.0 (1.47)	24.9 (1.78)
Type 2, non-insulin treated	16.9 (1.03)	16.7 (1.67)	15.2 (1.54)	20.7 (2.23)
Type 2, insulin treated	30.2 (2.05)	33.1 (5.13)	27.9 (3.49)	31.2 (2.85)

Data are based on self-report.

* Duration of diabetes was calculated as years since diagnosis of diabetes.

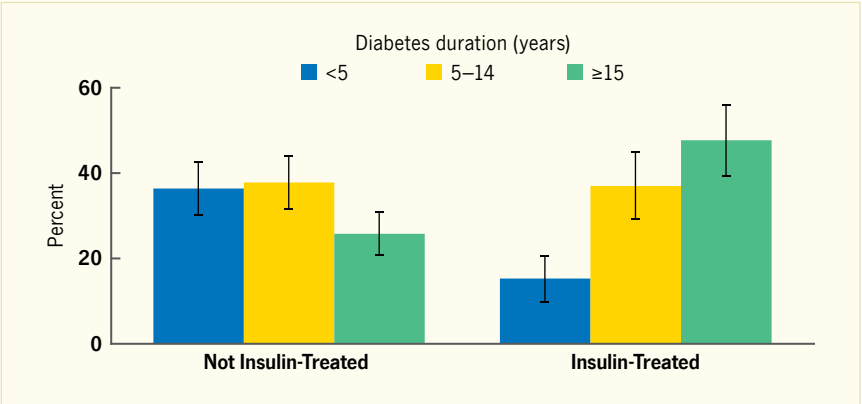
† Type 1 diabetes was defined by diabetes diagnosed at age <30 years and current insulin use; all other persons with a physician diagnosis of diabetes were considered to have type 2 diabetes.

[1] Relative standard error >30%–40%

[2] Relative standard error >40%–50%

SOURCE: National Health Interview Survey 2011

FIGURE 40.51. Insulin Use and Duration of Diabetes Among Adults With Type 2 Diabetes Age ≥18 Years Who Have Been Hospitalized in the Past Year, U.S., 2011



Duration of diabetes is calculated as years since diagnosis of diabetes. Type 1 diabetes (excluded from this figure) is defined by age at onset <30 years who currently use insulin; all other persons with a physician diagnosis of diabetes are considered to have type 2 diabetes. Data are based on self-report. Error bars represent 95% confidence intervals.

SOURCE: National Health Interview Survey 2011

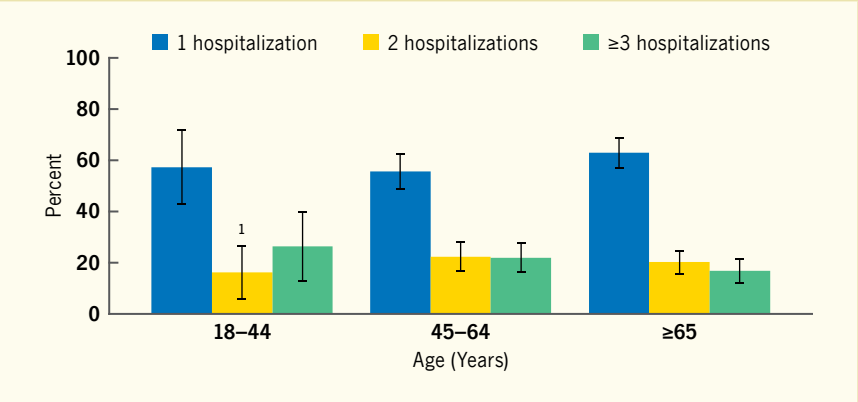
Multiple Hospitalizations Among Adults With Diabetes

Using data from the NHIS 2011, of all adults with diabetes who were hospitalized, 71% reported only one hospitalization, 17% reported two hospitalizations, and 12% reported three or more hospitalizations. The proportion of adults who reported only one hospitalization, or multiple hospitalizations, was similar across age groups (Figure 40.52). MEPS 2008–2012 data also showed that the proportion of adults who reported only one, or multiple hospitalizations, was similar across age groups; however, the percentage of people with only one hospitalization was higher in the MEPS than in the NHIS for each age group (Figure 40.53).

Length of Hospital Stay

In the NHIS 2011, people with diabetes age <65 years reported slightly longer lengths of stay (LOS) than those without diabetes (Table 40.27). In the oldest age group (≥65 years) people with diabetes had an average LOS that was 1 day shorter than those without diabetes, which could be due to in-hospital mortality. In the MEPS 2008–2012, people with diabetes reported an average LOS that was 1 day longer than those without diabetes. This was consistent across all age groups (Table 40.28). In both people with diabetes and those without diabetes, average LOS increased strongly with age. In the NHDS 2010, average LOS was strongly associated with age, whether diabetes was listed as the primary discharge diagnosis or as any listed diagnosis (Table 40.29). For many years, the average LOS as assessed by the NHDS has been decreasing. Based on NHDS discharges with diabetes as the primary diagnosis, the average LOS decreased by 42% (from 8.0 days to 4.6 days) between 1990 and 2010; for diabetes as any listed diagnosis, the average length of stay declined by 40% (from 8.6 days to 5.1 days) between 1990 and 2010 (Figure 40.54).

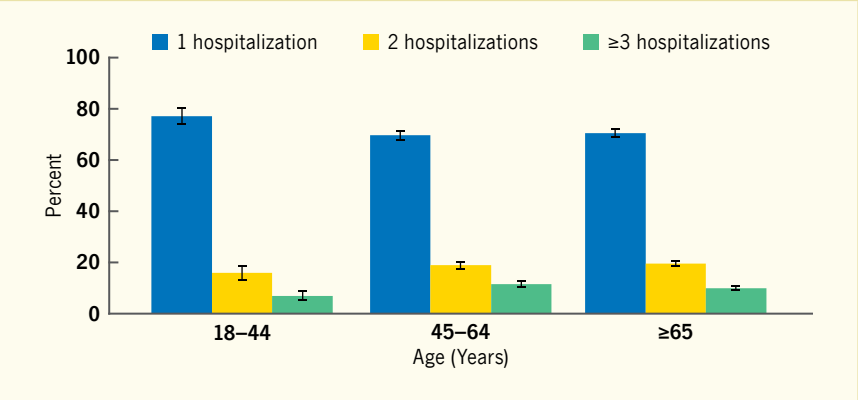
FIGURE 40.52. Distribution of the Number of Hospitalizations in the Past Year Among Adults With Diabetes Age ≥18 Years Who Report Being Hospitalized, by Age, U.S., 2011



Data are based on self-report. Error bars represent 95% confidence intervals.
[1] Relative standard error >30%–40%

SOURCE: National Health Interview Survey 2011

FIGURE 40.53. Distribution of the Number of Hospitalizations in the Past Year Among Adults With Diabetes Age ≥18 Years Who Report Being Hospitalized, by Age, U.S., 2008–2012



Data are based on self-report. Error bars represent 95% confidence intervals.

SOURCE: Medical Expenditure Panel Surveys 2008–2012

TABLE 40.27. Mean Length of Stay Per Hospitalization Among Adults Age ≥18 Years Who Report at Least One Hospitalization in the Past Year, by Diabetes Status and Age, U.S., 2011

	DIABETES		NO DIABETES	
AGE (YEARS)	LOS, Mean (SE)	LOS, Median (25th Percentile, 75th Percentile)	LOS, Mean (SE)	LOS, Median (25th Percentile, 75th Percentile)
18–44	3.9 (0.60)	2.42 (0.92, 4.80)	3.3 (0.37)	1.91 (0.94, 2.97)
45–64	5.1 (0.54)	2.90 (1.34, 4.87)	4.1 (0.31)	2.72 (0.99, 3.96)
≥65	4.9 (0.47)	2.82 (1.46, 4.98)	5.9 (0.45)	2.90 (1.74, 4.99)

Data are based on self-report. LOS, average length of stay in days=self-reported number of nights spent in a hospital in the past year/self-reported number of times in the hospital in the past year; SE, standard error.

SOURCE: National Health Interview Survey 2011

TABLE 40.28. Mean Length of Stay Per Hospitalization Among Adults Age ≥18 Years Who Report at Least One Hospitalization in the Past Year, by Diabetes Status and Age, U.S., 2008–2012

AGE (YEARS)	DIABETES		NO DIABETES	
	LOS, Mean (SE)	LOS, Median (25th Percentile, 75th Percentile)	LOS, Mean (SE)	LOS, Median (25th Percentile, 75th Percentile)
18–44	4.6 (0.38)	2.68 (1.39, 4.09)	3.5 (0.12)	1.93 (1.02, 3.28)
45–64	5.7 (0.30)	2.85 (1.34, 5.99)	4.8 (0.22)	2.34 (0.89, 4.59)
≥65	7.1 (0.40)	3.20 (1.42, 6.57)	6.0 (0.22)	2.90 (1.29, 6.07)

Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46. LOS, average length of stay in days=number of nights spent in a hospital in the past year/number of times in the hospital in the past year; SE, standard error.

SOURCE: Medical Expenditure Panel Surveys 2008–2012

TABLE 40.29. Number of Hospitalizations and Average Length of Hospital Stay Among Adults Age ≥18 Years With Diabetes as the Primary or Any Listed Diagnosis, by Age, U.S., 2010

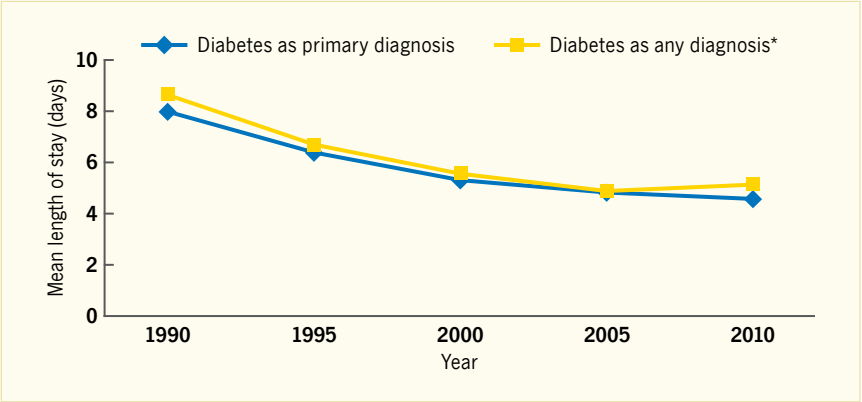
AGE (YEARS)	DIABETES LISTED AS PRIMARY DIAGNOSIS			DIABETES AS ANY LISTED DIAGNOSIS*		
	Number in Thousands	LOS, Mean	LOS, Median (25th Percentile, 75th Percentile)	Number in Thousands	LOS, Mean	LOS, Median (25th Percentile, 75th Percentile)
18–44	171	3.00	1.86 (1.05, 3.14)	654	4.19	2.32 (1.23, 4.18)
45–64	254	4.72	2.78 (1.29, 5.25)	2,377	4.99	2.83 (1.45, 5.36)
≥65	196	5.74	3.11 (1.38, 6.54)	3,729	5.38	3.31 (1.73, 6.02)

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1). LOS, average length of stay in days=number of nights spent in a hospital in the past year.

* Based on up to 15 diagnosis codes.

SOURCE: National Hospital Discharge Survey 2010

FIGURE 40.54. Time Trends in the Average Length of Stay for Hospital Discharges Listing Diabetes, U.S., 1990–2010



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1.

* 2010 was based on the first seven of up to 15 diagnosis codes to be consistent with 1990–2009, in which only the first seven codes were available.

SOURCE: National Hospital Discharge Surveys 1990, 1995, 2000, 2005, 2010

DIABETES AND LONG-TERM CARE

Long-term care is defined as the range of services and support one may need to meet health or personal needs over a long period of time (13). Long-term care can be delivered as either medical care or assistance with the basic personal tasks of everyday life and can be provided in the home by family members or home health care organizations or in nursing home facilities. Nursing home facilities typically provide more intensive care for those whose needs cannot be met in the home environment. In this section, national survey data are used to describe the demographic characteristics, health status, and use of care among people with diabetes who reside in nursing home facilities or receive home health care.

NATIONAL SURVEYS AND DATA SOURCES

New analyses were conducted to describe long-term care utilization among people with diabetes for *Diabetes in America*. The three major sources of data for analysis were the National Nursing Home Survey (NNHS), the National Home and Hospice Care Survey (NHHCS), and the MEPS.

National Nursing Home Survey

The NNHS was conducted by the National Center for Health Statistics in 1973–1974 and again in 1977, 1985, 1995, 1997, 1999, and 2004. It surveyed a nationally representative sample of U.S. nursing homes and their services, staff, and residents (14). Data were collected from nursing homes with at least three beds that were either certified by Medicare or Medicaid or had a state license to operate as a nursing home. The NNHS collected data on the providers of services and the recipients of care. For recipients of care, data were obtained from medical records and included demographic information, health status, diagnoses at time of admission and at the time of interview, medication use, services received, and sources of payment.

In 2004, the NNHS was redesigned to collect data on one admission diagnosis (with one or two corresponding ICD-9-CM codes) and up to 16 possible diagnoses at the time of interview (with one or two corresponding ICD-9-CM codes each). Previously, the NNHS collected data for six ICD-9 diagnosis codes at both the time of admission and time of interview. For the data presented in this section, all listed diagnosis codes at the time of admission and the time of interview were used.

Data are reported for people with diabetes (ICD-9-CM codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1) listed as any diagnosis at the time of admission or at the time of the interview. For some analyses, people with diabetes are compared to those without diabetes. Other conditions were ascertained by their ICD-9-CM codes: neoplasm (140–239); mental disorders (290–319); diseases of the nervous system and sense organs (320–389); essential hypertension (401); diseases of the circulatory system (390–459); heart disease (391–392.0, 393–398, 402, 404, 410–416, or 420–429); cerebrovascular disease (430–438), diseases of the respiratory system (460–519); diseases of the digestive system (520–579); diseases of the genitourinary system (580–629); and diseases of the musculoskeletal system and connective tissue (710–739). Analyses were restricted to recipients of care age ≥55 years.

A major limitation of the NNHS is that it used a current-resident sample, which describes people residing in the nursing home on the night before data collection. Residents with short nursing home stays are less likely to be on the nursing home rolls on a given night and are thus underrepresented in the sample. The current-resident sample is also more likely than a discharge sample to include long-term nursing home residents. In addition, for these analyses, a diagnosis of diabetes must be listed at the time of admission or at the time of interview since, by definition, residents had not been discharged.

Although the NNHS does not exclude people based on age, the majority of nursing home residents are age ≥65 years (88% in 2004). To be consistent with the previous editions of *Diabetes in America*, these new analyses of NNHS data have been limited to residents age ≥55 years.

National Home and Hospice Care Survey

The NHHCS was conducted by the National Center for Health Statistics in 1992, 1993, 1994, 1996, 1998, 2000, and 2007. It surveyed a nationally representative sample of U.S. home health and hospice agencies and their services, staff, and patients (15). Agencies that were either certified by Medicare and/or Medicaid or licensed by a state to provide home health and/or hospice services were surveyed. Agencies that provided only homemaker or housekeeping services, assistance with instrumental activities of daily living, or durable medical equipment and supplies were excluded. The NHHCS collected information about both the providers of services and the recipients of care. For recipients of care, data were obtained from medical records of the home health care patients and hospice discharges and included demographic information, health status, diagnoses at time of admission (one primary) and at the time of interview (one primary and up to 15 secondary), medication use, and services received. Analyses included only home health care patients. People receiving hospice care were excluded.

Data are reported for people with diabetes (ICD-9-CM codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1) listed as any diagnosis either at the time of admission or the time of interview. For some analyses, people with diabetes are compared to those without diabetes. Other conditions were ascertained using ICD-9-CM codes: diseases of the blood and blood-forming organs (280–289); mental disorders (290–319); diseases of the nervous system and sense organs (320–389); diseases of the circulatory system (390–459); diseases of the respiratory system (460–519); diseases of the digestive system (520–579); diseases of the genitourinary system (580–629); diseases of the musculoskeletal system

and connective tissue (710–739); and post-hospital aftercare (V42–V46, V52, V53.3–V53.7, or V54–V58).

A limitation of the NHHCS is that it used a current-patient sample, which describes people receiving home health care on the night before data collection. The current-patient sample is more likely than a discharge sample to include long-term home health care patients. Home health care patients receiving short-term care are less likely to be on the patient list on a given night and are thus underrepresented. In addition, for these analyses, a diagnosis of diabetes must be listed at the time of admission or at the time of interview since, by definition, patients had not been discharged.

Medical Expenditure Panel Survey

In addition to asking about ambulatory and inpatient care, as described in the preceding sections, the MEPS asks questions about home health care, including whether the respondent received home health care from an agency, a paid non-agency provider, or an unpaid informal caregiver, such as a spouse or child.

A limitation of using MEPS data for home health care for people with diabetes is the small sample size. When MEPS data are presented in this section, they should be interpreted as the yearly average for the time period 2008–2012. It is also important to note that the MEPS has a much broader scope than the NHHCS data. The MEPS includes three types of home health care providers, as specified above, whereas the NHHCS is much more selective, and eligible agencies had to be either certified by Medicare or Medicaid or licensed by a state to provide services.

NURSING HOME CARE

Nursing Home Environment

In 2004, there were 16,100 licensed nursing home facilities in the United States with almost 1.5 million residents (16). There were, on average, 108 beds per nursing home with an occupancy rate of 86%. More than two-thirds (68%) of nursing homes were in metropolitan counties, and most (67%) were located in the Midwest and South. Sixty-two percent of nursing homes were owned by for-profit organizations, 31% were operated as voluntary nonprofit facilities, and 8% were owned by government and other entities.

Certified nursing assistants represented the majority of staff employed in nursing homes. Other staff included registered nurses, licensed practical nurses, nurses' aides, and orderlies. Nursing care was usually provided according to the orders of physicians who visited the facilities. Supervising physicians included private physicians from the community (86%), physicians from contracted physician group practices (30%), or directly employed staff physicians (20%) (16). Pharmacy services and medical director services were most often provided under formal contract with outside providers (84% and 84%, respectively) (16). Other services commonly provided by outside sources included hospice, physical and occupational therapy, podiatry, dental, and diagnostic services.

Demographic Characteristics of Nursing Home Residents

According to the NNHS, 358,500 people with diabetes age ≥55 years resided in nursing homes in the United States in 2004. Table 40.30 shows the number of nursing home residents with diabetes by age and sex. Approximately 25% of nursing home residents had diabetes listed as any diagnosis at either the time of admission or the time of interview. The percentage of nursing home residents with diabetes decreased with age. Nursing home residents age ≥85 years were approximately half as likely to have diabetes as those age 55–64 years. The prevalence of diabetes was slightly higher for men (29%) than women (24%). Women tended to have higher prevalence of diabetes in the younger age groups (55–74 years), and men tended to have a higher prevalence of diabetes in the older age groups (≥75 years) (Figure 40.55).

Figures 40.56 and 40.57 show time trends in the numbers and percentage of nursing home residents age ≥55 years with diabetes by age. For the youngest age group (55–64 years), the number of people with diabetes in nursing homes increased from 10,600 in 1995 to 34,200 in 2004 (3.2 times increase). Between 1995 and 2004, the number increased 1.4 times for all other age groups. In 2004, the number of people with diabetes in nursing homes increased with age from 34,200 people age 55–64 years to 123,200 people age ≥85 years. The percentage of people with diabetes in the youngest age group (55–64 years) increased over time from 17% in 1995 to 37% in 2004 (2.2 times increase). The percentage of people with diabetes

TABLE 40.30. Number of Adults With Diabetes Age ≥55 Years Living in Nursing Homes, by Age and Sex, U.S., 2004

SEX, AGE (YEARS)	NUMBER IN THOUSANDS (STANDARD ERROR)	PERCENT (STANDARD ERROR)*
All persons	358.5 (7.80)	25.4 (0.51)
55–64	34.2 (2.38)	37.1 (1.98)
65–74	62.9 (3.30)	36.1 (1.46)
75–84	138.2 (4.93)	29.5 (0.87)
≥85	123.2 (4.46)	18.3 (0.58)
Women	247.7 (6.48)	24.2 (0.57)
55–64	16.1 (1.53)	37.3 (2.80)
65–74	37.4 (2.46)	37.8 (1.94)
75–84	96.3 (4.02)	29.4 (1.02)
≥85	98.0 (4.07)	17.7 (0.65)
Men	110.8 (4.38)	28.7 (0.92)
55–64	18.2 (1.78)	36.9 (2.88)
65–74	25.5 (2.11)	33.9 (2.23)
75–84	41.9 (2.59)	29.7 (1.47)
≥85	25.2 (1.88)	20.9 (1.42)

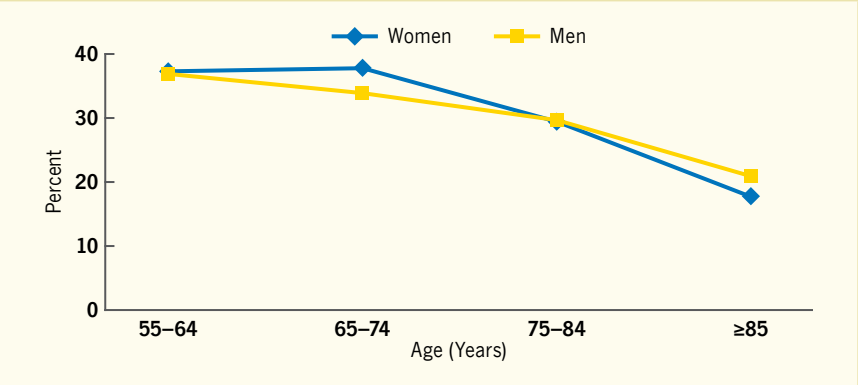
Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1.

* Percent of all people age ≥55 years living in a nursing home in that age/sex category.

SOURCE: National Nursing Home Survey 2004

increased 1.5 times for all other age groups. In 2004, the percentage of people with diabetes in nursing homes decreased with age from 37% in people age 55–64 years to 18% in people age ≥85 years.

