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Data in this report from health and demographic surveys present statistics by age and other variables on health care coverage, family planning services, blood carbon monoxide levels, blood lead levels, and ambulatory medical care. Estimates are based on the civilian noninstitutionalized population of the United States. These reports were originally published in 1981 and 1982.

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Health Care Coverage Under Private Health Insurance, Medicare, Medicaid, and Military or Veterans Administration Health Benefits: United States, 1978

Division of Health Interview Statistics

The National Center for Health Statistics included a special supplement on health care coverage under private health insurance and Medicare as a part of the 1978 National Health Interview Survey questionnaire. While this supplement was not designed to produce estimates for all types of health care coverage, it did contain a series of items related to eligibility for Medicaid and for military and Veterans Administration health care benefits.[1] By making certain assumptions about how these items relate to the broader concept of health care coverage, it is possible to obtain estimates of the number of persons eligibile for these types of benefits.

This preliminary report presents estimates of the coverage status of persons in the civilian noninstitutionalized population under private health insurance and the three types of public programs mentioned in the title. There are many other forms of at least partial coverage for health care costs, including neighborhood health clinics and local philanthropic health-service agencies. "Health care coverage" as used in this report does not include these forms of coverage or insurance restricted to dread diseases, accidents, dental care, or protection related to income maintenance during periods of illness. Coverage restricted to certain groups is also excluded, such as coverage for Indians whose sole source of care is through the Indian Health Service.

The focus of this report is on the *extent* or *scope* of health care coverage in the population rather than on the question of *breadth* or *depth* of that coverage. Estimates are shown first by cross-classifying the coverage status for each person to produce an unduplicated estimate of coverage under the four types considered together. This is followed by a presentation of estimates for each of the four types of health care coverage and the procedures followed in deriving them.

All of the estimates presented in this report are average annual point prevalence estimates for the civilian noninstitutionalized population. They are "point prevalence" estimates because they represent a person's health care coverage status only at the time of interview, and for no other period during the year. They are "average annual" estimates because the total annual National Health Interview Survey sample consists of summing the results for 52 weekly representative samples of the civilian noninstitutionalized population.

Technical qualifications related to the estimates are summarized in the technical notes. For a more detailed discussion of these qualifications and for a copy of the questionnaire see the 1978 *Current Estimates* (Series 10, No. 130). Additional data on health care coverage will be available in future publications from the National Center for Health Services Research based on the 1977 National Medical Care Expenditure Survey,[2] and from the National Center for Health Statistics and the Health Care Financing Administration based on the 1980 Medical Care Utilization and Expenditure Survey.

Coverage status of persons under four types of health care coverage

The concept of "coverage" is relatively unambiguous for private health insurance and Medicare, and can be approximated for military and/or Veterans Administration (VA) health benefits. The closest corresponding concept for Medicaid is that of "eligibility." However, because the criteria for Medicaid eligibility vary among the States, because many persons only become aware of their eligibility *after* seeking medical aid, and finally because of the added complexity in defining eligibility associated with "spend-down" provisions there is no generally agreed on criteria for estimating the number of persons "covered by" Medicaid.

The Medicaid estimates shown in this report are

operationally defined in terms of responses to three items contained on the 1978 National Health Interview Survey (NHIS) questionnaire. Persons are defined as having "categorical or reported Medicaid coverage" if they (1) had a valid Medicaid card at the time of interview, (2) were receiving Aid to Families with Dependent Children or Supplementary Security Income payments, or (3) Medicaid coverage was given as a reason for not being covered by any health insurance plan.

Because of the lack of uniformity associated with the definitions of Medicaid coverage, the estimates for this type of coverage are shown separately in table 1. The data from the 1978 NHIS indicate that about 179.5 million persons (83.9 percent) in the civilian noninstitutionalized population were covered by private health insurance, Medicare, or military and/or VA health benefits. Among the estimated 31.6 million persons (14.8 percent) not covered under any of these three and the 2.7 million persons (1.3 percent) for whom the coverage status could not be determined, an estimated 10.8 million persons had categorical or reported Medicaid coverage. Combining these two groups (represented by the boxed cells in table 1) produces estimates of about 190.3 million persons (89 percent) in the civilian noninstitutionalized population covered by at least one of the four types of coverage and about 23.5 million persons (11 percent) who were not identified as being covered under private health insurance or any of the three public programs.[3]

The sum of the estimates in the boxed cells in table 1 shows that virtually all persons 65 years of age and over (about 99 percent) were covered under at least one of the four types of coverage. The corresponding estimate for persons under 65 years of age is about 88 percent.

Table 2 shows estimates of persons in the civilian noninstitutionalized population with combined or unique coverage under private health insurance, Medicare, and military and/or VA health benefits. Because the number of persons actually eligible for Medicaid is not known, Medicaid is excluded from these estimates of plan combinations. An estimated 67.3 percent of the civilian noninstitutionalized population was covered by private health insurance only. The combination of private health insurance and Medicare coverage represents 6.2 percent, and each of the other plan combinations represents 3.4 percent or less.

Not unexpectedly, the patterns of coverage for persons under 65 years of age and 65 years of age and over are quite different. An estimated 75.0 percent of the younger age groups had coverage under private health insurance but did not have coverage under either of the two public programs. For persons

Table 1. Number and percent distribution of persons by age, coverage status under private health insurance, Medicare, and military and/or Veterans Administration health benefits, and by Medicaid coverage status: United States, 1978

Age and coverage status[1]	*All persons*	*Has valid Medicaid card, receives AFDC or SSI, and/or reports Medicaid coverage as reason for no health insurance plan*	
		Reported as meeting at least one criteria[2]	*Not reported as meeting any of these criteria*[3]
	Number of persons in thousands		
All ages, all coverage statuses . .	213,828	14,846	198,982
Covered	179,472	4,022	175,451
Not covered	31,643	10,348	21,295
Unknown if covered	2,713	476	2,237
Under 65 years, all coverage statuses.	191,041	12,762	178,279
Covered	157,110	2,111	155,000
Not covered	31,351	10,204	21,147
Unknown if covered	2,579	447	2,133
65 years and over, all coverage statuses.	22,788	2,084	20,703
Covered	22,362	1,911	20,451
Not covered	292	144	149
Unknown if covered	133	*29	104
	Percent distribution		
All ages, all coverage statuses . .	100.0	6.9	93.1
Covered	83.9	1.9	82.1
Not covered	14.8	4.8	10.0
Unknown if covered	1.3	0.2	1.0
Under 65 years, all coverage statuses.	100.0	6.7	93.3
Covered	82.2	1.1	81.1
Not covered	16.4	5.3	11.1
Unknown if covered	1.3	0.2	1.1
65 years and over, all coverage statuses.	100.0	9.1	90.9
Covered	98.1	8.4	89.7
Not covered	1.3	0.6	0.7
Unknown if covered	0.6	*0.1	0.5

[1]See the sections in this report on "Private Health Insurance Coverage," "Medicare Coverage," and "Military and Veterans Administration Health Care Coverage" for specifications of how the concept of "covered" is defined for each of the three types of health care coverage.

[2]See the section of this report on "Medicaid Coverage" for the estimates associated with each of the components of this definition.

[3]"Not reported" includes negative responses, refusals, and unknowns to any one of the components of this concept.

65 years of age and over, 54.5 percent had both private health insurance and Medicare, 26.7 percent had Medicare only, and 3.3 percent had private health insurance only.

The following sections show how the estimates for each of the four types of health care coverage are defined. Also shown are estimates of the more detailed aspects of coverage associated with each type.

Table 2. Number of persons by age and plan combinations of health care coverage under private health insurance, Medicare, and military and/or Veterans Administration health benefits[1]; percent distribution according to age: United States, 1978

Coverage status and plan combinations	All ages	Under 65 years	65 years and over	All ages	Under 65 years	65 years and over
	Number of persons in thousands			Percent distribution		
All persons	213,828	191,041	22,788	100.0	100.0	100.0
All plan combinations with known coverage status	208,023	185,658	22,365	97.3	97.2	98.1
Private insurance *only*	143,986	143,225	761	67.3	75.0	3.3
Private insurance *and* Medicare	13,296	882	12,414	6.2	0.5	54.5
Medicare *only*	7,210	1,121	6,089	3.4	0.6	26.7
Priority eligibility or reported military-VA coverage *only*	4,924	4,796	128	2.3	2.5	0.6
Private insurance *and* priority eligibility or reported military-VA coverage	4,142	3,966	176	1.9	2.1	0.8
All three types of coverage	1,817	121	1,696	0.8	0.1	7.4
Medicare *and* priority eligibility or reported military-VA coverage	1,005	196	809	0.5	0.1	3.6
Not covered by any of the three plans	31,643	31,351	292	14.8	16.4	1.3
Unknown coverage or combination status	5,805	5,383	423	2.7	2.8	1.9

[1]Excludes persons not meeting criteria used to define coverage discussed in text who also did not report military or VA coverage as a reason for not being covered by any health insurance plan.

Private health insurance coverage

Household respondents were asked whether any family member was covered by a health insurance plan that paid any part of a hospital bill, or a doctor's or surgeon's bill for operations. The names of all plans were listed for which a positive response was obtained to either or both of these questions. A series of questions were then asked for *each* plan that covered at least one family member. Included were questions about whether the plan was obtained through a group, the type of coverage associated with the plan, each family member's coverage status in relation to each of the plans, and whether the plan had been used during the past year. In tabulating the data, persons were classified as "covered by private health insurance" if they were covered by at least one plan, and as "not covered" if they were classified as "not covered" under *all* of the plans listed for the family. They were classified as "unknown" if their coverage status was not determined for at least one plan and they were not covered under any of the other plans (if any) listed for the family.

Table 3 shows that an estimated 166.1 million persons (77.7 percent) were covered by private health insurance. An estimated 159.0 million persons (74.3 percent) had both hospital and surgical coverage, 4.2 million persons had only hospital coverage, and 323,000 persons had only surgical coverage. About 325,000 persons classified as covered had neither hospital nor surgical coverage, and the type of coverage was not determined for about 2.2 million persons. An estimated 46.8 million persons (21.9 percent) did not have private health insurance coverage and the status of about 1.0 million persons (0.5 percent) could not be determined.

Table 3. Number of persons by age and type of private health insurance coverage; percent distribution according to age: United States, 1978

Type of private health insurance coverage	All ages	Under 65 years	65 years and over
	Number of persons in thousands		
All persons	213,828	191,041	22,788
Covered	166,050	150,928	15,122
Hospital and surgical coverage	158,978	145,316	13,662
Hospital, no or unknown surgical coverage	4,220	3,192	1,028
Surgical, no or unknown hospital coverage	323	243	81
Neither hospital nor surgical coverage	325	252	74
Unknown type of coverage	2,203	1,926	278
Not covered	46,791	39,310	7,482
Unknown if covered	987	803	184
	Percent distribution		
All persons	100.0	100.0	100.0
Covered	77.7	79.0	66.4
Hospital and surgical coverage	74.3	76.1	60.0
Hospital, no or unknown surgical coverage	2.0	1.7	4.5
Surgical, no or unknown hospital coverage	0.2	0.1	0.4
Neither hospital nor surgical coverage	0.2	0.1	0.3
Unknown type of coverage	1.0	1.0	1.2
Not covered	21.9	20.6	32.8
Unknown if covered	0.5	0.4	0.8

Among persons under 65 years of age, the estimated proportion with private health insurance coverage was 79.0 percent, while about two-out-of-three persons (66.4 percent) 65 years of age and over were covered by a private health insurance plan.

If the persons for whom either the coverage status or the type of coverage was unknown are distributed in the same proportions as for persons with known coverage status and known type of coverage, the following adjusted estimates result:[4] approximately 166.8 million persons were covered by private health insurance; of these about 166.4 million persons had hospital insurance and about 164.6 million persons had surgical insurance.[5]

Medicare coverage

Household respondents were asked whether anyone in the family was covered by Medicare, and if so, to indicate which persons were covered. Those classified as covered were then asked whether they were covered by the types of benefits that pay for hospital bills (Part A), physician care (Part B), or both. Table 4 shows either or both of these forms of coverage for an estimated 23.6 million persons (11.0 percent). About 21.2 million of these persons were 65 years of age and over and about 2.4 million were under 65 years of age. This represents a coverage rate under Medicare of 93.1 percent for the former group and 1.2 percent for the latter group.

An estimated 22.4 million persons had coverage under both Part A and B of Medicare. An additional 713,000 persons had coverage under Part A only, and another 137,000 persons had coverage only under Part B. Distributing the unknown cases in the same proportions as the known cases produces the following adjusted estimates for Medicare coverage: about 23.6 million persons in the civilian noninstitutionalized population were covered by Medicare, with virtually all of these persons covered by Part A, and about 23.1 million of them covered by Part B.

The Health Care Financing Administration (HCFA) produces estimates of persons enrolled in Medicare. The 1978 estimate is about 26.6 million enrollees. However, HCFA is not able to distinguish enrollees on the basis of institutionalization and their estimate is not, therefore, directly comparable to those shown in this report (which represent only the noninstitutionalized population).

Table 4. Number of persons by age and Medicare coverage; percent distribution according to age: United States, 1978

Type of Medicare coverage	*All ages*	*Under 65 years*	*65 years and over*
	Number of persons in thousands		
All persons	213,828	191,041	22,788
Covered	23,567	2,359	21,207
Hospital and doctor coverage	22,404	2,174	20,230
Hospital, no or unknown doctor's coverage	713	109	605
Doctor, no or unknown hospital coverage	137	*5	132
Unknown type of coverage	312	72	240
Not covered	189,733	188,273	1,460
Unknown if covered	529	409	120
	Percent distribution		
All persons	100.0	100.0	100.0
Covered	11.0	1.2	93.1
Hospital and doctor coverage	10.5	1.1	88.8
Hospital, no or unknown doctor's coverage	0.3	0.1	2.7
Doctor, no or unknown hospital coverage	0.1	*0.0	0.6
Unknown type of coverage	0.1	0.0	1.1
Not covered	88.7	98.6	6.4
Unknown if covered	0.2	0.2	0.5

Reason for not being covered by any health insurance plan

An estimated 38.5 million persons were not covered by private health insurance or Medicare. Respondents for persons in that category were asked to select the reasons for this "lack of coverage by any health insurance plan" from a flashcard containing the reasons shown in table 5. No reason was given for an estimated 1.5 million persons. An estimated 41.7 million reasons were obtained for 36.9 million persons. "Too expensive" was the reason chosen most often (15.3 million persons), followed by "Care received through Medicaid or Welfare" (9.1 million persons), and by "Military dependent (CHAMPUS) or Veterans benefits" (4.4 million persons).

It should be emphasized that the reasons related to Medicaid and military and/or VA benefits cannot

Table 5. Number and percent distribution of reasons for not being covered by any health insurance plan for persons who gave at least one reason, by type of reason: United States, 1978

Reason for no health insurance plan[1]	*All reasons in thousands*	*All reasons percent distribution*
All reasons	41,738	100.0
Care received through Medicaid or welfare	9,131	21.9
Unemployed or reasons related to unemployment	3,612	8.7
Cannot obtain due to poor health, illness, or age	632	1.5
Too expensive	15,274	36.6
Dissatisfied with previous insurance	727	1.7
Don't believe in insurance	945	2.3
Healthy, not much sickness in family, haven't needed	3,274	7.8
Military dependent, (CHAMPUS), Veterans benefits	4,408	10.6
Some other reason	3,735	8.9

[1]This question was asked of all persons with neither private health insurance nor Medicare.

by themselves serve as a basis for estimating the number of persons eligible for these two types of health care benefits: first, persons eligible for these types of benefits, who were also covered by Medicare or private health insurance, were not shown the card and asked to choose a reason; second, a person may be aware that he is eligible for either or both of these types of benefits but not perceive this as the reason he does not have health insurance. An individual may, for instance, perceive his unemployment or limited income as the real underlying reason for not having health insurance and consider his Medicaid eligibility as a mere consequence.

Military and Veterans Administration health care coverage

Aside from questions related to coverage under private health insurance and Medicare, the 1978 NHIS questionnaire included items relevant in determining whether persons had priority eligibility to receive military and/or VA health care benefits. Veterans were asked (1) whether they had a service connected disability, and (2) whether they were receiving a pension from any of the military services or the VA.

An estimated 3.0 million veterans had a service connected disability. However, respondents were not asked whether their disability had been certified by the VA as service connected. The estimate, therefore, is based on the respondent-assessed claim of such a disability.[6]

An estimated 3.4 million veterans received a pension from the military, VA, or both. Of these persons, the VA was the source of the pension for about 2.0 million,[7] and one of the military services for about 1.5 million.

All veterans with other than dishonorable discharges are potentially eligible to receive health care benefits from the VA. However, the availability of these services is limited and a system of criteria has been established to determine which veterans and their families qualify for these benefits. The following criteria are used to determine priority eligibility status: having a service connected disability, receipt of a pension from the VA, or being a veteran 65 years of age or over. A somewhat lower priority is afforded to other veterans if they establish that they are unable to defray the costs of necessary hospital charges elsewhere. Dependents and survivors of certain types of disabled or deceased veterans may also qualify for VA health care benefits. These persons were not, however, directly identified in the 1978 NHIS.

As noted above, an estimated 3.0 million veterans had a service connected disability. Additionally, about 2.9 million veterans either received a VA pension or were 65 years of age or over. These approximately 5.9 million veterans meet the criteria discussed above for priority eligibility for VA health care benefits.[8]

Aside from the VA, the military services themselves offer health care benefits to eligible dependents of active military personnel and to military pensioners and their eligible dependents. Civilian dependents of active military personnel are not directly identified in the NHIS. However, it is possible to indirectly estimate the number of eligible dependents. During 1978, there were about 1.8 million wives and dependent children under 21 years of age living at home with men on active military duty. These persons have a very high priority for receiving military health care benefits.

