

Chapter 26

Ambulatory Medical Care for Diabetes

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SUMMARY

Based on the 1990 National Health Interview Survey (NHIS), persons with diabetes in the United States had 96.1 million outpatient medical care contacts in 1990, including 53.4 million visits to physician's offices, 13.9 million visits to outpatient clinics, 1.6 million visits to emergency rooms, 10.7 million telephone contacts, and 16.4 million visits to other ambulatory care settings, including company, industry, and public health clinics and home visits. There was an average of 15.5 contacts with physicians for ambulatory care per person with diabetes, compared with 5.5 contacts per person in the general U.S. population. In 1990, ~6.2 million Americans, or 3% of the population, reported that they had diabetes. These persons accounted for 7% of all ambulatory medical contacts. While these include all outpatient contacts, regardless of whether the contact was diabetes-related, the disproportionate impact of diabetes on the ambulatory care system is clear. Based on the 1990 National Ambulatory Medical Care Survey (NAMCS), the estimated rate of office-based physician visits with a primary or secondary diagnosis of

diabetes per person with diabetes was two- to three-fold higher than the rate of visits for all other diagnoses for persons without diabetes. In the 1990 NAMCS, 15 million visits to office-based physicians had a primary diagnosis of diabetes. This represents an ~50% increase in the number of visits with a primary diagnosis of diabetes, compared with 1981. Diabetes was the second most frequently cited chronic disease accounting for office-based physician visits in the 1990 NAMCS, after hypertension.

In 1989, >90% of persons with diabetes had one physician whom they saw for treatment of their diabetes and, of these, 65% had seen this physician four or more times in the past year. The mean duration of a visit for diabetes in 1990 was 17.4 minutes. Blood pressure was measured in 77% and cholesterol in 10% of the visits, and urinalysis was performed in 25%. Medicare was the source of payment for 46% of office visits, Medicaid for 10%, commercial insurance for 25%, and in 30% the patient had out-of-pocket expenses.

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NATIONAL SURVEYS AND DATA SOURCES

A major source of information on ambulatory care is the NHIS, sponsored by the National Center for Health Statistics (NCHS)^{1,2}. The data are drawn from a series of household-based personal interviews conducted with a sample of the civilian, noninstitutionalized population of the United States and are tabulated and published annually. Each respondent is queried about the presence or absence of a series of chronic and acute conditions, including whether a physician had ever told them they had diabetes and the frequency and nature of contacts with the medical care system. The nature and site of the contact are stratified into hospital- and nonhospital-based. Home, telephone, and emergency room contacts are included, as

are physician office visits both in and outside the hospital setting. Disease-specific data from the NHIS on physician visits can either be coded according to the disease status of the respondent or to the primary reason for the contact as given by the respondent³. Using diabetes as an example, all contacts by persons with diabetes can be tabulated, thereby including contacts that might be independent of the diabetic state. Alternatively, only those contacts attributed to diabetes by the respondent can be tabulated. Due to the tendency to underreport diabetes as a secondary diagnosis⁴, this latter approach results in an underestimate of physician contacts. In addition, the ability of a respondent to distinguish accurately between diabetes-related and diabetes-unrelated ambulatory care is doubtful. In this chapter, the former approach has been taken, thereby describing all contacts with the

ambulatory care setting by persons with diabetes, independent of the reason for the contact given by the respondent. Each year, in addition to the core questionnaire, the NHIS includes a series of supplementary questions on special health topics. In 1989, a supplementary questionnaire was administered to all individuals with self-reported physician-diagnosed diabetes. Data relevant to ambulatory care usage included whether the person with diabetes had one physician for regular treatment of their diabetes and the frequency of contact with that physician and certain other health care professionals.

A second source of condition-specific ambulatory care data is the NAMCS, sponsored by NCHS^{5,6}. This is a national probability sample of office-based physicians, excluding pathologists, radiologists, anesthesiologists, chiropractors, podiatrists, optometrists, and federal physicians. Each patient record includes up to three patient complaints and physician diagnoses, as well as diagnostic, screening, counseling, and phar-

maceutical interventions planned, performed, or prescribed. Surveys performed in 1981 and 1985 covered the continental United States only; in the 1989-91 surveys, Hawaii and Alaska were included in the sampling frame. The strength of the NAMCS lies in the longitudinal documentation of resource use in the outpatient setting; its weakness lies in the restriction of the outpatient setting to the physician's office only. Outpatient, public health, or work-site clinic encounters are omitted, as are telephone and emergency room contacts. In addition, visits for patients with diabetes are underascertained because only three diagnoses can be listed in the record and these diagnoses are based on the reason for the visit rather than the underlying pathology. Further, because the data are visit-based rather than patient-based, they may overrepresent insulin-taking persons with diabetes, because these individuals have more frequent visits for ambulatory care relative to diabetic patients not taking insulin^{3,7}.

Table 26.1
Number of Physician Contacts for Ambulatory Care by Persons with Diabetes, U.S., 1990

Characteristics	Place of contact and number of contacts in thousands (%)					
	All places	Telephone	Office	Outpatient clinic	Emergency room	Other
All persons	96,093 (100)	10,743 (11.2)	53,437 (55.6)	13,906 (14.5)	1,641* (1.7)	16,366 (17.0)
<25 years	3,187 (100)	909* (28.5)	1,300* (40.8)	0*(0)	0*(0)	977* (30.7)
25-44 years	10,479 (100)	1,478* (14.1)	5,520 (52.7)	812* (7.7)	402* (3.8)	2,267 (21.6)
45-64 years	37,625 (100)	3,811 (10.1)	20,006 (53.2)	9,599 (25.5)	610* (1.6)	3,599 (9.6)
≥65 years	44,801 (100)	4,545 (10.1)	26,610 (59.4)	3,495 (7.8)	629* (1.4)	9,523 (21.3)
Females	61,210 (100)	6,659 (10.9)	36,156 (59.1)	6,591 (10.8)	931* (1.5)	10,870 (17.8)
<25 years	2,633 (100)	632* (24.0)	1,023* (38.9)	0*(0)	0*(0)	977* (37.1)
25-44 years	7,067 (100)	726* (10.3)	3,403 (48.2)	268* (3.8)	402* (5.7)	2,267 (32.1)
45-64 years	20,255 (100)	1,777 (8.8)	13,052 (64.4)	3,798 (18.8)	264* (1.3)	1,366* (6.7)
≥65 years	31,253 (100)	3,524 (11.3)	18,680 (59.8)	2,525 (8.1)	265* (0.8)	6,259 (20.0)
Males	34,886 (100)	4,084 (11.7)	17,280 (49.5)	7,315 (21.0)	710* (2.0)	5,496 (15.8)
<25 years	554* (100)	277* (50.0)	277* (50.0)	0*(0)	0*(0)	0*(0)
25-44 years	3,413 (100)	752* (22.0)	2,117 (62.0)	544* (15.9)	0*(0)	0*(0)
45-64 years	17,370 (100)	2,034 (11.7)	6,956 (40.0)	5,802 (33.4)	346* (2.0)	2,233 (12.9)
≥65 years	13,549 (100)	1,021* (7.5)	7,930 (58.5)	970* (7.2)	364* (2.7)	3,264 (24.1)
Whites	80,055 (100)	10,279 (12.8)	43,520 (54.4)	11,749 (14.7)	1,239* (1.5)	13,266 (16.6)
<25 years	3,187 (100)	909* (28.5)	1,300* (40.8)	0*(0)	0*(0)	977* (30.7)
25-44 years	8,529 (100)	1,478* (17.3)	4,241 (49.7)	544* (6.4)	0*(0)	2,267 (26.6)
45-64 years	28,843 (100)	3,489 (12.1)	14,797 (51.3)	7,711 (26.7)	610* (2.1)	2,233 (7.7)
≥65 years	39,495 (100)	4,403 (11.1)	23,180 (58.7)	3,495 (8.8)	629* (1.6)	7,789 (19.7)
Blacks	13,942 (100)	464* (3.3)	8,111 (58.2)	2,157 (15.5)	402* (2.9)	2,808 (20.1)
<25 years	0*	0*	0*	0*	0*	0*
25-44 years	1,950 (100)	0*(0)	1,280* (65.6)	268* (13.7)	402* (20.6)	0*(0)
45-64 years	8,502 (100)	322* (3.8)	4,925 (57.9)	1,889 (22.2)	0*(0)	1,366* (16.1)
≥65 years	3,490 (100)	142* (4.1)	1,906 (54.6)	0*(0)	0*(0)	1,441* (41.3)