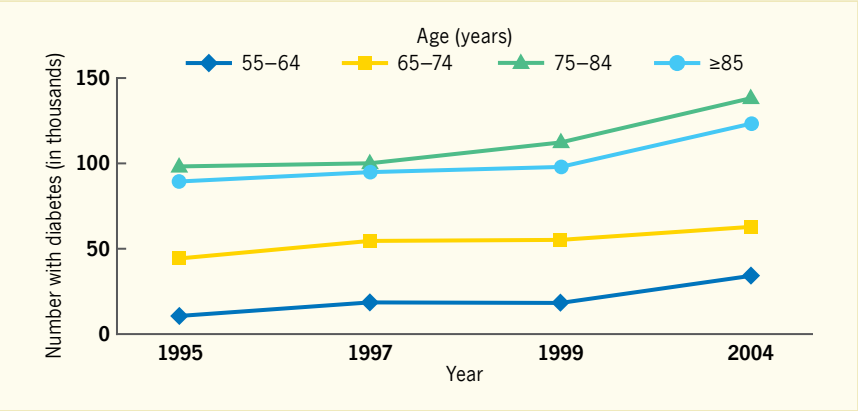
FIGURE 40.55. Prevalence of Diabetes Among Adults Age ≥55 Years Living in Nursing Homes, by Age and Sex, U.S., 2004



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1.

SOURCE: National Nursing Home Survey 2004

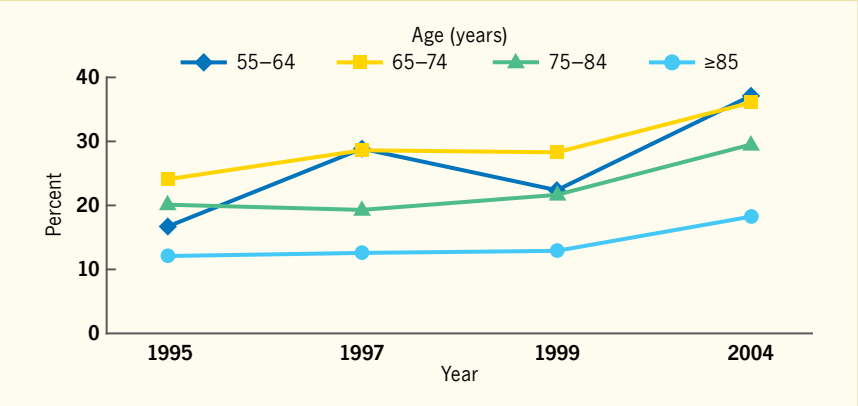
FIGURE 40.56. Trends in the Numbers of Nursing Home Residents With Diabetes Age ≥55 Years, by Age, U.S., 1995–2004



Diabetes is defined as ICD-9-CM codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. For 1995, 1997, and 1999, there were six ICD-9-CM codes at admission and six ICD-9-CM codes at time of interview. In 2004, there was one admission diagnosis with one or two ICD-9-CM codes and 16 diagnoses at time of interview with one or two ICD-9-CM codes each. ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification.

SOURCE: National Nursing Home Surveys 1995, 1997, 1999, 2004

FIGURE 40.57. Trends in the Percent of Nursing Home Residents With Diabetes Age ≥55 Years, by Age, U.S., 1995–2004



Diabetes is defined as ICD-9-CM codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. For 1995, 1997, and 1999, there were six ICD-9-CM codes at admission and six ICD-9-CM codes at time of interview. In 2004, there was one admission diagnosis with one or two ICD-9-CM codes and 16 diagnoses at time of interview with one or two ICD-9-CM codes each. ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification.

SOURCE: National Nursing Home Surveys 1995, 1997, 1999, 2004

Table 40.31 shows the characteristics of nursing home residents with and without diabetes compared to the general population with and without diabetes. Nursing home residents with diabetes were more likely to be younger (age 55–84 years), men, and nonwhite than nursing home residents without diabetes. Women with diabetes in nursing homes were less likely to be widowed, but more likely to be divorced or separated, than women without diabetes in nursing homes. Men with diabetes in nursing homes were more likely to be married or never married than men without diabetes in nursing homes. Compared to people with diabetes in the general population, nursing home residents with diabetes were more likely to be women, of non-Hispanic origin, and widowed or never married. Many of these differences are likely due to the considerably older age of people with diabetes in nursing homes compared with people with diabetes in the general population.

Living Arrangements Before Nursing Home Admission

Table 40.32 shows the living arrangements of nursing home residents before admission by diabetes status, after adjusting for age and sex. Nursing home residents with diabetes were more likely to be admitted from acute care hospitals and less likely to be admitted from private residences or assisted living/group homes than nursing home residents without diabetes. Forty-two percent of nursing home residents with diabetes were admitted from acute care hospitals, 28% from private residences, and 12% from another nursing home.

TABLE 40.31. Demographic Characteristics of Nursing Home Residents Age ≥55 Years and the General Population Among Adults Age ≥55 Years, by Diabetes Status, U.S., 2004

CHARACTERISTICS	PERCENT (STANDARD ERROR)			
	Nursing Home Residents*		General Population†	
	Diabetes	No Diabetes	Diabetes	No Diabetes
Age (years)				
55–64	9.5 (0.64)	5.5 (0.32)	38.3 (1.45)	46.8 (0.67)
65–74	17.5 (0.82)	10.7 (0.39)	34.9 (1.39)	27.8 (0.56)
75–84	38.6 (1.06)	31.4 (0.56)	22.4 (1.12)	19.3 (0.48)
≥85	34.4 (1.02)	52.4 (0.71)	4.3 (0.54)	6.0 (0.29)
Sex				
Women	69.1 (1.01)	73.8 (0.62)	48.6 (1.49)	56.2 (0.62)
Men	30.9 (1.01)	26.2 (0.62)	51.4 (1.49)	43.8 (0.62)
Race				
White	80.6 (1.19)	88.5 (0.73)	81.9 (1.06)	88.8 (0.44)
Black	16.9 (1.16)	10.0 (0.69)	14.1 (0.93)	8.1 (0.37)
All other	2.5 (0.39)	1.5 (0.25)	4.1 (0.60)	3.1 (0.26)
Hispanic origin				
Yes	5.0 (0.64)	3.0 (0.34)	10.6 (0.80)	6.1 (0.30)
No	95.0 (0.64)	97.0 (0.34)	89.5 (0.80)	93.9 (0.30)
Marital status, women				
Married	9.2 (0.61)	10.2 (0.38)	46.6 (2.07)	53.6 (0.87)
Widowed	45.2 (1.11)	50.7 (0.69)	34.1 (1.82)	28.2 (0.75)
Divorced or separated	7.1 (0.53)	5.7 (0.30)	14.5 (1.25)	13.6 (0.49)
Never married	7.5 (0.58)	7.2 (0.35)	4.8 (0.80)	4.5 (0.29)
Marital status, men				
Married	13.0 (0.72)	10.2 (0.41)	77.3 (1.48)	76.9 (0.75)
Widowed	7.4 (0.53)	7.8 (0.33)	8.7 (0.99)	8.5 (0.40)
Divorced or separated	4.3 (0.42)	3.2 (0.24)	10.1 (1.07)	10.1 (0.50)
Never married	6.3 (0.56)	5.0 (0.29)	3.9 (0.73)	4.5 (0.35)

* Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1.
† Data are based on self-report.

SOURCE: National Nursing Home Survey 2004 and National Health Interview Survey 2004

TABLE 40.32. Age- and Sex-Standardized Living Arrangements Before Nursing Home Admission Among Nursing Home Residents Age ≥55 Years, by Diabetes Status, U.S., 2004

LIVING ARRANGEMENT BEFORE ADMISSION	DIABETES		NO DIABETES	
	Number in Thousands (SE)	Percent (SE)	Number in Thousands (SE)	Percent (SE)
Acute Care Hospital	145.7 (6.29)	41.8 (1.51)	360.3 (11.69)	35.4 (1.08)*
Private residence	95.5 (4.29)	27.8 (1.16)	318.5 (9.67)	31.2 (0.88)*
Another nursing home	41.1 (2.71)	11.7 (0.76)	118.6 (5.44)	11.7 (0.52)
Hospital skilled nursing facility	32.7 (3.42)	9.4 (0.95)	88.5 (7.37)	8.8 (0.72)
Assisted living, Board & Care, Group home	20.4 (1.86)	6.2 (0.56)	94.1 (5.02)	9.1 (0.46)*
Facility for psychiatric, mentally retarded/developmentally delayed	4.1 (0.78)	1.1 (0.22)	17.0 (2.04)	1.8 (0.21)*
Rehabilitation facility	3.8 (0.78)	1.1 (0.22)	9.3 (1.62)	0.9 (0.16)
Other	3.3 (0.71)	0.9 (0.19)	11.1 (1.66)	1.1 (0.17)

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. Data are standardized to the overall National Nursing Home Survey population using age groups 55–64, 65–74, and ≥75 years. SE, standard error.
* Significantly different from diabetic nursing home residents at the p≤0.05 level

SOURCE: National Nursing Home Survey 2004

Chronic Medical Conditions in Nursing Home Residents

Table 40.33 shows the prevalence of selected chronic medical conditions in nursing home residents age ≥55 years by diabetes status. Diseases of the circulatory system were common in residents with and without diabetes but were more common in nursing home residents with diabetes compared to those without diabetes. Eighty-nine percent of nursing home residents with diabetes also had diseases of the circulatory system (64% hypertension, 52% heart disease, and 27% cerebrovascular disease) compared to 78% of nursing home residents without diabetes (53% hypertension, 43% heart disease, and 23% cerebrovascular disease). Residents with diabetes were more likely to also have genitourinary disorders than residents without diabetes (26% vs. 18%). Residents with diabetes were less likely to have comorbid mental disorders (63% vs. 70%), diseases of the nervous system and sense organs (39% vs. 46%), and diseases of the musculoskeletal system and connective tissue (39% vs. 49%) than residents without diabetes. These differences remained after adjusting for age and sex (Figure 40.58). The prevalences of neoplasms, diseases of the respiratory system, and diseases of the digestive system were similar among residents with and without diabetes.

Figure 40.59 and Table 40.33 also show the number of chronic medical conditions (excluding diabetes) among nursing home residents. Nursing home residents with and without diabetes had similar numbers of chronic medical conditions, even after adjusting for age and sex (Figure 40.59). Forty-one percent of nursing home residents with diabetes had four or more chronic medical conditions, excluding diabetes.

TABLE 40.33. Prevalence of Selected Chronic Medical Conditions at Admission or Time of Interview Among Nursing Home Residents Age ≥55 Years, by Diabetes Status, U.S., 2004

CHRONIC MEDICAL CONDITIONS	DIABETES		NO DIABETES	
	Number in Thousands (SE)	Percent (SE)	Number in Thousands (SE)	Percent (SE)
Individual conditions				
Neoplasms	31.1 (2.51)	8.7 (0.63)	93.7 (4.55)	8.9 (0.35)
Mental disorders*	227.3 (8.67)	63.4 (1.09)	735.4 (21.99)	70.0 (0.72)†
Diseases of the nervous system and sense organs‡	139.0 (6.08)	38.8 (1.12)	478.0 (16.00)	45.5 (0.77)†
Diseases of the circulatory system	318.1 (11.20)	88.7 (0.71)	823.5 (23.93)	78.3 (0.61)†
Essential hypertension	228.9 (8.77)	63.9 (1.11)	553.0 (17.22)	52.6 (0.71)†
Heart disease	184.9 (7.30)	51.6 (1.06)	456.4 (14.72)	43.4 (0.68)†
Cerebrovascular disease	95.4 (4.75)	26.6 (0.94)	244.2 (8.87)	23.2 (0.56)†
Diseases of the respiratory system	82.5 (4.25)	23.0 (0.88)	238.5 (8.75)	22.7 (0.54)
Diseases of the digestive system	129.0 (5.99)	36.0 (1.13)	389.8 (13.41)	37.1 (0.75)
Diseases of the genitourinary system	91.9 (4.80)	25.6 (0.98)	191.0 (7.75)	18.2 (0.52)†
Diseases of the musculoskeletal system and connective tissue§	141.2 (6.21)	39.4 (1.12)	516.0 (17.11)	49.1 (0.80)†
Number of chronic conditions‖				
None	1.5 (0.41)	0.4 (0.11)	12.7 (3.50)	1.2 (0.33)†
One	26.4 (2.26)	7.4 (0.58)	70.7 (4.62)	6.7 (0.39)
Two	84.4 (4.41)	23.5 (0.98)	208.3 (8.25)	19.8 (0.57)†
Three	100.4 (5.07)	28.0 (1.00)	307.3 (10.78)	29.2 (0.62)
Four or more	145.9 (6.60)	40.7 (1.22)	452.1 (15.84)	43.1 (0.87)

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. SE, standard error.

* Includes senile dementia, mental retardation, and others.

† Significantly different from diabetic nursing home residents at the p≤0.05 level.

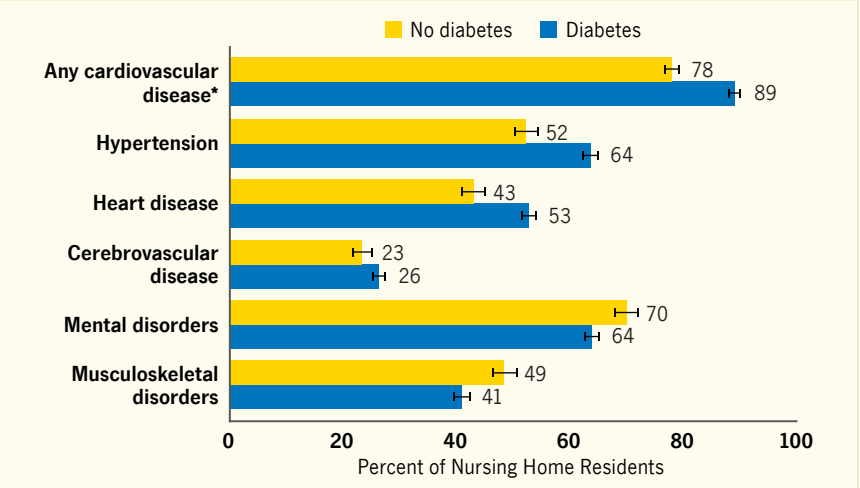
‡ Includes Alzheimer's disease, Parkinson's disease, multiple sclerosis, and others.

§ Includes osteoarthritis, osteoporosis, and others.

‖ Count excludes diabetes and does not include the separate components of diseases of the circulatory system (essential hypertension, heart disease, or cerebrovascular disease).

SOURCE: National Nursing Home Survey 2004

FIGURE 40.58. Age- and Sex-Standardized Prevalence of Selected Chronic Medical Conditions Among Nursing Home Residents Age ≥55 Years, by Diabetes Status, U.S., 2004



Diabetes is defined as ICD-9-CM codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. Other conditions were ascertained by ICD-9-CM codes: mental disorders (290–319); essential hypertension (401); heart disease (391–392.0, 393–398, 402, 404, 410–416, or 420–429); cerebrovascular disease (430–438); and diseases of the musculoskeletal system and connective tissue (710–739). Data are standardized to the overall National Nursing Home Survey population using age groups 55–64, 65–74, and ≥75 years. Error bars represent 95% confidence intervals. ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification.

* Any cardiovascular disease includes hypertension, heart disease, and cerebrovascular disease, as well as other ICD-9 codes.

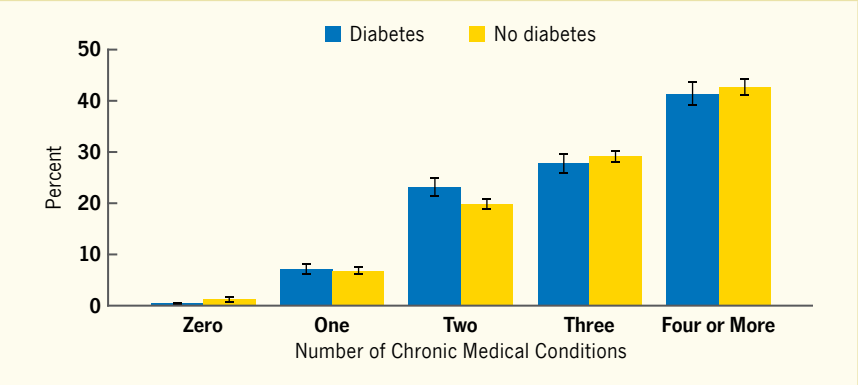
SOURCE: National Nursing Home Survey 2004

Limitations in Activities of Daily Living in Nursing Home Residents

Approximately 6% of nursing home residents with diabetes required only limited assistance with bathing, dressing, toileting, or transferring (moving from bed to a chair or back again), while 23% required limited assistance with eating and 49% require limited assistance with walking (Table 40.34). Fifty-eight percent of nursing home residents with diabetes were unable or required extensive assistance to dress themselves, 55% were unable or required extensive assistance to bathe themselves, and 19% were unable or required extensive assistance to eat by themselves; in addition, about 47% of nursing home residents with diabetes were unable or required extensive assistance to perform one or more of transferring, toileting, or walking (Figure 40.60). Forty-seven percent of nursing home residents with diabetes were unable to bathe themselves, 38% were unable to dress themselves, approximately 30% were unable to toilet or transfer by themselves, 9% were unable to eat by themselves, and 18% were unable to walk by themselves (Table 40.34). The frequencies of limitations in activities of daily living in nursing home residents were similar in every category for persons with and without diabetes.

Nursing home residents with diabetes were less likely to have difficulty controlling urine compared to nursing home residents without diabetes, but urinary incontinence was prevalent in both groups (approximately 50%). Fecal incontinence was only slightly less common than urinary incontinence (about 42%) and was similar for residents with and without diabetes.

FIGURE 40.59. Age- and Sex-Standardized Number of Chronic Medical Conditions (Excluding Diabetes) Among Nursing Home Residents Age ≥55 Years, by Diabetes Status, U.S., 2004



Data are standardized to the overall National Nursing Home Survey population using age groups 55–64, 65–74, and ≥75 years. Error bars represent 95% confidence intervals.

SOURCE: National Nursing Home Survey 2004

TABLE 40.34. Frequency of Limitations in Activities of Daily Living Among Nursing Home Residents Age ≥55 Years, by Diabetes Status, U.S., 2004

LIMITATIONS IN ACTIVITIES OF DAILY LIVING	DIABETES		NO DIABETES	
	Number in Thousands (SE)	Percent (SE)	Number in Thousands (SE)	Percent (SE)
Limited assistance needed in specific activities of daily living				
Bathing	18.5 (1.80)	5.2 (0.49)	52.7 (3.46)	5.1 (0.33)
Dressing	20.8 (1.72)	5.9 (0.48)	67.5 (3.40)	6.5 (0.32)
Toileting	19.0 (1.68)	5.4 (0.47)	56.8 (3.16)	5.5 (0.30)
Transferring	24.5 (1.88)	7.0 (0.53)	71.8 (3.59)	6.9 (0.34)
Eating	80.1 (4.00)	22.6 (1.02)	243.8 (7.61)	23.5 (0.67)
Walking*	82.1 (3.64)	49.3 (1.59)	265.8 (7.07)	50.3 (1.02)
Requires extensive assistance				
Bathing	29.4 (2.21)	8.3 (0.60)	86.9 (4.19)	8.4 (0.40)
Dressing	71.5 (3.22)	20.2 (0.85)	223.4 (6.20)	21.5 (0.57)
Toileting	57.5 (2.98)	16.3 (0.79)	184.1 (6.03)	17.8 (0.54)
Transferring	69.7 (3.29)	19.8 (0.84)	210.1 (5.97)	20.3 (0.51)
Eating	34.2 (2.50)	9.6 (0.67)	114.7 (4.66)	11.0 (0.43)
Walking*	48.2 (2.70)	29.0 (1.40)	151.4 (5.23)	28.7 (0.86)
Unable to perform activity				
Bathing	165.7 (5.36)	46.8 (1.17)	474.6 (9.91)	45.8 (0.78)
Dressing	134.7 (5.22)	38.0 (1.14)	371.3 (9.23)	35.8 (0.75)
Toileting	107.0 (4.40)	30.3 (1.07)	303.1 (8.63)	29.3 (0.74)
Transferring	101.2 (4.46)	28.8 (1.09)	311.9 (8.37)	30.2 (0.72)
Eating	32.6 (2.32)	9.2 (0.62)	96.6 (4.06)	9.3 (0.37)
Walking*	29.4 (2.28)	17.7 (1.22)	88.9 (4.22)	16.8 (0.72)
Difficulty controlling urine	174.4 (5.47)	49.1 (1.06)	549.7 (9.88)	52.9 (0.72)†
Difficulty controlling bowel movements	149.6 (5.33)	42.1 (1.07)	434.9 (9.30)	41.8 (0.77)

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. SE, standard error.

* Walking includes in room or in corridor.

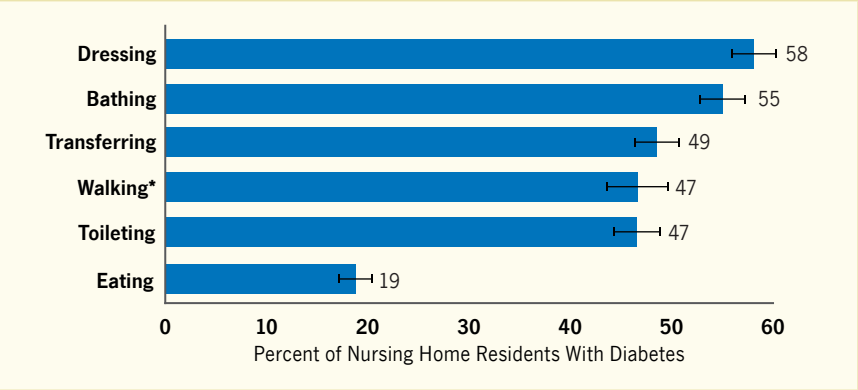
† Significantly different from diabetic persons at the p≤0.05 level.

SOURCE: National Nursing Home Survey 2004

Time Since Admission

The mean and median number of days since admission for people with diabetes were 754 days and 424 days compared to 853 days and 486 days for people without diabetes, respectively. The shorter mean and median length of stays for people with diabetes are likely due to the higher competing risk of death for people with diabetes. About half of residents were institutionalized for at least the entire year before the interview (Table 40.35). Forty-eight percent of people age 55–64 years with diabetes were residents ≥1 year but were less likely to be institutionalized ≥1 year than residents without diabetes. The proportion increased for each age group, so that 62.5% of people age ≥85 years with diabetes were residents ≥1 year. Because all individuals were, by definition, current nursing home residents, time from admission does not reflect average length of stay.