A somewhat lower priority is afforded military pensioners and their eligible dependents. Even though questions were not asked to identify these dependents, it is possible to indirectly identify about 2.3 million of them by the family relationship they bear to the pensioners. These include the wives and dependent children under 21 years of age living at home with the military pensioner. Combining the above estimates for dependents of active military personnel and of military pensioners, and including the military pensioners themselves, produces an overall estimate of about 5.6 million persons in the civilian noninstitutionalized population with priority eligibility to receive health care benefits from the military.[9] Certain groups, however, (such as eligible survivors of military pensioners who have died) could not be identified and are, thus, excluded from this estimate.

Among the 5.9 million veterans identified as having priority eligibility to receive VA health care benefits and the 5.6 million persons identified as having priority eligibility for military health care benefits, 835,000 were identified as having priority eligibility for both types of benefits. However, the resulting total of about 10.7 million persons with priority eligibility for either or both types of health care benefits does not include other persons with "military or VA health care coverage" as a reason for not being covered by any health insurance plan.

Table 6 shows the results of cross-classifying persons by identified priority eligibility status and whether or not military and/or VA coverage was given as a reason for not having a health insurance plan. An estimated 1.3 million persons with this reason did not meet the criteria used to identify persons with priority eligibility for military or VA health benefits. Under the assumption that these persons would not claim that their eligibility for these health care benefits was a reason for not obtaining

Table 6. Number of persons by whether military and/or Veterans Administration coverage was reported as reason for no health insurance plan, and eligibility for military and/or Veterans Administration health benefits and source of eligibility: United States, 1978

Eligibility status and source of eligibility benefits	All persons	Military and/or VA coverage as reason for no health insurance plan			
		Yes	No	No response	Not asked[1]
	Number of persons in thousands				
All eligibility statuses, all sources	213,828	4,408	32,525	1,544	175,351
Identified priority eligibility, all sources[2,3]	10,660	3,065	447	69	7,079
Military and VA[2,3]	835	159	*22	*2	653
Military only[2]	4,773	2,614	137	50	1,972
VA only[3]	5,052	293	288	*17	4,454
Priority eligibility status not identified	203,168	1,343	32,079	1,475	168,272

[1]Not asked reason because person not reported to lack private health insurance or Medicare coverage.
[2]Excludes dependents of deceased or institutionalized military pensioners.
[3]Excludes veterans who qualify for priority eligibility solely on the basis of low income.

health insurance, unless they had a relatively high priority eligibility status for receiving them, it is reasonable to include them in the total for persons with priority eligibility status for the receipt of military or VA health care benefits. This procedure produces an overall estimate of about 12.0 million persons in the civilian noninstitutionalized population with either coverage or priority eligibility status for receiving military or VA health care benefits (table 7).

Table 7. Number of persons by military and/or Veterans Administration health care coverage status[1]: United States, 1978

Military and/or VA health care coverage	Number of persons in thousands
All persons	213,828
Priority eligibility or reported military and/or VA coverage[1]	12,003
Neither priority eligibility nor reported military and/or VA coverage	197,019
Unknown military and/or VA health benefits coverage	4,806

[1]Excludes persons not meeting criteria used to define coverage discussed in text who also did not report military or VA coverage as a reason for not being covered by any health insurance plan.

Medicaid coverage

As discussed earlier in this report, persons were defined as having "categorical or reported Medicaid coverage" if they (1) had a valid Medicaid card at the time of the interview, or (2) were reported as receiving Aid to Families with Dependent Children (AFDC) or Supplemental Security Income (SSI), or (3) Medicaid coverage was given as a reason for not being covered by any health insurance plan.

Based on the number of respondents who presented a valid Medicaid card, it is estimated that 8.2 million persons were enrolled in the Medicaid program in 1978. An additional estimate of 4.9 million persons eligible for Medicaid was obtained based on the reports of AFDC or SSI recipients (often called categorical eligibility) who did not show a valid Medicaid card.[10] Together the criteria of a valid Medicaid card and/or reported receipt of AFDC or SSI results in an estimate of 13.1 million persons.

Earlier it was noted that respondents representing an estimated 9.1 million persons gave Medicaid coverage as the reason for not having coverage by any health insurance plan. As is shown in table 8, an estimated 1.7 million (863,000 and 848,000) of these persons did not have a valid Medicaid card and were not receiving AFDC or SSI. If these 1.7 million persons are combined with the 13.1 million cited above, an estimate of 14.8 million persons with categorical or reported Medicaid coverage is obtained.

This figure (14.8 million persons) is an average annual point prevalence estimate. It is not an estimate of the total number of persons covered by or eligible for Medicaid during part or all of the 12-month period. Data from the National Medical Care Expenditure Survey provide an estimate of 20.8 million persons in the civilian noninstitutionalized population with Medicaid coverage during part or all of 1977.[11]

Table 8. Number of persons by whether Medicaid coverage was reported as a reason for no health insurance plan, and possession of a valid Medicaid card or receipt of AFDC or SSI: United States, 1978

Possession of valid Medicaid care card or receives AFDC-SSI	All statuses	Medicaid as reason for no health insurance plan			
		Yes	No	Unknown	Not asked[1]
	Number of persons in thousands				
All persons	213,828	9,131	27,803	1,544	175,351
Has Medicaid card and/or receives AFDC or SSI	13,135	7,420	1,670	162	3,883
Neither has Medicaid card nor receives AFDC or SSI	198,444	863	25,750	1,337	170,493
Unknown if meets at least one of these criteria	2,250	848	383	45	974

[1]Not asked reason because person not reported to lack private health insurance or Medicare coverage.

Discussion

An aspect of the debate on national health insurance has been the growing interest in determining the extent, breadth, and depth of health care coverage among the American population. As noted earlier, while the data presented in this report are relevant to the issue of the extent of health care coverage, they are of limited value regarding the breadth and depth of that coverage. As such, the focus of the discussion has been on whether or not persons were covered under any of the four types of coverage or under at least one of them. As discussed in the following section, this focus on the question of coverage may lead to misinterpretations of the results discussed in this report.

Alternative estimates of the extent of coverage

The previous discussions of Medicaid coverage and of reported or priority eligibility under military or VA health care benefits demonstrate that any estimate of the number of persons not covered under any of the four plans derives to a significant degree from the definition of the concept being measured, assumptions made about the data, and the type of statistic being estimated. Within this context, the following paragraphs briefly indicate some alternative estimates that might have been derived from the same data.

Among the approximately 23.5 million persons shown in table 1 without identified coverage under any of the four types of coverage, about 2.2 million were members of families with an annual income of less than $3,000, about 2.4 million were veterans, and 442,000 were unable to perform the usual activity of their age-sex group due to chronic health conditions or impairments. Among the same 23.5 million persons, an estimated 738,000 received Medicaid benefits or VA health benefits during the 12 months preceding the interview. The unduplicated estimate of those who meet one or more of these criteria is about 5.3 million persons. Thus by assuming that these persons would have some type of health care coverage, the estimate of those not identified as covered in table 1 is reduced by 22.4 percent (or to about 18.3 million persons).

On the other hand, certain assumptions made in classifying persons as "covered" in earlier sections of this report might be questioned. For example, whether or not persons with priority eligibility for VA health care benefits actually are able to receive health care from the VA depends on a number of factors including their proximity to VA health facilities and the ability of these facilities to accomodate them. This type of relationship does not provide the usual implications for accessibility to health care that having private health insurance, Medicare, or even military coverage implies. In addition, the data in table 6 suggest that persons with VA eligibility do not necessarily regard this as an alternative to private health insurance. Very few of those persons with only VA coverage gave that as a reason for not being covered by a health insurance plan. Data are needed on the extent to which persons with priority eligibility for VA health benefits actually use VA facilities. Such data will be available in the near future from the National Center for Health Services Research based on the 1977 National Medical Care Expenditure Survey, and from the National Center for Health Statistics and the Health Care Financing Administration, based on the 1980 National Medical Care Utilization and Expenditure Survey.

Beyond assumptions related to the data itself, different estimates could be derived by choosing to use a different and perhaps a more relevant statistic to estimate. For instance, compared with the average annual point prevalance estimate of a maximum of about 23.5 million persons not identified as covered under any of the four types of coverage, the average point prevalence estimate for a shorter period of time (or as of a certain date) might be the more appropriate statistic; the estimate of persons not identified as covered under any of the four types of plans for each of the four quarters of 1978 differ by as much as 1.1 million persons.

Consideration of further issues (including the assumptions made in editing the data) and recognition of the sampling errors associated with the estimates suggests that the 1978 NHIS data file could reasonably serve as a basis to produce an estimate of anywhere from about 7 to 13 percent as the proportion of the civilian noninstitutionalized population not covered under any of the four types of health care coverage discussed in this report.

Extent of coverage and the financial burden of illness

There is only a partial association between the concepts of coverage and of financially unimpeded access to health care services (except perhaps in the case of eligibility for full Medicaid benefits or membership in a Health Maintenance Organization). For instance, many of the persons classified as

"covered" in this report may have experienced relatively large out-of-pocket health expenditures even though they were covered, while persons classified as not being covered may have had no health expenditures during the period they were not covered. As such, the concept of coverage is only partially related (1) to the issue of the financial burden of illness, injury, or impairment; and (2) to the issue of the degree to which people fail to seek needed medical care because of the potential financial burden associated with obtaining such care.

In summary, the focus given in this report to the question of the extent of health care coverage, and the limited consideration given to the question of the breadth and depth of that coverage, derive from the strengths and limitations of the types of data collected on these issues in the 1978 NHIS and not from the assumption that a mere identification of the so-called "uninsured," "uncovered," or "unprotected" population is of paramount importance to the major issue of the financial burden of illness.

References

[1]Because these items were not included in the 1976 National Health Interview Survey and because different assumptions were made in analyzing the data, comparisons of the results of this study and those shown in *Health Care Coverage, 1976* (Advance Data No. 44, September 20, 1979) should be made with caution.

[2]Reports currently available from the National Center for Health Services Research include: Data Preview 1: "Who are the Uninsured?" and Data Preview 4: "Health Insurance Coverage of Veterans."

[3]This estimate of about 11 percent of persons in the civilian noninstitutionalized population not identified as having coverage differs from the estimate of 12.6 percent shown as "without insurance coverage" in the recent, "Who are the uninsured?" *Data Preview 1* (National Center for Health Services Research) because: (1) the concept "not identified as covered" differs from the concept "without insurance coverage," (2) different criteria were used to define "coverage," and (3) data from different years and for different time periods were used to produce the two estimates.

[4]In this and in following sections the estimates based on reported data are shown in the tables. When a significant number of unknown cases are associated with an estimate of major interest, an adjusted population estimate will be given in the text. The adjusted estimates are derived by multiplying the percent of persons covered and not covered (i.e., the unknown cases are excluded) by the number of persons in the entire civilian noninstitutionalized population.

[5]As of December 31, 1977 the Health Care Financing Administration estimates that about 168.2 million persons had hospital coverage and about 163.9 million persons had surgical coverage under private health insurance, (Carrol, M.S., Arnett III, R.H., "Private Health Insurance Plans in 1977: Coverage, Enrollment and Financial Experience," *Health Financing Review*, Fall, 1979).

[6]The VA estimates that about 4 million veterans have a service connected disability and about 1.7 million of these veterans are classified as having a zero percent service connected disability. Presumably, many of these veterans with a zero percent disability did not report having a service connected disability.

[7]The VA estimates that about 1 million veterans were receiving a VA pension and almost 2.3 million veterans were receiving VA compensation during 1978. Presumably, about 1 million persons represented in the NHIS did not distinguish between receipt of a pension and receipt of compensation payments from the VA.

[8]The VA also includes in its priority eligibility group those veterans under 65 years of age with an individual income of under $7,000 a year. It estimates that 11 to 12 million veterans have priority eligibility to receive VA health care. Combining the under $7,000 annual income group of veterans identified in the NHIS with the 5.9 million veterans who meet the priority eligibility criteria discussed in the text produces a NHIS estimate of about 11.1 million veterans in the civilian noninstitutionalized population meeting the VA criteria for priority eligibility for VA health care benefits (this estimate is not adjusted for unknowns).

[9]The Pentagon estimates 6 to 7 million civilians were eligible to receive military health care benefits during 1978.

[10]Based on the number of respondents who reported receipt of AFDC or SSI (regardless of whether or not a valid Medicaid card was presented), it is estimated that a total of 10.7 million persons had categorical eligibility for Medicaid.

[11]Wilensky, G., Walden, D., and Kasper, J.: "The Changing Medicaid Population," paper presented at the 1980 Annual Meeting of the American Statistical Association, Houston, Texas, Aug. 11, 1980.

Technical notes

The estimates shown in this report are based on data obtained in household interviews in a continuing nationwide survey. Each week a probability sample of households is interviewed by personnel of the U.S. Bureau of the Census to obtain information about the health and other characteristics of the civilian noninstitutionalized population of the United States.

During 1978, interviews were conducted in approximately 41,000 households containing about 110,000 family members and unrelated individuals. The total noninterview rate was about 3.8 percent. The weights of interviewed persons in the segments containing households in the sample for whom data were not obtained were inflated to compensate for household nonresponse.

All persons 17 years of age and over were asked to participate in the interview. When this was not possible, proxy responses were accepted from family members meeting the NHIS respondent rules. Approximately 63 percent of persons 17 years of age and over responded for themselves. Proxy responses were obtained on the remaining 37 percent of adult family members. All information on persons under 17 years of age is obtained from adult family members or guardians.

The appendixes of the 1978 *Current Estimates* (Series 10, No. 130) should be consulted for a more detailed discussion of the sample design and weighting procedures (appendix I) and for a copy of the questionnaire used during 1978. Approximate sampling errors for estimates contained in this report are shown in table I (aggregates) and table II (percents).

Table I. Standard errors of estimates of aggregates

Size of estimate in thousands	*Standard error in thousands*
35	11
100	18
300	31
500	40
1,000	57
5,000	125
10,000	174
20,000	237
30,000	278
150,000	393

Table II. Standard errors, expressed in percentage points, of estimated percentages

Base of percentages in thousands	*Estimated percentages*				
	2 or 98	*5 or 95*	*10 or 90*	*20 or 80*	*50*
100	2.5	3.9	5.4	7.2	9.0
300	1.5	2.3	3.1	4.2	5.2
500	1.1	1.8	2.4	3.2	4.0
1,000	0.8	1.2	1.7	2.3	2.9
5,000	0.4	0.6	0.8	1.0	1.3
10,000	0.3	0.4	0.5	0.7	0.9
20,000	0.2	0.3	0.4	0.5	0.6
30,000	0.1	0.2	0.3	0.4	0.5
150,000	0.1	0.1	0.1	0.2	0.2

nchs advancedata

From Vital and Health Statistics of the National Center for Health Statistics Number 72 • June 29, 1981

Visits to Family Planning Service Sites: United States, 1978

by Bettie L. Hudson, Division of Health Care Statistics

Data highlights

According to data collected for the National Reporting System for Family Planning Services by the National Center for Health Statistics, an estimated 7,425,000 medical family planning visits by females were made to nonmilitary family planning service sites in the United States. Excluded from the scope of the National Reporting System for Family Planning Services are family planning visits that were made to private physicians. Of these visits, 38.1 percent were made by females 20-24 years of age.

Of the family planning visits made by females, an estimated 77.6 percent resulted in the adoption or continuation of an oral contraceptive pill, an intrauterine device (IUD), or sterilization, each of which is a highly effective contraceptive method requiring medical services.

About 32.7 million medical services were provided to females at an average rate of 4.4 services per visit. Four of the 11 medical services specified in the National Reporting System for Family Planning Services (the Pap smear, the pelvic examination, the breast examination, and the blood pressure check) accounted for 56.2 percent of the total medical services provided.

Introduction

Since 1972 the Division of Health Care Statistics of the National Center for Health Statistics (NCHS) has used the National Reporting System for Family Planning Services (NRSFPS) to obtain data on the utilization of family planning services provided by the Nation's family planning program.[1] NRSFPS data are also used by the Department of Health and Human Services to prepare the annual "Report on Family Planning Services and Population Research," made to Congress, as required under Section 1009 of the Public Health Service Act (Public Law 94-63).

On July 1, 1977, the NRSFPS was converted from a full-count to a sample-based survey. Figure 1 is a facsimile of the primary data collection form used. Estimates in this report are based on a sample approach for the entire year.

A brief description of the sample design and an explanation of the sampling error associated with the estimates are found in the technical notes in this report.

According to the NRSFPS definition, family planning services encompass medical services related to contraceptive methods (including sterilization) and treatment for infertility. These medical services are the Pap smear, pelvic examination, breast examination, blood pressure check, pregnancy testing, venereal disease testing, urinalysis, blood test, sterilization, infertility treatment, and other medical services. While family planning services are available through several components of the Nation's health care delivery system, the Nation's family planning program distinguishes itself from the other components by its commitment to provide family planning services to individuals regardless of economic status. The Nation's family planning program, as outlined in the 1978 report to Congress, is comprised of public and private agencies that provide family planning services through a network of family planning service sites. The U.S. Public Health Service provides a significant financial base for the provision of family planning services through grants for health services to many of these agencies.

Data on family planning services are also collected in two other surveys—the National Ambulatory Medical Care Survey (NAMCS),[2] and the National Survey of Family Growth (NSFG).[3] NAMCS collects data on visits to office-based physicians, and NSFG collects data on family planning visits made by married women ages 15-44 years. Because of differences in the populations sampled, the definitions, and the data collection procedures, estimates on family planning visits from the three data systems may differ.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
HEALTH RESOURCES ADMINISTRATION
NATIONAL CENTER FOR HEALTH STATISTICS

Clinic Visit Record for Family Planning Services

FORM No. 1479 O.M.B. 68-R1137

ASSURANCE OF CONFIDENTIALITY—All information which would permit identification of an individual, a practice, or an establishment will be held confidential, will be used only by persons engaged in and for the purposes of the survey and will not be disclosed or released to other persons or used for any other purpose. Provision of services is in no way contingent on the patient's providing any information for this form.