*Estimates may be unstable (relative standard error >30%) due to small sample size. Number of contacts is shown in thousands; numbers in parentheses are percent of total for each age/sex/race group; place of contact: all places excludes unknown place of contact; office includes doctor's office in hospital; other includes company or industry clinic and home visits.

Source: 1990 National Health Interview Survey

A third dataset is the 1987 National Medical Expenditure Survey (NMES) of the Agency for Health Care Policy and Research⁸. The NMES is drawn from a national probability sample of the civilian, noninstitutionalized population. It provides national estimates of health status, use of and expenditures for medical services, and sources of payment for those services. To provide this scope of coverage, it supplements household and telephone interviews with a health insurance plan survey of employers and insurers of respondents, a medical provider survey of physicians, osteopaths, and inpatient and outpatient facilities providing services to respondents, and a Medicare records component which links to data on eligibility and claims for all respondents who are Medicare beneficiaries. Persons with diabetes are identified by self-report and through the presence of diabetes on any medical record or payment claim form.

NUMBER AND SOURCES OF OUTPATIENT CONTACTS

Data from the 1990 NHIS indicate that 96.1 million visits by persons with diabetes were made to various sources of ambulatory medical care that year (Table 26.1). About 56% of all contacts were physician office visits. Other sources of care, including home visits and industry and company clinics, accounted for the next largest proportion, followed by hospital outpatient clinics and telephone contacts. Visits to emergency rooms represented <2% of all outpatient medical encounters by persons with diabetes. The number of physician visits increased with age and was considerably greater for women than men; whites accounted for 83% of all physician contacts among persons with diabetes (Table 26.1; Appendix 26.1). The number of visits per person with diabetes calculated from the 1990 NHIS is shown by age, sex, and race in Table 26.2. The rate of physician contact across age groups appears bimodal, with higher rates in the youngest

Table 26.2
Rate of Physician Contacts for Ambulatory Care per Person with Diabetes, U.S., 1990

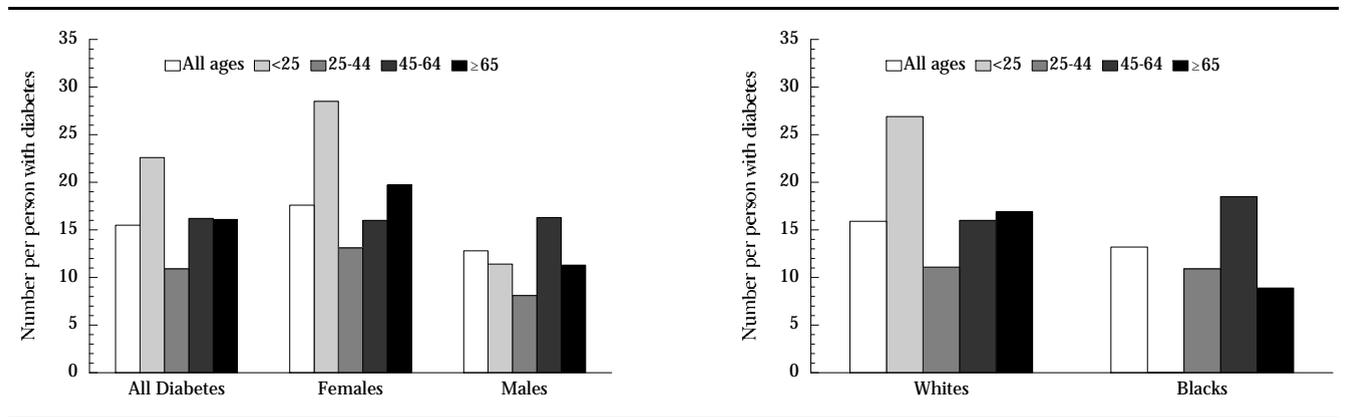
Characteristics	Place of contact and number per person with diabetes					
	All places	Telephone	Office	Outpatient clinic	Emergency room	Other
All persons	15.5	1.7	8.6	2.2	0.3	2.6
<25 years	22.6	6.4*	9.2*	0*	0*	6.9*
25-44 years	10.9	1.5*	5.7	0.8*	0.4*	2.4
45-64 years	16.2	1.6	8.6	4.1	0.3*	1.5
≥65 years	16.1	1.6	9.6	1.3	0.2*	3.4
Females	17.6	1.9	10.4	1.9	0.3*	3.1
<25 years	28.5	6.8*	11.1*	0*	0*	10.6*
25-44 years	13.1	1.3*	6.3	0.5*	0.7*	4.2
45-64 years	16.0	1.4	10.3	3.0	0.2*	1.1*
≥65 years	19.7	2.2	11.8	1.6	0.2*	4.0
Males	12.8	1.5	6.3	2.7	0.3*	2.0
<25 years	11.4*	5.7*	5.7*	0*	0*	0*
25-44 years	8.1	1.8*	5.0	1.3*	0*	0*
45-64 years	16.3	1.9	6.5	5.4	0.3*	2.1
≥65 years	11.3	0.8*	6.6	0.8*	0.3*	2.7
Whites	15.9	2.0	8.7	2.3	0.2*	2.6
<25 years	26.9	7.7*	11.0*	0*	0*	8.2*
25-44 years	11.1	1.9*	5.5	0.7*	0*	2.9
45-64 years	16.0	1.9	8.2	4.3	0.3*	1.2
≥65 years	16.9	1.9	9.9	1.5	0.3*	3.3
Blacks	13.2	0.4*	7.7	2.0	0.4*	2.7
<25 years	0*	0*	0*	0*	0*	0*
25-44 years	10.9	0*	7.1*	1.5*	2.2*	0*
45-64 years	18.5	0.7*	10.7	4.1	0*	3.0*
≥65 years	8.9	0.4*	4.9	0*	0*	3.7*