FIGURE 40.60. Prevalence of Limitations in Activities of Daily Living Among Nursing Home Residents With Diabetes Age ≥55 Years, U.S., 2004



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. Prevalence of limitations is defined as the percent of nursing home residents age ≥55 years who require extensive assistance with the activity or are unable to perform the activity. Error bars represent 95% confidence intervals.

* Walking includes in room or in corridor.

SOURCE: National Nursing Home Survey 2004

TABLE 40.35. Time Since Admission Among Nursing Home Residents Age ≥55 Years, by Diabetes Status and Age, U.S., 2004

	DIABETES		NO DIABETES	
TIME SINCE ADMISSION BY AGE (YEARS)	Number in Thousands (SE)	Percent (SE)	Number in Thousands (SE)	Percent (SE)
55–64				
≤3 months	9.4 (1.26)	27.4 (3.15)	13.6 (1.39)	23.3 (2.10)
3 months to 1 year	8.3 (1.07)	24.2 (2.74)	10.8 (1.32)	18.5 (1.98)
≥1 year	16.6 (1.66)	48.4 (3.28)	33.8 (2.38)	58.2 (2.40)*
65–74				
≤3 months	15.4 (1.65)	24.5 (2.26)	25.0 (1.97)	22.5 (1.59)
3 months to 1 year	16.4 (1.60)	26.0 (2.14)	26.6 (1.93)	24.0 (1.48)
≥1 year	31.1 (2.23)	49.5 (2.46)	59.4 (3.03)	53.5 (1.90)
75–84				
≤3 months	33.0 (2.28)	23.9 (1.39)	74.9 (3.47)	22.7 (0.94)
3 months to 1 year	35.5 (2.47)	25.7 (1.52)	84.4 (3.70)	25.5 (0.98)
≥1 year	69.5 (3.35)	50.4 (1.70)	171.2 (5.05)	51.8 (1.12)
≥85				
≤3 months	21.5 (1.78)	17.5 (1.32)	88.4 (3.96)	16.0 (0.66)
3 months to 1 year	24.6 (1.89)	20.0 (1.39)	128.2 (4.68)	23.3 (0.71)*
≥1 year	77.1 (3.64)	62.5 (1.76)	334.6 (8.08)	60.7 (0.86)

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. SE, standard error.

* Significantly different from diabetic nursing home residents at the p≤0.05 level.

SOURCE: National Nursing Home Survey 2004

Sources of Payment and Expenditures

Table 40.36 shows the sources of payment for the first month of nursing home care and the month of care immediately before the interview for residents with and without diabetes. For both the first and most recent months of care, residents with diabetes were less likely than those without diabetes to have private sources of payment. For the first month of care for residents with and without diabetes, the most frequent non-private source of payment was Medicare. For the most recent month of care, the most frequent non-private source of payment was Medicaid.

Table 40.37 shows the distribution of annual expenditures for nursing home care paid by an individual or family by diabetes status. Self or family payment was shifted toward no payment or smaller amounts of payment for people with diabetes compared with those without diabetes. Figure 40.61 shows the mean annual expenditures for nursing home care by self/family or by other sources by diabetes status. Total expenditures were similar for residents with diabetes ($43,175) and without diabetes ($42,927). However, the proportion of expenditures paid by self/family was less for residents with diabetes (20%) compared to residents without diabetes (28%), and the absolute annual cost burden to self/family was less for diabetic residents ($8,647) than for nondiabetic residents ($12,091).

TABLE 40.36. Sources of Payment Among Nursing Home Residents Age ≥55 Years, by Diabetes Status, U.S., 2004

	DIABETES		NO DIABETES	
SOURCE OF PAYMENT*	Number in Thousands (SE)	Percent (SE)	Number in Thousands (SE)	Percent (SE)
For first month of care				
Private sources†	137.9 (5.15)	40.1 (1.26)	468.0 (11.95)	46.8 (0.97)
Medicare	145.4 (5.60)	42.3 (1.22)	384.9 (10.58)	38.5 (0.91)
Medicaid	129.2 (5.11)	37.6 (1.27)	341.6 (10.29)	34.1 (0.95)
Other‡	13.8 (2.20)	4.0 (0.63)	28.8 (3.29)	2.9 (0.33)
For past month of care				
Private sources†	226.3 (6.33)	65.4 (1.17)	725.0 (13.46)	71.9 (0.90)
Medicare	51.4 (3.35)	14.8 (0.92)	132.7 (6.42)	13.2 (0.62)
Medicaid	228.2 (6.74)	65.9 (1.23)	602.6 (11.75)	59.7 (0.90)
Other‡	15.1 (2.43)	4.3 (0.68)	39.8 (4.45)	3.9 (0.44)

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. SE, standard error.
* Residents may have used multiple sources of payment.
† Private sources include private health insurance and self or other family members' out-of-pocket payments.
‡ Other includes Lifecare, Welfare, Department of Veterans Affairs, and other.

SOURCE: National Nursing Home Survey 2004

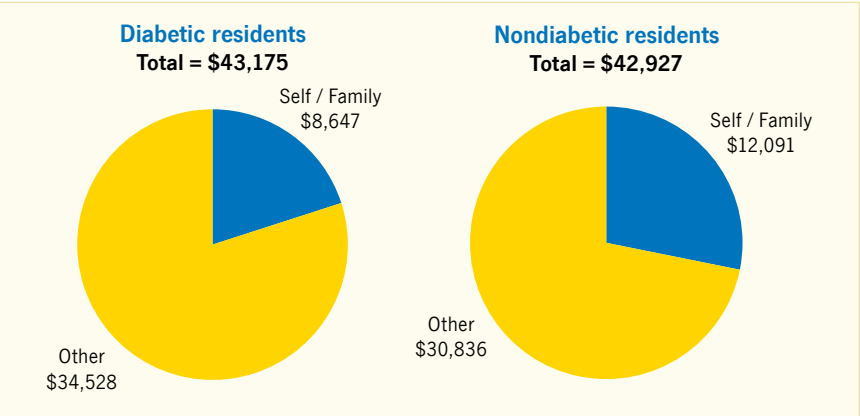
TABLE 40.37. Annual Expenditures for Nursing Home Care Paid by Individuals or Families Among Residents Age ≥55 Years, by Diabetes Status, U.S., 2004

	DIABETES		NO DIABETES	
EXPENDITURES*	Number in Thousands (SE)	Percent (SE)	Number in Thousands (SE)	Percent (SE)
None	95.7 (4.70)	30.3 (1.25)	216.5 (8.60)	23.3 (0.89)
$1–$5,000	89.8 (4.01)	28.4 (1.06)	237.7 (6.82)	25.5 (0.66)
$5,001–$10,000	59.5 (3.30)	18.8 (0.94)	171.0 (5.57)	18.4 (0.53)
$10,001–$20,000	26.8 (2.08)	8.5 (0.63)	98.6 (4.46)	10.6 (0.45)
>$20,000	44.1 (2.81)	14.0 (0.86)	206.4 (7.97)	22.2 (0.77)

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. SE, standard error.
* Annual payment is calculated as ((first month + current month) / 2)*12.

SOURCE: National Nursing Home Survey 2004

FIGURE 40.61. Distribution of Annual Expenditures for Nursing Home Care Among Residents Age ≥55 Years, by Diabetes Status and Source of Payment, U.S., 2004



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. Annual payment is calculated as ((first month payment + current month payment) / 2) *12).

SOURCE: National Nursing Home Survey 2004

HOME HEALTH CARE

Home Health Care Environment

Home health care agencies provide health care in a home setting. Home health care can vary from rehabilitation care after surgery for an otherwise healthy person to end-of-life care for a terminally ill person. Home health care agencies provide long-term care for an increasing number of people. For many, home health care provides an attractive alternative to nursing home admission.

In 2007, there were 14,500 licensed home health and hospice care agencies in the United States, with most (75%) providing only home health care (17); approximately 15% provided only hospice care; and 10% provided both home health and hospice care. There were an average of 109 current home health care patients for agencies providing only home health care and an average of 178 current home health care patients for agencies providing both home health and hospice services. More than three-quarters (76%) of agencies providing home health care only and 58% of agencies providing both home health care and hospice services were in metropolitan counties. Seventy-six percent of agencies that provided home health care only were owned by for-profit organizations. Only 26% of agencies providing both home health care and hospice services were proprietary. The majority of home health care agencies provided skilled nursing services (95%), physical therapy (79%), and assistance with activities of daily living (83%). Other services commonly provided included speech therapy, occupational therapy, medical social services, and homemaker services.

Characteristics of Home Health Care Patients

According to the NHHCS, 456,395 people with diabetes age ≥18 years received home health care in 2007. Nearly one-third of all home health care recipients had diabetes. Table 40.38 shows the number and prevalence of diabetes in home health care recipients by age and sex. The prevalence of diabetes increased with age, reaching its highest prevalence (45%) in home health care recipients age 65–74 years. Thereafter, the prevalence of diabetes decreased in home health care recipients. The prevalence of diabetes was similar among men (35%) and women (32%) receiving home health care in all age groups (Figure 40.62).

According to the MEPS, the yearly average number of people with diabetes age ≥18 years receiving home health care between 2008 and 2012 was over 2 million, and 30% of all home health care recipients had diabetes. Table 40.39 shows the number of people with diabetes and prevalence of diabetes in home health care recipients by age and sex. The data from the MEPS are similar to the NHHCS data. Most people with diabetes receiving home health care receive care provided by someone who works for an agency (78%), by an informal/unpaid home health care provider (15%), or a non-agency home health care worker paid directly by the client (7%) (Table 40.40). The NHHCS and the MEPS show a similar

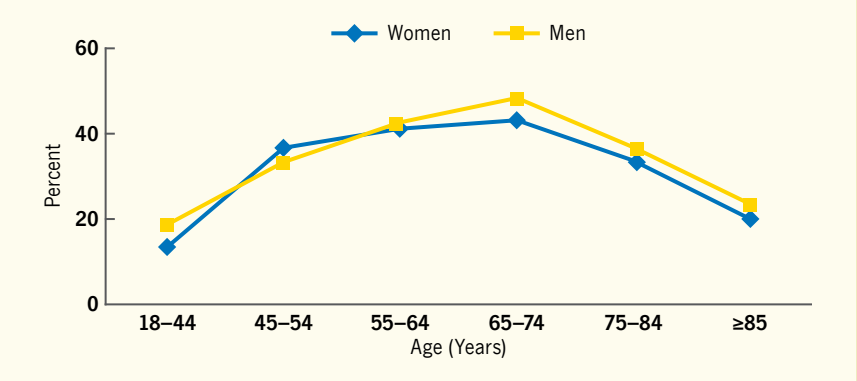
TABLE 40.38. Prevalence of Diabetes Among Current Home Health Care Recipients Age ≥18 Years, by Age and Sex, U.S., 2007

SEX, AGE (YEARS)	NUMBER	PERCENT (STANDARD ERROR)
All persons	456,395	32.8 (1.47)
18–44	18,998	16.1 (3.44)
45–54	40,765	35.4 (3.98)
55–64	65,282	41.9 (4.03)
65–74	117,358	45.0 (3.01)
75–84	147,218	34.7 (2.39)
≥85	66,774	21.0 (2.03)
Women	285,777	31.7 (1.75)
18–44	7,697	13.4 (3.99)
45–54	25,832	36.7 (5.82)
55–64	36,371	41.2 (5.41)
65–74	73,676	43.1 (3.45)
75–84	96,159	33.7 (3.03)
≥85	46,042	20.1 (2.36)
Men	170,618	34.8 (2.11)
18–44	11,301	18.7 (5.62)
45–54	14.933	33.3 (5.58)
55–64	28,911	42.7 (5.05)
65–74	43,682	48.4 (4.82)
75–84	51,059	36.8 (3.29)
≥85	20,732	23.5 (3.99)

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, and 775.1.

SOURCE: National Home and Hospice Care Survey 2007

FIGURE 40.62. Prevalence of Diabetes Among Adults Age ≥18 Years Receiving Home Health Care, by Age and Sex, U.S., 2007



Diabetes includes the following International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes: 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1.

SOURCE: National Home and Hospice Care Survey 2007

prevalence of diabetes among men and women receiving home health care in each age group (Figures 40.62 and 40.63).

TABLE 40.39. Prevalence of Diabetes Among Current Home Health Care Recipients Age ≥18 Years, by Age and Sex, U.S., 2008–2012

SEX, AGE (YEARS)	NUMBER	PERCENT (STANDARD ERROR)
All persons	2,081,507	30.0 (0.94)
18–44	67,373	9.4 (1.73)
45–54	207,070	27.9 (3.25)
55–64	415,280	39.4 (3.01)
65–74	564,481	41.3 (2.83)
75–84	536,864	34.6 (2.05)
≥85	290,440	19.2 (2.15)
Women	1,297,901	30.0 (1.28)
18–44	45,446	10.5 (2.42)
45–54	98,092	23.8 (4.52)
55–64	256,083	41.0 (3.88)
65–74	368,168	45.7 (3.43)
75–84	344,052	33.0 (2.93)
≥85	186,060	18.4 (2.38)
Men	783,605	30.1 (1.70)
18–44	21,927	7.9 (2.34)
45–54	108,978	33.0 (4.57)
55–64	159,196	37.0 (4.72)
65–74	196,312	34.9 (3.91)
75–84	192,811	38.1 (3.98)
≥85	104,380	20.9 (3.90)

Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46.

SOURCE: Medical Expenditure Panel Surveys 2008–2012

TABLE 40.40. Prevalence of Diabetes Among Current Home Health Care Recipients Age ≥18 Years, by Type of Home Health Care Provider, Age, and Sex, U.S., 2008–2012

TYPE OF PROVIDER, SEX, AGE (YEARS)	NUMBER	PERCENT (STANDARD ERROR)
Agency*		
All persons	1,781,296	31.6 (1.04)
18–44	52,579	10.6 (2.04)
45–54	179,528	32.8 (3.84)
55–64	361,771	41.3 (3.56)
65–74	495,748	41.7 (3.11)
75–84	465,410	35.7 (2.33)
≥85	226,260	18.4 (2.31)
Women	1,075,681	31.2 (1.36)
18–44	32,995	11.3 (2.79)
45–54	87,630	29.5 (5.47)
55–64	218,086	43.4 (4.58)
65–74	317,904	46.3 (3.79)
75–84	285,083	33.5 (3.42)
≥85	133,982	16.4 (2.36)
Men	705,615	32.2 (1.89)
18–44	19,584	9.7 (3.00)[1]
45–54	91,897	36.8 (5.41)
55–64	143,685	38.4 (5.17)
65–74	177,844	35.4 (4.43)
75–84	180,327	40.0 (4.48)
≥85	92,278	22.3 (4.50)
Informal†		
All persons	339,871	27.7 (2.25)
18–44	15,239	9.2 (4.35)[2]
45–54	39,766	20.4 (5.38)
55–64	78,186	36.9 (5.49)
65–74	84,817	48.2 (6.31)
75–84	65,598	28.4 (4.80)
≥85	56,265	22.8 (4.83)

Table 40.40 continues on the next page.

TABLE 40.40. (continued)

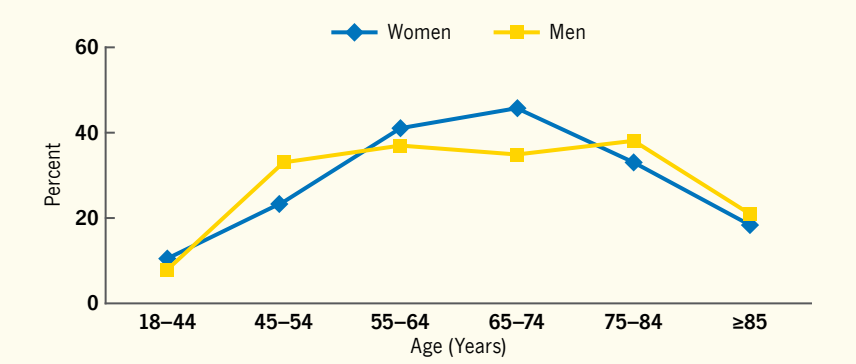
TYPE OF PROVIDER, SEX, AGE (YEARS)	NUMBER	PERCENT (STANDARD ERROR)
Women	232,189	27.7 (2.78)
18–44	[3]	[3]
45–54	16,825	13.2 (6.45)[2]
55–64	51,425	35.6 (6.55)
65–74	56,622	46.4 (7.21)
75–84	49,105	29.7 (5.80)
≥85	45,316	25.6 (6.04)
Men	107,683	27.9 (4.19)
18–44	[3]	[3]
45–54	22,940	33.8 (10.09)
55–64	26,762	39.7 (12.43)[1]
65–74	28,195	52.3 (11.71)
75–84	16,493	25.3 (7.58)
≥85	10,948	15.7 (5.76)[1]
Non-Agency‡		
All persons	153,097	21.2 (3.05)
18–44	[3]	[3]
45–54	[3]	[3]
55–64	26,350	37.7 (12.90)[1]
65–74	32,681	32.2 (7.65)
75–84	43,853	26.0 (6.04)
≥85	36,390	15.8 (4.54)
Women	110,659	22.5 (3.96)
18–44	[3]	[3]
45–54	[3]	[3]
55–64	9,812	21.1 (9.44)[2]
65–74	25,684	41.0 (10.10)
75–84	37,766	30.0 (7.28)
≥85	26,491	15.6 (6.21)[1]
Men	42,438	18.4 (5.71)[1]
18–44	[3]	[3]
45–54	[3]	[3]
55–64	16,538	70.7 (18.84)
65–74	[3]	[3]
75–84	[3]	[3]
≥85	[3]	[3]

Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46.

* Home health care provider works for an agency.
† Home health care provider provides informal unpaid care.
‡ Home health care provider is paid directly, independent of an agency.
[1] Relative standard error >30%–40%
[2] Relative standard error >40%–50%
[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: Medical Expenditure Panel Surveys 2008–2012

FIGURE 40.63. Prevalence of Diabetes Among Adults Age ≥18 Years Receiving Home Health Care, by Age and Sex, U.S., 2008–2012



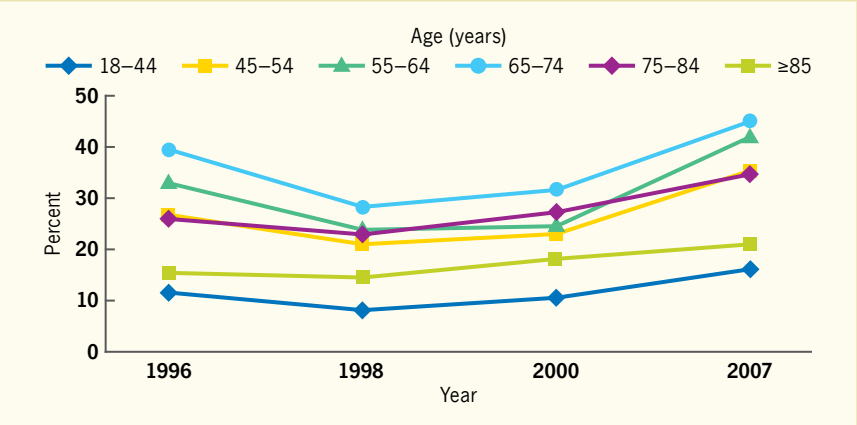
Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46.

SOURCE: Medical Expenditure Panel Surveys 2008–2012

Figure 40.64 shows the time trend in the percentage of home health care recipients who had diabetes by age. The prevalence of diabetes among home health care recipients has varied year-to-year but has generally increased over time for all age groups.

Table 40.41 shows the demographic characteristics of home health care recipients with and without diabetes and the general population with and without diabetes. Home health care recipients with diabetes were more likely to be age 55–84 years and nonwhite than home health care recipients without diabetes. The proportion of home health care recipients with and without diabetes who were married or widowed did not differ by diabetes status, but home health care recipients with diabetes were more likely to be divorced or separated, and a smaller proportion tended never to have married compared to people without diabetes. Home health recipients with diabetes were more likely to be women and to be unmarried compared to people with diabetes in the general population. Many of these differences are likely due to the considerably older age of people with diabetes receiving home health care compared to people with diabetes in the general population.

FIGURE 40.64. Trends in the Prevalence of Diabetes Among Patients Age ≥18 Years Receiving Home Health Care, by Age, U.S., 1996–2007



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1.

SOURCE: National Home and Hospice Care Surveys 1996, 1998, 2000, 2007

TABLE 40.41. Demographic Characteristics Among Home Health Care Recipients Age ≥18 Years and the General Population Age ≥18 Years, by Diabetes Status, U.S., 2007

	PERCENT (STANDARD ERROR)			
	Home Health Care Recipients*		General Population†	
CHARACTERISTICS	Diabetes	No Diabetes	Diabetes	No Diabetes
Age (years)				
18–44	4.2 (0.94)	10.6 (1.33)	14.1 (1.01)	52.7 (0.47)
45–54	8.9 (1.52)	8.0 (0.86)	20.6 (1.21)	19.4 (0.31)
55–64	14.3 (1.52)	9.7 (0.97)	26.3 (1.26)	13.6 (0.29)
65–74	25.7 (1.84)	15.4 (1.21)	22.2 (1.05)	7.5 (0.22)
75–84	32.3 (2.09)	29.6 (1.35)	13.7 (0.90)	5.1 (0.19)
≥85	14.6 (1.46)	26.7 (1.48)	3.1 (0.44)	1.7 (0.09)
Sex				
Women	62.6 (2.25)	65.9 (1.62)	51.4 (1.37)	51.8 (0.45)
Men	37.4 (2.25)	34.1 (1.62)	48.6 (1.37)	48.2 (0.45)
Race/ethnicity				
Non-Hispanic white	63.7 (3.13)	80.0 (1.92)	63.0 (1.45)	69.9 (0.53)
Non-Hispanic black	21.4 (2.83)	11.5 (1.57)	15.6 (0.97)	11.3 (0.35)
Non-Hispanic other	2.3 (0.76)	2.5 (0.58)	7.1 (0.93)	5.5 (0.23)
Hispanic	12.6 (2.05)	6.0 (0.96)	13.4 (0.91)	13.4 (0.39)
Hispanic origin				
Yes	12.6 (2.05)	6.0 (0.96)	13.4 (0.91)	13.4 (0.39)
No	87.4 (2.05)	94.0 (0.96)	86.6 (0.91)	86.6 (0.39)
Marital status				
Married	40.8 (2.44)	37.5 (2.07)	61.7 (1.33)	59.6 (0.55)
Widowed	33.4 (2.12)	36.7 (2.19)	13.9 (0.81)	6.2 (0.19)
Divorced or separated	14.8 (1.64)	8.2 (0.82)	14.7 (0.76)	11.3 (0.23)
Never married	11.0 (1.66)	17.6 (1.87)	9.8 (0.96)	23.0 (0.54)

* Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, and 775.1.