1. SERVICE NUMBER ☐☐☐☐☐☐☐ Number

2. PATIENT NUMBER ☐☐☐☐☐☐☐☐☐ Number

3. DATE OF THIS VISIT ☐☐ Month ☐☐ Day ☐☐ Year

4. PATIENT'S SEX
a ☐ Female b ☐ Male

5. ARE YOU OF HISPANIC ORIGIN OR DESCENT?
HAND CARD A a ☐ Yes b ☐ No

6. PATIENT'S RACE *(Check one box)*
a ☐ White c ☐ Asian or Pacific Islander
b ☐ Black d ☐ American Indian or Alaskan Native

7. WHAT IS YOUR BIRTH DATE?
a Date → ☐☐ Month ☐☐ Day ☐☐ Year
b ☐ If unknown ask—"How old are you"? _____ (No. of Years)

8. PATIENT STATUS
Have you ever been a patient of this or any other clinic for family planning medical services?
a ☐ Yes b ☐ No
If "Yes," when were you last a patient at any clinic for family planning medical services? → ☐☐ Month ☐☐ Year

9. EDUCATION
A. What is the highest grade (or year) of regular school you have completed? *(Circle one number)*
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17+
(If "zero," go to 10)
B. Are you presently a student in a regular school?
a ☐ Yes
b ☐ No

10. FAMILY INCOME AND FAMILY SIZE
HAND CARD B and HAND CARD C
A. Which of the following groups represents your total combined gross (before deductions) family income for the past 12 months?
a ☐ 0-$1,249 d ☐ $6,250-$8,749 g ☐ $18,750+
b ☐ $1,250-$3,749 e ☐ $8,750-$13,749 h ☐ Unknown
c ☐ $3,750-$6,249 f ☐ $13,750-$18,749
B. How many people are in your family, that is, the number supported by this income? _____
C. Does this income include any public assistance?
a ☐ Yes b ☐ No
D What is your relationship to the chief earner?
a ☐ Chief earner c ☐ Daughter/Son
b ☐ Wife/Husband d ☐ Other relative

AGENCY USE ONLY						
	A	B	C	D	E	F
1.						
2.						
3.						
4.						
5.						
6.						

11. PREGNANCY HISTORY (Females only)
A. Have you ever been pregnant?
a ☐ Yes b ☐ No — *Go to 12*
B. How many live births have you had? _____
C. Of these, how many are now living? _____
D. How many of your pregnancies were ended by stillbirth, induced abortion, or miscarriage? *(If "zero," go to F)* _____
E. How many of these pregnancies were ended by induced abortion since January 1973? _____
F. In what month and year did your last pregnancy end (regardless of how it ended)? ☐☐ Month ☐☐ Year

12. CONTRACEPTIVE HISTORY
A. Have you ever used a method of birth control regularly?
a ☐ Yes b ☐ No — *Go to 13*
HAND CARD D
B. What method did you last use regularly? *(Check all methods that apply)*
a ☐ Sterilization
b ☐ Oral (Pill)
c ☐ IUD
d ☐ Diaphragm
e ☐ Injection
f ☐ Condom
g ☐ Foam/Jelly/Cream
h ☐ Natural (including rhythm)
j ☐ Other
C. Do you currently use that method (primary method checked in 12B)?
a ☐ Yes — *Go to E* b ☐ No
D. In what month and year did you stop using that method? ☐☐ Month ☐☐ Year
E. How long did you use that method?
_____ Days (If less than a month)
_____ Months (If less than a year)
_____ Years
F. Where was the method prescribed or obtained?
a ☐ This service site
b ☐ Clinic (If other than this site)
c ☐ Hospital (If other than this site)
d ☐ Private physician
e ☐ Drug store (nonprescription)
f ☐ Other
g ☐ Unknown

13. MEDICAL SERVICES PROVIDED AT THIS VISIT
a ☐ Pap smear
b ☐ Pelvic exam
c ☐ Breast exam
d ☐ Blood pressure
e ☐ Pregnancy testing
f ☐ V.D. testing
g ☐ Urinalysis (n.e.s.)
h ☐ Blood test (n.e.s.)
j ☐ Sterilization
k ☐ Infertility treatment
m ☐ Other medical services

14. CONTRACEPTIVE METHOD AT THE END OF THIS VISIT
A. Method *(Check all that apply)*
a ☐ Sterilization
b ☐ Oral (Pill)
c ☐ IUD
d ☐ Diaphragm
e ☐ Injection
f ☐ Condom
g ☐ Foam/Jelly/Cream
h ☐ Natural (including rhythm)
j ☐ Other
k ☐ None
B. If "None," give reason *(Check one only)*
a ☐ Pregnant
b ☐ Infertility patient
c ☐ Seeking pregnancy
d ☐ Other medical reasons
e ☐ Relying on partner's method
f ☐ Other

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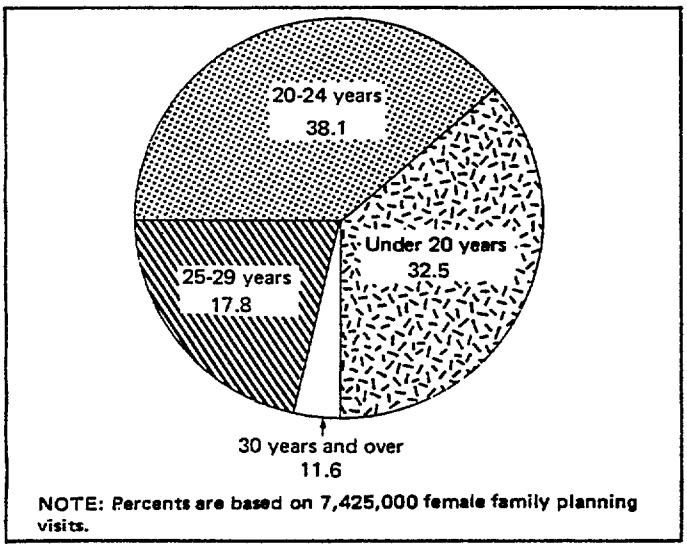
Figure 1. Clinic Visit Record for Family Planning Services

Sex, age, race, and ethnicity

In addition to the estimated 7,425,000 medical family planning visits made by females, an estimated 27,000 medical family planning visits were made by males to family planning service sites. Because the size of the NRSFPS sample is not large enough to allow a detailed analysis by various service and sociodemographic characteristics, this report is limited to family planning visits made by females. However, data on family planning visits by males have been presented in other NCHS publications.[4,5,6]

Figure 2 shows that 88.4 percent of the family planning visits were made by females under 30 years. Of these visits made by females in this age range, 32.5 percent were made by those under 20 years, 38.1 percent were made by those 20-24 years, and 17.8 percent were made by those 25-29 years. Females aged 30 years and over accounted for 11.6 percent.



NOTE: Percents are based on 7,425,000 female family planning visits.

Figure 2. Percent distribution of female family planning visits by age: United States, 1978

An estimated 66.5 percent of the visits were made by white females and 31.7 percent by black females. The remaining 1.8 percent were made by females of other races. Data for white females (table 1) show that 67.8 percent of the visits were made by those under 20 years. In addition, two-thirds of the visits were made by those aged 20-29 years, and white females also accounted for a large proportion (61.0 percent) of the visits made by females aged 30 years and over.

An estimated 9.9 percent of the visits were made by females of Hispanic origin or descent. The proportion of these visits ranged by age from 5.8 percent to 19.0 percent.

Table 1. Number and percent distribution of female family planning visits by race, ethnicity, and education, according to age: United States, 1978

Race, ethnicity, and education	All ages	Age			
		Under 20 years	20-24 years	25-29 years	30 years and over
	Number in thousands				
All visits	7,425	2,410	2,831	1,321	864
	Percent distribution				
Total	100.0	100.0	100.0	100.0	100.0
Race					
White	66.5	67.8	68.3	63.7	61.0
Black	31.7	30.8	30.0	34.0	36.7
Other	1.8	1.4	1.7	2.3	2.3
Ethnicity					
Hispanic origin or descent	9.9	5.8	9.0	13.6	19.0
Not of Hispanic origin or descent	90.1	94.2	91.0	86.4	81.0
Education					
Less than 12 years	39.7	61.4	25.3	28.6	43.5
12 years	39.0	31.3	43.5	43.1	39.5
13 years or more	21.3	7.3	31.2	28.2	17.0

Education

Table 1 shows that 78.7 percent of the visits were made by females with 12 years of education or less. For ages 20 years and over, the proportion of visits made by females with more than 12 years of education decreased with increasing age.

Pregnancy history

A large proportion (41.8 percent) of the visits were made by females who had never been pregnant (table 2). As expected, the proportion of visits

Table 2. Percent distribution of female family planning visits by number of pregnancies, and number of live births, according to age: United States, 1978

Pregnancies and live births	All ages	Age			
		Under 20 years	20-24 years	25-29 years	30 years and over
Total pregnancies	100.0	100.0	100.0	100.0	100.0
Never pregnant	41.8	64.3	41.4	21.8	10.4
One pregnancy	26.8	27.6	31.6	25.1	11.6
Two pregnancies or more	31.4	8.2	26.9	53.0	77.9
Total live births	100.0	100.0	100.0	100.0	100,0
No live births	53.2	77.6	55.3	30.4	13.5
One live birth	22.6	18.8	26.8	26.0	14.4
Two live births or more	24.1	3.6	17.9	43.6	72.0

made by females who had never been pregnant decreased with age, however, the proportion of visits made by females with two or more pregnancies increased with age. Approximately 64.3 percent of the visits were made by teenagers (under 20 years of age) who reported they had never been pregnant, however, 8.2 percent were made by teenagers who reported two or more pregnancies. Of those visits made by females 30 years and over, about 10.4 percent reported they had never been pregnant, compared with 77.9 percent who reported two or more pregnancies. The proportion of visits made by females who had had one pregnancy was about the same for all age groups, except those visits made by females aged 30 years and over (11.6 percent).

About 53.2 percent of the reported visits were associated with nulliparous females. A large proportion (77.6 percent) of visits by teenagers were made by those who had never had a live birth, compared with 3.6 percent who reported two live births or more (table 2). The proportion of visits made by females 30 years and over was larger than visits made by those under 30 years who reported one or more live births (86.4 percent and 41.6 percent, respectively).

Medical services

According to the NRSFPS classification of family planning medical services, there were an estimated 32.7 million medical services provided during 7.4 million female family planning visits.

The vast majority of these visits included services related to contraception, and only 0.1 percent of the visits included treatment for infertility.

A Pap smear, a breast examination, and a blood pressure check—basic medical services for female contraceptors—were provided at 48.2 percent, 50.2 percent, and 86.1 percent of the visits, respectively (figure 3). Futhermore, a pelvic examination was provided at 63.2 percent of the visits. It should be noted that any one family planning visit may involve several medical services. Thus the percentages in figures 3 do not add to 100 percent.

The medical service of sterilization was not commonly provided to females at family planning visits (0.2 percent) and was not generally available at most service sites.

Venereal disease testing was commonly provided at family planning visits (44.1 percent), but the NRSFPS did not collect information on test results.

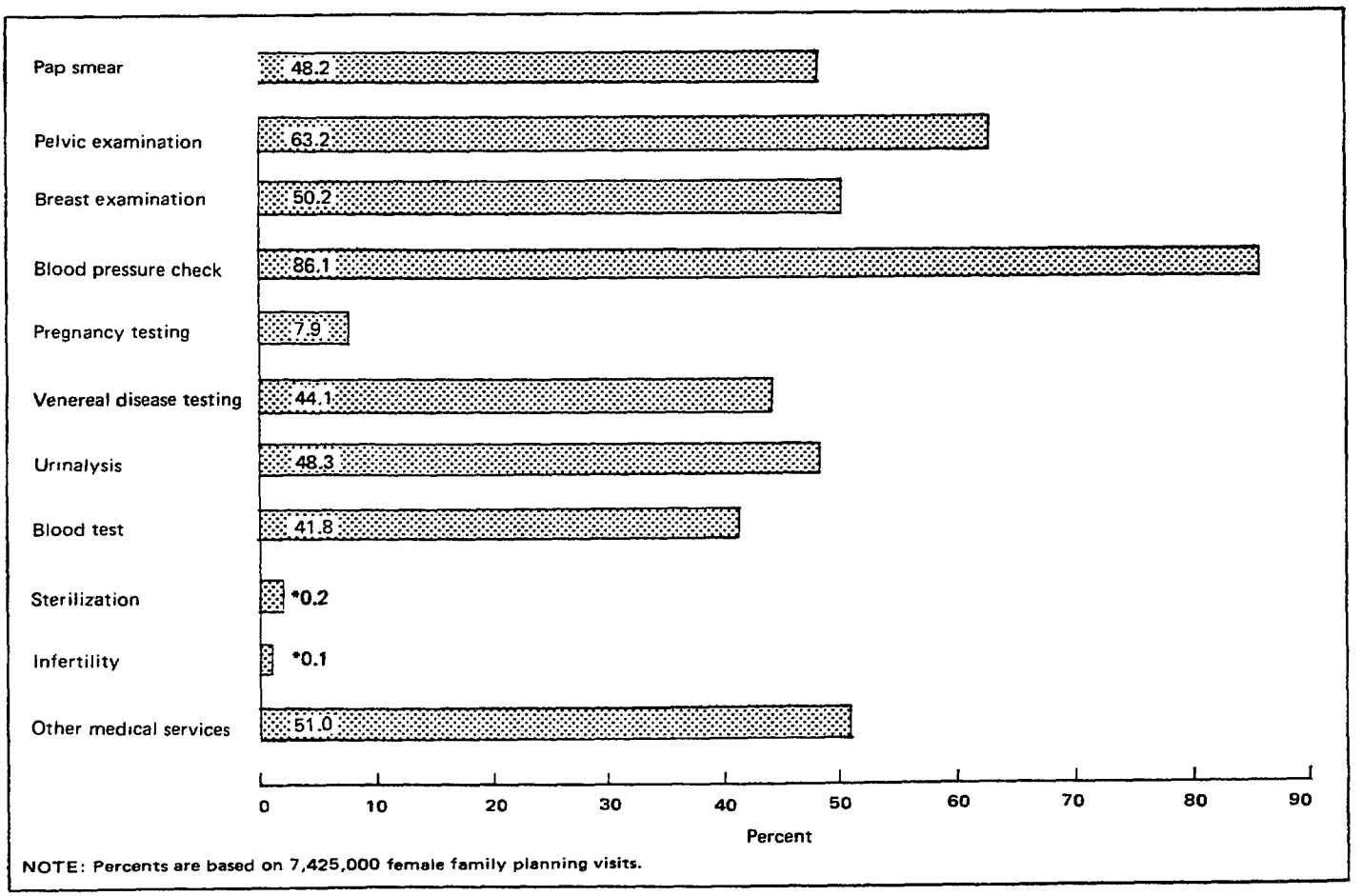


Figure 3. Percent of female family planning visits, by type of medical services provided: United States, 1978

Pregnancy testing was provided at a smaller proportion of the visits (7.9 percent).

The category "other medical services" comprises those medical family planning services not otherwise specified by the NRSFPS. Other medical services were provided at 51.0 percent of the family planning visits.

Contraceptive method adopted or continued

As noted, virtually all of the visits made by females to family planning service sites were to obtain medical services related to contraception. The pill was adopted or continued for about 67.1 percent of the reported visits (figure 4 and table 3). The next most popular method was the intrauterine device. The diaphragm and foam, jelly, or cream (considered as methods used independently) were the contraceptive methods adopted or continued at 6.4 and 4.8 percent of the visits, respectively. Sterilization was the contraceptive method adopted or continued at 1.0 percent of the visits; however, it should be noted that females who have elected sterilization as their method of contraception generally have less need to make routine followup visits than females on other methods. Overall, 89.8 percent of the visits resulted in the continuation or adoption of some contraceptive method.

Table 3 shows that although the pill was the most frequently adopted or continued contraceptive method in each age interval, generally the proportion of visits involving its use declined with increasing age, from 77.0 percent of the visits made by females under 20 years of age to 45.3 percent of the visits made by females 30 years and over.

While figure 4 shows that 10.2 percent of family planning visits resulted in neither the adoption nor the continued use of a contraceptive method, table 3 shows that 3.2 percent of these visits were made by females who relied on their partner's method for contraceptive protection. In addition, about 2.9 percent of these visits were made by females who were pregnant, and the remaining 4.1 percent reported other reasons for no contraceptive method.

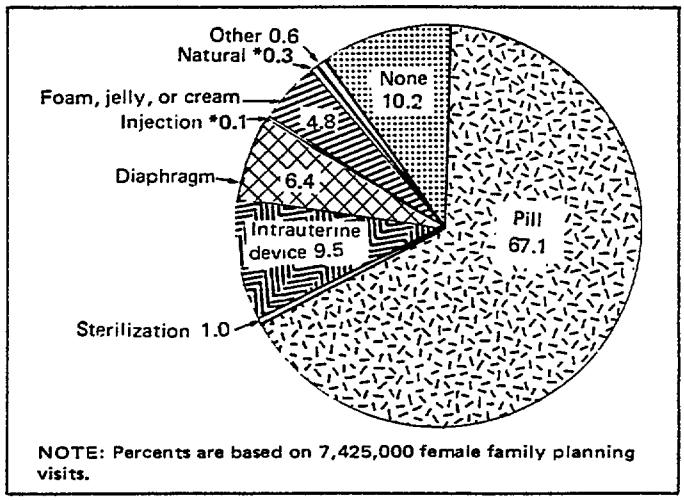


Figure 4: Percent distribution of female family planning visits at which a contraceptive method was adopted or continued, by method chosen: United States, 1978.