*Estimates may be unstable (relative standard error >30%) due to small sample size. Place of contact: all places excludes unknown place of contact; office includes doctor's office in hospital; other includes company or industry clinic and home visits.

Source: 1990 National Health Interview Survey

Figure 26.1

Rate of Physician Contacts for Ambulatory Care per Person with Diabetes, U.S., 1990



Places and types of physician contact include the physician's office, telephone, hospital outpatient clinic, emergency room, home visits, and industry and company clinics; diabetes is based on a self-report of physician-diagnosed diabetes.

Source: 1990 National Health Interview Survey

(age <25 years) and older (age ≥45 years) age groups, compared with age 25-44 years. Rates were somewhat higher among females relative to males and among whites relative to blacks (Figure 26.1).

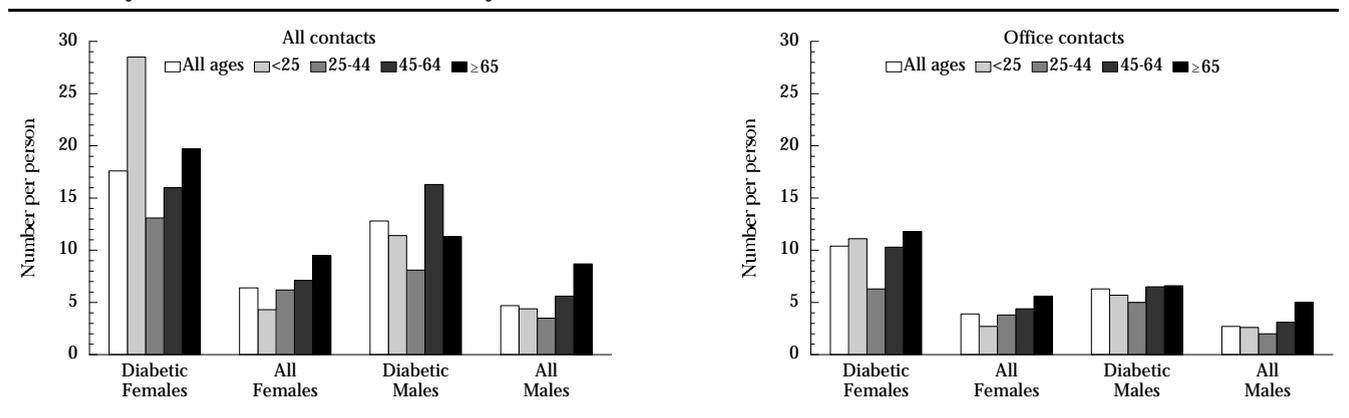
The total number of visits by persons with diabetes is almost certainly an overestimate of contacts with sources of ambulatory care specifically for treatment of diabetes and its complications. An estimate of the excess ambulatory care for people with diabetes can be made by comparing the NHIS data for diabetes and for all persons (Figure 26.2). It is apparent that ambulatory care contacts for those with diabetes are two to three times higher than for all persons in every age and sex group. In the 1990 NHIS, there was an average of 5.5 contacts per person among the entire civilian

noninstitutionalized population². The rate among persons with diabetes in 1990 was almost three times higher (15.5 contacts) (Table 26.2).

The NAMCS codes each physician visit to the primary diagnosis most associated with the patient's primary complaint; "other significant current diagnoses" are coded as second or third diagnoses. A maximum of three diagnoses may be recorded on the form. As noted above, NAMCS probably underestimates the number of visits by patients with diabetes. Table 26.3 summarizes the number of office-based physician visits with a principal diagnosis of diabetes, based on the NAMCS conducted during 1981-90. The total number of physician visits with a principal diagnosis of diabetes increased from 10.8 to 15.4 million over the dec-

Figure 26.2

Rate of Physician Contacts for Ambulatory Care for Persons with Diabetes and for All Persons, U.S., 1990



Places and types of physician contact for all contacts (left panel) include the physician's office, telephone, hospital outpatient clinic, emergency room, home visits, and industry and company clinics; for the right panel, place of contact is the physician's office; diabetes is based on a self-report of physician-diagnosed diabetes.

Source: 1990 National Health Interview Survey

Table 26.3

Visits to Office-Based Physicians in Which Diabetes Was the Diagnosis Most Associated with the Patient's Primary Complaint, U.S., 1981-90

Patient age, sex and race	Year and number of visits in thousands (%)			
	1981	1985	1989	1990
All visits	10,810 (100)	12,436 (100)	13,356(100)	15,394(100)
<25 years	401 (3.4)*	374 (3.0)	261 (2.0)*	374 (2.4)*
25-34 years	443 (4.1)*	530 (4.3)	569 (4.3)	406 (2.6)*
35-44 years	846 (7.8)	820 (6.6)	1,105 (8.3)	1,381 (9.0)
45-54 years	1,254 (11.6)	1,607 (12.9)	1,593 (11.9)	2,296 (14.9)
55-64 years	3,174 (29.5)	3,199 (25.7)	2,948 (22.1)	3,283 (21.3)
65-74 years	3,169 (29.4)	3,578 (28.8)	4,002 (30.0)	4,978 (32.3)
≥75 years	1,523 (14.1)	2,330 (18.7)	2,878 (21.5)	2,678 (17.4)
Females	5,913 (100)	7,593 (100)	7,736 (100)	8,283 (100)
<25 years	231 (3.4)*	208 (2.7)*	132 (1.7)*	257 (3.1)*
25-44 years	760 (12.9)	809 (10.7)	863 (11.2)	689 (8.3)
45-64 years	2,448 (41.7)	2,896 (38.1)	2,548 (32.9)	2,875 (34.7)
≥65 years	2,473 (42.1)	3,681 (48.5)	4,194 (54.2)	4,462 (53.9)
Males	4,897 (100)	4,843 (100)	5,619 (100)	7,111 (100)
<25 years	170 (3.5)*	166 (3.4)*	129 (2.3)*	117 (1.6)*
25-44 years	529 (10.8)	541 (11.2)	811 (14.4)	1,097 (15.4)
45-64 years	1,980 (40.4)	1,910 (39.4)	1,993 (35.5)	2,703 (38.0)
≥65 years	2,219 (45.3)	2,226 (46.0)	2,686 (47.8)	3,194 (44.9)
Whites	8,800 (100)	10,799 (100)	10,562 (100)	12,077 (100)
<25 years	362 (3.9)*	307 (2.8)*	253 (2.4)*	218 (1.8)*
25-44 years	1,046 (11.9)	1,211 (11.2)	1,251 (11.9)	1,531 (12.7)
45-64 years	3,352 (38.2)	4,007(37.1)	3,418 (32.4)	4,157 (34.4)
≥65 years	4,040 (46.0)	5,274 (48.8)	5,640 (53.4)	6,170 (51.1)
Blacks	1,994 (100)	1,498 (100)	1,939 (100)	2,415 (100)
<25 years	23 (1.2)*	67 (4.5)*	0 (0)*	117 (4.9)*
25-44 years	243 (12.2)*	139 (9.3)*	247 (12.7)*	181 (7.5)*
45-64 years	1,075 (54.0)	749 (50.0)	879 (45.3)	1,068 (44.2)
≥65 years	652 (32.7)	543 (36.2)	814 (42.0)	1,049 (43.4)