† Data are based on self-report.

SOURCE: National Home and Hospice Care Survey 2007 and National Health Interview Survey 2007

Living Arrangements of Home Health Care Recipients

Table 40.42 shows the living arrangements of home health care recipients before they received home health care and while they were receiving home health care, by diabetes status. People with and without diabetes did not differ according to their types of living arrangements before they received home health care. The majority of home health care recipients with diabetes (75%) and without diabetes (75%) were admitted to an emergency room or hospital before they received home health care. Other recipients lived in nursing homes or rehabilitation facilities before receiving home health care. While receiving home health care, most recipients lived in a private residence (93% of recipients with diabetes and 90% without diabetes).

TABLE 40.42. Living Arrangements Among Home Health Care Recipients Age ≥18 Years, by Diabetes Status, U.S., 2007

	DIABETES		NO DIABETES	
	Number	Percent (SE)	Number	Percent (SE)
Living arrangements before receiving home health care				
Emergency Room/Hospital	184,381	74.8 (3.26)	359,660	75.4 (2.03)
Nursing home	31,795	12.9 (2.07)	54,846	11.5 (1.52)
Rehabilitation facility	24,532	9.9 (2.19)	52,331	11.0 (1.79)
Assisted living	4,072	[3]	9,432	2.0 (0.65)[1]
Other	1,718	[3]	663	[3]
Living arrangements while receiving home health care				
Private residence	421,889	93.0 (1.25)	884,384	90.4 (1.20)
Residential care facility	28,919	6.4 (1.23)	88,226	9.4 (1.20)
Other	2,834	[3]	2,104	0.2 (0.08)[2]

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, and 775.1. No significant differences between persons with and without diabetes at the p≤0.05 level. SE, standard error.

[1] Relative standard error >30%–40%

[2] Relative standard error >40%–50%

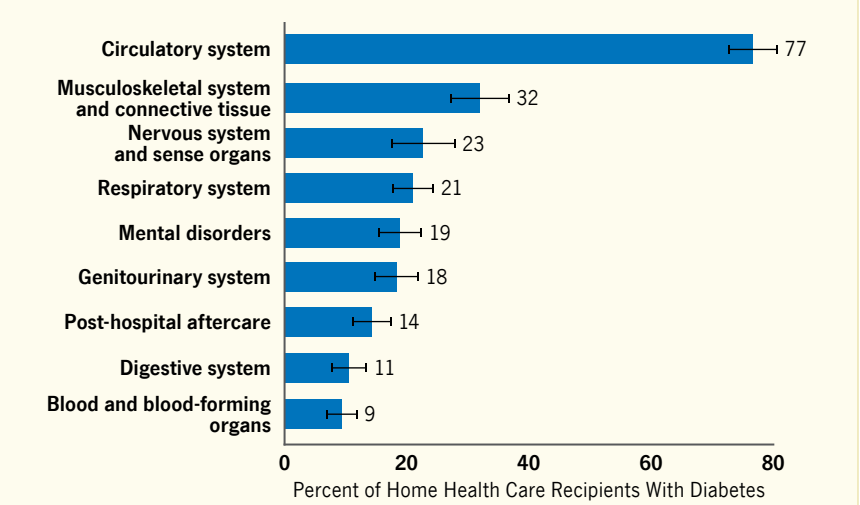
[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Home and Hospice Care Survey 2007

Medical Conditions of Home Health Care Recipients

Figure 40.65 and Table 40.43 show the prevalence of selected chronic medical conditions in home health care recipients at the time of admission or interview. Diseases of the circulatory system were the most common chronic condition in recipients with and without diabetes but were more common in home health care recipients with diabetes (77% vs. 61%). Home health care recipients with diabetes were more likely to also have diseases of the respiratory system than home health care recipients without diabetes (21% vs. 17%). Home health care recipients with diabetes were less likely to be receiving post-hospital aftercare. This difference is likely due to otherwise healthy home health care recipients without diabetes needing care for rehabilitation or recovery after surgery, whereas home health care recipients with diabetes are more likely to use home health care as an alternative to nursing home or hospital admission. Home health care recipients with diabetes had similar numbers of chronic conditions (excluding diabetes) as home health care recipients without diabetes (Figure 40.66, Table 40.43).

FIGURE 40.65. Prevalence of Selected Chronic Medical Conditions Among Home Health Care Recipients With Diabetes Age ≥18 Years, U.S., 2007



Diabetes is defined as ICD-9-CM codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. ICD-9-CM codes for other conditions are: diseases of the blood and blood-forming organs (280–289); mental disorders (290–319); diseases of the nervous system and sense organs (320–389); diseases of the circulatory system (390–459); diseases of the respiratory system (460–519); diseases of the digestive system (520–579); diseases of the genitourinary system (580–629); diseases of the musculoskeletal system and connective tissue (710–739); and post-hospital aftercare (V42–V46, V52, V53.3–V53.7, or V54–V58). Error bars represent 95% confidence intervals. ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification.

SOURCE: National Home and Hospice Care Survey 2007

TABLE 40.43. Number of Selected Chronic Medical Conditions Among Home Health Care Recipients Age ≥18 Years at Admission or Interview, by Diabetes Status, U.S., 2007

CHRONIC MEDICAL CONDITIONS	NUMBER (PERCENT)	
	Diabetes	No Diabetes
Individual conditions		
Diseases of the blood and blood-forming organs	43,043 (9.4)	89,238 (9.5)
Mental disorders*	86,165 (18.9)	189,592 (20.3)
Diseases of the nervous system and sense organs†	103,375 (22.7)	226,188 (24.2)
Diseases of the circulatory system	350,211 (76.7)	570,704 (61.0)‡
Diseases of the respiratory system	95,978 (21.0)	156,622 (16.7)‡
Diseases of the digestive system	48,452 (10.6)	109,519 (11.7)
Diseases of the genitourinary system	83,951 (18.4)	135,507 (14.5)
Diseases of the musculoskeletal system and connective tissue§	145,964 (32.0)	344,183 (36.8)
Post-hospital aftercare	65,197 (14.3)	237,900 (25.4)‡
Number of chronic conditions‖		
None	17,935 (3.9)	53,002 (5.7)
One	108,256 (23.7)	221,539 (23.7)
Two	162,093 (35.5)	320,065 (34.2)
Three	102,154 (22.4)	219,814 (23.5)
Four or more	65,957 (14.5)	121,911 (13.0)

Diabetes is defined as ICD-9-CM codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. ICD-9-CM codes for other conditions are: diseases of the blood and blood-forming organs (280–289); mental disorders (290–319); diseases of the nervous system and sense organs (320–389); diseases of the circulatory system (390–459); diseases of the respiratory system (460–519); diseases of the digestive system (520–579); diseases of the genitourinary system (580–629); diseases of the musculoskeletal system and connective tissue (710–739); and post-hospital aftercare (V42–V46, V52, V53.3–V53.7, or V54–V58).

* Includes senile dementia, mental retardation, and others.

† Includes Alzheimer's disease, Parkinson's disease, multiple sclerosis, and others.

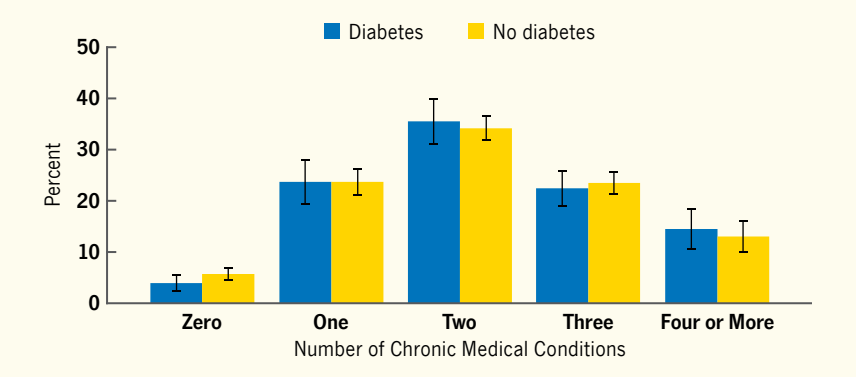
‡ Significantly different from diabetic home health care patients at the p<0.05 level.

§ Includes osteoarthritis, osteoporosis, and others.

‖ Excludes diabetes.

SOURCE: National Home and Hospice Care Survey 2007

FIGURE 40.66. Number of Chronic Medical Conditions (Excluding Diabetes) Among Home Health Care Recipients Age ≥18 Years, by Diabetes Status, U.S., 2007



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. Error bars represent 95% confidence intervals.

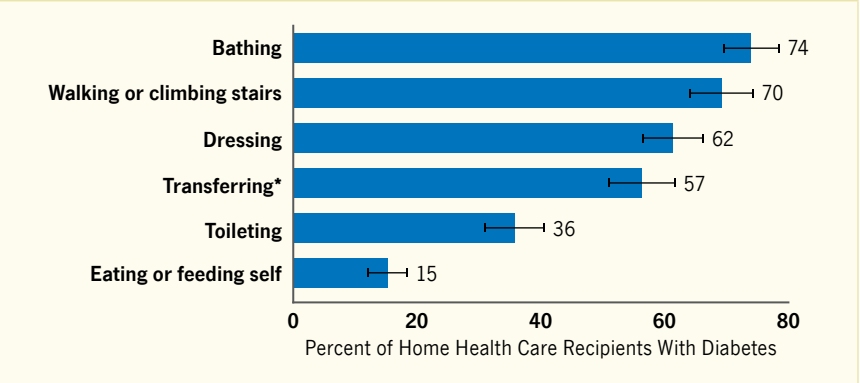
SOURCE: National Home and Hospice Care Survey 2007

Limitations in Activities of Daily Living

With the exception of toileting, home health care recipients with and without diabetes had similar needs for assistance with activities of daily living (Figure 40.67, Table 40.44). Home health care recipients with diabetes were less likely to need assistance toileting (36%) than those without diabetes (44%). Almost three-quarters of home health care recipients with diabetes (74%) needed assistance bathing, and 70% required help walking or climbing stairs. In addition, 66% of home health care recipients with diabetes who needed help walking also needed help with at least one other activity of daily living. Sixty-two percent required assistance dressing themselves, and 57% required assistance transferring out of a bed or chair. Few home health care recipients with diabetes required assistance with eating (15%). Among home health care recipients who needed any assistance in activities of daily living, home health agencies provided assistance on average 45% of the time (average percentage of all specific activities listed). This was true for persons with and without diabetes.

Approximately 43% of home health care recipients with and without diabetes had difficulties with urinary incontinence. Eleven percent of home health care recipients with diabetes and 19% of home health care recipients without diabetes had problems with fecal incontinence.

FIGURE 40.67. Prevalence of Limitations in Activities of Daily Living Among Home Health Care Recipients With Diabetes Age ≥18 Years, U.S., 2007



Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. Error bars represent 95% confidence intervals.
* Transferring includes getting out of bed or chairs.

SOURCE: National Home and Hospice Care Survey 2007

TABLE 40.44. Frequency of Limitations in Activities of Daily Living Among Home Health Care Recipients Age ≥18 Years, by Diabetes Status, U.S., 2007

	DIABETES		NO DIABETES	
	Number	Percent (SE)	Number	Percent (SE)
Assistance needed in specific activities of daily living				
Bathing	334,098	74.4 (2.34)	699,569	75.7 (1.66)
Dressing	277,490	61.7 (2.56)	593,309	64.2 (1.96)
Toileting	161,338	36.0 (2.50)	409,125	44.2 (2.27)*
Transferring out of bed or chairs	250,850	56.7 (2.77)	532,173	58.8 (2.34)
Eating or feeding self	68,073	15.3 (1.68)	168,896	18.5 (1.85)
Walking or climbing stairs	286,728	69.6 (2.68)	540,285	67.3 (2.30)
Walking and at least one other ADL	271,663	65.9 (2.95)	514,216	64.1 (2.29)
Home health care agency provides assistance†				
Bathing	139,197	41.7 (3.49)	314,097	45.1 (3.31)
Dressing	119,065	42.9 (3.85)	270,659	45.7 (3.43)
Toileting	66,611	41.3 (4.57)	189,182	46.3 (3.57)
Transferring	113,930	45.6 (4.36)	257,960	48.6 (3.35)
Eating or feeding self	22,822	33.5 (6.20)	79,268	46.9 (5.56)
Walking or climbing stairs	135,429	47.4 (4.37)	259,677	48.2 (3.14)
Walking and at least one other ADL	111,184	42.4 (4.31)	226,566	44.8 (3.18)
Difficulty controlling urine	181,758	43.6 (2.98)	358,024	43.2 (2.70)
Difficulty controlling bowel movements	49,972	11.3 (1.42)	170,791	18.9 (1.53)*

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. ADL, activities of daily living; SE, standard error.
* Significantly different from persons with diabetes at the p≤0.05 level
† Among home health care patients who need any assistance in ADLs from another person.

SOURCE: National Home and Hospice Care Survey 2007

Length of Time With Home Health Care

People with diabetes receiving home health care had been receiving it for an average of 227 days with a median of 66 days. People without diabetes receiving home health care had been receiving it for an average of 225 days with a median of 68 days. For those receiving home health care, people without diabetes tended to be older than people with diabetes (Table 40.45).

TABLE 40.45. Length of Time in Home Health Care Among Adults Age ≥18 Years Receiving Home Health Care, by Diabetes Status and Age, U.S., 2007

TIME IN HOME HEALTH CARE BY AGE GROUP (YEARS)	DIABETES		NO DIABETES	
	Number	Percent (SE)	Number	Percent (SE)
≤3 months				
18–44	13,872	5.5 (1.43)	42,429	8.1 (1.10)
45–54	23,880	9.4 (1.99)	43,541	8.3 (1.10)
55–64	38,575	15.1 (2.30)	52,775	10.1 (1.20)
65–74	65,074	25.5 (2.41)	80,848	15.4 (1.43)
75–84	87,419	34.3 (2.93)	174,566	33.3 (1.78)
≥85	26,050	10.2 (1.53)	130,136	24.8 (1.88)
3 months to 6 months				
18–44	1,239	[3]	15,000	11.6 (2.95)
45–54	6,017	10.3 (3.56)[1]	7,426	5.8 (1.79)[1]
55–64	5,768	9.9 (3.09)[1]	12,822	9.9 (2.59)
65–74	18,113	31.0 (6.18)	23,653	18.4 (3.06)
75–84	12,304	21.0 (5.16)	35,369	27.5 (3.94)
≥85	15,004	25.7 (5.48)	34,443	26.8 (3.63)
6 months to 1 year				
18–44	39	[3]	4,838	5.0 (1.89)[1]
45–54	1,971	[3]	7,200	7.5 (2.78)[1]
55–64	4,703	9.9 (2.77)	3,779	3.9 (1.22)[1]
65–74	12,774	26.8 (5.72)	17,295	18.0 (4.77)
75–84	18,728	39.4 (6.22)	27,685	28.7 (4.07)
≥85	9,373	19.7 (4.62)	35,567	36.9 (5.37)
>1 year				
18–44	3,848	4.1 (1.99)[2]	36,106	19.4 (4.95)
45–54	8,897	9.3 (3.31)[1]	16,350	8.8 (1.84)
55–64	16,236	17.0 (3.59)	21,344	11.4 (2.56)
65–74	21,397	22.4 (3.18)	21,933	11.8 (2.09)
75–84	28,767	30.1 (3.95)	39,702	21.3 (2.85)
≥85	16,347	17.1 (2.92)	50,749	27.3 (3.75)

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250, 357.2, 362.0, 366.41, 648.0, and 775.1. SE, standard error.

[1] Relative standard error >30%–40%

[2] Relative standard error >40%–50%

[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Home and Hospice Care Survey 2007

ECONOMIC IMPACT OF DIABETES

The costs of medical care for people with diabetes (direct medical costs) and the costs of lost productivity and premature mortality attributable to diabetes (indirect costs) are enormous. In this section, data from the American Diabetes Association (ADA) are used to describe the direct and indirect costs of diabetes in the United States. Data from the MEPS 2012 are also used to supplement the health care expenditure data for antihyperglycemic, antihypertensive, and cholesterol-lowering medications.

NATIONAL SURVEYS AND DATA SOURCES

In the past, a variety of methodologic approaches have been used to estimate the economic impact of diabetes (7). Since 1992, the ADA has used a prevalence-based approach to estimate the costs of diabetes, and since 2002, the methods and results have been comparable (18,19,20).

The ADA uses national data to describe the prevalence of diagnosed diabetes, the health care utilization of those with diabetes, and the direct and indirect costs of those with diabetes to construct a cost of diabetes model. The methodology builds on the NHIS, the American Community Survey, the Behavioral Risk Factor Surveillance System, the MEPS, the OptumInsight de-identified Normative Health Information database, the Medicare 5% sample Standard Analytical Files, the Nationwide Inpatient Sample, the NAMCS, the National Hospital Ambulatory Medical Care Survey, the NNHS, the NHHCS, and the Current Population Survey (20).

Small sample sizes limit meaningful analyses for some categories of services, including over-the-counter medication use, optometry, and dental services. Intangible costs, such as pain and suffering and reduced quality of life, are omitted from the analyses. Lost productivity estimates are for people with diagnosed diabetes and do not include lost productivity of family members associated with caring for people with diabetes.

DIRECT AND INDIRECT COSTS OF DIABETES

Costs may be divided into direct costs associated with medical care and indirect costs associated with lost productivity due to morbidity and mortality. The direct medical costs of diabetes include the costs of diabetes treatment, the costs of treating the acute, microvascular, and neuropathic complications of diabetes, and the costs of treating diabetes-related comorbid conditions. Direct costs include expenditures associated with hospital and nursing home care, physician services, laboratory tests, prescription drugs, and medical supplies. To estimate the direct medical costs of comorbid conditions attributable to diabetes, resource use among people with diabetes in excess of the resource use that would be expected in the absence of diabetes is estimated. This estimate is then combined with estimates of the average medical cost per event to compute total medical costs attributable to diabetes.

Indirect costs represent the value of work days missed due to health conditions (absenteeism), reduced work productivity while working due to health conditions (presenteeism), reduced workforce participation due to disability, and productivity lost due to premature mortality. Indirect costs are estimated by adding the years of work lost due to absenteeism, presenteeism, chronic disability, and premature mortality among people with diabetes by multiplying them by average annual earnings.

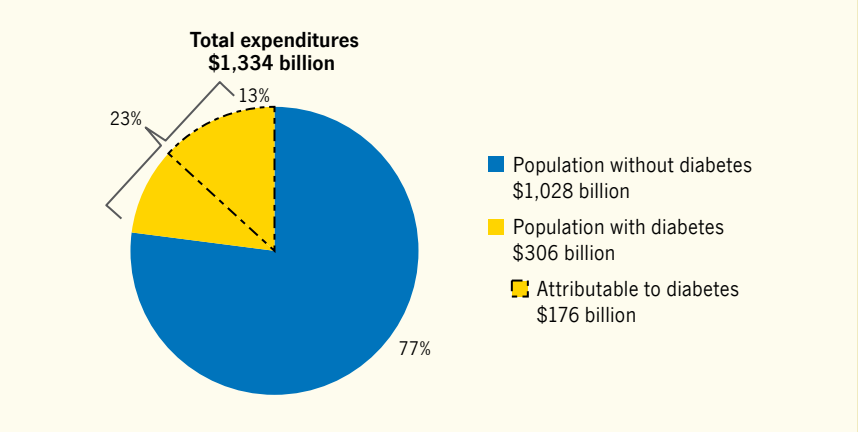
Direct Medical Costs

Figure 40.68 and Table 40.46 show total health care expenditures (direct medical costs) in the United States in 2012 (20). Health care expenditures totaled over $1,334 billion, with $306 billion (23%) incurred by people with diabetes. The excess costs attributable to diabetes were $176 billion. The proportion of expenditures attributable to diabetes increased with age.

Approximately 8% of the costs attributable to diabetes were incurred by people age <45 years, 33% by people age 45–64 years, and 59% by people age ≥65 years (Figure 40.69) (20). Despite a slightly larger population of men, women had higher health care expenditures attributable to diabetes ($91 billion for women vs. $84 billion for men). Across racial/ethnic groups, non-Hispanic whites had the highest expenditures attributable to diabetes, driven in large part by the size of the population relative to the other groups.

Institutional Care. Inpatient, nursing home, and hospice care accounted for the largest proportion of the total direct medical costs of health care in the United States in 2012 (>$576 billion). Inpatient care accounted for 36%, nursing home

FIGURE 40.68. Total Health Care Expenditures, Expenditures Incurred by People With Diabetes, and Expenditures Attributable to Diabetes, U.S., 2012



SOURCE: Reference 20

care for 7%, and hospice care for 1% of the direct medical costs (Figure 40.70) (20). Approximately 26% of hospital inpatient costs, 32% of nursing home costs, and 13% of hospice costs were incurred by people with diabetes, and 16%, 17% and <1% of these costs were attributable to diabetes, respectively (Table 40.47) (20). The proportion of the excess costs attributable to diabetes for inpatient, nursing home, and hospice care increased with age. Approximately 6% of direct medical costs attributable to diabetes were incurred by people with diabetes age <45 years, 28% by people age 45–64 years, and 66% by people age ≥65 years. The overall pattern of excess costs attributable to diabetes by sex and race/ethnicity groups was consistent across types of institutional care.

Outpatient Care. Outpatient care accounted for the second largest proportion of total direct medical costs in the United States (nearly $446 billion) (Figure 40.70) (20). Outpatient care includes visits to physician offices, hospital outpatient clinics, and emergency departments, as well as ambulatory services, home health care, and podiatry. Approximately 16% of the total dollars spent for outpatient care were incurred by people with diabetes ($70 billion), and 46% ($32 billion) of those costs were attributable to diabetes.