Table 3. Percent distribution of female family planning visits by contraceptive method adopted or continued, according to age: United States, 1978

Method	All ages	Age			
		Under 20 years	20-24 years	25-29 years	30 years and over
Total	100.0	100.0	100.0	100.0	100.0
Pill	67.1	77.0	68.6	60.1	45.3
Intrauterine device	9.5	4.4	8.9	13.5	20.0
Diaphragm	6.4	3.7	7.3	8.3	7.8
Foam, jelly, or cream	4.8	4.2	4.2	5.1	8.3
Other	2.0	0.8	1.4	2.7	5.8
None-pregnant	2.9	3.4	2.9	2.3	1.9
None-relying on partner	3.2	2.6	2.8	3.7	5.7
None-other	4.1	3.8	3.9	4.2	5.2

References

[1]National Center for Health Statistics: Background and development of the National Reporting System for Family Planning Services, United States, by B. J. Haupt. *Vital and Health Statistics.* Series 1 - No. 13. DHEW Pub. No. (PHS) 78-1313. Public Health Service. Washington. U.S. Government Printing Office, Apr. 1978.

[2]National Center for Health Statistics: Office visits for family planning, National Ambulatory Medical Care Survey, United States, 1977, by B. K. Cypress. *Advance Data from Vital and Health Statistics,* No. 49. DHEW Pub. No. (PHS) 79-1250. Public Health Service. Hyattsville, Md. Apr. 16, 1979.

[3]National Center for Health Statistics: Use of family planning services by currently married women 15-44 years of age, United States, 1977 and 1976, by G. E. Hendershot. *Advance Data from Vital and Health Statistics,* No. 45. DHEW Pub. No. (PHS) 79-1250. Public Health Service. Hyattsville, Md. Feb. 7, 1979.

[4]National Center for Health Statistics: 1974 *Annual Report, National Reporting System for Family Planning Services,* by B. J. Haupt. DHEW Pub. No. (HRA) 77-1238. Health Resources Administration. Washington. U.S. Government Printing Office, May 1977.

[5]National Center for Health Statistics: 1975 *Annual Report, National Reporting System for Family Planning Services,* by B. J. Haupt. DHEW Pub. No. (HRA) 78-1238. Health Resources Administration. Washington. U.S. Government Printing Office, Sept. 1977.

[6]National Center for Health Statistics: 1976 Provisional Data from the National Reporting System for Family Planning Services, January 1976-December 1976.

Technical notes

Sampling design

The 1978 National Reporting System for Family Planning Services estimates are based on a stratified two-stage sampling design. The 1978 NRSFPS sample for the United States encompassed 276,619 female visit records. A clinic visit record was completed for each sample family planning visit. A report delineating the NRSFPS background, development, and evolution has been published.[1]

Estimation

The statistics provided by the NRSFPS for 1978 are derived by a complex estimation procedure. This procedure, which was used to produce essentially unbiased national estimates for the NRSFPS has two principal components—inflation by the reciprocal of the probability of sample selection, and adjustment for nonresponse.

Sampling error

The statistics presented in this report are based on a two-stage stratified sample survey and therefore differ from those that would be obtained based on a full-count (100 percent) survey using the same data collection procedures and definitions.

The standard error is primarily a measure of the variability that occurs by chance because a sample rather than the population is surveyed. While the standard error as calculated for this report reflects some of the random variation inherent in the measurement process, it does not measure any systematic error that is present in the NRSFPS data. The reader is directed to refer to "Nonsampling Error" in this section for additional information on measurement error. The relative standard error of an estimate is obtained by dividing the standard error of the estimate by the estimate itself and is sometimes expressed as a percentage of the estimate. The chances are about 0.68 that the interval specified by the estimate plus or minus one standard error of the estimate contains the figure which would be obtained through a full-count survey of the sampling frame. The chances are about 0.95 that the interval specified by the estimate plus or minus two standard errors of the estimate contains the figure which would be obtained through a full-count survey of the sampling frame.

In order to derive standard errors that would be applicable to a wide variety of statistics and that could be derived at moderate costs, several approximations were required. For the categories by age of female family planning visits presented in this report, estimates of totals and relative standard errors of totals are shown in table I. The standard errors for estimated percentages of visits are shown in table II.

Table I. Number of family planning visits by women and relative standard error, by age: United States, 1978

Age	Number of visits in thousands	Relative standard error in percent
All ages	7,425	3.4
Under 20 years	2,410	3.7
20-24 years	2,831	3.5
25-29 years	1,321	3.6
30 years and over	864	3.3

Table II. Approximate standard error of percent of estimated number of female family planning visits, by age: United States, 1978

Age	Estimated percent of visits					
	1 or 99	5 or 95	10 or 90	20 or 80	30 or 70	50
	Standard error in percentage points					
All ages	0.2	0.3	0.5	0.6	0.7	0.8
Under 20 years	0.2	0.5	0.7	0.9	1.0	1.1
20-24 years	0.2	0.5	0.6	0.9	1.0	1.1
25-29 years	0.3	0.7	1.0	1.3	1.5	1.6
30 years and over	0.4	0.8	1.1	1.4	1.6	1.8

Example of use of table: An estimate of 90 percent based on all teenage visits has a standard error of 0.7 percent or a relative standard error of 0.8 percent (0.7 percent ÷ 90 percent).

Nonsampling error

While nonsampling error is present in most sample surveys, the NRSFPS was particularly subject to error associated with a gap between the survey's universe and sampling frame. This gap existed because the sampling frame did not include sites that began providing services after the frame was finalized in early 1976. Other nonsampling error includes error due to service site nonresponse, item nonresponse, information incompletely or inaccurately recorded, and processing error. Through a study conducted during 1980 which included site visits to a probability subsample of the NRSFPS sample sites, several problems associated with the collection of data for the NRSFPS were identified. While the study results are not applicable to the 1978 NRSFPS per se, they are probably indicative of the

A list of references follow text.

difficulties inherent in the 1978 NRSFPS data collection efforts.

Rounding

Aggregate estimates of family planning visits in tables are rounded to the nearest thousand. The percentages were computed based on unrounded estimates; thus, the figures may not add to the totals.

Definitions

Family planning service site.—A family planning service site is a location or place where medical family planning services are provided on a regular basis under the supervision of a physician. Private physician's offices and group medical practices are not considered sites unless they receive support through a Department of Health and Human Services grant for the provision of family planning services. Military service sites are excluded from the survey.

Family planning visit.—A family planning visit is a visit to a family planning service site in which medical services related to contraception, infertility treatment, or sterilization are provided.

Symbols

- - -	Data not available
. . .	Category not applicable
-	Quantity zero
0.0	Quantity more than 0 but less than 0.05
*	Figure does not meet standards of reliability or precision

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From Vital and Health Statistics of the National Center for Health Statistics

Number 73 • June 24, 1981

Patient Profile, National Reporting System for Family Planning Services: United States, 1978

by Jean E. Foster, formerly with the Division of Health Care Statistics

The National Reporting System for Family Planning Services (NRSFPS) is a sample survey conducted on a continuous basis by the Division of Health Care Statistics, National Center for Health Statistics. The NRSFPS, begun in 1972 to collect data on clinic-based visits for family planning services in the United States and some of its territories, encompasses medical family planning visits occurring in clinics. The clinics include those operated by public health departments, private organizations such as affiliates of Planned Parenthood Federation of America, Inc. or hospitals, and other sites that provide family planning services. Medical family planning visits to private physicans' offices are excluded from the survey.

The Clinic Visit Record (CVR) is the basic data collection form used in the NRSFPS. Service sites that collected NRSFPS data through participation in a computerized record system generally used a locally developed form containing the CVR items. The 14 items on the CVR cover basic sociodemographic information about the patient and include questions about family planning. In this survey, family planning patients are defined as individuals who made a visit for medical family planning services related to contraception, infertility treatment, or sterilization. Persons seeking only a pregnancy or venereal disease test are not counted as family planning patients, nor are persons interested only in obtaining contraceptive supplies or counseling.

Although the primary sampling unit in the NRSFPS is the family planning visit, an unduplicated count of patients can be obtained by identifying 1) new patients at the time of their first visit, and 2) continuation and readmission patients at the time of their first visit in the survey year. (Readmission patients are patients who last visited a family planning service site at least one calendar year prior to 1978). Data based on patients, rather than visits, is inherently limited for NRSFPS data items which may change from one visit to another. Therefore, the reader should be cautious when interpreting the data. Further discussion of the survey methodology and the sampling variation associated with the statistics, and the definitions of certain terms used in this report, are included in Technical Notes.

Patient estimates

According to NRSFPS data, about 3,831,000 patients received medical family planning services in 1978 from family planning service sites in the United States. Table 1 shows that 99.6 percent of patients

Table 1. Number, percent distribution, and enrollment rates of family planning patients by selected characteristics: United States, 1978

Selected characteristic	*Number in thousands*	*Percent distribution*	*Enrollment rate per 1,000*[1]
All patients	3,831	100.0	18
Sex			
Female	3,815	99.6	77
Male	*17	0.4	...
All female patients	3,815	100.0	77
Age			
Under 15 years	44	1.2	...
15-19 years	1,225	32.1	119
20-24 years	1,402	36.8	139
25-29 years	669	17.5	74
30-34 years	282	7.4	35
35-39 years	117	3.1	18
40-44 years	49	1.3	8
45 years and over	27	0.7	...
Race			
White	2,616	68.6	61
Black	1,118	29.3	181
Other	81	2.1	75
Ethnicity			
Hispanic	415	10.9	133
Other	3,400	89.1	73

[1]Based on the female civilian, noninstitutionalized population age 15-44 years.

NOTE: Figures may not add to totals due to rounding.

in 1978 were women and only 0.4 percent were men. Since the estimated number of male patients is too small for reliable estimates based on detailed cross-tabulations, this report focuses on female family planning patients.

Most female medical family planning patients are 20-24 years old; the enrollment rate peaks at 139 per 1,000 women in that age interval. Teenagers account for 32.1 percent of all female patients and women 45 years and over represent only about 0.7 percent. The median female patient age is 22.9 years.

Although there are proportionately more white than black female patients (68.6 percent and 29.3 percent, respectively), the black enrollment rate is 181 per 1,000 women age 15 to 44 years compared with the white enrollment rate of 61 per 1,000 women age 15 to 44 years. Women of Hispanic origin comprise 10.9 percent of all female patients, with an enrollment rate of 133 per 1,000 women age 15 to 44 years. Ethnicity is independent of racial classification and may include persons of all races.

Patient status

Table 2 shows the relatively large proportion (61.5 percent) of continuation and readmission patients among women in 1978, which indicates the extent of previous exposure to the family planning program. As expected, continuation and readmission female patients tend to be older than new patients. The proportion of new patients is about 53.5 percent for the 15-19 age group and drops to about 28.8 percent for the 25-29 age group. The proportion of continuation patients levels off to about 59 percent beginning with women age 30-34. The median age for new female patients is 20.4 years, compared with 23.0 years for continuation patients and 24.1 years for readmission patients.

In 1978, a larger proportion of white female patients are new patients (42.3 percent) than among black female patients (28.6 percent). Conversely, continuation status is higher among black women (60.1 percent) than among white women (48.7 percent). There are proportionately more new patients among the Hispanic than among the non-Hispanic female patient population.

Table 2. Number and percent distribution of female family planning patients by patient status, according to selected characteristics: United States, 1978

Selected characteristic	All patients	Total	Patient status		
			New	Continuation	Readmit
		Percent distribution			
All female patients	3,815	100.0	38.4	51.9	9.6
Age					
Under 15 years	44	100.0	81.8	18.2	-
15-19 years	1,225	100.0	53.5	41.7	4.8
20-24 years	1,402	100.0	32.5	56.6	10.9
25-29 years	669	100.0	28.8	58.3	12.9
30-34 years	282	100.0	27.7	58.9	13.5
35-39 years	117	100.0	26.5	59.0	15.4
40-44 years	49	100.0	22.4	59.2	18.4
45 years and over	27	100.0	*22.2	59.3	*18.5
Race					
White	2,616	100.0	42.3	48.7	9.0
Black	1,118	100.0	28.6	60.1	11.3
Other	81	100.0	50.0	42.5	7.5
Ethnicity					
Hispanic	415	100.0	43.1	46.7	10.1
Other	3,400	100.0	37.9	52.6	9.6

NOTE: Figures may not add to totals due to rounding.

Female patient demographics

The data in table 3 show that there are at least 2 times as many white as black female patients in

Table 3. Number of female family planning patients by age and percent distribution by selected characteristics, according to age: United States, 1978

Selected characteristic	*All ages*	*Age*		
		Under 20 years	*20-29 years*	*30 years and over*
	Number in thousands			
All female patients	3,815	1,269	2,071	475
	Percent distribution			
Total	100.0	100.0	100.0	100.0
Race				
White	68.6	70.3	69.0	62.3
Black	29.3	28.0	28.8	35.2
Other	2.1	1.7	2.3	2.7
Ethnicity				
Hispanic	10.9	6.6	11.4	20.0
Other	89.1	93.3	88.6	80.2
Education				
Less than 12 years	39.5	61.2	25.3	42.9
12 years	38.2	30.7	42.7	38.5
13 years or more	22.3	8.0	32.0	18.1
Student status				
Student	29.6	55.6	18.4	8.8
Not a student	70.4	44.3	81.7	90.9
Public assistance income				
Receives public assistance	14.7	14.1	14.7	16.4
Does not receive public assistance	85.3	86.0	85.3	83.8

NOTE: Figures may not add to totals due to rounding.

the two youngest age groups shown (under 20 years of age and 20-29 years of age). Also, a smaller proportion of teenage women in the youngest age group was reported as being of Hispanic origin or descent than were women in the two older age groups.

The proportion of female family planning patients with less than a high school education (39.5 percent) varied with age, with the lowest proportion in the 20-29 year age group. About three-quarters of women in the middle age group reported that they completed high school or had additional years of schooling. Public assistance income is one indicator of family income and relative economic status. Most patients are not part of families whose income includes some type of public assistance. The proportion ranged from 14.1 percent among women under 20 years of age to 16.4 percent among women 30 years of age and over.

Pregnancy history

Tables 4 and 5 present statistics on the pregnancy history of female patients by age and race, respectively. As expected, the proportion who have never had a pregnancy decreases sharply with age. A larger proportion of white women have never been pregnant than black women. The same pattern is found for live births: 59.8 percent of the white women and 39.7 percent of the black women reported they had never borne a live child. However, the proportion of patients with one or more fetal deaths is the same for women of both races—approximately 23 percent. Among teenage patients, 15.2 percent reported at least one fetal death, whereas in the over 30 age group this proportion doubled, primarily due to longer exposure time associated with increasing age.

The proportion of women who reported three or more pregnancies or live births is highest in the over 30 age group. Approximately 58.3 percent of these patients reported three or more pregnancies compared with 15.6 percent of the patients 20-29 years of age. Differences are also apparent by race, with black patients having the larger proportion of both three or more pregnancies and three or more live births (21.2 percent and 14.7 percent, respectively).

Table 4. Number of female family planning patients by age and percent distribution by pregnancy history, according to age: United States, 1978

Pregnancy history	*All ages*	*Age*		
		Under 20 years	*20-29 years*	*30 years and over*
	Number in thousands			
All female patients	3,815	1,269	2,071	475
	Percent distribution			
Total	100.0	100.0	100.0	100.0
Number of pregnancies				
None	42.4	65.7	35.6	10.1
One	25.9	26.2	29.1	11.6
Two	15.2	6.0	19.8	20.2
Three or more	16.4	2.1	15.6	58.3
Number of live births				
None	53.9	78.3	48.1	13.3
One	21.8	18.1	25.8	14.3
Two	13.4	3.1	17.4	23.6
Three or more	10.9	*0.4	8.7	48.6
Number of fetal deaths				
None	77.4	84.8	75.0	68.2
One	17.2	13.2	18.9	20.2
Two or more	5.3	2.0	6.0	11.6

NOTE: Figures may not add to totals due to rounding.

Table 5. Number of female family planning patients by race and percent distribution by pregnancy history, according to race: United States, 1978

Pregnancy history	*Total*[1]	*White*	*Black*
	Number in thousands		
All female patients	3,815	2,616	1,118
	Percent distribution		
Total	100.0	100.0	100.0
Number of pregnancies			
None	42.4	46.9	31.9
One	25.9	24.7	28.9
Two	15.2	14.1	17.9
Three or more	16.4	14.3	21.2
Number of live births			
None	53.9	59.8	39.7
One	21.8	18.7	29.2
Two	13.4	12.2	16.4
Three or more	10.9	9.2	14.7
Number of fetal deaths			
None	77.4	77.5	77.3
One	17.2	17.4	16.8
Two or more	5.3	5.1	5.8

[1]Includes all other races not shown separately.

NOTE: Figures may not add to totals due to rounding.

Contraceptive use

Tables 6 and 7 present statistics on the contraceptive method used prior to the visit and the contraceptive method adopted or continued at the end of the patient's visit by age and race, respectively. These data refer to the first visit for new patients and the first visit in 1978 for all other patients. Given this limitation, table 6 indicates that teenagers are over three times more likely than either of the two older

Table 6. Number of female family planning patients by age and percent distribution by contraceptive use, according to age: United States, 1978

Contraceptive use	All ages	Age		
		Under 20 years	20-29 years	30 years and over
	Number in thousands			
All female patients	3,815	1,269	2,071	475
	Percent distribution			
Total	100.0	100.0	100.0	100.0
Prior contraceptive method				
Pill	57.4	48.8	64.8	48.2
IUD	8.7	2.3	9.8	21.5
Diaphragm	4.1	1.3	5.3	6.3
Foam, jelly, or cream	3.4	2.4	3.4	5.9
Natural	0.5	*0.6	*0.5	*0.4
Sterilization	1.2	*0.3	1.0	4.0
Other	3.6	4.3	3.1	4.0
No method used regularly	21.0	39.9	12.2	9.3
Current contraceptive method				
Pill	63.5	74.6	62.3	38.9
IUD	9.3	3.7	10.1	20.8
Diaphragm	7.4	4.2	9.0	9.3
Foam, jelly, or cream	5.7	5.0	5.2	9.5
Natural	0.4	*0.2	*0.4	*1.1
Sterilization	1.2	*0.2	1.0	4.8
Relying on partner	3.6	2.8	3.4	6.3
Other	0.8	*0.5	0.8	*1.5
None	8.2	8.7	7.8	8.2

NOTE: Figures may not add to totals due to rounding.