* Estimates may be unstable (relative standard error >30%) due to small sample size. Number of contacts is shown in thousands; numbers in parentheses are percent of total for each age/sex/race group; diabetes defined as ICD-9-CM codes 250 (all), 357.2, 362.0, 366.41, and 648.0.

Source: 1981, 1985, 1989, and 1990 National Ambulatory Medical Care Surveys

ade. Table 26.4 shows the average annual number of NAMCS office-based physician visits in which diabetes was listed as any of the three possible diagnoses during 1990-91. The average number of visits with a primary diagnosis of diabetes to office-based physicians varied from 2.0 visits per person with diabetes per year in 1981 to 2.5 in 1990; the average number of office visits in which diabetes was listed as any one of the three allowable physician's diagnoses ranged from 3.3 per person per year in 1981 to 4.0 in 1990. Whether one examines only those NAMCS office visits in which diabetes was the diagnosis most associated with the patient's primary complaint, or all visits to office-based physicians in which diabetes was listed as any of three possible physician's diagnoses, the total number of visits in which diabetes is listed has in-

Table 26.4

Number of Visits to Office-Based Physicians in Which Diabetes Was Listed as a Diagnosis, U.S., 1990-91

	Average annual number of visits (millions)
All diabetic persons	23.7
<35 years	1.1
35-54 years	5.3
55-64 years	4.9
65-74 years	7.9
≥75 years	4.4
Females	13.6
<35 years	7.1
35-54 years	2.8
55-64 years	2.7
65-74 years	4.7
≥75 years	2.7
Males	10.1
<35 years	0.4
35-54 years	2.5
55-64 years	2.2
65-74 years	3.2
≥75 years	1.8

Number includes all visits in which diabetes was the first, second, or third listed of three possible diagnoses; diabetes defined as ICD-9-CM codes 250(all), 357.2, 362.0, 366.41, and 648.0.

Source: 1990 and 1991 National Ambulatory Medical Care Surveys

Table 26.5

Number of Visits to Office-Based Physicians for All Diagnoses and for Diabetes Diagnoses, U.S., 1981-90

Year	Number of visits (thousands) for all physician diagnoses	Number of visits (thousands) with physician diagnosis of diabetes as		
		Primary diagnosis	Second or third diagnosis	Any diagnosis
1981	585,177	10,810	7,359	17,875
1985	636,386	12,436	9,365	20,745
1989	692,702	13,356	9,788	21,955
1990	704,604	15,394	11,222	24,968

Diabetes defined as ICD-9-CM codes 250 (all), 357.2, 362.0, 366.41, and 648.0.; 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; 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 second/third diagnoses because diabetes was listed more than once in some visits.

Source: 1981, 1985, 1989, and 1990 National Ambulatory Medical Care Surveys

creased markedly during the past decade. While total visits for all conditions in all people increased by 20% during 1981-90, visits in which diabetes was listed increased by 44% (Table 26.5). The relative impact of diabetes among all chronic conditions is further illus-

Table 26.6

Number of Return Visits to Office-Based Physicians for Care of the 10 Most Frequent Diagnoses Associated with the Patient's Primary Complaint, U.S., 1981-90

Principal diagnosis (ICD-9-CM code)	Year and rank and number of visits in thousands (%)							
	1981		1985		1989		1990	
	Rank	Visits	Rank	Visits	Rank	Visits	Rank	Visits
All return visits		375,537 (100)		384,128 (100)		422,207 (100)		431,006 (100)
Essential hypertension (401.9)	1	26,297 (7.0)	1	23,062 (6.0)	1	24,088 (5.7)	1	23,784 (5.5)
Pregnancy (V22.1/2)	2	20,856 (5.6)	2	19,305 (5.0)	2	19,502 (4.6)	2	17,625 (4.1)
Health check—child or infant (V20.2)	3	13,706 (3.6)	3	11,896 (3.1)	4	10,059 (2.4)	4	10,880 (2.5)
Diabetes mellitus (250.0)	4	8,955 (2.4)	4	9,488 (2.5)	5	9,776 (2.3)	5	10,471 (2.4)
Otitis media (382.9)	6	7,248 (1.9)	5	8,347 (2.2)	3	10,643 (2.5)	3	11,559 (2.7)
Allergic rhinitis (477.9)	7	6,666 (1.8)	7	5,760 (1.5)	6	9,074 (2.1)	6	9,235 (2.1)
Upper respiratory infection (465.9)	8	5,971 (1.6)	8	5,193 (1.4)	9	4,977 (1.2)	8	6,296 (1.5)
General medical exam (V70.0/9)			10	4,449 (1.2)	7	6,519 (1.5)	7	6,967 (1.6)
Followup to surgery (V67.0)	5	7,959 (2.1)	6	7,806 (2.0)				
Acne (706.1)	9	5,694 (1.5)						
Cataract (366.9)			9	4,500 (1.2)			9	5,916 (1.4)
Chronic sinusitis (473.9)							10	5,220 (1.2)
Gynecological exam (V72.3)	10	4,933 (1.3)						
Postsurgical status (V45.89)					8	5,752 (1.4)		
Asthma (493.9)					10	4,831 (1.1)		

ICD-9-CM, *International Classification of Diseases, 9th Revision, Clinical Modification*; table shows number of visits in thousands and percent of all visits in parentheses; only primary diagnoses (first of three possible physician's diagnoses) are included.

