
Special Articles



Medical Expenditures and Insurance Coverage for People With Diabetes: Estimates From the National Medical Care Expenditure Survey

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Access to health insurance and protection against expenditures for medical care are of special concern to diabetic patients in the United States. This study examines some information on the extent and breadth of public and private health insurance for individuals with diabetes, as well as some estimates of their use of health-care services and their mean expenses for this care.

About 12% of all diabetic patients <65 yr old (~311,000 individuals) were uninsured throughout 1977, a rate not much different from that for the rest of the United States population. Those with diabetes who are uninsured tend to be younger, Black or Hispanic, in excellent or good health, and live outside of metropolitan areas and in the South or West.

As expected, diabetic patients use more medical care than others of their age and sex, and their medical expenses are also much higher, particularly in younger age groups. In 1977, average total medical-care expenses for people with diabetes were \$1514 compared with \$548 for the rest of the population. They and their families paid ~ 20% out of pocket (~\$355). Their health insurance premiums were not much different from those without diabetes, averaging ~ \$1000 in 1977 for those under age 65. The private insurance coverage for diabetic patients was similar to that for others, although slightly fewer had major medical coverage than the general population. *Diabetes Care* 10:87-94, 1987

Access to insurance coverage and protection against expenditures for medical care are of special concern to diabetic patients. People with diabetes often have difficulty obtaining individual health insurance at an affordable price and may not be able to find employment that would provide group coverage. Insurance companies may offer only limited coverage or charge higher premiums to those with diabetes because their illnesses are often more severe due to complications of diabetes (1). In addition, diabetic patients may be admitted to the hospital more readily and have longer stays than those without diabetes. Reimbursement for outpatient education and for medical supplies can also be a problem. Sinnock and Bauer (2,3) found that these items were not routinely covered by health insurance and that reimbursement differed by the type of coverage, the state of residence, and the item or procedure under consideration.

The literature has addressed in general the issue of the insurability of people with diabetes, but few empirical data have previously been available that would permit detailed national estimates of the health insurance benefits actually

held by the diabetic population of the United States. The purpose of this paper is to provide information on the breadth and depth of their public and private health insurance coverage, as well as a description of their use of health services and their expenses.

Overall, we found that many people with diabetes had no insurance, although the percentage of the diabetic population without health insurance was not significantly different from that of the nondiabetic population. In addition, people with diabetes used more health services than others and had much higher medical-care expenses than the rest of the population, even after controlling for age. Therefore, their out-of-pocket payments for medical care were much higher than those for people without diabetes. Health insurance premiums and policies were similar for both those with diabetes and those without in 1977.

DESCRIPTION OF DATA

The data presented here are based on the 1977 National Medical Care Expenditure Survey (NMCES) (4,5). This sur-

vey is the only data set available that contains detailed information on many aspects of insurance coverage as well as medical-care use and expenditures. These estimates provide a useful point of comparison for an analysis of the effects of recent changes in the market for health insurance and medical care. The survey provides detailed national estimates for the civilian noninstitutionalized population in the United States on the use of health services, health expenditures, and health insurance coverage, in addition to sociodemographic and economic information based on the 40,000 individuals in the sample. Use of and expenditures for health services and sociodemographic characteristics of individuals and families were identified from data obtained in the household survey, which was conducted over five rounds of interviewing. The household reference period was January 1 to December 31, 1977. Estimates of private health insurance coverage and premiums, type of policy, and sources of premium payment are based on the Health Insurance/Employer Survey (HIES). The HIES was undertaken to obtain more specific insurance data than the household survey. Information was obtained from the employers, unions, insurance companies, and other organizations identified by NMCES households as the source of their private insurance coverage. The HIES respondent was asked if the policy covered a family, a couple, or an individual and whether it was issued on a group or individual basis. A copy of the policy describing the benefits offered was requested and subsequently abstracted for computer analysis. Participation in public programs, such as Medicare and Medicaid, was obtained from household respondents. Information on the benefits offered under Medicare, CHAMPUS/CHAMPVA, and each state's Medicaid program in 1977 was obtained from administrative sources and coded onto the same forms that were used for private insurance.