Table 7. Number of female family planning patients by race and percent distribution by contraceptive use, according to race: United States, 1978

Contraceptive use	Total[1]	White	Black
	Number in thousands		
All female patients	3,815	2,616	1,118
	Percent distribution		
Total	100.0	100.0	100.0
Prior contraceptive method			
Pill	57.4	56.5	59.8
IUD	8.7	7.8	10.7
Diaphragm	4.1	4.7	2.9
Foam, jelly, or cream	3.4	3.5	3.1
Natural	0.5	0.6	*0.2
Sterilization	1.2	1.1	*1.4
Other	3.6	4.3	2.1
No method used regularly	21.0	21.5	19.9
Current contraceptive method			
Pill	63.5	63.2	64.7
IUD	9.3	8.5	11.1
Diaphragm	7.4	8.6	4.9
Foam, jelly, or cream	5.7	5.0	7.2
Natural	0.4	*0.4	*0.4
Sterilization	1.2	1.0	1.6
Relying on partner	3.6	3.9	2.8
Other	0.8	0.8	*0.6
None	8.2	8.6	6.7

[1]Includes all other races not shown separately.

NOTE: Figures may not add to totals due to rounding.

age groups to have not used a contraceptive method regularly prior to visiting the clinic. Accordingly, 54.5 percent of the teenage patients reported they had never made a prior visit to a family planning clinic. There is no statistical difference between the proportion of white and black patients reporting no prior contraceptive method.

Overall, 79.0 percent of all female patients reported that some method of contraception was used prior to their visit. Among contraceptors in all age and racial groups, the pill is the most prevalent method used regularly prior to the family planning visit. However, reported pill use varies considerably by age. It was the most common prior method used by women in the 20-29 age range. About 56.5 percent of the white patients and 59.8 percent of the black patients reported the pill as their prior contraceptive method.

The contraceptive method adopted or continued after the visit, as mentioned above, represents only a minimal level of contraceptive services provided at service sites; method changes which may have occurred at return visits during the year are not represented in the statistics presented in this report. The proportion of patients reporting no method dropped from 21.0 percent before the visit to 8.2 percent after the visit; the comparable figures for teenage patients are 39.9 percent and 8.7 percent, respectively. The proportion of noncontraceptors did not differ significantly by race.

Oral contraception is the method most commonly adopted or continued by all age and race groups; 63.5 percent of all female family planning patients chose the pill.

More women under 20 years of age (74.6 percent) than women 30 years of age and over (38.9 percent) opted to use the pill, whereas the proportions choosing the IUD, diaphragm, and other methods generally increases with age. With the exception of a higher proportion of white patients that adopted or continued use of the diaphragm, there were no statistically significant differences between the races in the choice of birth control methods.

The three most effective methods—the pill, IUD, and sterilization—account for 74.0 percent of all female patients. The proportion of patients choosing or continuing these methods is 78.5 percent for women under 20 years of age, 73.4 percent for women 20-29 years of age, and 64.5 percent for women 30 years of age and over.

Technical Notes

Sampling design

The 1978 National Reporting System for Family Planning Services estimates are based on a stratified two-stage sampling design. In the first stage, a probability sample of 1,195 (about 1 in 4, nationally) family planning service sites was selected from a stratified sampling frame developed in 1976.

In the second stage of the sampling plan, family planning visits occurring at each sample site were systematically selected. The sampling rate assigned by NCHS to each sample site depended on the site's reported visit volume and the State in which the site was located. Overall, there were 14 visit sampling rates used to determine the proportion of each site's family planning visits needed for the survey; the visit sampling rates ranged from 1/1 to 1/30. The 1978 National Reporting System for Family Planning Services sample for the United States encompassed 138,129 female patient records. A report delineating the NRSFPS background, development, and evolution has been published.[1]

Estimation

The statistics provided by the NRSFPS for 1978 are derived by a complex-estimation procedure. The estimation procedure used to produce essentially unbiased national estimates for the NRSFPS has two principal components—inflation by the reciprocal of the probability of sample selection and imputation for nonresponse.

Sampling error

The statistics presented in this report are based on a sample survey and therefore differ from those that would be obtained from a full-count (100 percent) survey using the same data collection procedures and definitions.

The standard error is primarily a measure of the variability that occurs by chance because a sample rather than the entire universe is surveyed. While the standard error, as calculated for this report, reflects some of the random variation inherent in the measurement process, it does not measure any systematic error that is present in the NRSFPS data. The relative standard error of an estimate is obtained by dividing the standard error of the estimate by the estimate itself and is sometimes expressed as a percentage of the estimate. The chances are about 0.68 that the interval specified by the estimate plus or minus one standard error of the estimate contains the figure which would be obtained through a full-count survey of the sampling frame. The chances are about 0.95 that the interval specified by the estimate plus or minus two standard errors of the estimate contains the figure which would be obtained through a full-count survey of the sampling frame.

To derive standard errors that would be applicable to a wide variety of statistics and could be derived at moderate costs, several approximations were required. For the three basic age categories of patients presented in this report, estimates of totals and relative standard errors of totals are shown in table I. The standard error for estimated percentages of patients are shown in table II.

Table I. Number of female family planning patients and relative standard error, by age: United States, 1978

Age	Number of patients in thousands	Relative standard error in percent
All ages	3,815	4.1
Under 20 years	1,269	4.3
20-29 years	2,071	4.4
30 years and over	475	3.9

Table II. Approximate standard error of percent of female family planning patients, by age: United States, 1978

Age	Estimated percent of patients					
	1 or 99	5 or 95	10 or 90	20 or 80	30 or 70	50
	Standard error in percentage points					
All ages	0.2	0.4	0.6	0.8	0.9	0.9
Under 20 years	0.3	0.7	1.0	1.3	1.5	1.6
20-29 years	0.3	0.6	0.8	1.0	1.2	1.3
30 years and over	0.4	0.9	1.2	1.6	1.8	2.0

Example of use of table: An estimate of 90 percent based on all teenage patients has a standard error of 1.0 percent or a relative standard error of 1.1 percent (1.0 percent ÷ 90 percent).

Nonsampling error

While nonsampling error is present in most sample surveys, the NRSFPS was particularly subject to error associated with a gap between the survey's universe and sampling frame. This gap existed because the sampling frame did not include sites that began providing services after the frame was finalized in early

[1] National Center for Health Statistics: Background and development of the national reporting system for family planning services, by B. J. Haupt. *Vital and Health Statistics*, Series 1—No. 13. DHEW Pub. No. (PHS) 78-1313. Public Health Service. Washington. U.S. Government Printing Office, Apr. 1978.

1976. Other nonsampling error includes that due to service site nonresponse, item nonresponse, information incompletely or inaccurately recorded, and processing error. Through an evaluation study conducted during 1980, several problems associated with the collection of data for the NRSFPS were identified (i.e., adherence to NRSFPS definitions). While the study results are not directly applicable to the 1978 NRSFPS results, they are indicative of the difficulties inherent in the 1978 NRSFPS data collection effort.

Rounding

Aggregate estimates of family planning visits in the tables are rounded to the nearest thousand. The percentages were computed based on rounded estimates; thus, the figures may not add to the totals.

Definitions

Family planning service site.—A family planning service site is the location where medical family planning services are provided on a regular basis under the supervision of a physician. Private physicians' offices and group medical practices are not considered sites unless they receive support through a Department of Health and Human Services grant for the provision of family planning services. Military service sites are excluded from the survey.

Family planning visit.—A family planning visit is a visit to a family planning service site in which medical services related to contraception, infertility treatment, or sterilization are provided.

Family planning patient.—A family planning patient is an individual who has made one or more family planning visits.

Medical services.—Medical services include Pap smears, pelvic exams, breast exams, blood pressure tests, pregnancy tests, venereal disease tests, sterilizations, infertility treatments, urinalyses and blood tests (unless included as part of another service), and other medical services.

Related data

Data for the National Ambulatory Medical Care Survey come from reports from a sample of office-based physicians; data for the National Reporting System for Family Planning Services come from a sample of medical organizations that provide family planning services. These data systems use information from the providers of family planning services; however, the National Survey of Family Growth uses information from recipients of the services. Because of this difference and differences in collection procedures and definitions of terms, statistics on family planning visits from the three data systems may differ.

Symbols

- - -	Data not available
. . .	Category not applicable
-	Quantity zero
0.0	Quantity more than 0 but less than 0.05
*	Figure does not meet standards of reliability or precision

nchs advancedata

From Vital and Health Statistics of the National Center for Health Statistics Number 74 • September 4, 1981

Visits to Family Planning Clinics: United States, 1979

by Barbara Bloom, Division of Health Care Statistics

The National Reporting System for Family Planning Services is conducted by the Division of Health Care Statistics of the National Center for Health Statistics. It is an ongoing system that collects data on clinic-based visits for family planning services in the United States and some of its territories (Guam, Puerto Rico, and the Virgin Islands). The scope of the National Reporting System for Family Planning Services includes medical family planning visits occurring in clinics (operated by public health departments, private organizations such as affiliates of the Planned Parenthood Federation of America, Inc., or hospitals) and in other sites that provide family planning services. Excluded from the scope of the National Reporting System for Family Planning Services are all family planning visits to private physicians' offices and visits made *only* for the detection of pregnancy or venereal disease or *only* for obtaining contraceptive supplies or counseling.

From 1972 through mid-1977 the National Reporting System for Family Planning Services (NRSFPS) was conducted as a full-count survey, collecting information for every medical family planning visit at every participating site. Since July 1, 1977, however, the system has been conducted as a sample survey. The sample design for NRSFPS is based on a stratified two-stage probability sample. The first stage was the selection of clinics; the second stage was the selection of family planning visits occurring at each sampled clinic.

This report examines visits made by women to family planning clinics in the United States in 1979. Its focus is on socioeconomic characteristics, pregnancy history, and contraceptive methods. The reader should note that data from the territories of Guam, Puerto Rico, and the Virgin Islands are excluded. Male family planning visits are also excluded because the number of male visits was too small for reliable estimates. Since the basic unit of analysis is visits, these data represent the services provided during the visits of clinic users over the period of a year. These data should not be interpreted as representing a profile of family planning clinic patients.

Since the estimates in this report are based on a sampling of family planning clinics rather than on a complete enumeration, they are subject to sampling variability. The technical notes at the end of this report provide a brief description of sampling errors and guidelines for judging the precision of the estimates presented, as well as definitions of certain terms used in NRSFPS. A more detailed description of the sample design and other definitions are being prepared.[1]

1978 data from NRSFPS that focus on visits to family planning clinics[2] and on a patient profile[3] have been published. Other data on the utilization of family planning services are collected by means of two other surveys—the National Ambulatory Medical Care Survey[4] and the National Survey of Family Growth.[5] The National Ambulatory Medical Care Survey, also conducted by the Division of Health Care Statistics, collects data on visits to office-based physicians which include a family planning service. The National Survey of Family Growth, conducted by the Division of Vital Statistics, provides more detailed statistics on women who made family planning visits either to their own physicians or to organized family planning clinics in the 3 years prior to the time of the survey. Unlike the other two surveys, however, the data for the National Survey of Family Growth were collected by means of personal interviews with a national sample of women 15-44 years of age who were ever married or who had never married but who had offspring living in the household. Because of differences in the populations sampled, the definitions, and the data collection procedures, estimates on family planning visits from these data systems differ.

Age, race, and ethnicity

Women in the United States made 8,609,000 visits to family planning clinics in 1979, representing a 16-percent increase over the number of visits reported in 1978. This increase, however, is largely attributed to the addition of 169 service sites to the universe in 1979. The majority, 89 percent, of these visits were made by women under 30 years of age: 33 percent by teenagers, and 71 percent by women under 25 years of age (table 1).

Table 1. Number and percent distributions of female family planning visits by selected socioeconomic characteristics: United States, 1979

Selected characteristic	*Number in thousands*	*Percent distribution*
All visits	8,609	100.0
Age		
Under 20 years	2,865	33.3
20-24 years	3,242	37.7
25-29 years	1,529	17.8
30 years and over	973	11.3
Race		
White	6,057	70.4
Black	2,387	27.7
Other	165	1.9
Ethnicity		
Hispanic origin or descent	1,001	11.6
Not of Hispanic origin or descent	7,607	88.4
Education		
Less than 12 years	3,422	39.7
12 years	3,435	39.9
13 years or more	1,752	20.4
Public assistance income		
Receives public assistance	1,208	14.0
Does not receive public assistance	7,401	86.0

NOTE: Figures may not add to totals due to rounding.

Seventy percent of all visits were made by white women. However, looking at visits by age, the proportion of visits made by white women declined for the two oldest age groups. The proportion of visits by white women decreased from 72 percent for women under 25 years of age to 68 percent for women aged 25-29 years and 66 percent for women aged 30 years and over (table 2). At 28 percent overall, the proportion of visits by black women did not vary significantly with age.

Visits by women of Hispanic origin or descent accounted for 12 percent of the total number of visits in 1979. (It should be noted that ethnic classification is independent of racial classification and may include persons of all races. For example, a woman of Hispanic origin or descent may be of any racial category.) The proportion of visits by Hispanic women increased significantly with increasing age, ranging from 7 percent for teenagers to 22 percent for women aged 30 years and over.

Education

NRSFPS findings reveal that in 1979 40 percent of the visits to family planning clinics in the United States were made by women with less than a high school education, that is, less than 12 years of education. Both visits by white women (40 percent) and visits by black women (40 percent) were the same as this national total (table 3). However, there were significantly fewer visits by black women who had some additional years of education beyond high school (16 percent) than the national average (20 percent).

Educational attainment by ethnicity shows great disparity from the national average. Women of Hispanic origin who had less than 12 years of schooling made 57 percent of visits, as compared with 40 percent for the Nation, a difference of 17 percent. Also, Hispanic women who had additional years of education beyond high school made significantly fewer visits to family planning clinics (12 percent) than all women made (20 percent).

Income

Table 2 shows that 14 percent of visits to family planning clinics in 1979 were made by women living in families receiving public assistance income. The proportion was significantly higher for women aged 30 years and over (16 percent) than for teenagers (13 percent). In addition, as is shown in table 3, a greater proportion of visits by black women were characterized by the family's receipt of public assistance income (27 percent) than visits by white women were (9 percent). However, visits made by women of Hispanic origin receiving public assistance income (14 percent) were on a par with visits made by women who were not of Hispanic origin (14 percent).

Pregnancy history

In 1979, 43 percent of visits to family planning clinics were made by women who had never been pregnant. As expected, the proportion decreased dramatically with age, from 67 percent for teenagers to 10 percent for women aged 30 years and over (table 4). In significantly more visits by white women (47 percent) than by black women (35 percent) and in more visits by women who were not Hispanic (47 percent) than by Hispanic women (18 percent), the patient reported she had never been pregnant (table 5). The same patterns were found for live births. The proportion of visits made by women with no live births decreased with age, from 79 percent for teenagers to 13 percent for women aged 30

Table 2. Number of female family planning visits by age, and percent distributions by selected characteristics, according to age: United States, 1979

Selected characteristic	All ages	Age			
		Under 20 years	20-24 years	25-29 years	30 years and over
	Number in thousands				
All visits	8,609	2,865	3,242	1,529	973
	Percent distribution				
Total	100.0	100.0	100.0	100.0	100.0
Race					
White	70.4	71.6	71.7	67.9	66.3
Black	27.7	27.1	26.5	29.5	30.8
Other	1.9	1.3	1.8	2.7	2.9
Ethnicity					
Hispanic origin or descent	11.6	6.9	10.7	15.8	22.0
Not of Hispanic origin or descent	88.4	93.1	89.3	84.2	78.0
Education					
Less than 12 years	39.7	62.2	25.1	27.5	41.7
12 years	39.9	31.1	45.1	44.7	41.0
13 years or more	20.4	6.7	29.8	27.7	17.3
Public assistance income					
Receives public assistance	14.0	13.0	14.1	14.8	15.5
Does not receive public assistance	86.0	87.0	85.9	85.2	84.5

NOTE: Figures may not add to totals due to rounding.

Table 3. Number of female family planning visits by race and ethnicity, and percent distributions by education and public assistance income, according to race and ethnicity: United States, 1979

Education and public assistance income	Total[1]	Race		Ethnicity	
		White	Black	Hispanic origin or descent	Not of Hispanic origin or descent
	Number in thousands				
All visits	8,609	6,057	2,387	1,001	7,607
	Percent distribution				
Total	100.0	100.0	100.0	100.0	100.0
Education					
Less than 12 years	39.7	39.6	40.4	56.8	37.5
12 years	39.9	38.4	43.7	31.6	41.0
13 years or more	20.4	22.0	15.9	11.7	21.5
Public assistance income					
Receives public assistance	14.0	9.0	26.9	13.6	14.1
Does not receive public assistance	86.0	91.0	73.1	86.4	85.9

[1] Includes all other races not shown separately.

NOTE: Figures may not add to totals due to rounding.