Source: 1981, 1985, 1989, and 1990 National Ambulatory Medical Care Surveys

Table 26.7

Number of Persons with Diabetes by Interval Since Last Physician Contact in Outpatient and Inpatient Settings, U.S., 1990

Characteristics	Interval since last physician contact and diabetic population in thousands (%)				
	All intervals	<1 year	1 to <2 years	2 to <5 years	≥5 years
All persons	6,212 (100)	5,955 (95.9)	156 (2.5)	75 (1.2)	26* (0.4)
<25 years	141 (100)	141 (100)	0* (0)	0* (0)	0* (0)
25-44 years	962 (100)	938 (97.6)	23* (2.4)	0* (0)	0* (0)
45-64 years	2,329 (100)	2,182 (93.7)	98 (4.2)	49 (2.1)	0* (0)
≥65 years	2,780 (100)	2,694 (96.9)	35* (1.2)	25* (0.9)	26* (0.9)
Females	3,478 (100)	3,355 (96.5)	84 (2.4)	26* (0.7)	14* (0.4)
<25 years	92 (100)	92 (100)	0* (0)	0* (0)	0* (0)
25-44 years	539 (100)	527 (97.8)	12* (2.2)	0* (0)	0* (0)
45-64 years	1,264 (100)	1,201 (95.0)	37* (3.0)	26* (2.0)	0* (0)
≥65 years	1,583 (100)	1,534 (97.0)	35* (2.2)	0* (0)	14* (0.9)
Males	2,734 (100)	2,601 (95.1)	72 (2.6)	49 (1.8)	13* (0.5)
<25 years	49 (100)	49 (100)	0* (0)	0* (0)	0* (0)
25-44 years	422 (100)	411 (97.3)	11* (2.7)	0* (0)	0* (0)
45-64 years	1,066 (100)	981 (92.1)	61 (5.7)	24* (2.2)	0* (0)
≥65 years	1,198 (100)	1,160 (96.9)	0* (0)	25* (2.1)	13* (1.0)
Whites	5,021 (100)	4,812 (95.9)	121 (2.4)	61 (1.2)	26* (0.5)
<25 years	119 (100)	119 (100)	0* (0)	0* (0)	0* (0)
25-44 years	771 (100)	747 (97.0)	23* (3.0)	0* (0)	0* (0)
45-64 years	1,801 (100)	1,691 (93.9)	74 (4.1)	36* (2.0)	0* (0)
≥65 years	2,330 (100)	2,256 (96.8)	23* (1.0)	25* (1.1)	26* (1.1)
Blacks	1,054 (100)	1,018 (96.6)	23* (2.2)	13* (1.2)	0* (0)
<25 years	23* (100)	23* (100)	0* (0)	0* (0)	0* (0)
25-44 years	180 (100)	180 (100)	0* (0)	0* (0)	0* (0)
45-64 years	460 (100)	435 (94.7)	11* (2.5)	13* (2.9)	0* (0)
≥65 years	392 (100)	380 (97.1)	11* (2.9)	0* (0)	0* (0)

*Estimates may be unstable (relative standard error >30%) due to small sample size. Number of persons with diabetes is shown in thousands; numbers in parentheses are percent of total for each age/sex/race group; table includes ambulatory care physician contacts and physician contacts while an overnight patient in hospital (see Chapter 27 for information on hospitalization rates).

Source: 1990 National Health Interview Survey

trated in Table 26.6, which lists and ranks the number of visits for the 10 most frequently cited principal diagnoses associated with the patient's primary complaint during return visits for the care of old problems. If one considers prenatal and child health checks as belonging in a somewhat different category, this table confirms that diabetes has consistently ranked second only to hypertension among chronic conditions most often associated with a patient's primary complaint during visits to office-based physicians.

Table 26.8
Frequency of Visits by Diabetic Patients to Their Regular Physician for Medical Care for Diabetes, Age ≥18 Years, U.S., 1989

	All diabetic persons (%)	IDDM (%)	NIDDM taking insulin (%)	NIDDM not taking insulin (%)
Age ≥18 years				
Regular physician for diabetes	90.9	87.9	91.3	91.0
0-1 visits in past year	10.7	19.8	8.3	11.2
2-3 visits in past year	21.3	31.8	17.9	22.5
4-6 visits in past year	33.3	22.0	34.1	34.1
>6 visits in past year	25.5	14.1	30.9	23.0
No regular physician for diabetes	9.1	12.1	8.7	9.0
Age 18-44 years				
Regular physician for diabetes	85.2	88.3	89.8	78.5
0-1 visits in past year	14.6	18.8	7.5	16.8
2-3 visits in past year	28.5	35.8	30.3	21.4
4-6 visits in past year	21.7	17.3	23.4	24.3
>6 visits in past year	20.1	16.2	28.3	15.8
No regular physician for diabetes	14.8	11.7	10.2	21.5
Age 45-64 years				
Regular physician for diabetes	91.7	89.1	91.8	92.1
0-1 visits in past year	11.7		10.3	12.6
2-3 visits in past year	20.9		16.8	24.1
4-6 visits in past year	31.8		30.6	32.3
>6 visits in past year	27.2		34.1	22.9
No regular physician for diabetes	8.3	10.9	8.2	7.9
Age ≥65 years				
Regular physician for diabetes	92.2		91.3	92.7
0-1 visits in past year	8.3		6.5	9.0
2-3 visits in past year	19.2		15.2	21.5
4-6 visits in past year	38.5		41.1	37.4
>6 visits in past year	25.9		28.3	24.6
No regular physician for diabetes	7.9		8.7	7.3

IDDM was defined by age at onset <30 years, continuous insulin use since diagnosis of diabetes, and percent desirable weight <120; all other persons with a physician diagnosis of diabetes were considered to have NIDDM (Reference 9).

Source: 1989 National Health Interview Survey

FREQUENCY OF OUTPATIENT CONTACTS

As shown in Table 26.2, persons with diabetes reported an average of 15.5 contacts per person with the outpatient care system during 1990. Persons with diabetes are clearly regular and frequent users of medical care. This is reinforced by data on interval since last physician contact, from the 1990 NHIS (Table 26.7). Compared with 78% of the general population², 96% of all persons with diabetes indicated that they had seen or talked to a medical doctor or assistant within the past year in either outpatient or inpatient settings. This was consistent across age, sex, and race groups. When respondents to the 1989 NHIS Diabetes Supplement were asked about the nature and frequency of contacts with a medical doctor, 91% indicated that they had one physician whom they saw for regular care of their diabetes (Table 26.8). Almost 60% had seen this physician at least four times in the previous year. When the respondents were divided by probable type of diabetes (based on body mass index, age at diagnosis, and history of insulin use)⁹, persons with insulin-dependent diabetes mellitus (IDDM) reported a tendency toward less frequent contacts (<4 times in the past year) than those with non-insulin-dependent diabetes mellitus (NIDDM) (Figure 26.3). Regardless of type of diabetes, contacts were more frequent among older age groups.