People with diabetes spent about $43 billion for outpatient physician visits ($31.4 billion for physician office visits and $11.4 billion for hospital outpatient visits), $453 million for ambulance services, >$14 billion for emergency department visits, >$11 billion for home health care, and $458 million for podiatry (Table 40.48) (20). The proportion of outpatient costs attributable to diabetes increased with age, but the overall pattern was not as marked as it was for institutional care, as shown in Table 40.47 (20). People age <45 years were much more likely to incur costs related to emergency department use and podiatric care compared to other outpatient services use for that age group. For ambulance services, most of the cost attributable to diabetes was incurred by the 45–64 years age group (77%). Health

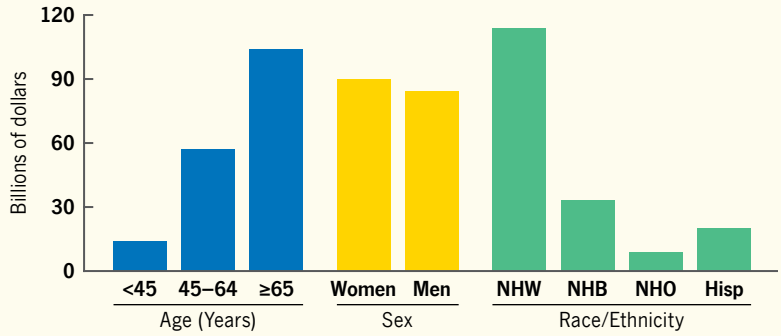
TABLE 40.46. Direct Medical Costs, by Diabetes Status, Age, Sex, and Race/Ethnicity, U.S., 2012

CHARACTERISTICS	NUMBER OF PEOPLE IN MILLIONS	DIRECT COSTS IN BILLIONS OF DOLLARS (PERCENT)
Total population*	340.9	1,334
Population without diabetes	318.6	1,028 (77)
Population with diabetes	22.3	306 (23)
Expenditures attributable to diabetes		176 (13)
Expenditures attributable to diabetes, by age (years)*		
<45	3.3	14 (8)
45–64	10.2	57 (33)
≥65	8.8	104 (59)
Expenditures attributable to diabetes, by sex*		
Women	11.0	91 (52)
Men	11.3	84 (48)
Expenditures attributable to diabetes, by race/ethnicity*		
Non-Hispanic white	14.1	114 (65)
Non-Hispanic black	3.4	33 (19)
Non-Hispanic other	1.4	9 (5)
Hispanic	3.4	20 (12)

* Numbers do not necessarily sum to totals because of rounding.

SOURCE: Reference 20

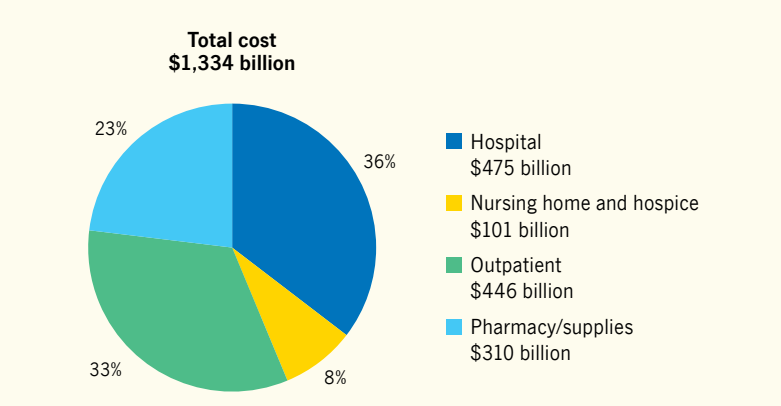
FIGURE 40.69. Total Annual Health Care Expenditures Attributable to Diabetes, by Age, Sex, and Race/Ethnicity, U.S., 2012



Hisp, Hispanic; NHB, Non-Hispanic black; NHO, Non-Hispanic other; NHW, Non-Hispanic white.

SOURCE: Reference 20

FIGURE 40.70. Direct Medical Costs of Health Care, by Type, U.S., 2012



SOURCE: Reference 20

TABLE 40.47. Health Care Expenditures for Institutional Care, by Diabetes Status, Age, Sex, and Race/Ethnicity, U.S., 2012

	NUMBER OF PEOPLE IN MILLIONS	DIRECT COSTS OF INSTITUTIONAL CARE IN BILLIONS OF DOLLARS (PERCENT)		
		Hospital Inpatient	Nursing Home	Hospice
Total population*	340.9	475.344	88.366	12.489
Population without diabetes	318.6	315.618 (74)	59.744 (68)	10.889 (87)
Population with diabetes	22.3	123.726 (26)	28.622 (32)	1.600 (13)
Expenditures attributable to diabetes		75.872 (16)	14.748 (17)	0.032 (0.3)
Expenditures attributable to diabetes, by age (years)*				
<45	3.3	4.924 (6)	0.211 (1)	0 (0)
45–64	10.2	22.934 (30)	2.871 (19)	0.003 (9)
≥65	8.8	48.015 (63)	11.757 (80)	0.029 (91)
Expenditures attributable to diabetes, by sex*				
Women	11.0	38.862 (51)	10.153 (69)	0.020 (63)
Men	11.3	37.010 (49)	4.595 (31)	0.012 (38)
Expenditures attributable to diabetes, by race/ethnicity*				
Non-Hispanic white	14.1	47.042 (62)	11.147 (76)	0.020 (62)
Non-Hispanic black	3.4	16.028 (21)	2.502 (17)	0.006 (19)
Non-Hispanic other	1.4	4.387 (6)	0.344 (2)	0.001 (3)
Hispanic	3.4	8.416 (11)	0.755 (5)	0.005 (16)

* Numbers do not necessarily sum to totals because of rounding.

SOURCE: Reference 20

TABLE 40.48. Health Care Expenditures for Outpatient Care, by Diabetes Status, Age, Sex, and Race/Ethnicity, U.S., 2012

	NUMBER OF PEOPLE IN MILLIONS	DIRECT COSTS OF OUTPATIENT CARE IN BILLIONS OF DOLLARS (PERCENT)					
		Physician Office	Hospital Outpatient	Ambulance Services	Emergency Department	Home Health Care	Podiatry
Total population*	340.9	186.669	87.497	1.987	119.230	48.533	1.807
Population without diabetes	318.6	155.226 (83)	76.144 (87)	1.534 (77)	105.111 (88)	37.264 (77)	1.349 (75)
Population with diabetes	22.3	31.433 (17)	11.354 (13)	0.453 (23)	14.119 (12)	11.269 (23)	0.458 (25)
Expenditures attributable to diabetes		15.221 (8)	5.027 (6)	0.218 (11)	6.654 (6)	4.466 (9)	0.212 (12)
Expenditures attributable to diabetes, by age (years)*							
<45	3.3	1.334 (9)	0.679 (13)	0.020 (9)	1.435 (22)	0.564 (13)	0.043 (20)
45–64	10.2	4.882 (32)	1.943 (39)	0.169 (77)	2.363 (36)	1.806 (40)	0.061 (29)
≥65	8.8	9.005 (59)	2.405 (48)	0.029 (13)	2.856 (43)	2.096 (47)	0.108 (51)
Expenditures attributable to diabetes, by sex*							
Women	11.0	7.294 (48)	2.655 (53)	0.107 (49)	3.600 (54)	2.197 (49)	0.104 (49)
Men	11.3	7.927 (52)	2.372 (47)	0.111 (51)	3.055 (46)	2.269 (51)	0.108 (51)
Expenditures attributable to diabetes, by race/ethnicity*							
Non-Hispanic white	14.1	10.549 (69)	2.637 (52)	0.137 (63)	3.732 (56)	2.815 (63)	0.134 (62)
Non-Hispanic black	3.4	1.995 (13)	1.416 (28)	0.034 (16)	1.786 (27)	0.688 (15)	0.033 (16)
Non-Hispanic other	1.4	0.778 (5)	0.212 (4)	0.013 (6)	0.250 (4)	0.277 (6)	0.013 (6)
Hispanic	3.4	1.898 (12)	0.762 (15)	0.033 (15)	0.886 (13)	0.686 (15)	0.033 (16)

* Numbers do not necessarily sum to totals because of rounding.

SOURCE: Reference 20

care expenditures for outpatient care attributable to diabetes were similar for women and men, although expenditures for hospital outpatient and emergency department care were slightly higher for women.

Outpatient Medications and Supplies. Outpatient medications and supplies accounted for 23% of the total direct medical costs in the United States in 2012 (almost $310 billion) (Figure 40.70) (20). Approximately $83 billion (27% of the total) was incurred by people with diabetes, and $53 billion (17% of the total) was attributable to diabetes. Most of the cost associated with medications and supplies was for prescription medications (Table 40.49) (20). People with diabetes incurred $59 billion or 22% of the total cost of prescription medications and $3.6 billion or 15% of the total cost for other equipment and supplies, including eyewear, orthopedic items, hearing devices, prostheses, etc. This accounts for over one-quarter (28%) of all health care expenditures attributed to diabetes (data not shown) (20).

When examining health care expenditures for outpatient medications and supplies attributable to diabetes by age, the proportion of total dollars attributable to diabetes increased with age for each category, especially for prescription medications, where 8% was incurred by the

TABLE 40.49. Health Care Expenditures for Outpatient Medications and Supplies, by Diabetes Status, Age, Sex, and Race/Ethnicity, U.S., 2012

	NUMBER OF PEOPLE IN MILLIONS	DIRECT COSTS OF OUTPATIENT MEDICATIONS AND SUPPLIES IN BILLIONS OF DOLLARS (PERCENT)				
		Insulin	Diabetes Supplies	Other Diabetes Agents	Prescription Medications	Other Equipment and Supplies
Total population*	340.9	6.157	2.296	12.137	267.729	23.669
Population without diabetes	318.6	0 (0)	0 (0)	0 (0)	208.662 (78)	20.076 (85)
Population with diabetes	22.3	6.157 (100)	2.296 (100)	12.137 (100)	59.067 (22)	3.593 (15)
Expenditures attributable to diabetes		6.157 (100)	2.296 (100)	12.137 (100)	31.716 (12)	1.063 (4)
Expenditures attributable to diabetes, by age (years)*						
<45	3.3	1.102 (18)	0.238 (10)	1.297 (11)	2.443 (8)	0.117 (11)
45–64	10.2	2.817 (46)	1.003 (44)	5.767 (48)	10.398 (33)	0.309 (29)
≥65	8.8	2.239 (36)	1.056 (46)	5.073 (42)	18.875 (60)	0.637 (60)
Expenditures attributable to diabetes, by sex*						
Women	11.2	2.991 (49)	1.188 (52)	5.864 (48)	15.799 (50)	0.523 (49)
Men	11.3	3.166 (51)	1.108 (48)	6.272 (52)	15.917 (50)	0.540 (51)
Expenditures attributable to diabetes, by race/ethnicity*						
Non-Hispanic white	14.1	3.819 (62)	1.760 (77)	7.555 (62)	21.812 (69)	0.670 (63)
Non-Hispanic black	3.4	1.186 (19)	0.277 (12)	1.871 (15)	4.786 (15)	0.164 (16)
Non-Hispanic other	1.4	0.270 (4)	0.084 (4)	0.814 (7)	1.413 (4)	0.066 (6)
Hispanic	3.4	0.882 (14)	0.176 (8)	1.897 (16)	3.705 (12)	0.163 (15)

* Numbers do not necessarily sum to totals because of rounding.

SOURCE: Reference 20

TABLE 40.50. Health Care Expenditures for Antihyperglycemic Medications Among Adults With Diabetes Age ≥18 Years, by Age, Sex, and Race/Ethnicity, U.S., 2012

CHARACTERISTICS	WEIGHTED NUMBER OF PEOPLE IN MILLIONS	DIRECT COSTS IN BILLIONS OF DOLLARS	
		Insulin	Non-Insulin Antihyperglycemic Agents*
Total	25.5	15.3	6.7
Age (years)			
18–44	3.3	2.8	0.5
45–64	11.4	7.2	2.6
≥65	10.8	5.1	3.5
Sex			
Women	12.7	7.0	3.3
Men	12.8	8.2	3.4
Race/ethnicity			
Non-Hispanic white	15.5	10.2	4.2
Non-Hispanic black	3.9	2.3	1.0
Non-Hispanic other	2.0	0.6	0.4
Hispanic	4.1	2.1	1.0

Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46.

* Other non-insulin antihyperglycemic agents include oral medications and non-insulin injectables.

SOURCE: Medical Expenditure Panel Survey 2012

<45 years age group, 33% by the 45–64 years age group, and 60% by the ≥65 years age group. As seen for inpatient and outpatient care, health care expenditures attributable to diabetes tend to be split fairly evenly between women and men across categories of outpatient medications. With respect to race/ethnicity, non-Hispanic whites had the highest proportion of health care expenditures for medications, largely due to the larger population size.

MEPS 2012 data were analyzed to describe expenditures for antihyperglycemic, antihypertensive, and cholesterol-lowering medications by age, sex, and race/ethnicity. Table 40.50 shows that in 2012, $15.3 billon was spent on insulin and $6.7 billion was spent on non-insulin antihyperglycemic medications by adults with diabetes age ≥18 years. For insulin, 18% of the $15.3 billion was spent by those age 18–44 years, 47% by those age 45–64 years, and 33% by those age ≥65 years. For non-insulin antihyperglycemic medications, the proportion of total expenditures increased with age, with 52% of expenditures by those age ≥65 years. Men spent slightly more than women on antihyperglycemic medications, and non-Hispanic whites had the highest proportion of health care expenditures for antihyperglycemic medications.

In 2012, people with diabetes spent $8.0 billion on antihypertensive medications. Approximately $15.9 billion was spent by

people without diabetes (Table 40.51). Approximately half of all expenditures for antihypertensive medications for people with and without diabetes were among those age ≥65 years. Men and women with diabetes had about equal expenditures for antihypertensive medications. Among those without diabetes, expenditures for antihypertensive medications were higher for women. Non-Hispanic whites had the highest proportion of expenditures for antihypertensive medications.

In 2012, people with diabetes spent $5.2 billion on statins and $2.7 on other cholesterol-lowering medications (Table 40.52). Most of the health care expenditures for statins and other cholesterol-lowering medications were for people age ≥45 years, with somewhat higher expenditures among men than women. Again, non-Hispanic whites had the highest proportion of health care expenditures for statins and other cholesterol-lowering medications. These trends were similar to those seen for people without diabetes.

Additional details on the types of medications used by people with diabetes can be found in Chapter 39 *Medication Use and Self-Care Practices in Persons With Diabetes*.

TABLE 40.51. Health Care Expenditures for Antihypertensive Medications Among Adults Age ≥18 Years, by Diabetes Status, Age, Sex, and Race/Ethnicity, U.S., 2012

CHARACTERISTICS	WEIGHTED NUMBER OF PEOPLE IN MILLIONS	DIRECT COSTS IN BILLIONS OF DOLLARS	
		Diabetes	No Diabetes
Total	230.9	8.0	15.9
Age (years)			
18–44	103.2	0.2	1.5
45–64	82.4	3.3	5.9
≥65	45.3	4.4	8.4
Sex			
Women	119.9	3.9	8.9
Men	111.0	4.0	7.0
Race/ethnicity			
Non-Hispanic white	153.4	5.1	12.1
Non-Hispanic black	26.4	1.3	2.0
Non-Hispanic other	17.2	0.4	0.9
Hispanic	33.9	1.0	0.8

Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46.

SOURCE: Medical Expenditure Panel Survey 2012

TABLE 40.52. Health Care Expenditures for Statins and Other Cholesterol-Lowering Medications Among Adults Age ≥18 Years, by Diabetes Status, Age, Sex, and Race/Ethnicity, U.S., 2012

CHARACTERISTICS	NUMBER OF PEOPLE IN MILLIONS	DIRECT COSTS IN BILLIONS OF DOLLARS			
		Statins		Other, Non-Statin Cholesterol-Lowering Medications	
		Diabetes	No Diabetes	Diabetes	No Diabetes
Total	235.5	5.2	11.1	2.7	4.7
Age (years)					
18–44	107.6	0.4	0.5	<0.1	0.4
45–64	82.3	2.5	5.0	1.1	2.0
≥65	45.3	2.2	5.5	1.5	2.2
Sex					
Women	122.0	2.3	4.8	1.1	1.9
Men	133.2	2.8	6.3	1.6	2.8
Race/ethnicity					
Non-Hispanic white	155.7	3.2	9.1	2.1	3.9
Non-Hispanic black	27.1	0.7	0.7	0.1	0.1
Non-Hispanic other	17.6	0.3	0.6	0.1	0.2
Hispanic	34.8	0.8	0.6	0.2	0.3

Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46.

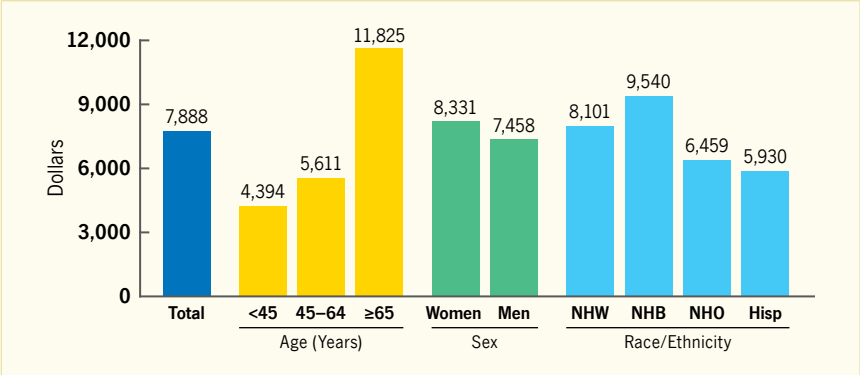
SOURCE: Medical Expenditure Panel Survey 2012

Per Capita Health Care Expenditures Attributable to Diabetes. Figure 40.71 shows the annual excess per capita health care expenditures attributable to diabetes in 2012 by age, sex, and race/ethnicity (20). Overall, $7,888 was spent each year per person with diabetes for care attributable to diabetes, its complications, and comorbidities. This figure was driven by the high per capita expenditures for people age ≥65 years ($11,825). Women had slightly higher per capita expenditures than men. Women spent on average $873 more per person per year than men. Although non-Hispanic whites had the highest health care expenditures attributable to diabetes overall (Tables 40.46–40.51), non-Hispanic blacks had the highest annual per capita expenditures ($9,540). Non-Hispanic whites had the next highest per capita annual expenditures ($8,101), and non-Hispanic others ($6,459) and Hispanics ($5,930) had the lowest annual per capita expenditures.

People with diabetes are older than people without diabetes and, thus, have higher average annual health care expenditures. Table 40.53 shows that after adjusting for age and sex differences between people with and without diabetes, people with diabetes have annual per capita health care expenditures that are 2.3 times higher than those without diabetes ($13,741 vs. $5,853) (20). This age- and sex-adjusted ratio is highest for hospital inpatient care (2.6) and prescription medications (2.2), lowest for other equipment and supplies (1.4), and slightly less than 2.0 for all other types of services and medications.

Table 40.54 shows the annual per capita excess health care expenditures attributable to diabetes by type of service and by age (20). For institutional care, the average annual per capita health care expenditure attributable to diabetes was $3,404 for hospital inpatient care, $662 for nursing home/residential facility care, and $1 for hospice care. For each of these categories, per capita expenditures increased with age, with the ≥65 years age group having the highest average per capita cost.

FIGURE 40.71. Annual Per Capita Health Care Expenditures (in Dollars) Attributable to Diabetes, by Age, Sex, and Race/Ethnicity, U.S., 2012



Hisp, Hispanic; NHB, Non-Hispanic black; NHO, Non-Hispanic other; NHW, Non-Hispanic white.
SOURCE: Reference 20

TABLE 40.53. Annual Per Capita Health Care Expenditures, by Diabetes Status and Type of Service, U.S., 2012

TYPE OF MEDICAL SERVICE	ANNUAL PER CAPITA HEALTH CARE EXPENDITURES IN DOLLARS				
		Unadjusted		Adjusted for Age and Sex	
	With Diabetes	Without Diabetes	Ratio With to Without Diabetes	Without Diabetes	Ratio With to Without Diabetes
Total	13,741	3,495	3.9	5,853	2.3
Institutional care					
Hospital inpatient	5,551	1,196	4.6	2,147	2.6
Nursing home	1,284	203	6.3	622	2.1
Outpatient care					
Physician office	1,411	528	2.7	728	1.9
Hospital outpatient	509	259	2.0	284	1.8
Emergency department	633	357	1.8	335	1.9
Ambulance services	20	5	3.9	11	1.9
Home health care	506	127	4.0	305	1.7
Podiatry	21	5	4.5	11	1.9
Outpatient medications and supplies					
Insulin	276	NA	NA	NA	NA
Diabetes supplies	103	NA	NA	NA	NA
Other diabetes agents*	544	NA	NA	NA	NA
Prescription medications	2,650	710	3.7	1,227	2.2
Other equipment and supplies†	161	68	2.4	113	1.4

NA, not applicable.
* Includes oral medications and non-insulin injectable diabetes agents, such as exenatide and pramlintide.
† Includes, but is not limited to, eyewear, orthopedic items, hearing devices, prosthesis, bathroom aids, medical equipment, and disposable supplies.

The highest annual per capita expenditure for outpatient care was for office visits ($683 for physician office visits and $226 for hospital outpatient visits). This spending is two to three times the annual per capita expenditure for the next two categories: emergency department ($299) and home health care ($200). This likely reflects the high rates of office visits necessary for the treatment of diabetes and its complications.

Ambulance services and podiatry had very low annual per capita expenditures (approximately $10 each). Per capita expenditures increased with age for physician office visits and home health. For emergency department visits, the highest per capita expenditures were for the youngest (<45 years) age group. For all other categories of outpatient care, the per capita expenditures were similar across age groups.

After hospital inpatient care, the next largest contributor to the excess annual per capita expenditure attributable to diabetes was for prescription medications. Average annual per capita expenditures for insulin and other antihyperglycemic medications were $276 and $544, respectively, and expenditures for diabetes supplies were $103. Average annual per capita expenditures attributable to diabetes for other prescription medications were $1,423. These represent expenditures for prescription medications (other than insulin and other antihyperglycemic medications) to treat the complications and comorbidities of diabetes. Average annual per capita expenditures for medications and supplies increased with age with the ≥65 years age group having almost three times higher annual per capita costs than the <45 years age group. The youngest age group (<45 years) had the highest average annual per capita expenditures for insulin, which is not unexpected as this age group has the highest proportion of people with type 1 diabetes.