Although the survey was comprehensive, it does not provide detailed information on all aspects of coverage. In most instances, we do know about deductibles, coinsurance rates,

limits on out-of-pocket expenditures, and maximum benefits. We also know whether individuals were covered for hospital stays, physicians' services, dental care, vision care, drugs, routine physicals, and outpatient psychiatric care. However, we do not have information regarding coverage for medical devices, equipment and supplies, or patient education.

Because the numbers presented here are based on a survey, they are only estimates of the true population parameters and are subject to standard errors that must be taken into account when making comparisons across groups (5,6). And even though the NMCES sample is large for a survey of its kind, it is not large enough for precise estimates for all population subgroups. Diabetes is a relatively common disease; NMCES data indicate that the actual number of diagnosed cases in the United States was ~ 4.5 million in 1977, slightly over half of whom were under age 65. Nevertheless, the relative standard errors are fairly large for certain subsets of this population and many apparent differences in the tables are not statistically significant.

RESULTS

Insurance coverage. Public and private health insurance coverage in the United States in 1977 are shown in Table 1 for individuals with and without diabetes. About 12% of the diabetic population under age 65 (~ 311,000 individuals) was uninsured throughout 1977. This is not significantly different from the percentage for the nondiabetic population (9.0%). Those with diabetes who were uninsured tended to be Black or Hispanic, poorer and younger than the rest of the diabetic population. They also were more likely to live outside of big cities and in the South and West. In addition, individuals with diabetes who considered themselves in excellent or good health were less likely to have been insured than those in fair or poor health. Most third-party coverage (~ 70%) was provided through private insurance. Diabetic patients who were female, Black or Hispanic, and in reported

TABLE 1
Health insurance coverage in the United States in 1977

	Age < 65 yr		Age ≥ 65 yr	
	People with diabetes	People without diabetes	People with diabetes	People without diabetes
Total population (thousands)	2525	187,312	1986	20,293
Private insurance with and without Medicaid				
Same group	63.2	73.2	26.9	24.7
Nongroup only	10.9	7.6	40.1	41.9
Medicaid only	8.6	7.1	NA	NA
Medicare only	NA	NA	14.6	20.6
Always uninsured	12.3	9.0	NA	NA
Medicare with and without Medicaid				
Medicaid	3.5	0.8	15.4	10.6
Other	1.5	2.3	3.0	1.8

NA, not applicable (too small to estimate).

TABLE 2
Utilization of medical care in the United States in 1977

	People with diabetes	People without diabetes
All ages		
Population (thousands)	4632	207,490
Percentage with ambulatory doctor visit	94.8	75.6
Mean number of visits (if visits \geq 1)	9.1	5.2
Percentage with hospital stay	27.5	11.3
Mean length of stay for those with stay (days)	15.9	8.6
Mean prescription drugs (for those with drugs)*	20.7	6.7
Percentage with nonphysician visits†	34.4	21.3
Percentage with purchase of other medical equipment and supplies‡	17.0	6.4
Under 45 yr		
Population (thousands)	702	145,719
Percentage with ambulatory doctor visit	96.2	74.4
Mean number if visits (if visits \geq 1)	7.1	4.6
Percentage with hospital stay	24.8	9.5
Mean length of stay for those with stay (days)	11.6	5.9
Mean prescription drugs for those with drugs*	12.0	4.6
Percentage with nonphysician visits†	32.5	19.6
Percentage with purchase of other medical equipment and supplies‡	19.1	5.0
45-64 yr		
Population (thousands)	1913	41,492
Percentage with ambulatory doctor visit	94.0	76.9
Mean number if visits (if visits \geq 1)	9.7	6.0
Percentage with hospital stay	24.5	13.6
Mean length of stay for those with stay (days)	13.2	11.2
Mean prescription drugs for those with drugs*	21.9	9.5
Percent with nonphysician visits†	34.3	24.0
Percent with purchase of other medical equipment and supplies‡	13.9	7.8
65 yr or older		
Population (thousands)	2017	20,279
Percentage with ambulatory doctor visit	95.0	81.4
Mean number if visits (if visits \geq 1)	9.3	7.0
Percentage with hospital stay	31.4	20.1
Mean length of stay for those with stay (days)	19.2	14.2
Mean prescription drugs (for those with drugs)*	22.3	12.9
Percentage with nonphysician visits†	35.3	27.9
Percentage with purchase of other medical equipment and supplies‡	19.3	13.5

* Any kind of drug or medical preparation reported as prescribed by a physician and purchased or otherwise obtained, including refills.