Figure 26.3
Frequency of Visits to a Physician for Regular Diabetes Care, Age ≥18 Years, U.S., 1989

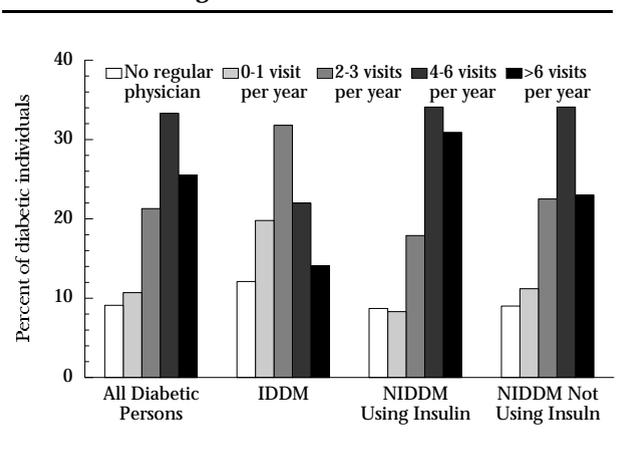


Figure shows percent distribution of adults with diagnosed diabetes according to number of visits in the past year to the physician who is their regular source of diabetes care; diabetes is based on a self-report of physician-diagnosed diabetes; IDDM is defined as age at diagnosis <30 years, percent desirable weight <120, and continuous insulin use; all other diabetic subjects are considered to have NIDDM.

Source: Reference 7; 1989 National Health Interview Survey

CHARACTERISTICS OF OUTPATIENT CONTACTS

The type of specialist seen in diabetes-related visits, as recorded in the 1985 NAMCS¹⁰ and the 1990-91 NAMCS, is shown in Table 26.9 and Figure 26.4. It is apparent that only 8% of visits in 1990-91 were made to specialists in diabetes and endocrinology. More than 34% of visits were made to general and family practitioners. In the 1989 NHIS, persons with self-reported diabetes were asked whether they had seen certain specialists during the past year, in addition to their regular diabetes physician. Figure 26.5 shows that less than half of persons with diabetes saw an ophthalmologist in the past year, only 21% saw a dietitian or nutritionist, and only 17% saw a podiatrist. Other characteristics of ambulatory care for adults with diabetes drawn from the 1989 NHIS are shown in Appendix 26.2.

As would be expected with a chronic disease, the majority of office visits with a principal diagnosis of diabetes were made for ongoing care, i.e., return visits. About 677,000 new cases of diabetes were reported in the 1989 NHIS, a rate that has been fairly consistent over the past decade¹¹. In 1989, 658,000 physician visits by new patients with a principal diag-

Table 26.9
Distribution of Ambulatory Care Visits for Diabetes by Physician Specialty, U.S., 1985 and 1990-91

Physician specialty	Percent of visits	
	1985	1990-91
Primary care specialties	78.8	80.0
Family practice	20.6	20.0
General practice	21.7	14.4
Internal medicine	33.2	37.2
Pediatrics	0.8	0.5
Diabetes/endocrinology	2.5	7.9
Subspecialties	21.2	20.0
Surgical specialties	5.9	2.7
Ophthalmology	4.5	5.9
Cardiovascular disease	2.9	3.5
Obstetrics and gynecology	1.9	0.9
Kidney/urology	1.2	1.9
Gastroenterology	0.7	0.4
Psychiatry	0.5	0.2
Neurology	0.4	0.5
All other	3.3	4.0

Diabetes defined as ICD-9-CM codes 250 (all), 357.2, 362.0, 366.41, and 648.0; table includes all visits in which diabetes was listed as one of three possible physician's diagnoses associated with the patient's reason for the visit.

Source: Reference 10 (1985); 1990 and 1991 National Ambulatory Medical Care Surveys

nosis of diabetes were reported in the NAMCS, reflecting this annual incidence rate.

Among NAMCS visits to ambulatory care physicians in which diabetes was the principal diagnosis, 33%-37% were of 11-15 minutes duration in 1981-90 (Table 26.10). The percentage of visits lasting 16-30 minutes and 31-60 minutes increased slightly over the same period. In 1990, 32% of visits in which diabetes was the primary diagnosis lasted more than 15 minutes (Figure 26.6). If mean duration of the visit is examined (Table 26.11), it is clear that there is an upward trend. This is particularly reflected in the

Figure 26.4
Physician Specialty in Visits Listing Diabetes as a Diagnosis, U.S., 1990-91

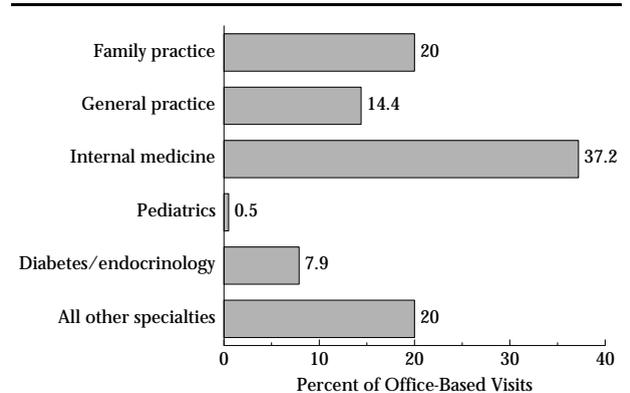


Figure shows percent distribution of all visits to office-based physicians in which diabetes was the first, second, or third listed diagnosis of three possible diagnoses.

Source: 1990-91 National Ambulatory Care Survey

Figure 26.5
Visits by Adults with Diabetes to Health Care Specialists, U.S., 1989

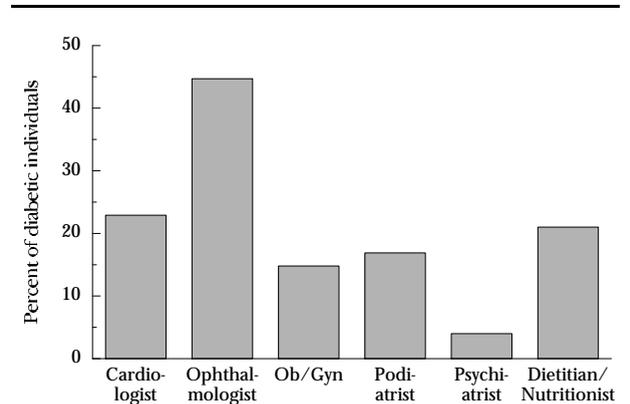


Figure shows percent of diabetic adults age ≥18 years who reported seeing the specialist during the previous year; diabetes is based on a self-report of physician-diagnosed diabetes.