TABLE 40.54. Annual Per Capita Health Care Expenditures Attributable to Diabetes, by Age and Type of Service, U.S., 2012

TYPE OF MEDICAL SERVICE	ANNUAL PER CAPITA HEALTH CARE EXPENDITURES IN DOLLARS			
	Age (Years)			
	All (N=22.3M)	<45 (N=3.3 M)	45–64 (N=10.2 M)	≥65 (N=8.8 M)
Total*	7,888	4,394	5,611	11,825
Institutional care				
Hospital inpatient	3,404	1,502	2,248	5,450
Nursing/residential facility	662	64	273	1,334
Hospice	1	0.01	0.29	3
Outpatient care				
Physician office	683	407	479	1,022
Hospital outpatient	226	207	191	273
Emergency department	299	438	232	324
Ambulance services	10	6	17	3
Home health	200	172	177	238
Podiatry	10	13	6	12
Outpatient medications and supplies				
Insulin	276	336	276	254
Diabetes supplies	103	73	98	120
Other antidiabetic agents†	544	396	565	576
Prescription medications	1,423	745	1,019	2,142
Other equipment and supplies‡	48	36	30	72

* Numbers do not necessarily sum to totals because of rounding.
† Includes oral medications and non-insulin injectable diabetes agents, such as exenatide and pramlintide.
‡ Includes, but is not limited to, eyewear, orthopedic items, hearing devices, prosthesis, bathroom aids, medical equipment, and disposable supplies.

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Table 40.55 shows the annual per capita expenditures for antihyperglycemic medications among adults with diabetes (among those taking insulin or non-insulin antihyperglycemic agents) age ≥18 years by age, sex, and race/ethnicity based on analyses of MEPS 2012 data. The annual per capita cost of insulin among those taking insulin was $2,358, and the annual per capita cost of non-insulin antihyperglycemic agents among those taking these drugs was $416. The annual per capita expenditure for insulin decreased with increasing age, while the annual per capita expenditure for non-insulin antihyperglycemic medications increased with age. Per capita expenditures for antihyperglycemic medications were similar for men and women and across all race/ethnicity groups, with the exception of the non-Hispanic other group which had a lower than average per capita expenditure for antihyperglycemic medications.

TABLE 40.55. Annual Per Capita Health Care Expenditures for Antihyperglycemic Medications Among Adults With Diabetes Age ≥18 Years, by Age, Sex, and Race/Ethnicity, U.S., 2012

CHARACTERISTICS	ANNUAL PER CAPITA HEALTH CARE EXPENDITURES IN DOLLARS	
	Insulin	Non-Insulin Antihyperglycemic Agents*
Total	2,357.77	416.18
Age (years)		
18–44	2,659.81	331.39
45–64	2,476.64	362.90
≥65	2,083.30	490.38
Sex		
Women	2,303.65	414.01
Men	2,406.64	418.27
Race/ethnicity		
Non-Hispanic white	2,521.64	427.24
Non-Hispanic black	2,123.07	419.98
Non-Hispanic other	1,708.74	366.17
Hispanic	2,173.67	395.78

Data are from those taking insulin or non-insulin antihyperglycemic agents. Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46.
* Other non-insulin antihyperglycemic agents include oral medications and other injectables.

SOURCE: Medical Expenditure Panel Survey 2012

Based on analyses of MEPS 2012 data, people with diabetes who were taking an antihypertensive medication had an excess per capita expenditure of $108 for antihypertensive medications after adjusting for age, sex, and race/ethnicity (Table 40.56). The excess per capita expenditure for antihypertensive medications was greatest in the 45–64 years age group ($142) and least in the age 18–44 years age group (-$42). Women had a slightly lower excess per capita expenditure than men, and the non-Hispanic other race/ethnicity group had the lowest excess per capita expenditure of all race/ethnicity groups (-$24).

Analyses of MEPS 2012 data showed that people with diabetes who were taking a statin or other cholesterol-lowering medication also had an excess per capita expenditure for statins and other cholesterol-lowering medications of $22 after adjusting for age, sex, and race/ethnicity (Table 40.57). The excess per capita expenditure was highest for the 18–44 years age group, followed by the 45–64 years age group and the ≥65 years age group. Women with diabetes had a higher excess per capita expenditure than men with diabetes. Excess per capita expenditure for cholesterol-lowering medications was highest among non-Hispanic blacks and lowest among non-Hispanic other, but this was likely driven by the low sample size of the non-Hispanic other group.

TABLE 40.56. Annual Per Capita Health Care Expenditures for Antihypertensive Medications Among Adults Age ≥18 Years, by Diabetes Status, Age, Sex, and Race/Ethnicity, U.S., 2012

CHARACTERISTICS	ANNUAL PER CAPITA HEALTH CARE EXPENDITURES IN DOLLARS		EXCESS PER CAPITA COST ATTRIBUTABLE TO DIABETES IN DOLLARS
	Diabetes	No Diabetes	
Total*	437.69	329.98	107.71
Age			
18–44	209.69	251.71	-42.02
45–64	429.84	287.71	142.13
≥65	478.78	385.08	93.70
Sex			
Women	437.41	348.05	89.36
Men	437.97	303.45	134.52
Race/ethnicity			
Non-Hispanic white	448.28	331.06	117.22
Non-Hispanic black	468.21	330.03	138.18
Non-Hispanic other	369.17	393.18	-24.01
Hispanic	391.54	234.18	157.36

Data are from those taking antihypertensive medications. Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46.

* Age-, sex- and race/ethnicity-standardized to the Medical Expenditure Panel Survey 2012 diabetic population using age categories 18–44, 45–64, and ≥65 years.

SOURCE: Medical Expenditure Panel Survey 2012

TABLE 40.57. Annual Per Capita Health Care Expenditures for Statins and Other Cholesterol-Lowering Medications Among Adults Age ≥18 Years, by Diabetes Status, Age, Sex, and Race/Ethnicity, U.S., 2012

CHARACTERISTICS	ANNUAL PER CAPITA HEALTH CARE EXPENDITURES IN DOLLARS		EXCESS PER CAPITA COST ATTRIBUTABLE TO DIABETES IN DOLLARS
	Diabetes	No Diabetes	
Total*	554.47	531.97	22.50
Age (years)			
18–44	602.08	427.96	174.12
45–64	591.52	541.46	50.06
≥65	516.88	525.27	-8.39
Sex			
Women	517.14	459.96	57.18
Men	587.50	584.81	2.69
Race/ethnicity			
Non-Hispanic white	571.86	527.11	44.75
Non-Hispanic black	529.44	413.97	115.47
Non-Hispanic other	430.63	608.89	-178.26
Hispanic	566.01	551.11	14.90

Data are from those taking statins or other cholesterol-lowering medications. Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46.

* Age-, sex-, race/ethnicity-standardized to the Medical Expenditure Panel Survey 2012 diabetic population using age categories 18–44, 45–64, and ≥65 years.

SOURCE: Medical Expenditure Panel Survey 2012

Health Care Expenditures Associated With Complications and Comorbidities Attributable to Diabetes. Table 40.58 shows the annual excess health care expenditures in 2012 that were attributable to diabetes in billions of dollars for individual complications and comorbidities; expenditures are further stratified by hospital inpatient visits, physician office and hospital outpatient visits, and emergency department visits (20). Overall, the care of other general medical conditions attributable to diabetes accounted for approximately 50% of expenditures. In addition to diabetes itself, cardiovascular complications, including peripheral vascular disease, were the largest contributors to health care expenditures. Together, diabetes, cardiovascular and peripheral vascular comorbidities, and general medical conditions accounted for 85% of hospital inpatient expenditures attributable to diabetes, 77% of expenditures for physician visits and 85% of hospital outpatient care attributable to diabetes, and 88% of expenditures for emergency department care.

Figure 40.72 shows the percentage of total U.S. expenditures in 2012 for complications and comorbidities attributable to diabetes (20). Expenditures for hospital inpatient, hospital outpatient, physician office, and emergency department visits, and prescription medications are combined within categories of complications/comorbidities. For five conditions (neurological, cardiovascular, peripheral vascular, renal, and other), >25% of total expenditures were attributable to diabetes. Twenty-one percent of ophthalmic costs were attributable to diabetes, followed by 11% of metabolic and 7% of general medical costs.

TABLE 40.58. Health Care Expenditures Attributable to Diabetes, by Medical Condition and Type of Service, U.S., 2012

MEDICAL CONDITION	EXPENDITURES (PERCENT) IN BILLIONS OF DOLLARS			
	Hospital Inpatient	Physician Office	Hospital Outpatient	Emergency Department
Total*	75.872	15.221	5.027	6.654
Diabetes	1.979 (3)	4.136 (27)	1.100 (22)	0.301 (5)
Chronic complications				
Neurological	4.229 (6)	0.413 (3)	0.155 (2)	0.161 (2)
Cardiovascular	19.441 (26)	2.196 (14)	0.635 (13)	0.805 (12)
Peripheral vascular	2.813 (4)	0.449 (3)	0.555 (11)	0.086 (1)
Renal	3.807 (5)	1.007 (7)	0.147 (3)	0.324 (5)
Metabolic	0.175 (<1)	0.176 (1)	0.018 (<1)	0.064 (1)
Ophthalmic	0.028 (<1)	1.483 (10)	0.314 (6)	0.016 (<1)
Other	4.002 (5)	0.295 (2)	0.173 (3)	0.262 (4)
General medical†	39.339 (52)	5.065 (33)	1.971 (39)	4.635 (70)

* Numbers do not necessarily sum to totals because of rounding.
† Includes all other health care that is not a known comorbidity of diabetes.

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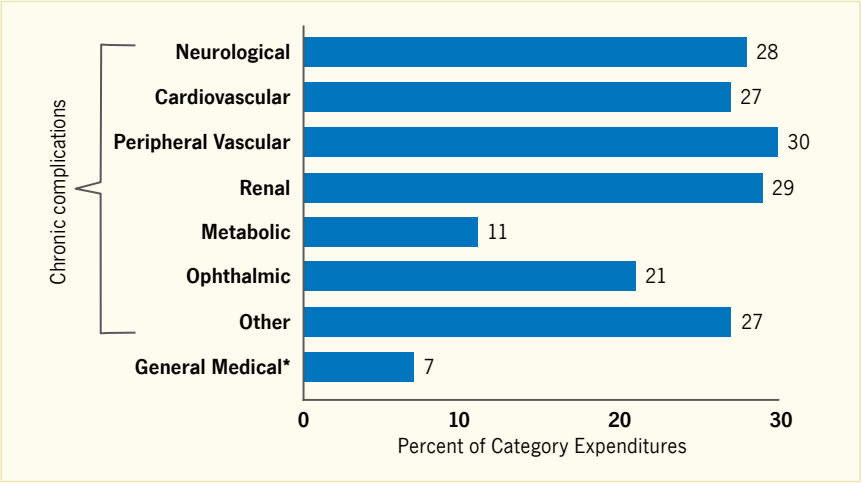
FIGURE 40.72. Percent of Total U.S. Expenditures for Complications and Comorbidities Attributable to Diabetes, U.S., 2012



* Includes all other health care that is not a known comorbidity of diabetes.

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Indirect Costs

Total indirect costs attributable to diabetes in the United States in 2012 were >$68 billion (Table 40.59) (20). Presenteeism (reduced performance at work), reduced labor force participation due to disability, and premature mortality each accounted for approximately 30% of the total. Both absenteeism (work days absent) and reduced productivity days for those not in the labor force accounted for only small percentages of the total indirect costs of diabetes (7% and 4%, respectively).

In 2012, an estimated 25 million days of work were lost due to diabetes. The cost of missing work due to diabetes was estimated to be $5 billion. The reduced performance at work due to diabetes was estimated to represent 113 million lost work days per year, accounting for a cost burden of $20.8 billion. If people with diabetes not in the workforce had similar numbers of days during which they were unable to work because of their diabetes, this would have accounted for 20 million days of reduced productivity and would have cost $2.7 billion. People with diabetes were more likely to leave the workforce because of disability related to their diabetes, and in 2012, 130 million days of productivity were lost at a cost of $21.6 billion.

Using estimates of premature mortality from the ADA publication, of all deaths in the United States in 2012, 246,000 were attributable to diabetes. This total includes 73,000 deaths with diabetes as the primary cause of death, 25,000 deaths with renal disease as the primary cause of death, 38,000 deaths with cerebrovascular disease as the primary cause of death, and 110,000 deaths with cardiovascular disease as the primary cause of death (Table 40.60) (20). The average cost of premature death declines with age, because there are fewer remaining expected working years. Nevertheless, mortality attributable to diabetes accounts for $18 billion in indirect costs, or $75,100 per death. Additional information on mortality associated with diabetes is provided in Chapter 35 *Mortality in Type 1 Diabetes* and Chapter 36 *Mortality Trends in Type 2 Diabetes*.

TABLE 40.59. Productivity Losses and Indirect Costs of Diabetes, U.S., 2012

TYPE OF INDIRECT COST	PRODUCTIVITY LOSS	COST ATTRIBUTABLE TO DIABETES ($ BILLIONS)	PROPORTION OF INDIRECT COSTS*
Total		68.6	100%
Absenteeism	25 million days	5.0	7%
Presenteeism	113 million days	20.8	30%
Reduced productivity days for those not in labor force	20 million days	2.7	4%
Unemployment from disability	130 million days	21.6	31%
Premature mortality	246,000 deaths	18.5	27%

* Numbers do not necessarily sum to totals because of rounding.

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TABLE 40.60. Deaths and Indirect Costs of Mortality Attributable to Diabetes, U.S., 2012

CAUSE OF DEATH	TOTAL U.S. DEATHS IN THOUSANDS*	DEATHS ATTRIBUTED TO DIABETES		
		Deaths in Thousands	Percent of U.S. Deaths in Category	Value of Lost Productivity ($ Billions)
Total	NA	246	NA	18.462
Diabetes	73	73	100%	7.147
Renal disease	46	25	55%	2.004
Cerebrovascular disease	136	38	28%	1.484
Cardiovascular disease	687	110	16%	7.827

NA, not applicable.

* Data source: *CDC National Vital Statistics Reports* for total deaths in 2009 by primary cause, scaled to 2012 using the annual diabetic population growth rate from 2009 to 2012 for each age, sex, and race/ethnicity group.

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Per Capita Productivity Loss. Table 40.61 shows the average annual excess indirect cost in 2012 per person with diabetes by age, sex, and race/ethnicity (20). Annual per capita indirect cost was $2,322 for women and $3,813 for men with diabetes. For men and women alike, the total annual burden of productivity loss per person with diabetes was highest in the middle age groups (35–64 years). This is likely because they are most likely to be employed and more likely to have higher earnings. Fewer young and old people are in the workforce. There are also differences across racial/ethnic groups, with non-Hispanic blacks with diabetes having the highest annual per capita productivity loss ($3,719), followed by non-Hispanic whites ($3,155), non-Hispanic others ($2,727), and Hispanics ($2,271).

TRENDS OVER TIME

Since the ADA used the same methodology to describe the economic burden of diabetes in the United States in 2002, 2007, and 2012, it is possible to make comparisons over time. Figure 40.73 shows the direct, indirect, and total health care expenditures attributable to diabetes between 2002 and 2012 after converting to 2012 dollars using the Consumer Price Index (18,19,20,21). Total health care expenditures for diabetes increased from $117 billion in direct and $9.6 billion in indirect costs in 2002 to $176 billion in direct and $69 billion in indirect costs in 2012. This is almost a 200% increase in the total costs (direct plus indirect) from $127 billion in 2002 to $245 billion in 2012. As a proportion of total costs, direct costs attributable to diabetes increased during 2002–2012, while indirect costs increased from 2002 to 2007 and then remained constant. Although there are some differences in the ADA methodology of calculating indirect costs in 2002, 2007, and 2012, this was likely due to the decline in the number of people participating in the workforce between 2007 and 2012 and the lower diabetes-attributed mortality estimates for 2012.

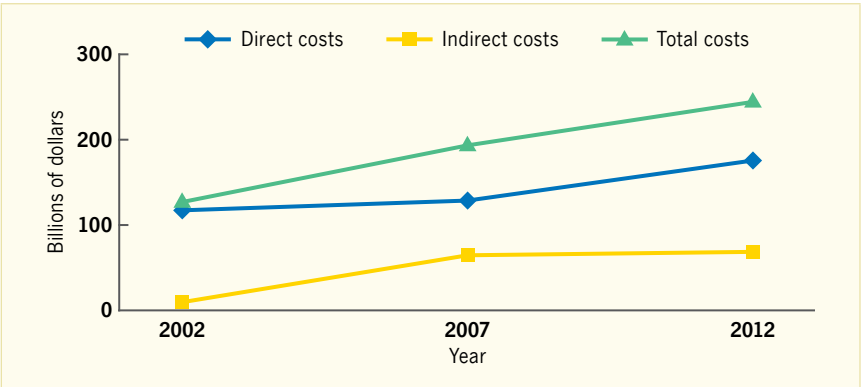
The absolute increase in direct costs has been driven by the increase in the cost of institutional care. However, the

TABLE 40.61. Annual Per Capita Indirect Costs Attributable to Diabetes, by Age, Sex, and Race/Ethnicity, U.S., 2012

CHARACTERISTICS	ANNUAL PER CAPITA INDIRECT COSTS IN DOLLARS
Sex	
Women	2,322
Men	3,813
Sex, age (years)	
Women	
18–34	2,847
35–44	4,301
45–54	4,222
55–59	3,401
60–64	2,394
65–69	849
≥70	647
Men	
18–34	4,556
35–44	6,490
45–54	6,844
55–59	5,149
60–64	3,805
65–69	1,593
≥70	876
Race/ethnicity	
Non-Hispanic white	3,155
Non-Hispanic black	3,719
Non-Hispanic other	2,727
Hispanic	2,271

SOURCE: Reference 20

FIGURE 40.73. Trends in Total Health Care Expenditures (Direct and Indirect) Attributable to Diabetes, U.S., 2002–2012



Data have been converted to 2012 dollars using the Consumer Price Index (Reference 21).

SOURCE: References 18, 19, and 20

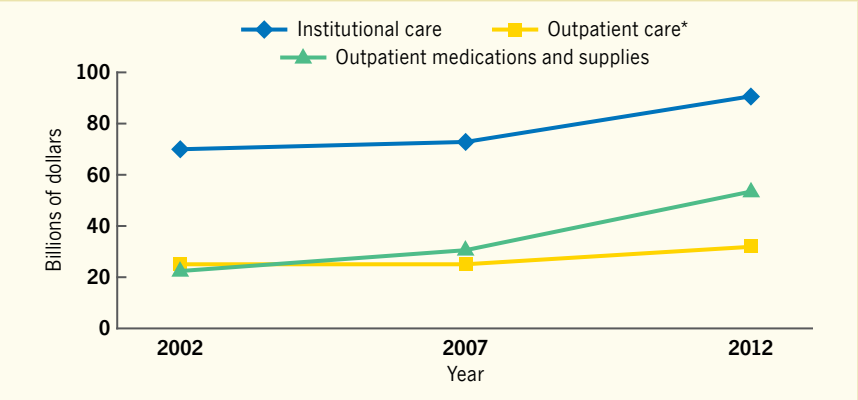
relative increase in direct costs has been driven largely by increases in the cost of outpatient medications and supplies (Figure 40.74) (18,19,20,21). Health care expenditures attributable to diabetes for both institutional care and outpatient care increased 1.3-fold from 2002 to 2012, while the cost of outpatient medications and supplies attributable to diabetes increased almost 2.5-fold. This was driven by the increase in cost for outpatient medications and supplies for persons with diabetes from 2007 to 2012.

Data from the MEPS 2002, 2007, and 2012 showed a sixfold increase in expenditures for insulin among adults with diabetes, from $2.6 billion in 2002 to almost $15.4 billion in 2012. Expenditures for non-insulin antihyperglycemic medications remained relatively stable at approximately $7.8 billion (Figure 40.75). For antihypertensive medications and statins and other cholesterol-lowering medications, the trends over time for total expenditures were similar among those with and without diabetes (Figure 40.76). The decrease in total expenditures for antihypertensive and cholesterol-lowering medications may in part be due to the approval of the first generic alternatives of these medications. Simvastatin and pravastatin had generic equivalents approved by the U.S. Food and Drug Administration in 2006, Cozaar and Hyzaar generic equivalents were approved in 2010, and a generic equivalent for Lipitor was approved in 2011.

While the 2002 report from the ADA did not give data on annual per capita health care expenditures attributable to diabetes, Figure 40.77 shows these data for 2007 and 2012 in constant 2012 dollars (19,20,21). Annual per capita expenditures attributable to diabetes increased during this time period with the increase driven by outpatient medications and supplies. There was almost no change in per capita expenditures for institutional care and outpatient care.