†Any contact with optometrists, psychologists, psychiatric social workers or any other mental-health workers, podiatrists, chiropractors, physical therapists, nurses, nurse practitioners, paramedics, home health aides, or physician assistants.

‡Includes wheelchairs or crutches, corrective shoes, supportive devices, hearing aids and supplies, syringes, needles, and other similar items.

poor health were more likely to be covered only by Medicaid than the rest of the diabetic population. Diabetic patients covered only by Medicaid also were poorer than others and less likely to have worked in 1977. Over age 65, almost the

TABLE 3
Average expense for persons with any expense in the United States in 1977

	Average expense for people with expense (dollars)	
	With diabetes	Without diabetes
All ages		
Total expenses	1514	548
Vision (includes glasses and contacts)	82	72
Dental	115	147
Hospital stay	2831	1783
Ambulatory care	277	148
Physician contacts	225	132
Nonphysician contacts*	167	88
Prescribed medicines	132	41
Other medical expenses†	125	62
Under 45 yr		
Total expenses	965	380
Vision (includes glasses and contacts)	101	67
Dental	93	122
Hospital stay	1904	1213
Ambulatory care	194	123
Physician contacts	180	111
Nonphysician contacts*	65	74
Prescribed medicines	64	26
Other medical expenses†	49	43
45-64 yr		
Total expenses	1343	781
Vision (includes glasses and contacts)	76	77
Dental	111	144
Hospital stay	2733	2251
Ambulatory care	276	186
Physician contacts	242	165
Nonphysician contacts*	109	94
Prescribed medicines	139	63
Other medical expenses†	145	68
65 yr or older		
Total expenses	1867	1239
Vision (includes glasses and contacts)	84	77
Dental	132	124
Hospital stay	3158	3061
Ambulatory care	307	238
Physician contacts	224	201
Nonphysician contacts*	253	146
Prescribed medicines	146	88
Other medical expenses†	140	101

* Any contact with optometrists, psychologists, psychiatric social workers or any other mental-health workers, podiatrists, chiropractors, physical therapists, nurses, nurse practitioners, paramedics, home health aides, or physician assistants.

†Includes wheelchairs or crutches, corrective shoes, supportive devices, hearing aids and supplies, syringes, needles, and other similar items.

entire population had Medicare. In addition, 67% of people with diabetes over age 65 (the same as those without diabetes) also had private insurance to supplement their Medicare coverage. A slightly higher percentage of those with diabetes (15.4%) than others (10.6%) over 65 also had Medicaid.

Utilization of medical services. People with diabetes used

more of all types of medical services than nondiabetic individuals (Table 2). They had a higher probability of seeing a doctor and were more likely to enter the hospital. They also went to the doctor more often and had longer hospital stays. In addition, people with diabetes used more prescription drugs, had more nonphysician visits, and bought more medical equipment and supplies than others (Table 3).

As a result, total medical expenses in 1977 for individuals with diabetes (\$1514) were about three times higher than for others (\$548) (Table 3). This difference existed for all age groups, although it was relatively greater for younger ages. Most of the difference was accounted for by the higher rate of hospitalization among the diabetic population (see Table 2). Expenditures for prescribed medicines and other medical equipment also tended to be higher for those with diabetes than others. A little over half (52%) of the mean expenses per person with diabetes was spent on inpatient hospital

services, with another 17% for inpatient physician services, or over two-thirds overall for hospital care (Table 4), compared with roughly 25% for ambulatory physician care and prescribed medicines. This is a slightly higher percentage for hospital care than for the nondiabetic population, which spent 57% of mean total health-care expenses on hospital care (7). Corresponding figures are also given for various characteristics of the population.