Table 4. Number of female family planning visits by age, and percent distributions by pregnancies, live births, and contraceptive methods, according to age: United States, 1979

Pregnancies, live births, and contraceptive method	All ages	Age			
		Under 20 years	20-24 years	25-29 years	30 years and over
	Number in thousands				
All visits	8,609	2,865	3,242	1,529	973
	Percent distribution				
Total	100.0	100.0	100.0	100.0	100.0
Number of pregnancies					
None	43.3	67.1	42.1	22.7	10.0
One	26.2	25.8	31.2	24.8	12.8
Two or more	30.5	7.1	26.7	52.5	77.1
Number of live births					
None	53.7	78.8	54.7	30.8	13.1
One	22.4	17.8	27.2	25.3	15.2
Two or more	23.9	3.5	18.1	43.9	71.7
Contraceptive method					
Pill	67.5	76.8	69.5	60.5	44.5
Intrauterine device	8.1	3.3	7.4	12.1	18.3
Diaphragm	6.0	3.3	6.9	8.1	7.6
Foam, jelly, or cream	5.2	4.3	4.6	5.5	9.0
Relying on partner	3.9	3.4	3.5	4.1	6.6
Other	2.5	1.3	1.7	3.2	7.4
None—pregnant	3.2	4.0	3.0	2.9	2.1
None—other	3.6	3.6	3.4	3.6	4.6

NOTE: Figures may not add to totals due to rounding.

years and over (table 4). Also, in significantly more visits by white women (58 percent) than by black women (43 percent) and in more visits by women who were not Hispanic (58 percent) than by Hispanic women (24 percent) the patient reported having no live births.

As expected, there were significantly more visits by women aged 30 years and over who had two or more pregnancies (77 percent) and two or more live births (72 percent) than by women in any other age category. There were also significant differences by race and ethnic origin. The data show relatively more visits were made by black women who had two or more pregnancies (36 percent) and two or more live births (28 percent) than by white women (28 percent and 22 percent, respectively); and a larger proportion of visits were made by Hispanic women who had two or more pregnancies (55 percent) and two or more live births (48 percent) than by women who were not Hispanic (27 percent and 21 percent, respectively).

Medical services

A typical visit to a family planning clinic usually included at least four different medical services. A blood pressure test was routinely given in 86 percent of visits. Other frequently provided services were pelvic examinations in 59 percent of visits, breast examinations in 48 percent of visits, urinalyses in 48 percent of visits, and Pap smears in 46 percent of visits. Pregnancy testing (in conjunction with other medical services) was performed during only 9 percent of all family planning visits (table 6).

Contraceptive method

During 93 percent of family planning visits some method of contraception was adopted or the use of a contraceptive method was continued. Oral contraception was the overwhelming choice of all women regardless of age, race, or ethnic background. The pill was adopted or its use was continued in about two-thirds of all family planning visits (figure 1). However, pill use did decrease significantly with age from 77 percent of teenage visits to 45 percent of visits by women aged 30 years and over. Although no differences were found by race, pill use was significantly lower for visits by Hispanic women (61 percent) than by women who were not Hispanic (68 percent).

The next most popular methods of contraception were the intrauterine device (8 percent) and the diaphragm (6 percent). In general, the proportion of visits in which an intrauterine device, diaphragm, or other methods were chosen increased from the youngest to the oldest age categories. Higher proportions of visits by black women (9

Table 5. Number of female family planning visits by race and ethnicity, and percent distributions by pregnancies, live births, and contraceptive methods, according to race and ethnicity: United States, 1979

Pregnancies, live births, and contraceptive method	Total[1]	Race		Ethnicity	
		White	Black	Hispanic origin or descent	Not of Hispanic origin or descent
	Number in thousands				
All visits	8,609	6,057	2,387	1,001	7,607
	Percent distribution				
Total	100.0	100.0	100.0	100.0	100.0
Number of pregnancies					
None	43.3	46.6	35.0	17.9	46.7
One	26.2	25.3	28.8	26.7	26.1
Two or more	30.5	28.1	36.2	55.4	27.2
Number of live births					
None	53.7	57.9	43.1	23.8	57.7
One	22.4	20.1	28.5	27.9	21.6
Two or more	23.9	22.0	28.4	48.3	20.7
Contraceptive method					
Pill	67.5	67.3	68.8	60.6	68.4
Intrauterine device	8.1	7.5	9.1	14.1	7.3
Diaphragm	6.0	6.8	4.1	3.4	6.3
Foam, jelly, or cream	5.2	4.6	6.7	6.6	5.0
Relying on partner	3.9	4.3	2.8	7.1	3.5
Other	2.5	2.3	2.7	2.3	2.5
None—pregnant	3.2	3.5	2.4	2.8	3.3
None—other	3.6	3.7	3.4	3.2	3.7

[1] Includes all other races not shown separately.

NOTE: Figures may not add to totals due to rounding.

Table 6. Number and percent of female family planning visits, by medical services provided: United States, 1979

Medical services	Number in thousands	Percent
All visits	8,609	100.0
Pap smear	3,980	46.2
Pelvic examination	5,078	59.0
Breast examination	4,137	48.1
Blood pressure test	7,394	85.9
Pregnancy test	745	8.7
Venereal disease testing	3,592	41.7
Urinalysis	4,139	48.1
Blood test	3,474	40.4
Sterilization	*12	*0.1
Infertility services	*5	*0.1
Other medical services	4,758	55.3

NOTE: Figures do not add to total since each visit may involve more than one medical service.

percent) and Hispanic women (14 percent) were associated with intrauterine device usage than visits by white women (8 percent) and by women who were not Hispanic (7 percent) were. More visits by white women (7 percent) and women who were not Hispanic (6 percent) were associated with diaphragm usage than visits by black women (4 percent) and by Hispanic women (3 percent) were.

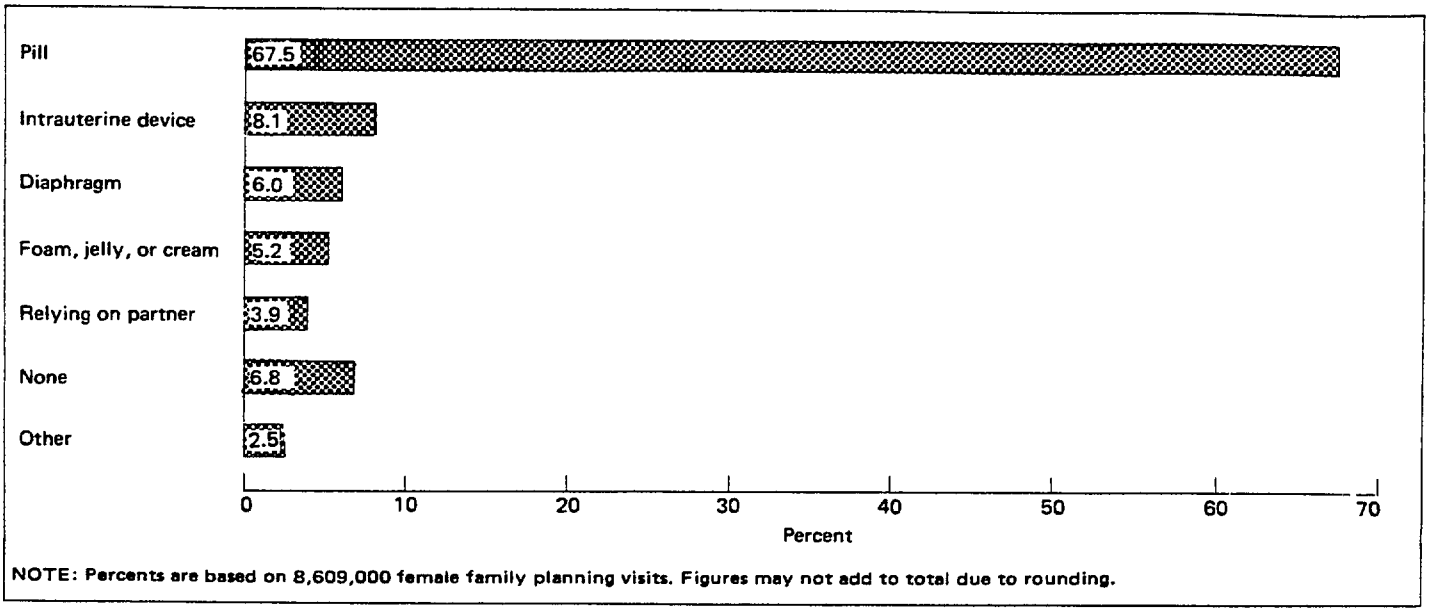

Figure 1. Percent distribution of female family planning visits at which a contraceptive method was adopted or continued by method chosen: United States, 1979

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Technical notes

Sample design

The 1979 National Reporting System for Family Planning Services (NRSFPS) estimates are based on a stratified two-stage sample design. In the first stage, a probability sample of family planning service sites was selected from a stratified sampling frame that was developed in 1976 and updated for 1979. In the second stage of the sampling plan, family planning visits occurring at each sample site were systematically selected. The sampling rate assigned by the National Center for Health Statistics to each sample site depended on the site's reported visit volume and the State in which the site was located. Overall, there were 14 visit sampling rates used to determine the proportion of each site's family planning visits needed for the survey; the visit sampling rates ranged from 1/1 to 1/30. The 1979 NRSFPS sample for the United States encompassed 376,472 female family planning visits. A report delineating NRSFPS background, development, and evolution has been published.[6]

Estimation

The statistics provided by NRSFPS for 1979 are derived by a complex-estimation procedure. The estimation procedure used to produce essentially unbiased national estimates for NRSFPS has two principal components—inflation by the reciprocal of the probability of sample selection and imputation for nonresponse.

Sampling error

The statistics presented in this report are based on a sample survey and therefore differ from those that would be obtained from a full-count (100 percent) survey using the same data collection procedures and definitions.

The standard error is primarily a measure of the variability that occurs by chance because a sample rather than the entire universe is surveyed. While the standard error as calculated for this report reflects some of the random variation inherent in the measurement process, it does not measure any systematic error present in NRSFPS data. The relative standard error of an estimate is obtained by dividing the standard error of the estimate by the estimate itself and is sometimes expressed as a percent of the estimate. The chances are about 0.68 that the interval specified by the estimate plus or minus one standard error of the estimate contains the figure that would be obtained through a full-count survey of the sampling frame. The chances are about 0.95 that the interval specified by the estimate plus or minus two standard errors of the estimate contains the figure that would be obtained through a full-count survey of the sampling frame.

In order to derive standard errors that would be applicable to a wide variety of statistics and that could be derived at moderate costs, several approximations were required. For the four basic age categories of patients presented in this report, estimates of totals and relative standard errors of totals are shown in table I. The standard error for estimated percents of visits are shown in table II.

Nonsampling error

Nonsampling error is present in most sample surveys and includes errors due to service site nonresponse, item nonresponse, information incompletely or inaccurately recorded, and processing error. Through an unpublished evaluation study conducted in 1980, several problems associated with the collection of data for NRSFPS (for example, adherence to NRSFPS definitions) were identified. While the study results are not applicable to the 1979 NRSFPS per se, they indicate the difficulties inherent in the data collection effort.

Rounding

Aggregate estimates of family planning visits in the tables are rounded to the nearest thousand. Because percents were computed according to unrounded estimates, figures may not add to totals.

Table I. Number of female family planning visits and relative standard error, by age: United States, 1979

Age	Number in thousands	Relative standard error
All ages	8,609	4.2
Under 20 years	2,865	5.1
20-24 years	3,242	4.4
25-29 years	1,529	3.5
30 years and over	973	3.9

Table II. Approximate standard errors of percents of estimated number of female family planning visits, by age: United States, 1979

Age	Estimated percent					
	1 or 99	5 or 95	10 or 90	20 or 80	30 or 70	50
	Standard error in percentage points					
All ages	0.1	0.3	0.4	0.5	0.6	0.7
Under 20 years	0.2	0.4	0.6	0.8	0.9	1.0
20-24 years	0.2	0.5	0.6	0.9	1.0	1.1
25-29 years	0.3	0.6	0.8	1.1	1.3	1.4
30 years and over	0.3	0.7	0.9	1.2	1.4	1.5

Example of use of table: An estimate of 20 percent of all teenage visits has a standard error of 0.8 percent or a relative standard error of 4.0 percent (0.8 percent ÷ 20 percent).

Definitions

Family planning service site.—A family planning service site is a location where medical family planning services are provided on a regular basis under the supervision of a physician. Private physicians' offices and group medical practices are not considered sites unless they receive support through a Department of Health and Human Services grant for the provision of family planning services. Military service sites are excluded from the survey.

Family planning visit.—A family planning visit is a visit to a family planning service site in which medical family planning services related to contraception, infertility treatment, or sterilization are provided.

Medical family planning services.—Medical family planning services include Pap smears, pelvic examinations, breast examinations, blood pressure tests, pregnancy tests, tests for venereal disease, sterilization, infertility treatment, urinalyses and blood tests (unless included as part of another service), and other medical services.

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From Vital and Health Statistics of the National Center for Health Statistics Number 75 • February 16, 1982

Expected Principal Source of Payment for Hospital Discharges: United States, 1979

by Edmund Graves and Robert Pokras, Division of Health Care Statistics

Introduction

This report presents statistics on data collected through the National Hospital Discharge Survey. The National Center for Health Statistics has continuously conducted this survey since 1965. In 1979 data were abstracted from the face sheets of medical records of approximately 215,000 patients discharged from 416 non-Federal short-stay hospitals. These data were used to produce estimates of hospital utilization by an estimated 36.7 million inpatients (excluding newborn infants) in the United States.

From 1968 through 1970 information on hospital charges and sources of payment from a subsample of the National Hospital Discharge Survey sample was collected.[1] No information on charges or sources of payment was collected from 1971 through 1976. However, during 1977-79 data on a patient's expected principal source of payment and other expected sources of payment were collected from the face sheets of all medical records in the National Hospital Discharge Survey sample. A report on the 1977 data has been published.[2] Statistics in that report as well as those in this one reflect only the patient's principal source of payment. The 1977 report presents estimates of source of payment by age and sex of patients as well as estimates for leading diagnostic and surgical categories. This report updates the basic estimates by age and sex of patients and provides new analysis by discharge status and surgical status of patients as well as by hospital location and ownership. The survey form used to collect these data is reproduced in another publication of the National Center for Health Statistics.[3]

Within NCHS, there are two other sources of information on health care costs: the National Medical Care Expenditures Survey (NMCES) and the National Health Interview Survey (NHIS). These surveys provide data on the number of persons in the general population covered under the different private or public health plans,[4-6] and the National Hospital Discharge Survey (NHDS) provides data on the hospital population only. According to the NHDS, approximately 6 percent of all patients discharged from short-stay hospitals had no health insurance. On the other hand, data from NHIS and NMCES indicate that 11.0 and 12.6 percent, respectively, of the noninstitutionalized population had no health insurance coverage. This would seem to indicate that a proportionately smaller number of the uninsured rather than of the insured are hospitalized. This may be true. Moreover, many individuals who claim they have no health insurance coverage may find on being hospitalized that they are covered under such public health programs as Medicaid, Welfare, Veterans Administration health benefits, and the like.

According to the National Hospital Discharge Survey, the percent of hospitalized individuals covered by private insurance was 52.5 percent. This is much lower than the estimated 77.7 percent of individuals covered by private insurance found in the 1978 National Health Interview Survey.[6] This difference is not unexpected since public health programs are often billed first for hospital charges, and individuals citing private insurance coverage may be using it as a secondary insurance source.

It should be noted that the expected source of payment recorded on the face sheet of the medical record may not have been the actual source of payment. For example, a patient admitted to a hospital following an automobile accident may have cited Blue Cross as the expected source of payment when, in fact, an automobile insurance company ultimately made restitution. Also, because of the manner in which this variable was collected, there is no way to determine the charge for the hospital stay or what proportions of the hospital stay and medical services were covered by the principal source of payment indicated.

Data highlights

Of the 36.7 million patients discharged from non-Federal short-stay hospitals in the United States during 1979, 52.5 percent expected to pay for their hospital stay through private insurance, 27.0 percent expected Medicare to pay for the hospitalization, 8.8 percent expected Medicaid to pay for the hospitalization, 5.9 percent expected to pay their own hospital bills, and the remaining 5.9 percent expected to have their hospital bills paid through other sources or not to be charged.

A typical person who was hospitalized in non-Federal short-stay hospitals in the United States during 1979 was female, white, about 44 years of age, was hospitalized in the South, was a patient in a nonprofit hospital, and expected to pay for the hospitalization through private insurance.

Discussion

Private Insurance

Private health insurance is the major type of health insurance in the United States. In studies done in 1976 and 1978 it was estimated that over 70 percent of all persons in the United States were covered by private insurance.[4,6] In the National Hospital Discharge Survey of 1979 it was the expected source of payment for about 50 percent of all hospital patients. The use of private insurance to pay hospital costs is a rather unusual method of payment since a study of 10 of the more developed countries pointed out that only the United States and Australia utilized private health insurance plans to a large extent.[7] Another interesting finding of that study was that the United States and Australia also had the shortest average lengths of stay of the 10 countries.

Private health insurance consists of Blue Cross and other private or commercial insurance. It was the expected source of payment for approximately 19.3 million discharges from non-Federal short-stay hospitals in 1979, about half of all discharges (table 1). Of these 19.3 million discharges, 19.0 million (98.7 percent) were under 65 years of age. The remaining 0.3 million (1.3 percent) were 65 years and over.

The numbers of males and females discharged were relatively similar for all age groups except 15-44 years (table 1). Of the discharges in this age group, females outnumbered males by about 5 to 2. This was due to the large number of females admitted for delivery and female-specific surgery.[2] However, the percent of males using private insurance and the percent of females using private insurance was about the same in each age group.