Source: Reference 7; 1989 National Health Interview Survey

Table 26.10

Duration of Visits to Office-Based Physicians in Which Diabetes Was the Diagnosis Most Associated with the Patient's Primary Complaint, U.S., 1981-90

Duration of visit (minutes)	Year and percent distribution			
	1981	1985	1989	1990
0	4.5*	3.2	1.6*	0.5*
1-5	8.3	6.1	6.4	6.4
6-10	27.2	26.0	23.3	23.6
11-15	33.3	37.2	33.7	37.3
16-30	22.8	23.7	29.1	24.8
31-60	3.2*	3.3	5.2	6.4
>60	0.7*	0.4*	0.7*	1.0*

*Estimates may be unstable (relative standard error >30%) due to small sample size. Diabetes defined as ICD-9-CM codes 250 (all), 357.2, 362.0, 366.41, and 648.0; visits of zero minutes duration are those in which there was no face-to-face contact between patient and physician.

Source: 1981, 1985, 1989, and 1990 National Ambulatory Medical Care Surveys

mean duration of face-to-face office visits with general and family practitioners, who are seen in 34% of NAMCS visits by persons with diabetes (Table 26.9). Although they have not tended to increase in length over time, visits to specialists, such as internists, cardiologists, and ophthalmologists, have consistently been the longest in duration. Not surprisingly, visits by new patients have also been longer in duration than return visits by old patients (Table 26.11).

The conditions to which the visit is attributed in NAMCS might be expected to predict the diagnostic and counseling services performed or prescribed during the visit. Indeed, the pattern of services provided

Figure 26.6

Duration of Visit for Office-Based Visits Listing Diabetes as Primary Diagnosis, U.S., 1990

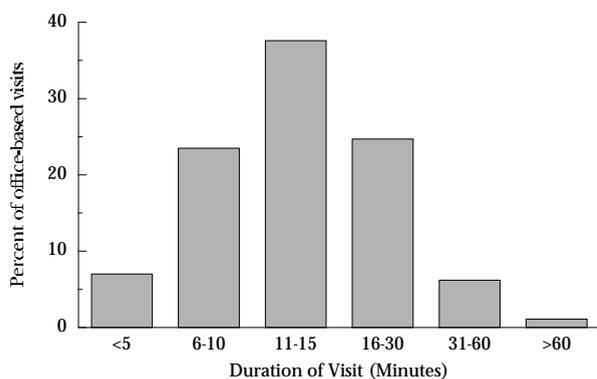


Figure shows the percent distribution of visits to office-based physicians in which diabetes was the diagnosis most associated with the patient's primary complaint.

Source: 1990 National Ambulatory Medical Care Survey

Table 26.11

Mean Duration of Face-to-Face Visits to Office-Based Physicians in Which Diabetes Was the Diagnosis Most Associated with the Patient's Primary Complaint, U.S., 1981-90

Physician specialty and prior-visit status	Year and mean duration in minutes			
	1981	1985	1989	1990
All physician specialties	15.3	15.5	17.0	17.5
General and family practice	13.6	14.6	14.6	14.8
Internal medicine	18.2	17.1	16.9	20.4
General surgery	13.5	12.7	15.6	14.7
Cardiovascular surgery	21.0	17.3	18.8	20.5
Ophthalmology	23.3	19.5	23.0	17.9
All other specialties	18.2	17.6	22.8	17.3
Prior-visit status				
New patient	30.4	29.5	36.5	30.0
Old patient	15.0	15.3	16.3	16.6

Diabetes defined as ICD-9-CM codes 250 (all), 357.2, 362.0, 366.41, and 648.0; table excludes office visits recorded as having zero duration.

Source: 1981, 1985, 1989, and 1990 National Ambulatory Medical Care Surveys

in a given year were substantially different for visits attributed primarily to diabetes versus all visits (Table 26.12). The higher frequency with which blood pressure, cholesterol, and visual acuity were measured reflects the spectrum of comorbidities that characterize diabetes. Urinalysis and blood tests were performed substantially more frequently during diabetes-associated visits, reflecting use of these tests in diabetes management. Patients with diabetes were also counseled on weight and cholesterol reduction much more frequently than the general population. The data in Table 26.12 are not stratified by age, and some proportion of the differences may reflect differences in age of the diabetic versus the general population.

Medicare data from 1989 indicated that diabetes was the underlying cause of 25% of all cases of end-stage renal disease in the United States¹². For this reason, dialysis encounters are an important component of diabetes-related outpatient visits. Both NMEs and NHIS include data on hospital-based dialysis encounters in their enumeration of diabetes-related hospital outpatient contacts; however, outpatient dialysis encounters at free-standing dialysis centers are not included. In 1990, these represented 60% of all dialysis centers in the United States. Data on renal dialysis are presented in Chapter 16.

Table 26.12

Diagnostic and Counseling Services in Visits to Office-Based Physicians in Which Diabetes Was the Diagnosis Most Associated with the Patient's Primary Complaint and for All Diagnoses, U.S., 1989-90

Selected services	1989		1990	
	Diabetes diagnoses (%)	All diagnoses (%)	Diabetes diagnoses (%)	All diagnoses (%)
Diagnostic and screening services				
None	6.8	38.4	6.3	36.1
Blood pressure checks	72.4	34.9	77.0	38.5
Urinalysis	17.9	12.7	25.5	12.8
Cholesterol measure	9.7	3.6	9.9	3.7
Visual acuity	7.9	6.5	7.3	6.4
Rectal exam	3.4*	3.6	3.5	3.7
Stool blood	2.7*	2.2	3.7	2.5
Other blood tests	54.6	12.7	57.6	13.3
Other services	25.1	25.4	22.6	25.0
Counseling services				
None	44.1	62.9	37.8	62.8
Weight reduction	32.4	6.3	35.2	6.3
Cholesterol reduction	9.8	3.1	15.6	3.2
Smoking cessation	3.1*	2.2	4.1	2.1
Other counseling/advice	30.5	27.9	33.8	28.2

*Estimates may be unstable (relative standard error >30%) due to small sample size. Diabetes defined as ICD-9-CM codes 250 (all), 357.2, 362.0, 366.41, and 648.0; column totals may exceed 100% because more than one category may be reported per visit. Percentages reflect number of visits which included the designated service.