Sources of payment. Diabetic individuals and their families paid ~ 20% of their total charges for medical care out of pocket on average (Table 5). This was \$335 in 1977 and would correspond to ~ \$586 today. They actually paid a lower percentage out of pocket (22 vs. 31%) than the rest of the population, but their total charges were much higher: people with diabetes paid \$335 directly, while others paid only \$184. On average, private insurance paid 24%, Medicare 32%, Medicaid 12%, and other payers 10%. The em-

TABLE 4
Annual expenses for personal health services for diabetic population in the United States in 1977

	Total population with expense (thousands)	Mean expense/person with expense (dollars)	Type of service (percent distribution)						
			Inpatient hospital services	Inpatient physician services	Ambulatory physician contacts	Dental services	Ambulatory nonphysician contacts*	Prescribed medicines	Other
Total	4583	1514	52.0	16.8	14.1	2.2	3.5	8.3	2.9
Age (yr)									
<45	693	965	49.5	17.4	17.8	4.1	2.0	5.9	3.3
45-64	1895	1343	50.3	14.6	17.0	2.5	2.6	10.0	3.0
≥65	1995	1867	53.6	18.3	11.5	1.7	4.4	7.6	2.9
Sex									
Male	1929	1373	47.0	21.1	14.9	3.3	2.8	7.5	3.4
Female	2655	1616	55.1	14.2	13.7	1.5	3.9	8.9	2.7
Race									
White	3328	1504	49.8	18.5	14.1	2.3	3.9	8.8	2.6
Black/Hispanic	859	1430	56.4	11.3	15.4	2.3	2.9	7.8	3.9
Income									
Poor/near poor	1126	1657	56.6	12.9	13.7	1.4	5.4	7.9	2.1
Other low	826	1699	56.7	13.1	13.5	1.5	3.5	8.3	3.3
Middle	1550	1547	49.3	22.9	12.6	2.1	2.5	7.9	2.8
High	1081	1177	45.2	15.4	18.4	4.4	2.7	9.9	4.0
Employment									
Employed all or part of year	1826	998	43.5	14.8	20.0	4.3	2.9	10.2	4.3
Never employed (age <65)	1015	1705	55.6	15.3	14.3	1.6	2.3	8.4	2.5
Never employed (age ≥65)	1406	1892	57.4	14.2	11.5	1.4	5.4	7.5	2.5
Health									
Excellent/good	2230	1187	45.5	20.3	14.9	3.5	4.2	8.1	3.5
Fair	1507	1434	53.7	14.6	15.3	2.0	3.3	9.4	1.8
Poor	769	2534	58.6	14.0	12.4	0.9	3.0	7.9	3.2
Region									
North	1141	2221	63.2	13.2	9.9	1.4	4.6	5.3	2.3
North central	1143	1254	49.8	18.0	14.5	2.0	1.5	10.8	3.4
South	1546	1233	52.0	13.1	16.3	2.4	3.1	10.1	3.0
West	753	1413	28.4	30.8	19.8	4.1	4.4	9.0	3.6

* Any contact with optometrists, psychologists, psychiatric social workers or any other mental health workers, podiatrists, chiropractors, physical therapists, nurses, nurse practitioners, paramedics, home health aides, or physician assistants.

TABLE 5
Annual individual expenses and sources of payment for personal health services for diabetic population in the United States in 1977