The average length of stay for patients with private insurance as an expected source of payment was 5.9 days (table 2). This was 1.3 days less than the average of 7.2 days for all patients discharged from short-stay hospitals. This difference is partially a function of age since average length of stay increases with age, and the average age of patients using private insurance was 34.4 years compared with an average age of 43.7 years for all patients (table 3). The shorter average length of stay means that a proportionately smaller number of days of care were used by the patients. Whereas approximately 52 percent of all discharges were expected to be covered by private insurance, only about 43 percent of the total days of care in non-Federal short-stay hospitals were used by these patients.

Table 4 provides data on the number and percent of patients discharged from non-Federal short-stay hospitals who had one or more surgical or nonsurgical procedures performed during 1979. A total of 18.9 million or 51.4 percent of all patients discharged during 1979 had one or more procedures performed.

Of the 19.3 million patients who expected to pay for their hospitalization through private insurance, 58.5 percent had one or more procedures performed (table 5). Women 15-44 years of age had three times more surgical procedures than men of the same age had because of the large number of obstetrical procedures.[2] Approximately 69.4 percent of all women 15-44 years expecting to pay for their hospitalization through private insurance had one or more procedures performed, whereas only 53.1 percent of the men 15-44 years with the same characteristic had one or more procedures performed.

Table 5 provides data on the discharge status for all patients under 65 years and 65 years and over. Of the 19.3 million patients covered by private insurance programs, 18.0 million (93.5 percent) were discharged alive and 184,000 (1.0 percent) were discharged dead; the discharge status of 1.1 million (5.6 percent) were unknown. A total of 17.8 million (98.8 percent) of the 18.0 million patients discharged alive were under 65 years. The remaining 223,000 patients (1.2 percent) were 65 years and over.

Table 6 shows the number and percent distribution of patients discharged from non-Federal short-stay hospitals by source of payment, race, region, and hospital ownership. Approximately 14.8 million (76.8 percent) of the 19.3 million patients discharged from short-stay hospitals who expected to pay for their hospitalization through private insurance were white. Of the remaining 4.5 million, 1.9 million (9.8 percent) were of other races and 2.6 million (13.3 percent) did not have race stated on the medical record.

Estimates of the number of discharges by region showed that the South Region, with 6.4 million

Table 1. Number and percent distribution of patients discharged from non-Federal short-stay hospitals by principal expected source of payment, according to age and sex: United States, 1979

Age and sex	All expected sources of payment	Private insurance	Workmen's Compensation	Medicare	Medicaid	Other government payments	Self-pay	No charge	Other payments
				Number in thousands					
Both sexes									
All ages	36,747	19,289	643	9,925	3,227	918	2,168	30	546
Under 15 years	3,641	2,437	...	43	675	163	235	5	83
15-44 years	15,488	10,574	447	288	1,820	507	1,500	15	337
45-64 years	8,532	6,017	182	1,019	592	228	372	7	116
65 years and over	9,086	260	14	8,576	139	21	61	4	11
Male									
All ages	14,705	7,399	528	4,437	974	353	773	11	230
Under 15 years	2,053	1,381	...	19	381	87	136	2	46
15-44 years	4,680	3,122	375	148	329	152	431	3	120
45-64 years	4,017	2,765	143	554	210	105	179	3	58
65 years and over	3,955	131	10	3,716	54	10	27	2	5
Female									
All ages	22,042	11,889	115	5,488	2,253	565	1,395	20	316
Under 15 years	1,588	1,056	...	23	294	76	99	2	37
15-44 years	10,808	7,452	72	140	1,491	355	1,069	12	216
45-64 years	4,515	3,252	39	465	382	123	193	3	58
65 years and over	5,131	129	4	4,860	85	11	34	2	6
				Percent distribution					
Both sexes									
All ages	100.0	52.5	1.8	27.0	8.8	2.5	5.9	0.1	1.5
Under 15 years	100.0	66.9	...	1.2	18.5	4.5	6.5	0.1	2.3
15-44 years	100.0	68.3	2.9	1.9	11.8	3.3	9.7	0.1	2.2
45-64 years	100.0	70.5	2.1	11.9	6.9	2.7	4.4	0.1	1.4
65 years and over	100.0	2.9	0.2	94.4	1.5	0.2	0.7	0.0	0.1
Male									
All ages	100.0	50.3	3.6	30.2	6.6	2.4	5.3	0.1	1.6
Under 15 years	100.0	67.3	...	0.9	18.6	4.2	6.6	0.1	2.3
15-44 years	100.0	66.7	8.0	3.2	7.0	3.2	9.2	0.1	2.6
45-64 years	100.0	68.8	3.6	13.8	5.2	2.6	4.5	0.1	1.4
65 years and over	100.0	3.3	0.2	94.0	1.4	0.2	0.7	0.0	0.1
Female									
All ages	100.0	53.9	0.5	24.9	10.2	2.6	6.3	0.1	1.4
Under 15 years	100.0	66.5	...	1.5	18.5	4.8	6.2	0.1	2.3
15-44 years	100.0	68.9	0.7	1.3	13.8	3.3	9.9	0.1	2.0
45-64 years	100.0	72.0	0.9	10.3	8.5	2.7	4.3	0.1	1.3
65 years and over	100.0	2.5	0.1	94.7	1.7	0.2	0.7	0.0	0.1

(33.2 percent), and the North Central, with 6.0 million (31.3 percent), had the largest numbers of discharged patients covered by private insurance. The West, with 2.7 million (14.1 percent) had the smallest number of discharges.

Patients discharged from nonprofit hospitals accounted for 14.2 million (73.6 percent) of the 19.3 million patients covered by private insurance discharged from non-Federal short-stay hospitals. Of the remaining 5.1 million patients, 3.5 million (18.0 percent) were discharged from State and local government hospitals and 1.6 million (8.4 percent) were discharged from profitmaking (proprietary) hospitals.

Public health programs

Public health programs include Medicare, Medicaid, Workmen's Compensation, and other government programs. Together these programs were the principal expected source of payment for 14.7 million or 40.0 percent of all discharges (table 1). Of these 14.7 million, 9.9 million (67.5 percent) were Medicare patients, 3.2 million (21.9 percent) were Medicaid patients, 0.6 million (4.4 percent) were covered under Workmen's Compensation, and the remaining 0.9 million (6.2 percent) were covered

Table 2. Number and percent distribution of days of care and average length of stay for patients discharged from non-Federal short-stay hospitals by principal expected source of payment, according to age: United States, 1979

Age	All expected sources of payment	Private insurance	Workmen's Compensation	Medicare	Medicaid	Other government payments	Self-pay	No charge	Other payments
				Days of care in thousands					
All ages	264,173	113,329	4,300	105,319	20,433	5,401	11,595	242	3,555
Under 15 years	15,765	9,808	...	346	3,230	724	1,175	55	426
15-44 years	80,913	54,205	2,760	2,719	9,806	2,663	6,797	67	1,895
45-64 years	69,755	46,738	1,391	9,904	5,800	1,846	2,951	57	1,067
65 years and over	97,740	2,578	149	92,350	1,596	167	671	63	166
				Percent distribution of days of care					
All ages	100.0	42.9	1.6	39.9	7.7	2.0	4.4	0.1	1.3
Under 15 years	100.0	62.2	...	2.2	20.5	4.6	7.5	0.3	2.7
15-44 years	100.0	67.0	3.4	3.4	12.1	3.3	8.4	0.1	2.3
45-64 years	100.0	67.0	2.0	14.2	8.3	2.6	4.2	0.1	1.5
65 years and over	100.0	2.6	0.2	94.5	1.6	0.2	0.7	0.1	0.2
				Average length of stay in days					
All ages	7.2	5.9	6.7	10.6	6.3	5.9	5.3	7.9	6.5
Under 15 years	4.3	4.0	...	8.1	4.8	4.5	5.0	11.6	5.1
15-44 years	5.2	5.1	6.2	9.4	5.4	5.3	4.5	4.4	5.6
45-64 years	8.2	7.8	7.6	9.7	9.8	8.1	7.9	8.7	9.2
65 years and over	10.8	9.9	10.9	10.8	11.5	8.0	11.0	15.7	15.7

Table 3. Number of discharges, days of care, average length of stay, and average age of patients discharged from non-Federal short-stay hospitals, by principal expected source of payment: United States, 1979

Item	All expected sources of payment	Expected sources of payment		
		Private	Public	Self-pay, no charge, and other
Total number of discharges in millions	36.7	19.3	14.7	2.7
Total days of care in millions	264.2	113.3	135.5	15.4
Average length of stay in days	7.2	5.9	9.2	5.7
Average age of patients in years	43.7	34.4	58.5	29.9

by other forms of government health payment programs.

Forty percent of all discharges expected to pay for their hospitalization through public health programs, and they accounted for 51.3 percent of the total days of care. As stated earlier, 52.5 percent of the discharges in the NHDS were covered by private insurance, but they accounted for only 42.9 percent of the total days of care (table 2). This resulted in longer average length of stay for patients covered by public health programs than for those covered by private insurance—9.2 days compared with 5.9 days. In addition, 86.4 percent of the Medicare patients were 65 years and over, and the average length of stay for patients of this age group was 10.8 days.

The average age of patients expecting to pay for their hospitalization through public programs was 58.5 years (table 3). This was 70 percent higher than the average of 34.4 years for patients expecting to pay hospital bills through private insurance. The higher average age for patients covered by public health insurance was because of the high proportion of Medicare patients.

In the age-by-sex distributions of table 1, the most prominent sex difference in the number of discharges was in the age group 15-44 years. For Medicaid and other government payments there were more than twice as many female as male discharges in this age group. For Medicare the number of females and males 15-44 years of age were quite similar (140,000 and 148,000, respectively), but for Workmen's Compensation the number of males outnumbered the number of females discharged by more than 5 to 1 (375,000 and 72,000, respectively).

Medicare is a government-sponsored program primarily designed to help older people defray the costs of hospitalization. Medicare patients accounted for 9.9 million patients (27.0 percent) discharged from short-stay hospitals (table 1). Of these 9.9 million, 8.6 million (86.4 percent) were 65 years and over. Table 4 shows that a total of 3.9 million (38.9 percent) of the Medicare patients had one or more procedures performed. This was considerably lower than the 56.1 percent of patients with one or more procedures performed who were covered under all

Table 4. Number and percent of patients with procedures discharged from non-Federal short-stay hospitals by sex, age, and principal expected source of payment: United States, 1979

Sex and age of patients with procedures	All expected sources of payment	Private insurance	Workmen's Compensation	Medicare	Medicaid	Other government payments	Self-pay	No charge	Other payments
				Number in thousands					
Both sexes									
All ages	18,896	11,284	380	3,862	1,491	460	1,117	17	285
Under 15 years	1,575	1,142	...	14	225	75	82	2	36
15-44 years	9,514	6,825	263	109	993	277	849	10	188
45-64 years	4,207	3,194	109	365	219	98	163	4	55
65 years and over	3,601	124	9	3,374	53	11	23	2	5
Male									
All ages	6,839	3,786	320	1,824	344	147	307	5	105
Under 15 years	899	661	...	7	123	38	48	1	20
15-44 years	2,357	1,656	226	50	126	62	180	1	54
45-64 years	1,894	1,404	87	191	71	43	68	1	28
65 years and over	1,690	64	7	1,575	25	4	11	1	2
Female									
All ages	12,057	7,498	60	2,039	1,146	313	809	12	179
Under 15 years	676	480	...	7	102	36	33	1	16
15-44 years	7,157	5,168	36	58	867	216	669	8	134
45-64 years	2,313	1,790	22	174	149	55	95	2	27
65 years and over	1,911	60	2	1,799	28	6	12	1	3
				Percent					
Both sexes									
All ages	51.4	58.5	59.1	38.9	46.2	50.1	51.5	55.9	52.1
Under 15 years	43.2	46.8	...	33.8	33.3	45.8	34.7	39.2	43.0
15-44 years	61.4	64.5	58.7	37.8	54.6	54.7	56.6	64.0	56.0
45-64 years	49.3	53.1	59.9	35.8	37.1	43.0	43.9	57.4	47.5
65 years and over	39.6	47.7	63.1	39.3	38.0	51.3	37.5	42.4	51.9
Male									
All ages	46.5	51.2	60.6	41.1	35.4	41.8	39.8	44.3	45.7
Under 15 years	43.8	47.9	...	36.4	32.2	44.0	35.5	53.2	42.9
15-44 years	50.4	53.1	60.3	34.0	38.5	40.6	41.8	41.0	45.2
45-64 years	47.1	50.8	60.7	34.5	33.7	41.3	38.0	42.5	48.8
65 years and over	42.7	49.1	70.3	42.4	45.6	45.4	40.2	41.0	50.7
Female									
All ages	54.7	63.1	52.4	37.1	50.9	55.4	58.0	62.0	56.8
Under 15 years	42.6	45.5	...	31.7	34.8	47.9	33.5	24.9	43.0
15-44 years	66.2	69.4	50.4	41.8	58.1	60.7	62.5	69.6	62.0
45-64 years	51.2	55.0	56.8	37.4	38.9	44.5	49.4	72.0	46.2
65 years and over	37.3	46.3	45.5	37.0	33.3	56.5	35.3	43.6	53.0

other sources of payment. One reason for this difference may be that Medicare patients, who are primarily elderly people, may be more likely to be hospitalized for chronic nonoperable conditions.

As shown in table 5 patients covered under the Medicare program were also more likely to have a higher mortality rate than patients covered under other sources of payment. Medicare patients constituted 70.7 percent of all patients discharged dead even though they constituted only 27.0 percent of all patients discharged from short-stay hospitals. Again, this is because of the substantially older average age of Medicare patients.

Approximately 10.6 million (72.3 percent) of the 14.7 million patients expecting to pay for their hospitalization through public insurance were white (table 6). Of the remaining 4.1 million, 2.2 million (15.0 percent) were of other races, and race was not stated for 1.9 million (12.6 percent).

An estimated 24.8 percent of other than white patients discharged from short-stay hospitals had Medicaid entitlement whereas only 6.2 percent of white patients discharged from short-stay hospitals had Medicaid entitlement. An explanation of this may be that Medicaid is primarily a program to provide medical benefits to certain low income people in need of medical care and that people of other races have proportionately more low income families than white people. Specifically, in 1979 the actual poverty level was determined to be $7,412 for a family of four. In that year 13.3 percent of all families were below an income level of $7,500. For

Table 5. Number and percent distribution of patients discharged from non-Federal short-stay hospitals by age and discharge status, according to principal expected source of payment: United States, 1979

Age and discharge status	All expected sources of payment	Private insurance	Workmen's Compensation	Medicare	Medicaid	Other government payments	Self-pay	No charge	Other payments
				Number in thousands					
All ages	36,747	19,289	643	9,925	3,227	918	2,168	30	546
Alive	33,812	18,034	610	8,743	3,024	837	2,031	29	504
Dead	924	184	2	653	40	12	23	1	8
Not stated	2,011	1,071	31	529	162	69	114	1	34
Under 65 years	27,661	19,028	630	1,349	3,087	897	2,107	26	535
Alive	25,845	17,811	598	1,223	2,896	821	1,977	25	495
Dead	287	165	2	51	33	10	20	Z	7
Not stated	1,528	1,053	30	75	158	67	111	1	34
65 years and over	9,086	260	14	8,576	139	21	61	4	11
Alive	7,967	223	12	7,520	128	16	54	3	10
Dead	636	19	1	603	7	2	4	1	1
Not stated	483	18	1	454	4	2	3	-	Z
				Percent distribution					
All ages	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Alive	92.0	93.5	94.9	88.1	93.7	91.2	93.7	94.2	92.4
Dead	2.5	1.0	0.4	6.6	1.2	1.3	1.1	3.8	1.4
Not stated	5.5	5.6	4.8	5.3	5.0	7.5	5.3	2.0	6.2
Under 65 years	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Alive	93.4	93.6	94.9	90.7	93.8	91.5	93.8	96.3	92.4
Dead	1.0	0.9	0.3	3.8	1.1	1.1	0.9	1.4	1.3
Not stated	5.5	5.5	4.8	5.6	5.1	7.5	5.3	2.3	6.3
65 years and over	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Alive	87.7	85.8	90.7	87.7	92.1	79.1	88.5	80.3	90.5
Dead	7.0	7.3	4.8	7.0	4.8	10.0	6.2	19.7	5.9
Not stated	5.3	6.9	4.5	5.3	3.1	10.9	5.3	-	3.6

white families this figure was 11.0 percent while for all others it was 30.0 percent.[8]

Estimates of the number of discharges by region showed that the South Region, with about 5.0 million discharges, had the largest number of patients expecting to pay for their hospitalization through public insurance programs. This was followed by the North Central Region with 4.1 million, the Northeast with 3.2 million, and the West with 2.5 million discharges. Even though the number of discharges varied by region, patients with public insurance represented approximately 40 percent of all discharges in each region.

Nonprofit hospitals accounted for 10.2 million (69.4 percent) of the 14.7 million patients discharged from non-Federal short-stay hospitals covered under public programs. Of the remaining 4.5 million patients, 3.3 million (22.4 percent) were discharged from government operated hospitals, and 1.2 million (8.2 percent) were discharged from profitmaking hospitals. The percent of patients with public health coverage discharged from nonprofit hospitals (69.4 percent) was lower than the percent of patients covered by private insurance discharged from the same hospitals (73.6 percent). This is not unexpected since patients covered by public health programs may be referred to State or local government-owned hospitals. This is especially true of Medicaid patients of whom 29.7 percent were discharged from State or local government-owned hospitals compared with only 18.0 percent for patients covered by private insurance.

Self-pay

Approximately 2.2 million patients (5.9 percent) expected to pay for their hospitalization principally by themselves (table 1). Of these, 1.1 million (49.3 percent) were females 15-44 years of age. This was 1.4 times greater than the total number of males expecting to pay for their hospitalization by themselves.