Source: 1989 and 1990 National Ambulatory Medical Care Surveys

Table 26.13

Expected Sources of Payment for Visits to Office-Based Physicians in Which Diabetes Was the Diagnosis Most Associated with the Patient's Primary Complaint, U.S., 1985-90

Expected source of payment	Year and percent of total visits		
	1985	1989	1990
Self pay	42.7	33.2	29.7
Medicare	38.8	44.0	45.9
Medicaid	12.6	8.9	10.3
Blue Cross-Blue Shield	12.9	6.7	9.6
Other commercial insurance	8.7	14.7	16.3
HMO/prepaid plan	10.0	13.8	10.8
No charge	1.1*	1.3*	1.6*
Other	2.3*	3.0*	3.2
Unknown	0.5*	1.2*	0.7*

*Estimates may be unstable (relative standard error >30%) due to small sample size. Diabetes defined as ICD-9-CM codes 250 (all), 357.2, 362.0, 366.41, and 648.0; column totals exceed 100% because more than one category was reported per visit; HMO, health maintenance organization.

Source: 1985, 1989, and 1990 National Ambulatory Medical Care Surveys

payment is expected to come from the patient (self-pay) has decreased, and the percentage reimbursed by Medicare has increased. The large percentage of visits covered by Medicare reflects the older average age of people with diabetes in the United States. There may be an overall decrease in the proportion of visits reimbursed by Blue Cross-Blue Shield and an increase in those covered by prepaid plans, which would follow national trends, but the data are not definitive. Additional data on health insurance coverage for diabetes are in Chapter 29 of this volume.

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SOURCES OF PAYMENT FOR AMBULATORY CARE VISITS

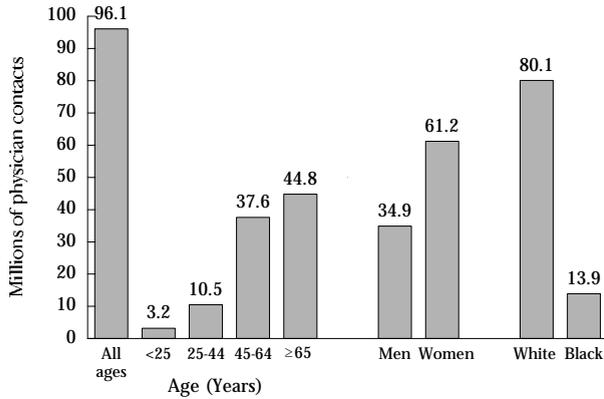
For visits to office-based physicians, the distribution of expected sources of payment, as reported by the physician, is listed in Table 26.13. There are two notable trends: the percentage of visits for which some

REFERENCES

1. Massey JT, Moore TF, Parsons VL: Design and estimation for the National Health Interview Survey, 1985-94. National Center for Health Statistics, *Vital and Health Statistics Series 2*, no. 110, 1989
2. National Center for Health Statistics: Current estimates from the National Health Interview Survey, 1990. *Vital and Health Statistics Series 10*, no. 181, 1991
3. Harris MI: Ambulatory medical care for diabetes. In *Diabetes in America*. Harris MI, Hamman RF, eds. DHHS publ. no. 85-1468, 1985
4. American Diabetes Association: Direct and Indirect Costs of Diabetes in the United States in 1992. Alexandria, VA, ADA, 1993
5. Bryant E, Shimizu I: Sample design, sampling variances, and estimation procedures for the National Ambulatory Medical Care Survey. National Center for Health Statistics, *Vital and Health Statistics Series 2*, no. 108, 1988
6. Schappert S: Office visits for diabetes mellitus: United States, 1989. *Vital and Health Statistics Advance Data*, no. 211, National Center for Health Statistics, 1992
7. Harris MI, Eastman RC, Siebert C: The DCCT and medical care for diabetes in the U.S. *Diabetes Care* 17:761-64, 1994
8. Edwards WS, Berlin M: National Medical Expenditure Survey, Questionnaires and Data Collection Methods for the Household Survey and the Survey of American Indians and Alaska Natives. Methods 2. National Center for Health Services Research and Health Care Technology Assessment, DHHS publ. no. (PHS) 89-3450, 1989
9. Harris MI, Cowie CC, Howie LJ: Self-monitoring of blood glucose by adults with diabetes in the United States population. *Diabetes Care* 16:1116-23, 1993
10. Harris MI: Testing for blood glucose by office-based physicians in the U.S. *Diabetes Care* 13:419-26, 1990
11. Division of Diabetes Translation, Centers for Disease Control: *Diabetes Surveillance, 1991*. DHHS publ. no. 635-150, 1992
12. Health Care Financing Administration: *Health Care Financing Research Report: End-Stage Renal Disease, 1990*. DHHS publ. no. 03328, 1992

APPENDICES

Appendix 26.1
Number of Physician Contacts for Ambulatory Care Among Persons with Diabetes, U.S., 1990



Places of physician contact include the physician's office, telephone, hospital outpatient clinic, emergency room, home visits, and industry and company clinics; diabetes is based on a self-report of physician-diagnosed diabetes.

Source: 1990 National Health Interview Survey

Appendix 26.2
Characteristics of Ambulatory Care for Patients with Diabetes, Age ≥18 Years, U.S., 1989

	IDDM	NIDDM, not insulin-treated	NIDDM, insulin-treated
Patient Demographic Characteristics			
Mean age (years)	34.1	60.6	62.6
White (%)	92.0	63.4	73.7
Black (%)	3.7	26.7	16.0
Other race/ethnicity (%)	4.3	10.0	10.3
Education beyond high school (%)	50.6	21.8	20.4
Family income >\$25,000 (%)	64.6	34.0	32.9
Mean duration of diabetes (years)	18.0	13.4	8.6
Patient Clinical Characteristics			
≥4 visits to diabetes physician in past year (%)	36.1	65.0	57.1
Visit to cardiologist in past year (%)	4.7	26.7	22.4
Visit to ophthalmologist in past year (%)	54.4	50.8	39.8
Dilated eye examination in past year (%)	56.9	54.6	43.6
Visit to podiatrist in past year (%)	7.9	22.5	14.0
Health professional has checked feet at least twice in past 6 months (%)	24.4	38.8	25.3
≥2 insulin injections per day (%)	61.1	47.6	
≥3 insulin injections per day (%)	13.5	3.1	
Uses insulin pump (%)	0.7	0.2	
Mean years of insulin use	18.0	8.0	
Mean units insulin per day	47.1	50.7	
Mean percent desirable weight	101.3	131.6	129.7
Percent desirable weight ≥120 (%)		61.2	60.1
Self-tests blood glucose at least once per day (%)	39.5	25.8	5.3
Health professional has checked blood glucose at least four times in past year (%)	52.9	70.4	67.0
Visit to dietitian/nutritionist in past year	20.8	24.5	18.6
Has had diabetes education class or course (%)	58.6	48.9	23.7
Mean patient education hours	15.7	13.3	9.1
Ever heard of glycosylated hemoglobin (%)	43.3	16.7	12.5

IDDM was defined as diabetes onset at age <30 years, continuous insulin use, and percent desirable weight <120.

Source: Reference 7; 1989 National Health Interview Survey