	Total population with expense (thousands)	Mean expense/person with expense (dollars)	Source of payment (percent distribution)				
			Out-of-pocket expense paid by family	Private health insurance	Medicare	Medicaid	Other*
Total	4583	1514	22.1	24.2	31.8	11.8	10.2
Age (yr)							
<45	693	965	19.8	47.4	1.7	20.2	10.9
45-64	1895	1343	22.8	36.0	11.4	15.9	13.9
≥65	1995	1867	22.0	12.0	51.1	7.5	7.5
Sex							
Male	1829	1373	23.2	18.5	40.2	4.0	14.0
Female	2655	1616	21.4	27.7	26.6	16.6	7.8
Race							
White	3328	1504	22.6	27.7	34.4	4.8	10.4
Black/Hispanic	859	1430	20.9	13.9	11.0	46.0	8.1
Income							
Poor/near poor	1126	1657	18.1	6.0	32.8	35.9	7.2
Other low	826	1699	25.4	18.4	36.6	7.1	12.5
Middle	1550	1547	22.9	34.9	34.2	1.8	6.2
High	1081	1177	22.8	37.1	20.3	0.4	19.4
Employment							
Employed all or part of year	1826	998	30.3	40.0	12.3	7.3	10.1
Never employed (age <65)	1015	1705	16.7	27.1	17.5	23.8	14.9
Never employed (age ≥65)	1406	1892	20.1	10.6	49.6	10.1	9.5
Health							
Excellent/good	2230	1187	25.5	22.4	36.7	8.4	7.0
Fair	1507	1434	22.0	27.4	28.6	11.6	10.3
Poor	769	2534	17.6	23.9	25.8	17.5	15.2
Region							
North	1141	2221	15.9	24.9	43.8	9.3	6.1
North central	1143	1254	20.8	32.5	23.9	8.0	14.8
South	1546	1233	26.4	19.0	21.1	18.5	15.0
West	753	1413	30.9	20.5	32.8	10.7	5.1

*Includes CHAMPUS/CHAMPVA; Indian Health Services; Veterans Administration; military; other federal, state, city, or county payers; philanthropic institutions; and unknown source of payment.

ployed and those living in the West paid a higher percentage out of pocket than others. For those under age 45, private insurance paid the largest share of expenses: 47%. For the diabetic population over age 65, 50% was paid for by Medicare, 22% by the family, 12% by private insurance, and 8% by Medicaid. The percentage paid out of pocket was highest for those who were employed, had low incomes (but were not poor), were in excellent or good self-reported health, and lived outside large metropolitan areas or in the South and West.

Insurance characteristics. Comparison of health insurance policies shows that premiums for policies covering those with diabetes were not significantly different from those for the rest of the population (Table 6). For those under age 65, mean premiums averaged ~ \$1000 for both groups in 1977. Given the rapid increase in health insurance premiums in

recent years, this would correspond to ~ \$2500 in 1984, an average annual rate of increase of 14%. On average, employers paid for about two-thirds of these premiums for both those with or without diabetes. For diabetic people 65 yr or older who supplemented their Medicare coverage, average premiums were \$527, over half (56%) of which was paid for out of pocket.

It is also interesting to look at various aspects of coverage provided by private insurance policies (Table 7). In general, coverage for the diabetic population under age 65 was similar to that for the nondiabetic population. There were no significant differences found in the percentages with basic and major medical coverage; coinsurance rates and deductibles for hospital care and physician office visits; and the percentages with coverage for dental care, vision, drugs, routine physicals, and psychiatric care. A higher percentage of those

TABLE 6
Cost of health insurance premiums for diabetic and nondiabetic population in the United States in 1977

	Total population (thousands)	Mean premium* (dollars)	Percentage share		
			Employer	Employee	Other
People with diabetes (age <65 yr)					
Total	1872	999	66.4	29.8	3.8
Individual	570	972	62.7	31.3	6.0
Family	1023	1076	71.1	25.4	3.5
People without diabetes (age <65 yr)					
Total	151,402	1063	68.2	28.6	3.2
Individual	36,274	1011	64.7	31.1	3.2
Family	107,499	1087	69.5	27.1	3.3
People with diabetes (age ≥65 yr)					
Total	1382	527	38.2	56.3	5.6
Individual	938	398	20.9	68.2	10.8
Family	435	809	53.3	46.8	0.0
People without diabetes (age ≥65 yr)					
Total	13,818	464	38.9	58.2	3.0
Individual	9459	374	27.5	70.1	2.4
Family	4323	659	50.1	46.6	3.3

*Includes both group and nongroup insurance plans.

with diabetes either lacked any coverage for office visits (24.7 vs. 16.6%) or lacked major medical coverage (25.9 vs. 17.7%). The out-of-pocket limit was also higher for individuals with diabetes.

DISCUSSION

Data from the NMCES show that the cost and coverage of health insurance for the diabetic population in 1977 was comparable to the rest of the population of the United States. Similar results were reported by Sinnock (8). However, people with diabetes tended to be sicker and used more medical care than those without diabetes. The result is that their out-of-pocket expenditures as well as total medical expenses were much higher than for the nondiabetic population. In addition, those with diabetes who do not have or cannot get insurance coverage often experience extremely high financial burdens.