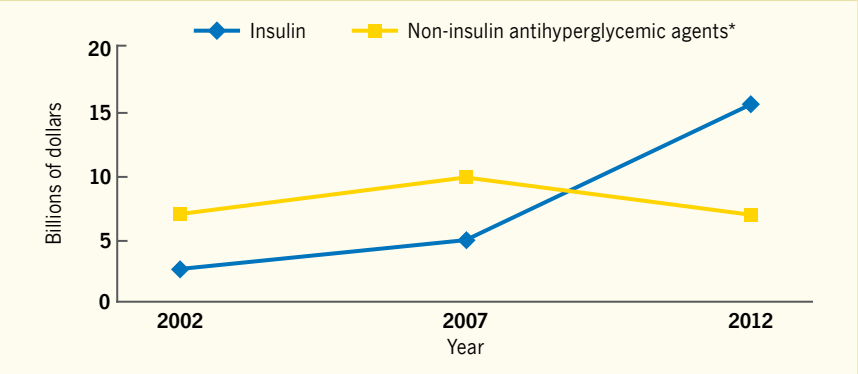
Data from the MEPS 2002, 2007, and 2012 showed that while the per capita cost of insulin for those taking insulin

FIGURE 40.74. Trends in Health Care Expenditures Attributable to Diabetes, by Type of Cost, U.S., 2002–2012



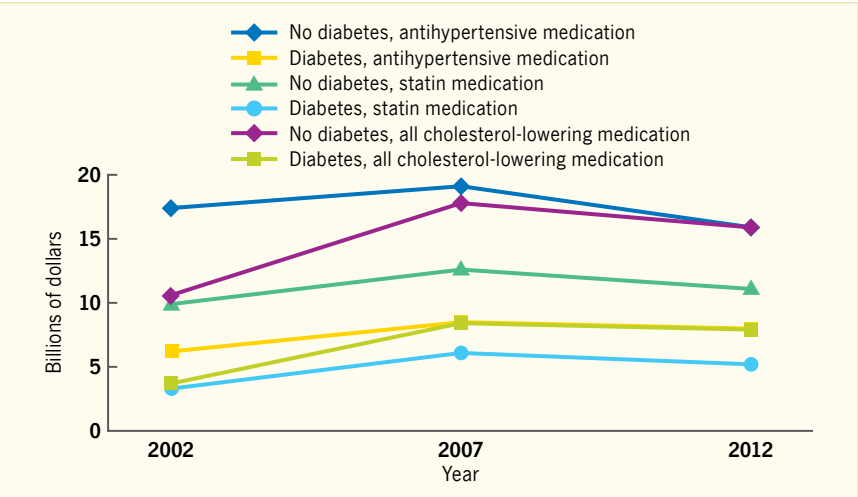
Data have been converted to 2012 dollars using the Consumer Price Index (Reference 21).
* 2002 outpatient care does not include podiatry.
SOURCE: References 18, 19, and 20

FIGURE 40.75. Trends in Total Health Care Expenditures for Antihyperglycemic Medications Among Adults With Diabetes Age ≥18 Years, by Medication Class, U.S., 2002–2012



Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46.
* Non-insulin antihyperglycemic agents include oral medications and other non-insulin injectables.
SOURCE: Medical Expenditure Panel Surveys 2002, 2007, 2012

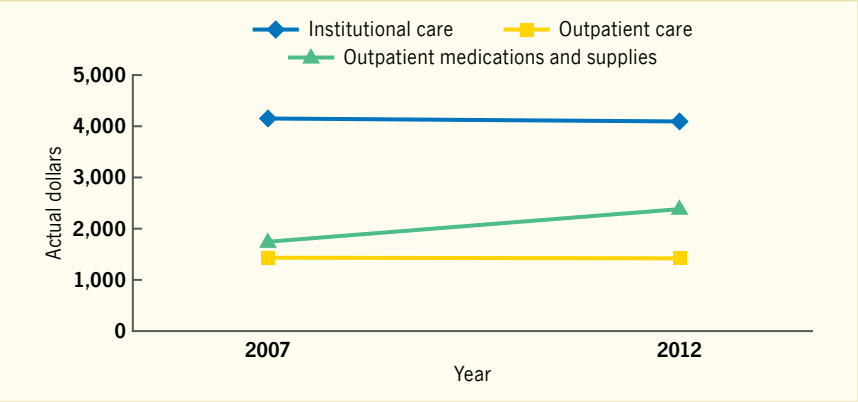
FIGURE 40.76. Trends in Total Health Care Expenditures for Antihypertensive and Cholesterol-Lowering Medications Among Adults Age ≥18 Years, by Diabetes Status and Medication Class, U.S., 2002–2012



Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46.
SOURCE: Medical Expenditure Panel Surveys 2002, 2007, 2012

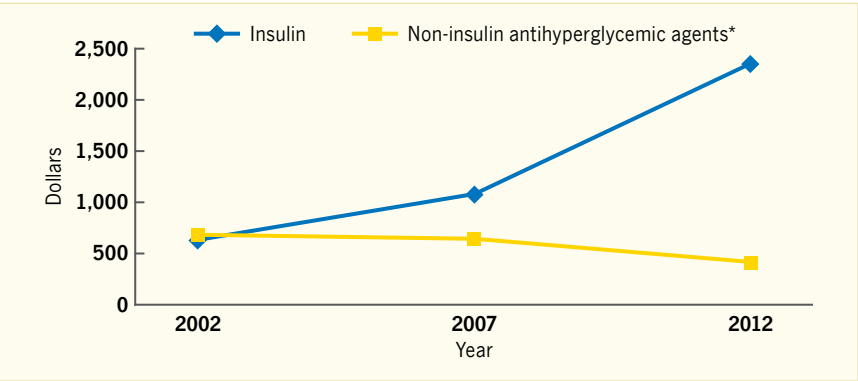
increased almost fourfold over the 10-year period ($634 to $2,358), the per capita cost of non-insulin antihyperglycemic medications for those taking such medications decreased by 60% ($684 to $416) (Figure 40.78). For antihypertensive and cholesterol-lowering medications, the trends in per capita expenditures for those taking such medications were similar for those with and without diabetes (Figure 40.79).

FIGURE 40.77. Trends in Annual Per Capita Health Care Expenditures Attributable to Diabetes, by Type of Cost, U.S., 2007–2012



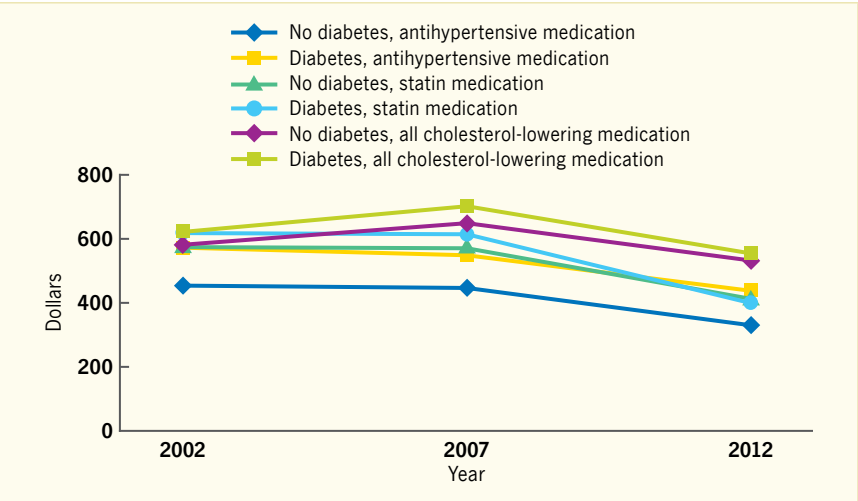
Data have been converted to 2012 dollars using the Consumer Price Index (Reference 21).
SOURCE: References 19 and 20

FIGURE 40.78. Trends in Per Capita Health Care Expenditures for Antihyperglycemic Medications Among Adults With Diabetes Age ≥18 Years, by Medication Class, U.S., 2002–2012



Data represent adults with diabetes who are taking insulin or non-insulin antihyperglycemic agents. Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46.
* Non-insulin antihyperglycemic agents include oral medications and other non-insulin injectables.
SOURCE: Medical Expenditure Panel Surveys 2002, 2007, 2012

FIGURE 40.79. Trends in Per Capita Health Care Expenditures for Antihypertensive and Cholesterol-Lowering Medications Among Adults Age ≥18 Years, by Diabetes Status and Medication Class, U.S., 2002–2012

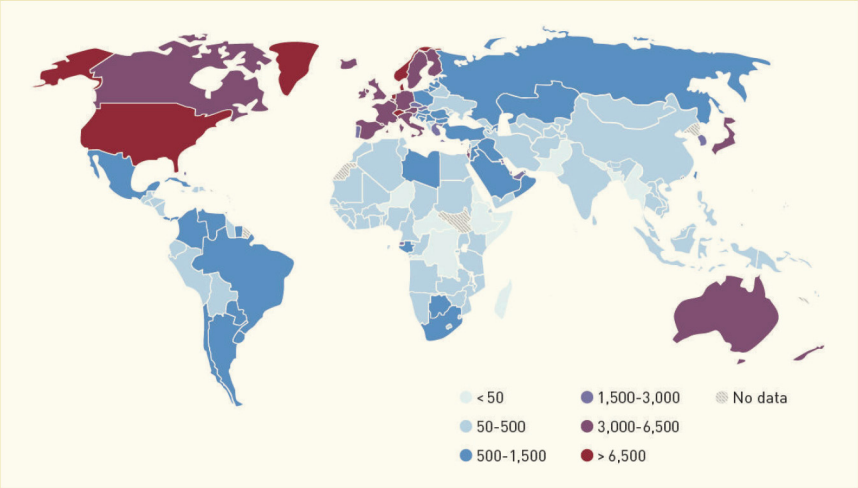


Data represent adults who are taking the medication designated in the legend. Diabetes status is based on self-reported diabetes diagnosis or a medical visit related to diabetes in the past year using International Classification of Diseases, Ninth Revision, codes 249–250, 790.2, 791.5–791.6, V45.85, V53.91, and V65.46.
SOURCE: Medical Expenditure Panel Surveys 2002, 2007, 2012

INTERNATIONAL COMPARISON

The International Diabetes Federation (IDF) published the 6th edition of its *Diabetes Atlas* in 2013 (22). As seen in Figure 40.80, there was a large disparity in the mean diabetes-related health expenditures per person with diabetes age 20–79 years. The IDF estimated that the mean diabetes-related expenditure per person with diabetes in the United States was $9,800. On average, the estimated health spending due to diabetes was $5,621 in high income countries and $356 in low income countries (22).

FIGURE 40.80. Mean Diabetes-Related Health Expenditure Per Person With Diabetes Age 20–79 Years, 2013



Data are presented in U.S. dollars.

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LIST OF ABBREVIATIONS

ADA . . . . . .American Diabetes Association
DKA . . . . . .diabetic ketoacidosis
ICD-9-CM . . . . .International Classification of Diseases, Ninth Revision, Clinical Modification
IDF . . . . . .International Diabetes Federation
LOS . . . . . .length of stay
MEPS . . . . . .Medical Expenditure Panel Survey
NAMCS . . . . . .National Ambulatory Medical Care Survey
NHDS . . . . . .National Hospital Discharge Survey
NHHCS . . . . . .National Home and Hospice Care Survey
NHIS . . . . . .National Health Interview Survey
NNHS . . . . . .National Nursing Home Survey
TIA . . . . . .transient ischemic attack

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DUALITY OF INTEREST

Drs. McEwen and Herman reported no conflicts of interest. Dr. McEwen was supported by funding, as noted, from the University of Michigan. Dr. Herman was supported by funding from the NIDDK, as noted, and serves on data safety monitoring boards for Merck and Lexicon.

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APPENDICES

APPENDIX 40.1. Time Trends in the Number of Hospital Discharges With Diabetes Listed as the Primary Diagnosis Among Adults Age ≥18 Years, by Age and Sex, U.S., 1990–2010

	NUMBER (STANDARD ERROR) OF DISCHARGES IN THOUSANDS											
	All (Age, Years)				Men (Age, Years)				Women (Age, Years)			
YEAR	All	18–44	45–64	≥65	All	18–44	45–64	≥65	All	18–44	45–64	≥65
1990	406 (11.6)	119 (6.2)	134 (6.5)	153 (7.3)	181 (7.9)	61 (4.7)	65 (4.7)	56 (4.1)	225 (8.5)	58 (4.0)	70 (4.4)	98 (6.1)
1991	414 (11.9)	126 (6.5)	128 (6.5)	160 (7.7)	173 (7.3)	63 (4.6)	58 (4.2)	52 (3.9)	241 (9.5)	64 (4.6)	70 (4.9)	107 (6.7)
1992	460 (12.4)	138 (7.0)	148 (6.9)	174 (7.6)	196 (7.8)	64 (4.5)	63 (4.4)	68 (4.6)	264 (9.6)	73 (5.3)	85 (5.3)	106 (6.0)
1993	456 (12.6)	127 (6.6)	148 (7.1)	182 (8.1)	205 (8.5)	60 (4.6)	70 (5.0)	75 (5.1)	251 (9.4)	67 (4.8)	78 (5.0)	107 (6.3)
1994	483 (13.3)	142 (7.7)	153 (6.9)	188 (8.4)	212 (8.7)	72 (5.2)	65 (4.6)	75 (5.1)	271 (10.1)	71 (5.7)	88 (5.2)	113 (6.6)
1995	469 (13.0)	108 (6.0)	172 (8.0)	188 (8.2)	220 (8.9)	52 (4.5)	86 (5.4)	81 (5.5)	249 (9.4)	56 (4.0)	86 (5.9)	107 (6.2)
1996	477 (13.3)	118 (6.8)	161 (7.6)	198 (8.5)	216 (9.1)	58 (4.7)	83 (5.7)	76 (5.3)	261 (9.7)	61 (4.9)	78 (5.0)	122 (6.7)
1997	486 (12.6)	114 (6.0)	173 (7.2)	199 (8.4)	231 (8.5)	62 (4.6)	91 (5.3)	78 (4.9)	256 (9.3)	53 (3.9)	81 (5.0)	122 (6.8)
1998	491 (13.1)	130 (7.1)	161 (7.0)	200 (8.5)	234 (9.3)	68 (5.6)	84 (5.1)	83 (5.4)	257 (9.2)	62 (4.3)	77 (4.8)	117 (6.6)
1999	521 (13.5)	136 (6.6)	187 (7.9)	199 (8.7)	249 (9.1)	70 (4.9)	96 (5.5)	83 (5.3)	273 (10.0)	66 (4.4)	91 (5.7)	116 (6.9)
2000	534 (14.3)	135 (7.2)	207 (9.0)	192 (8.5)	265 (10.1)	72 (5.6)	114 (6.7)	79 (5.2)	269 (10.1)	63 (4.6)	93 (6.1)	113 (6.7)
2001	536 (13.9)	130 (6.5)	201 (8.5)	206 (8.9)	255 (9.4)	70 (5.0)	107 (6.4)	79 (4.8)	281 (10.3)	60 (4.2)	94 (5.6)	127 (7.5)
2002	546 (13.8)	149 (7.2)	205 (8.5)	193 (8.1)	264 (9.3)	81 (5.3)	98 (5.5)	85 (5.3)	283 (10.2)	67 (4.9)	107 (6.5)	108 (6.1)
2003	565 (14.6)	156 (7.3)	204 (8.9)	205 (8.9)	264 (10.1)	73 (5.0)	105 (6.5)	86 (5.9)	301 (10.5)	82 (5.4)	99 (6.1)	119 (6.7)
2004	570 (14.0)	150 (7.1)	209 (8.5)	211 (8.6)	281 (10.1)	80 (5.4)	107 (6.2)	93 (5.8)	289 (9.8)	70 (4.6)	101 (5.9)	118 (6.4)
2005	555 (13.4)	155 (6.8)	209 (8.6)	191 (7.7)	265 (9.2)	75 (4.5)	110 (6.2)	81 (5.0)	290 (9.8)	80 (5.0)	99 (6.0)	111 (5.9)
2006	559 (14.1)	166 (7.9)	205 (8.3)	188 (8.2)	270 (9.6)	86 (5.7)	105 (5.9)	79 (5.0)	289 (10.3)	80 (5.4)	100 (5.9)	109 (6.5)
2007	603 (15.6)	155 (7.5)	220 (8.9)	228 (10.3)	307 (11.2)	82 (5.4)	112 (6.1)	113 (7.7)	297 (10.8)	74 (5.2)	108 (6.4)	115 (6.9)
2008	594 (20.2)	162 (9.9)	212 (11.7)	220 (13.1)	293 (14.0)	82 (6.8)	121 (8.8)	90 (8.6)	301 (14.5)	80 (7.2)	91 (7.7)	129 (9.9)
2009	666 (21.7)	170 (10.1)	256 (13.3)	240 (13.9)	300 (13.4)	79 (6.5)	124 (8.4)	97 (8.2)	367 (17.2)	91 (7.8)	132 (10.4)	143 (11.2)
2010	622 (20.8)	171 (11.3)	255 (13.1)	196 (11.6)	304 (14.5)	79 (7.4)	133 (9.4)	93 (8.2)	318 (14.9)	93 (8.5)	122 (9.2)	103 (8.2)

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Standard errors were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.

SOURCE: National Hospital Discharge Surveys 1990–2010

APPENDIX 40.2. Time Trends in the Number of Hospital Discharges With Diabetes Listed as the Primary Diagnosis Among Adults Age ≥18 Years, by Age and Race/Ethnicity, U.S., 1990–2010

	NUMBER (STANDARD ERROR) OF DISCHARGES IN THOUSANDS											
	White (Age, Years)				Black (Age, Years)				Other (Age, Years)			
YEAR	All	18–44	45–64	≥65	All	18–44	45–64	≥65	All	18–44	45–64	≥65
1990	258 (9.7)	66 (4.9)	81 (5.2)	111 (6.6)	81 (5.0)	31 (3.1)	27 (3.0)	22 (2.6)	12 (1.8)	3 (1.2)	6 (1.1)	3 (0.8)
1991	237 (9.3)	69 (4.8)	68 (5.0)	99 (6.2)	94 (5.8)	33 (3.4)	32 (3.3)	29 (3.4)	12 (1.5)	3 (0.6)	5 (1.1)	5 (0.9)
1992	263 (9.9)	73 (5.3)	74 (5.2)	116 (6.6)	98 (5.6)	37 (3.6)	38 (3.5)	23 (2.5)	14 (1.6)	4 (0.8)	6 (1.0)	4 (0.8)
1993	256 (10.1)	67 (5.1)	74 (5.3)	115 (6.9)	103 (5.8)	32 (3.2)	40 (3.6)	30 (3.1)	16 (1.7)	4 (0.9)	6 (1.1)	5 (0.8)
1994	262 (10.1)	74 (6.0)	81 (5.1)	108 (6.3)	107 (6.0)	41 (3.9)	37 (3.5)	29 (2.8)	19 (1.9)	5 (1.0)	7 (1.3)	7 (1.0)
1995	250 (9.7)	53 (4.4)	86 (5.5)	112 (6.6)	110 (6.4)	33 (3.4)	46 (4.4)	32 (3.2)	17 (2.0)	4 (0.7)	8 (1.7)	5 (0.9)
1996	261 (10.1)	70 (5.7)	75 (4.7)	116 (6.9)	108 (6.2)	29 (3.0)	47 (4.2)	33 (3.6)	27 (2.8)	7 (1.7)	11 (1.6)	10 (1.5)
1997	255 (9.5)	56 (4.1)	83 (5.1)	116 (6.9)	111 (5.8)	29 (2.9)	47 (3.9)	35 (3.1)	33 (3.3)	7 (1.6)	15 (2.3)	11 (1.8)
1998	274 (10.3)	73 (5.5)	79 (5.3)	122 (6.9)	113 (6.4)	31 (3.6)	41 (3.3)	41 (4.1)	30 (2.8)	6 (1.1)	15 (2.1)	10 (1.5)
1999	286 (10.6)	68 (4.6)	97 (5.9)	121 (7.4)	116 (6.1)	37 (3.7)	47 (4.0)	32 (2.8)	32 (3.3)	8 (1.6)	11 (1.9)	13 (2.2)

Appendix 40.2 continues on the next page.

APPENDIX 40.2. (continued)

YEAR	NUMBER (STANDARD ERROR) OF DISCHARGES IN THOUSANDS											
	White (Age, Years)				Black (Age, Years)				Other (Age, Years)			
	All	18–44	45–64	≥65	All	18–44	45–64	≥65	All	18–44	45–64	≥65
2000	273 (11.3)	60 (5.2)	104 (7.1)	109 (7.1)	123 (6.1)	41 (3.7)	50 (4.0)	32 (2.7)	21 (3.1)	6 (1.8)	9 (2.1)	6 (1.3)
2001	292 (11.4)	72 (5.2)	102 (6.8)	118 (7.5)	117 (5.8)	32 (3.2)	47 (3.6)	38 (3.3)	19 (2.2)	4 (0.8)	7 (1.4)	8 (1.5)
2002	284 (10.6)	75 (5.7)	97 (6.1)	112 (6.5)	119 (5.9)	41 (3.4)	50 (4.0)	28 (2.7)	24 (2.7)	9 (1.8)	7 (1.1)	9 (1.7)
2003	297 (11.4)	76 (5.7)	103 (6.6)	118 (7.4)	123 (6.5)	43 (3.6)	50 (4.6)	30 (2.8)	23 (2.3)	5 (1.0)	9 (1.3)	9 (1.6)
2004	289 (10.8)	67 (5.1)	108 (6.8)	114 (6.7)	122 (5.7)	38 (3.2)	48 (3.5)	36 (3.0)	32 (3.4)	7 (1.5)	11 (1.8)	14 (2.4)
2005	279 (9.9)	71 (4.7)	103 (6.1)	106 (6.3)	129 (6.5)	44 (3.5)	51 (4.6)	34 (3.0)	29 (2.8)	8 (1.5)	10 (1.4)	12 (1.9)
2006	288 (10.8)	82 (6.0)	107 (6.5)	99 (6.3)	127 (6.2)	43 (3.7)	48 (3.8)	36 (3.3)	21 (2.2)	6 (1.3)	8 (1.2)	7 (1.2)
2007	324 (12.6)	80 (6.1)	104 (6.6)	140 (8.8)	134 (6.8)	34 (3.1)	58 (4.5)	41 (4.0)	22 (2.5)	5 (0.9)	9 (1.5)	8 (1.8)
2008	279 (14.8)	61 (6.1)	98 (8.5)	120 (10.5)	137 (9.1)	44 (5.1)	53 (5.6)	40 (5.1)	39 (5.1)	17 (3.6)	10 (2.2)	12 (2.9)
2009	371 (16.8)	87 (7.8)	141 (10.3)	143 (10.7)	139 (9.0)	44 (4.7)	59 (5.9)	36 (4.8)	35 (4.4)	10 (2.4)	14 (2.7)	11 (2.6)
2010	328 (15.3)	80 (7.9)	137 (9.9)	111 (8.5)	154 (10.2)	58 (6.7)	58 (5.6)	38 (5.2)	36 (4.2)	5 (1.2)	19 (3.3)	12 (2.4)

Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Standard errors were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.