Although people with diabetes have access to health insurance coverage and medical-care services similar to those of the rest of the population, there is presently some concern about whether this will continue to be the case. Many changes in the organization and financing of medical care have occurred over the past decade, with potential impact on patients with diabetes. Medicare's implementation of a prospective payment system based on diagnostic-related groups will affect the amount hospitals are reimbursed by Medicare for patients admitted with a primary or secondary diagnosis of diabetes. This system compensates hospitals based on preset rates determined by clinical diagnosis and not for the actual cost of caring for a given patient. Preliminary analysis

suggests that reimbursement for diabetic patients may not be sufficient to cover the full costs of these patients (9). If this is the case, hospitals might try to discourage the admission of sicker patients or encourage shorter stays in the hospital. This system also offers no financial support for nurses and dietitians who provide hospital-based patient education programs for people with diabetes. In addition to Medicare's prospective-payment system, private health insurers and state health programs are also moving to adopt various prospective payment and capitation plans that make it difficult for costs to be shifted to other payers.

The market for health insurance is becoming increasingly competitive. One feature of some procompetitive proposals, that of requiring employers to offer more choice of health insurance plans, may have important consequences for those with chronic illnesses. One of the advantages of the current system is that individuals at high risk in terms of their medical expenditures do not have to bear the full costs of their higher expected expenses (10). However, if the availability of choice allows healthier individuals to select less comprehensive plans, this would leave the more comprehensive plans with a relatively sicker population. This means that families who expect to have higher medical expenses may have to pay more for their coverage and/or settle for less insurance. In this environment, it will be increasingly important to ensure the continuing availability of good health insurance coverage to the diabetic population.

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TABLE 7
Private insurance coverage for individuals under age 65 in the United States in 1977

	People with diabetes		People without diabetes	
	Number (thousands)	%	Number (thousands)	%
All	1906	100.0	151,409	100.0
Type of coverage				
Any HMO	49	2.6	6211	4.1
Basic only	404	21.2	21,370	14.1
Major medical	212	11.1	23,681	15.6
Basic and major medical	1190	62.4	98,899	65.3
Other unknown	52	2.7	1247	0.8
Breadth of coverage				
Dental	393	20.6	38,614	25.5
Vision	136	7.1	12,457	8.2
Drugs	1464	76.8	123,957	81.9
Routine physical	129	6.8	9098	6.0
Outpatient psychiatry	1287	67.5	108,191	71.5
Hospital				
No deductible, semiprivate, generous*	804	42.2	58,141	38.4
No deductible, semiprivate, less generous	528	27.7	45,574	30.1
No deductible, less than semiprivate	303	15.9	27,254	18.0
Deductible, semiprivate, generous	48	2.5	4239	2.8
Deductible, semiprivate, less generous	80	4.2	4391	2.9
Deductible, less than semiprivate	107	5.6	9387	6.2
No coverage	34	1.8	2574	1.7
Physician office				
No deductible, coinsurance <20%	147	7.7	11,335	7.5
No deductible, coinsurance >20%	76	4.0	10,525	7.0
Deductible, coinsurance <20%	255	13.4	19,177	12.7
Deductible, coinsurance >20%	957	50.2	85,222	56.3
No coverage	471	24.7	25,176	16.6
Major medical maximum				
<\$250,000	749	39.3	53,357	35.2
≥\$250,000	526	27.6	56,746	37.5
Unlimited	135	7.1	14,583	9.6
No major medical	494	25.9	26,724	17.7
Major medical out-of-pocket limit				
≤\$750	304	16.0	44,586	29.5
>\$750	363	19.0	28,642	18.9
Unlimited	745	39.1	51,460	34.0

Data includes both group and nongroup plans.

*Generous coverage is either basic coverage with 365 or more days of semiprivate room and board, or no basic coverage but a major medical maximum of \$250,000 or more.

The views in this paper are those of the author, and no official endorsement by the National Center for Health Services Research and Health Care Technology Assessment is intended or should be inferred.

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