SOURCE: National Hospital Discharge Surveys 1990–2010

APPENDIX 40.3. Time Trends in the Number of Hospital Discharges With Diabetes Listed as Any Diagnosis Among Adults Age ≥18 Years by Age and Sex, U.S., 1990–2010

YEAR	NUMBER (STANDARD ERROR) OF DISCHARGES IN THOUSANDS											
	All (Age, Years)				Men (Age, Years)				Women (Age, Years)			
	All	18–44	45–64	≥65	All	18–44	45–64	≥65	All	18–44	45–64	≥65
1990	2,825 (30.7)	326 (10.3)	849 (16.7)	1,651 (23.8)	1,202 (19.9)	142 (7.0)	399 (11.3)	661 (14.9)	1,624 (23.5)	184 (7.6)	450 (12.3)	990 (18.5)
1991	3,084 (32.7)	374 (11.3)	897 (17.2)	1,813 (25.6)	1,305 (21.1)	159 (7.5)	416 (11.7)	729 (15.9)	1,779 (25.1)	215 (8.5)	480 (12.7)	1,084 (20.0)
1992	3,281 (32.5)	376 (11.0)	997 (18.0)	1,908 (24.9)	1,430 (21.4)	162 (7.0)	464 (12.2)	804 (16.1)	1,851 (24.6)	214 (8.5)	534 (13.2)	1,103 (19.0)
1993	3,424 (34.9)	373 (11.7)	1,044 (19.3)	2,007 (26.8)	1,531 (23.9)	173 (8.2)	528 (14.3)	830 (17.3)	1,894 (25.7)	200 (8.4)	516 (13.0)	1,178 (20.5)
1994	3,466 (34.6)	381 (12.0)	1,017 (18.3)	2,068 (27.0)	1,509 (22.1)	168 (7.9)	480 (12.4)	861 (16.6)	1,957 (26.8)	213 (9.1)	537 (13.5)	1,207 (21.4)
1995	3,660 (36.2)	354 (11.0)	1,123 (20.2)	2,183 (28.1)	1,592 (23.8)	153 (7.5)	542 (13.8)	898 (17.9)	2,067 (27.4)	201 (8.1)	581 (14.7)	1,286 (21.8)
1996	3,792 (36.3)	397 (12.2)	1,148 (19.8)	2,247 (28.1)	1,699 (24.6)	184 (8.8)	577 (14.4)	939 (18.0)	2,093 (26.9)	214 (8.5)	571 (13.7)	1,308 (21.6)
1997	3,880 (35.6)	378 (11.3)	1,212 (19.6)	2,290 (27.7)	1,709 (23.7)	171 (7.4)	604 (13.9)	935 (17.8)	2,171 (26.8)	208 (8.5)	608 (14.0)	1,355 (21.3)
1998	4,145 (36.6)	406 (11.6)	1,280 (19.9)	2,459 (28.6)	1,833 (24.5)	188 (8.4)	625 (14.1)	1,021 (18.2)	2,312 (27.4)	218 (8.0)	656 (14.2)	1,438 (22.2)
1999	4,269 (38.8)	409 (11.4)	1,375 (22.0)	2,486 (30.1)	1,914 (25.9)	185 (7.8)	697 (15.9)	1,033 (19.0)	2,355 (29.1)	224 (8.4)	678 (15.3)	1,453 (23.4)
2000	4,359 (39.9)	433 (12.3)	1,430 (22.6)	2,496 (30.8)	1,907 (26.0)	193 (8.2)	699 (15.5)	1,015 (19.3)	2,452 (30.5)	240 (9.2)	730 (16.4)	1,481 (24.1)
2001	4,560 (39.9)	449 (12.0)	1,491 (22.6)	2,621 (30.9)	1,977 (26.3)	200 (8.2)	715 (15.3)	1,061 (19.9)	2,584 (30.3)	249 (8.8)	775 (16.7)	1,560 (23.8)
2002	4,801 (42.2)	513 (13.8)	1,652 (25.0)	2,636 (31.3)	2,196 (28.3)	242 (9.6)	817 (17.2)	1,137 (20.4)	2,605 (31.5)	270 (9.8)	835 (18.2)	1,499 (23.9)
2003	5,100 (45.1)	544 (13.9)	1,766 (26.9)	2,791 (33.8)	2,274 (30.1)	233 (8.7)	854 (18.6)	1,186 (22.1)	2,827 (33.9)	310 (10.8)	912 (19.5)	1,605 (25.7)
2004	5,161 (42.9)	537 (13.2)	1,779 (24.7)	2,844 (32.8)	2,403 (29.9)	234 (8.6)	903 (18.0)	1,265 (22.4)	2,758 (31.1)	303 (10.0)	876 (17.0)	1,579 (24.1)
2005	5,173 (43.1)	547 (13.2)	1,770 (24.4)	2,857 (33.3)	2,323 (28.2)	245 (8.7)	855 (16.8)	1,223 (21.1)	2,850 (32.9)	301 (10.0)	915 (17.8)	1,634 (25.9)
2006	5,218 (43.7)	585 (14.3)	1,835 (25.1)	2,798 (33.1)	2,352 (29.4)	261 (9.7)	908 (17.6)	1,184 (21.6)	2,866 (32.6)	324 (10.6)	927 (18.0)	1,615 (25.1)
2007	5,142 (44.7)	574 (14.2)	1,863 (26.7)	2,705 (33.2)	2,384 (30.4)	252 (9.3)	918 (18.4)	1,214 (22.5)	2,758 (33.0)	322 (10.8)	945 (19.4)	1,491 (24.6)
2008	5,325 (58.7)	602 (19.5)	1,879 (34.7)	2,845 (43.4)	2,409 (39.6)	261 (12.9)	917 (24.1)	1,232 (28.7)	2,916 (43.6)	341 (14.6)	961 (25.0)	1,613 (32.6)
2009	5,491 (61.2)	636 (20.7)	2,011 (37.5)	2,844 (44.0)	2,535 (41.5)	275 (13.7)	988 (25.9)	1,272 (29.4)	2,956 (45.2)	361 (15.5)	1,024 (27.2)	1,572 (32.7)
2010	5,320 (60.0)	599 (20.0)	1,938 (35.8)	2,783 (44.1)	2,479 (40.8)	257 (12.9)	976 (25.5)	1,246 (29.1)	2,842 (44.3)	341 (15.3)	963 (25.1)	1,538 (33.2)

Diabetes diagnosis is based on the first seven listed diagnosis codes. Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Standard errors were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.

SOURCE: National Hospital Discharge Surveys 1990–2010

APPENDIX 40.4. Time Trends in the Number of Hospital Discharges With Diabetes Listed as Any Diagnosis Among Adults Age ≥18 Years, by Age and Race/Ethnicity, U.S., 1990–2010

	NUMBER (STANDARD ERROR) OF DISCHARGES IN THOUSANDS											
	White (Age, Years)				Black (Age, Years)				Other (Age, Years)			
YEAR	All	18–44	45–64	≥65	All	18–44	45–64	≥65	All	18–44	45–64	≥65
1990	1,971 (26.5)	193 (8.4)	537 (13.4)	1,241 (21.3)	407 (11.5)	73 (4.5)	160 (7.6)	174 (7.4)	78 (4.4)	9 (1.5)	33 (3.0)	35 (2.9)
1991	2,056 (27.6)	222 (9.0)	542 (13.9)	1,292 (22.1)	466 (12.4)	83 (5.2)	178 (7.4)	204 (8.5)	92 (4.5)	11 (1.3)	34 (2.9)	47 (3.1)
1992	2,136 (27.5)	214 (8.8)	579 (14.2)	1,343 (21.9)	489 (12.7)	84 (5.1)	207 (8.8)	198 (7.7)	108 (4.8)	14 (1.6)	44 (3.1)	50 (3.2)
1993	2,201 (29.2)	211 (9.4)	615 (15.4)	1,376 (23.0)	516 (13.3)	80 (5.2)	200 (8.2)	236 (9.1)	130 (5.8)	16 (1.8)	47 (3.4)	68 (4.3)
1994	2,191 (28.7)	211 (9.3)	601 (14.8)	1,379 (22.9)	503 (13.1)	85 (5.7)	196 (7.9)	222 (8.7)	131 (4.6)	15 (1.7)	48 (2.9)	67 (3.1)
1995	2,281 (29.9)	181 (8.2)	645 (16.0)	1,455 (24.1)	570 (14.2)	83 (5.1)	220 (8.8)	268 (9.9)	128 (5.4)	16 (2.0)	49 (3.5)	64 (3.7)
1996	2,363 (29.8)	214 (9.1)	664 (15.5)	1,484 (23.8)	576 (14.0)	96 (6.0)	239 (9.1)	241 (8.9)	184 (7.0)	26 (3.4)	60 (3.8)	99 (4.9)
1997	2,383 (29.6)	207 (8.8)	683 (15.8)	1,494 (23.5)	590 (13.2)	89 (5.1)	250 (8.6)	251 (8.5)	202 (7.7)	23 (2.7)	79 (4.8)	100 (5.5)
1998	2,590 (30.5)	222 (9.0)	727 (15.9)	1,641 (24.6)	633 (14.0)	97 (5.8)	250 (8.6)	286 (9.5)	219 (7.6)	24 (2.4)	93 (4.9)	102 (5.3)
1999	2,638 (32.7)	206 (8.3)	793 (18.1)	1,639 (26.0)	643 (13.9)	102 (5.7)	261 (8.8)	280 (9.2)	229 (8.1)	29 (2.9)	85 (5.0)	114 (5.7)
2000	2,515 (33.0)	208 (9.2)	771 (18.2)	1,536 (26.1)	654 (14.0)	96 (5.3)	268 (9.0)	291 (9.3)	153 (6.9)	20 (2.7)	58 (4.2)	75 (4.8)
2001	2,698 (33.4)	229 (9.4)	810 (18.3)	1,659 (26.5)	713 (14.3)	109 (5.4)	293 (9.2)	311 (9.5)	162 (7.0)	17 (1.8)	63 (3.7)	82 (5.7)
2002	2,839 (35.1)	273 (11.3)	914 (20.0)	1,652 (26.7)	718 (14.6)	118 (5.6)	300 (9.6)	300 (9.4)	186 (8.0)	23 (2.8)	63 (4.5)	100 (6.0)
2003	3,030 (38.3)	272 (10.8)	985 (22.1)	1,774 (29.5)	747 (15.3)	126 (6.1)	323 (10.7)	299 (9.2)	203 (8.2)	23 (2.5)	83 (5.3)	97 (5.7)
2004	2,996 (35.6)	252 (9.7)	965 (19.8)	1,778 (28.1)	769 (15.0)	130 (6.2)	313 (9.3)	325 (10.0)	226 (8.4)	26 (2.7)	91 (5.2)	110 (6.0)
2005	2,994 (35.4)	266 (9.6)	940 (19.2)	1,788 (28.2)	776 (15.7)	124 (5.8)	344 (10.4)	308 (10.2)	209 (7.7)	25 (2.3)	74 (4.1)	110 (6.1)
2006	2,999 (35.9)	289 (11.0)	992 (19.8)	1,718 (28.0)	815 (16.4)	135 (6.3)	343 (10.6)	337 (10.8)	197 (7.4)	28 (3.1)	69 (4.0)	99 (5.5)
2007	2,940 (36.9)	284 (10.9)	982 (21.0)	1,675 (28.4)	819 (16.8)	136 (7.0)	367 (11.3)	316 (10.3)	183 (7.4)	25 (2.5)	75 (4.6)	84 (5.2)
2008	2,959 (46.9)	261 (13.4)	969 (26.8)	1,730 (36.2)	913 (24.5)	161 (10.3)	378 (15.5)	374 (15.9)	296 (12.6)	44 (5.5)	109 (7.1)	143 (8.8)
2009	3,355 (49.2)	318 (15.4)	1,146 (29.1)	1,891 (36.7)	931 (24.2)	151 (9.3)	402 (16.3)	378 (15.4)	301 (13.4)	50 (5.5)	117 (8.1)	134 (9.2)
2010	3,365 (49.2)	292 (14.1)	1,179 (29.2)	1,894 (37.1)	915 (23.9)	159 (10.2)	364 (14.2)	393 (16.2)	314 (12.7)	46 (4.8)	131 (8.3)	138 (8.3)

Diabetes diagnosis is based on the first seven listed diagnosis codes. Diabetes is defined as International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 250 (all), 357.2, 362.0, 366.41, 648.0, and 775.1. Standard errors were most likely underestimated because the National Hospital Discharge Survey sampling variables were not available, and consequently, it was not possible to take into account the complex sampling design.

SOURCE: National Hospital Discharge Surveys 1990–2010

APPENDIX 40.5. Percent of Adults Age ≥18 Years Who Reported Being Hospitalized Overnight at Least Once in the Past Year, by Diabetes Status, Age, Sex, and Race/Ethnicity, U.S., 2011

	PERCENT (STANDARD ERROR)					
CHARACTERISTICS	Total	Type 1 Diabetes*	Type 2 Diabetes, Using Insulin	Type 2 Diabetes, Not Using Insulin	All Diabetes	No Diabetes
All persons	9.4 (0.20)	31.5 (3.95)	29.8 (2.02)	17.2 (1.02)	20.8 (0.90)	8.3 (0.20)
Age (years)						
18–44	7.0 (0.26)	27.8 (5.33)	13.2 (6.69)[2]	12.7 (2.32)	16.4 (2.07)	6.8 (0.26)
45–64	8.8 (0.35)	29.4 (6.25)	26.5 (2.82)	14.3 (1.34)	17.9 (1.31)	7.5 (0.35)
≥65	17.3 (0.53)	54.3 (11.60)	35.5 (2.87)	21.9 (1.63)	25.7 (1.40)	15.2 (0.57)
Sex, age (years)						
Women	11.4 (0.27)	35.5 (5.53)	35.8 (2.88)	18.7 (1.46)	23.5 (1.26)	10.2 (0.27)
18–44	10.5 (0.43)	29.1 (7.48)	[3]	19.0 (3.54)	21.6 (3.19)	10.2 (0.42)
45–64	9.2 (0.45)	36.0 (8.29)	31.9 (4.53)	14.6 (1.79)	19.6 (1.78)	7.9 (0.46)
≥65	17.4 (0.68)	67.6 (14.02)	40.5 (4.19)	23.1 (2.33)	28.3 (2.04)	14.9 (0.71)
Men	7.3 (0.27)	26.7 (5.62)	24.1 (2.65)	15.7 (1.31)	18.2 (1.19)	6.2 (0.27)
18–44	3.5 (0.27)	26.4 (7.70)	[3]	5.1 (2.28)[2]	10.4 (2.48)	3.4 (0.27)
45–64	8.3 (0.50)	20.6 (8.34)[2]	22.3 (3.59)	14.0 (1.87)	16.3 (1.81)	7.1 (0.49)
≥65	17.2 (0.81)	43.0 (17.49)[2]	29.1 (4.04)	20.7 (2.30)	23.0 (2.06)	15.6 (0.97)

Appendix 40.5 continues on the next page.

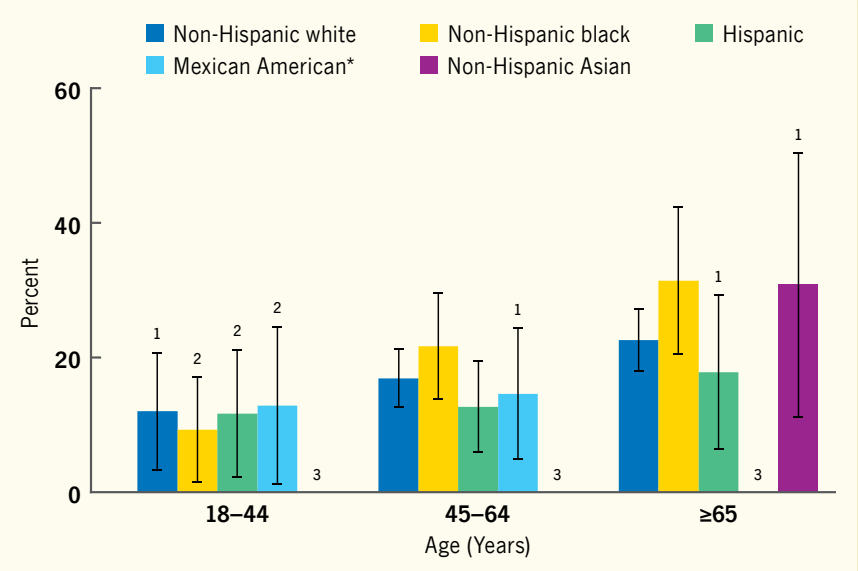
APPENDIX 40.5. (continued)

CHARACTERISTICS	PERCENT (STANDARD ERROR)					
	Total	Type 1 Diabetes*	Type 2 Diabetes, Using Insulin	Type 2 Diabetes, Not Using Insulin	All Diabetes	No Diabetes
Race/ethnicity, age (years)						
Non-Hispanic white	9.9 (0.25)	29.8 (5.63)	30.7 (2.74)	18.2 (1.32)	21.5 (1.19)	8.8 (0.25)
18–44	7.4 (0.36)	28.2 (7.60)	[3]	17.4 (4.20)	20.4 (3.57)	7.1 (0.36)
45–64	8.8 (0.43)	26.3 (8.43)[1]	27.1 (3.99)	14.6 (1.70)	17.9 (1.68)	7.8 (0.42)
≥65	17.1 (0.61)	56.4 (19.20)[1]	36.3 (3.66)	22.0 (1.97)	25.5 (1.68)	15.2 (0.67)
Non-Hispanic black	10.8 (0.49)	35.6 (7.50)	31.2 (4.17)	20.5 (2.28)	24.8 (1.82)	9.0 (0.47)
18–44	7.1 (0.57)	24.1 (9.81)[2]	[3]	10.8 (3.46)[1]	14.5 (3.16)	6.8 (0.59)
45–64	12.5 (0.90)	37.1 (10.91)	29.1 (5.40)	20.8 (3.70)	24.8 (3.04)	10.0 (0.93)
≥65	22.4 (1.54)	65.7 (13.33)	36.5 (7.28)	26.4 (3.92)	31.0 (3.44)	18.7 (1.62)
Hispanic	7.4 (0.41)	30.7 (7.99)	24.3 (4.48)	13.0 (2.11)	16.4 (1.93)	6.4 (0.38)
18–44	6.6 (0.48)	37.5 (11.70)[1]	[3]	10.8 (4.51)[2]	14.6 (4.05)	6.3 (0.47)
45–64	6.6 (0.72)	31.5 (14.24)[2]	22.5 (5.84)	10.8 (2.84)	14.4 (2.67)	4.9 (0.64)
≥65	15.5 (1.67)	[3]	28.8 (7.00)	18.9 (4.49)	21.3 (3.89)	13.0 (1.97)
Mexican American†	7.0 (0.52)	37.0 (10.63)	24.0 (5.92)	14.0 (2.94)	17.4 (2.62)	5.9 (0.48)
18–44	6.1 (0.59)	44.9 (13.86)[1]	[3]	12.4 (5.59)[2]	16.5 (5.06)[1]	5.7 (0.58)
45–64	6.3 (1.02)	[3]	25.0 (7.77)[1]	9.3 (3.66)[1]	14.1 (3.54)	4.4 (0.89)
≥65	17.8 (2.35)	[3]	25.2 (9.41)[1]	26.6 (7.18)	25.3 (5.95)	14.3 (2.89)
Non-Hispanic Asian	5.3 (0.61)	[3]	34.1 (10.96)[1]	11.3 (3.73)[1]	15.3 (3.98)	4.5 (0.56)
18–44	3.8 (0.68)	[3]	[3]	[3]	[3]	3.9 (0.70)
45–64	4.2 (0.94)	[3]	[3]	[3]	[3]	3.7 (0.91)
≥65	14.4 (2.62)	[3]	45.4 (14.46)[1]	23.7 (9.09)[1]	29.9 (8.13)	9.7 (2.39)

Data are based on self-report.
* Type 1 diabetes is defined as age at onset <30 years and current use of insulin.
† Mexican American is a subset of Hispanic.
[1] Relative standard error >30%–40%
[2] Relative standard error >40%–50%
[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Health Interview Survey 2011

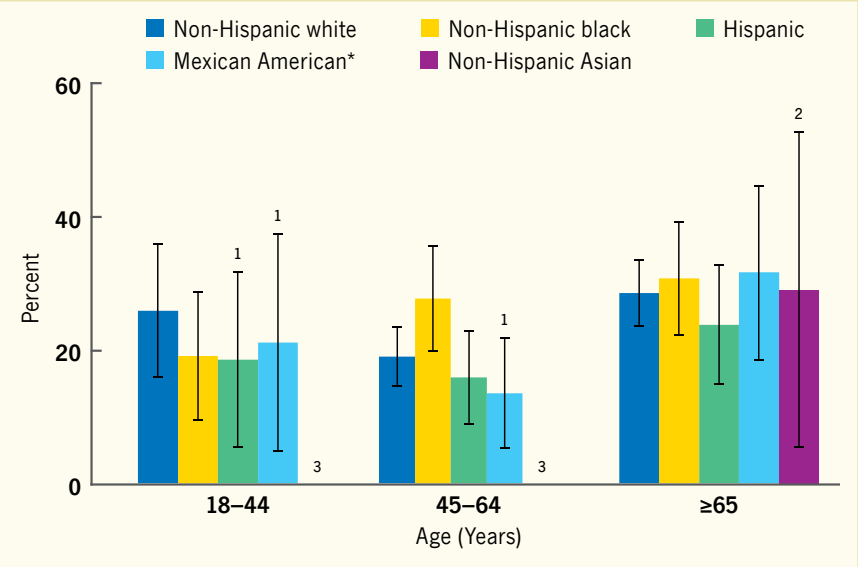
APPENDIX 40.6. Percent of Men With Diabetes Age ≥18 Years Who Report Being Hospitalized Overnight in the Past Year, by Age and Race/Ethnicity, U.S., 2011



Data are based on self-report. Error bars represent 95% confidence intervals.
* Mexican American is a subgroup of Hispanic.
[1] Relative standard error >30%–40%
[2] Relative standard error >40%–50%
[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Health Interview Survey 2011

APPENDIX 40.7. Percent of Women With Diabetes Age ≥18 Years Who Report Being Hospitalized Overnight in the Past Year, by Age and Race/Ethnicity, U.S., 2011



Data are based on self-report. Error bars represent 95% confidence intervals.
* Mexican American is a subgroup of Hispanic.
[1] Relative standard error >30%–40%
[2] Relative standard error >40%–50%
[3] Estimate is too unreliable to present; ≤1 case or relative standard error >50%.

SOURCE: National Health Interview Survey 2011