The length of stay for self-pay patients was 5.3 days (table 2). This was almost 4 days less than the length of stay for patients covered by public health programs and almost 2 days less than the 7.2 days for all patients (table 3). Lack of financial resources coupled with the age and reason for hospitalization

Table 6. Number and percent distribution of patients discharged from non-Federal short-stay hospitals by race and region and type of ownership of hospital, according to principal expected source of payment: United States, 1979

Race, region, and type of ownership	All expected sources of payment	Private insurance	Workmen's Compensation	Medicare	Medicaid	Other government payments	Self-pay	No charge	Other payments
				Number in thousands					
Total	36,747	19,289	643	9,925	3,227	918	2,168	30	546
Race									
White	27,451	14,819	453	7,881	1,689	617	1,592	24	375
All other	4,572	1,900	79	800	1,136	198	331	5	123
Not stated	4,724	2,570	111	1,244	401	103	245	1	48
Hospital region									
Northeast	7,786	4,125	91	2,154	819	151	334	1	110
North Central	10,647	6,041	163	2,761	902	229	441	2	108
South	12,425	6,402	252	3,464	989	268	865	3	180
West	5,889	2,720	137	1,546	517	269	528	24	147
Hospital ownership									
Nonprofit	26,105	14,188	444	7,085	2,065	623	1,334	4	362
Profit	2,956	1,621	87	878	202	39	106	Z	23
State or local government	7,686	3,480	113	1,962	960	256	728	26	161
				Percent distribution					
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Race									
White	74.7	76.8	70.5	79.4	52.3	67.2	73.4	80.0	68.7
All other	12.4	9.8	12.3	8.1	35.2	21.6	15.3	16.7	22.5
Not stated	12.9	13.3	17.3	12.5	12.4	11.2	11.3	3.3	8.8
Hospital region									
Northeast	21.2	21.4	14.2	21.7	25.4	16.4	15.4	3.3	20.1
North Central	29.0	31.3	25.3	27.8	28.0	24.9	20.3	6.7	19.8
South	33.8	33.2	39.2	34.9	30.6	29.2	39.9	10.0	33.0
West	16.0	14.1	21.3	15.6	16.0	29.3	24.4	80.0	26.9
Hospital ownership									
Nonprofit	71.0	73.6	69.1	71.4	64.0	67.9	61.5	13.3	66.3
Profit	8.0	8.4	13.5	8.8	6.3	4.2	4.9	0.0	4.2
State or local government	20.9	18.0	17.6	19.8	29.7	27.9	33.6	86.7	29.5

associated with these patients are some of the principal reasons for the shorter length of stay. According to the National Health Interview Survey data, 54.2 percent of all reasons given for no health insurance were that insurance costs were too high.[6]

In NHDS data, approximately one-half of all self-insurers are females aged 15-44 years, a period of life when cost of insurance may be a critical factor. A type of hospital utilization related both to self-pay status and short average length of stay are obstetrical conditions,[2] conditions which are very common for the age and sex of half of the self-pay patients.

An estimated 1.1 million (51.5 percent) self-insurers had at least one surgical or nonsurgical procedure performed (table 4). The majority of these (59.9 percent) were for females 15-44 years of age. Females composed about 70 percent of all self-insurers who had one or more procedures performed.

Approximately 1.6 million (73.4 percent) of the 2.2 million self-insurers discharged from non-Federal short-stay hospitals were white. Of the remaining 0.6 million, 0.3 million (15.3 percent) were of other races, and 0.2 million (11.3 percent) did not have their race stated in the medical record.

The South Region, with 0.9 million (39.9 percent), had the largest number and percent of self-insurers discharged from non-Federal short-stay hospitals. The number and percent of self-insurers discharged from these hospitals in the other three regions were 0.5 million (24.4 percent) for the West, 0.4 million (20.3 percent) for the North Central, and 0.3 million (15.4 percent) for the Northeast.

About 1.3 million (61.5 percent) of the self-insurers were hospitalized in nonprofit hospitals. Of the remaining 0.9 million self-insurers, 0.7 million (33.6 percent) were hospitalized in a State or local

hospital, and 0.1 million (4.9 percent) were hospitalized in a proprietary hospital.

No charge

In 1979 an estimated 30,000 patients (table 1) were not charged for approximately 242,000 days of care (table 2). This was only about 0.1 percent of all discharges and days of care in short-stay hospitals. Females in the 15-44 years of age group composed 40.0 percent of all no-charge discharges (table 1) and 49.7 percent of all no-charge discharges for which one or more procedures were performed. In addition, 80.0 percent of the discharges were from the West, and 86.7 percent were discharged from State or local government hospitals.

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Technical notes

Source of data

The National Hospital Discharge Survey encompasses patients discharged from short-stay noninstitutionalized hospitals, exclusive of military and Veterans Administration hospitals, located in the 50 States and the District of Columbia. Only hospitals with six beds or more and an average length of stay less than 30 days for all patients are included in the survey. Discharges of newborn infants are excluded from this report.

The universe of the survey consisted of 6,965 short-stay hospitals contained in the 1963 Master Facility Inventory of Hospitals and Institutions. New hospitals were sampled for inclusion into the survey in 1972, 1975, and 1977. In all, 544 hospitals were sampled in 1979. Of these hospitals, 80 refused to participate, and 48 were out of scope. The 416 participating hospitals provided approximately 215,000 medical records.

Sample design

All hospitals with 1,000 beds or more in the universe of short-stay hospitals were selected with certainty in the sample. All hospitals with fewer than 1,000 beds were stratified, the primary strata being 24 size-by-region classes. Within each of these 24 primary strata, the allocation of the hospitals was made through a controlled selection technique so that hospitals in the sample would be properly distributed with regard to type of ownership and geographic division. Sample hospitals were drawn with probabilities ranging from certainty for the largest hospitals to 1 in 40 for the smallest hospitals.

Sample discharges were selected within the hospitals using the daily listing sheet of discharges as the sampling frame. These discharges were selected by a random technique, usually on the basis of the terminal digit or digits of the patient's medical record number, a number assigned when the patient was admitted to the hospital. The within-hospital sampling ratio for selecting sample discharges varied inversely with the probability of selection of the hospital.

Sampling errors, nonresponse, and data edits

Since the estimates for this report are based on a sample rather than the entire universe, they are subject to sampling variability. The relative standard errors presented in table I are obtained by dividing the standard error of the estimate by the estimate itself and are expressed as a percent of the estimate.

About 7.7 percent of the discharges sampled for the 1977 NHDS did not have information concerning source of payment on the face sheet of the medical record. An expected source of payment was imputed for these discharges based on the sex and age of the patient.

There were several edits performed on the raw data. When a principal expected source of payment was not indicated, but a single expected source of payment was listed as a secondary source of payment, the indicated secondary source of payment was assumed to be the principal expected source of payment. When Workmen's Compensation was listed in conjunction with other insurance sources, Workmen's Compensation was taken as the principal expected source of payment; and when Medicare was listed in conjunction with other insurance sources (except Workmen's Compensation), Medicare was taken as the principal expected source of payment.

Table I. Relative standard errors of estimates, by all principal expected sources of payment

Size of estimates	*Number of discharges*	*Days of care*
10,000	27.0	...
100,000	12.1	15.5
1,000,000	9.4	9.4
10,000,000	9.1	6.0
100,000,000	...	4.2

Definitions

Private insurance.—Health insurance provided by nongovernment sources including consumers, insurance companies, private industry, and philanthropic organizations.

Workmen's Compensation.—A program in all states under which employees injured on the job receive financial compensation without regard to fault.

Medicare (Title XVIII).—A nationwide health insurance program providing health insurance protection to people 65 years of age and over, people eligible for social security disability payments for more than 2 years, and people with end-stage renal disease, regardless of income.

Medicaid.—A joint federal-state welfare program available in virtually all states that provide medicaid benefits for low income persons, including the aged. In order to qualify for this program, a person must meet each State's definition of "low income."

Other government payments.—Government payments in which the expected source of payment

cannot be classified in one of the other three government categories. These include payments made under the Title V Program, Champus (a program designed to provide medical coverage for dependants of military personnel), no fault (casualty coverage, vocational rehabilition, Federal or State research grant (medical research), or legal hold (prisoner in medical detention).

Self-pay.—The major share of the total costs for this hospitalization is expected to be paid by the patient, spouse, family, or next of kin.

No charge.—There is no charge for hospital costs for patients admitted with the understanding that payment would not be expected because the medical services are provided free of charge by the hospital. This category includes hospital sponsored welfare, staff services donated, and hospital-sponsored special research or "teaching" patients.

Other payments.—This includes all other nonprofit sources of payment such as church welfare, United Way (United Appeal), or Shriner's Crippled Children Services.

Definitions of other terms are available in Appendix II of another report.[3]

Symbols

- - -	Data not available
. . .	Category not applicable
-	Quantity zero
0.0	Quantity more than zero but less than 0.05
Z	Quantity more than zero but less than 500 where numbers are rounded to thousands
*	Figure does not meet standards of reliability or precision
#	Figure suppressed to comply with confidentiality requirements

nchs advancedata

From Vital and Health Statistics of the National Center for Health Statistics Number 76 • March 17, 1982

Blood Carbon Monoxide Levels in Persons 3-74 Years of Age: United States, 1976-80[a]

by Edward P. Radford, M.D., University of Pittsburgh and Terence A. Drizd, Division of Health Examination Statistics

Air pollution is an often-cited environmental hazard in many cities of the United States. One major component of air pollution is carbon monoxide, an odorless colorless gas that is a product of incomplete combustion. It is one of the pollutants subject to control by the Environmental Protection Agency (EPA) under the Clean Air Act. National Ambient Air Quality Standards established by EPA allow a carbon monoxide concentration of 9 parts per million. At this concentration, 8 hours of exposure would generally result in blood carbon monoxide levels in humans greater than 1.5 percent.

Industrial plants, electric generating plants, and automobile exhausts are sources of carbon monoxide in outdoor air. In homes, gas stoves or furnaces produce this gas. Tobacco smokers are regularly exposed to higher levels of carbon monoxide than almost all nonsmokers.

The health effects of exposure to carbon monoxide are not fully known. However, research findings in selected population groups indicate that carbon monoxide acts as an added stress factor to precipitate cardiac symptomatology or episodes in persons with hearts already compromised by coronary disease.[1,2] Additionally, excessive levels of carbon monoxide in the blood have been found by some investigators to impair certain perceptual and motor functions.[1] However, further assessment of the possible deleterious health effects of exposure to carbon monoxide has been handicapped by the lack of data for the United States population on the body burden resulting from exposure. This report presents the initial findings from such data—the first estimates of blood carbon monoxide levels ever obtained on a representative sample of the U.S. population. These findings should also be pertinent in consideration of national legislation such as revision of the Clean Air Act and local ordinances to curb air pollution.

Carbon monoxide is unique among air pollutants in that the degree of body burden from exposure to this gas can be directly determined by measuring the percent of carboxyhemoglobin (the compound formed from hemoglobin on exposure to carbon monoxide) in the blood. Blood carboxyhemoglobin (COHb) levels were measured on a cross-sectional national probability sample of persons representative of the U.S. civilian noninstitutionalized population 3-74 years of age in the second National Health and Nutrition Examination Survey (NHANES II) conducted from February 1976 to February 1980. NHANES II is the fifth in a series of National Health Examination Surveys conducted since 1960 by the National Center for Health Statistics. These programs, described in previous publications,[3-8] are designed to collect a broad range of morbidity data on chronic illness and related health information. The primary emphasis has been placed on obtaining those kinds of data that can be optimally collected through standardized, direct physical examination, tests, and measurements. Dietary intake and food consumption information also are collected to be used in the analysis of the interrelationships between nutrition and health status measures.

Examinations were conducted in specially equipped Mobile Examination Centers (MEC's), which visited 64 locations selected from 1,924 primary sampling units (PSU's) into which the entire United States is divided. Each PSU is a standard metropolitan statistical area (SMSA), a county, or a group of two or three contiguous counties. The entire sample consisted of 27,801 persons ages 6 months-74 years. Of these, 20,322 persons were examined—a

[a]The laboratory analysis of blood carboxyhemoglobin levels was carried out under the direction and supervision of Edward P. Radford, M.D., Department of Epidemiology, Graduate School of Public Health, University of Pittsburgh, under funding from the U.S. Department of Energy (contract #DE-AC02-77EV04552). Cooperation also was received from Dr. F. Lee Rodkey and Mr. R. Robertson of the National Naval Medical Research Institute in Bethesda, Maryland, who aided in the quality control and validation of reported carboxyhemoglobin levels.

sample response rate of 73.1 percent. The findings below are based on data from a probability half-sample of 11,368 persons ages 3-74 years selected to receive the test for levels of carbon monoxide. Of these 11,368 persons, 9,365 came in for examination, and acceptable COHb blood samples were obtained for 8,411, giving an item nonresponse rate of 10.2 percent for this test.

This report presents national estimates of the distribution of carbon monoxide levels in the blood of persons ages 3-74 years in the United States by age, smoking status, race, urbanization status of residence, annual family income, and season of the year. These findings will be described and analyzed further in a report in the *Vital and Health Statistics* series (in preparation).

In this report the relative contributions of the four principal sources of carbon monoxide (smoking, ambient or outdoor exposures, occupational exposures, and indoor exposures) to COHb levels are examined. Of these, smoking is the most significant and widespread, although in special circumstances each of the other contributors assumes some importance.

Sources of data

Sample collection and COHb determination

At the Mobile Examination Center, venipuncture blood samples were drawn by the nurse. For the carboxyhemoglobin assessments, which were performed on a subset of examinees ages 3-74 years, at least 1 ml of whole blood was placed into a 2-ml Vacutainer and refrigerated until a weekly shipment was made to the laboratory at the University of Pittsburgh. The specimens were kept cool, but not frozen, in transit.

Carboxyhemoglobin and methemoglobin (metHb) level measurements were made by the spectrophotometric method of Small et al.[9] This method utilizes the difference in light absorption spectra among oxyhemoglobin, carboxyhemoglobin, and methemoglobin to identify and quantify the proportions of these compounds in the blood. From blood diluted about 1 to 70 in dilute ammonia, absorbance measurements are made in the Soret region (390-435 nm) at four wavelengths with a 1-mm light path; the equipment employed was a Gilford Model 240 spectrophotometer, with corrections applied to compensate for nonlinearity of the phototube. A series of simultaneous equations is used to determine the percents of carboxyhemoglobin and methemoglobin and, by difference, the percent of oxyhemoglobin. Measurements have been shown to be accurate and reliable at all levels of carbon monoxide saturation, including saturation from 0 to 5 percent COHb (see Technical notes), the range found to be least reliable when monitored with other rapid techniques.

Simultaneous measurement of methemoglobin level facilitates a determination of the condition of the blood sample, because an excessively high methemoglobin level indicates that the sample is partially decomposed. In this report, acceptable samples were defined as having methemoglobin levels of 5 percent or less.

Questionnaire and demographic data

Age was defined as age at last birthday at the time of the household interview. Race was determined by interviewer observation during the interview. The interviewer categorized respondents as "white," "black," or "other." Data on other races are not presented separately in this report but are included in the "all races" category. Income was defined as reported total family income during the 12 months preceding the interview.

Based on a preliminary analysis, two season categories were defined. The first category includes data for all persons in the sample examined during May through September; the second category includes data for all persons in the sample examined during November through March. October and April were transition months, and inclusion of data for persons in the sample examined during these months with those in the season categories they preceded had an insignificant effect on the overall means. Consequently, these data were excluded from the seasonal analysis.

Smoking status was derived from questionnaire data collected on all respondents ages 12-74 years. Never-smokers were defined as persons who had smoked fewer than 100 cigarettes in their lifetimes and were not current smokers. Ex-smokers were persons who had smoked more than 100 cigarettes but were not current smokers; ex-cigar and ex-pipe smokers were not identified separately but were included in the never-, ex-, or current smoker category, depending on their cigarette smoking status. Current smokers were persons reporting that they were current cigarette, cigar, or pipe smokers.

Results

In all the following analyses, the primary statistics of interest are the mean COHb levels for the population subgroup or the proportion of the subgroup with blood COHb levels greater than 1.5 or 2.0 percent. The sample sizes for most of the defined subgroups were large enough to provide national estimates that are not subject to excessive sampling variability. Unless otherwise noted, statistical significance was determined at the 5-percent level, as described in the Technical notes. The tables at the end of the text also present population frequency distributions for COHb (from which can be determined the proportion of the population with COHb levels greater than critical points other than the 1.5 or 2.0 percent used in this report) and selected percentiles.

Carboxyhemoglobin concentration by smoking status and age group

Table 1 and figure 1 show the mean percent of carboxyhemoglobin concentration in blood among the U.S. population ages 3-74 years by smoking status and age. Children in the age group 3-11 years were assumed to have never smoked, although among the 1.2 percent of the population with COHb levels greater than 2 percent in this age group, a few smokers may have been present. For healthy nonsmokers, 2 percent is well above the sum of COHb arising from endogenous metabolism and from minimal exposures to ambient CO. For this reason, values greater than 2 percent were considered to be the result of unusual exposures. About 1 percent of the children under 5 years of age had COHb levels greater than 2 percent, and it is likely that most of these cases represent exposures to sources other than smoking.

Among never-smokers age 12 years and over, 3.6 percent had COHb levels greater than 2 percent (figure 2). The difference between age groups of never-smokers may be due to occupational exposures of the older group to environments with high ambient CO levels (such as those experienced by garage mechanics or taxi drivers).

The ex-smoking population show 5.5 percent with COHb levels greater than 2 percent, compared with 3.6 percent for never-smokers age 12 years and over. The higher proportion with COHb levels over 2 percent accounts for the higher mean and standard deviation for ex-smokers than for never-smokers, because the two medians are nearly identical (0.77 percent COHb versus 0.74 percent COHb, respectively). The excess may be accounted for in part or wholly by the inclusion in the ex-smoking group of smokers

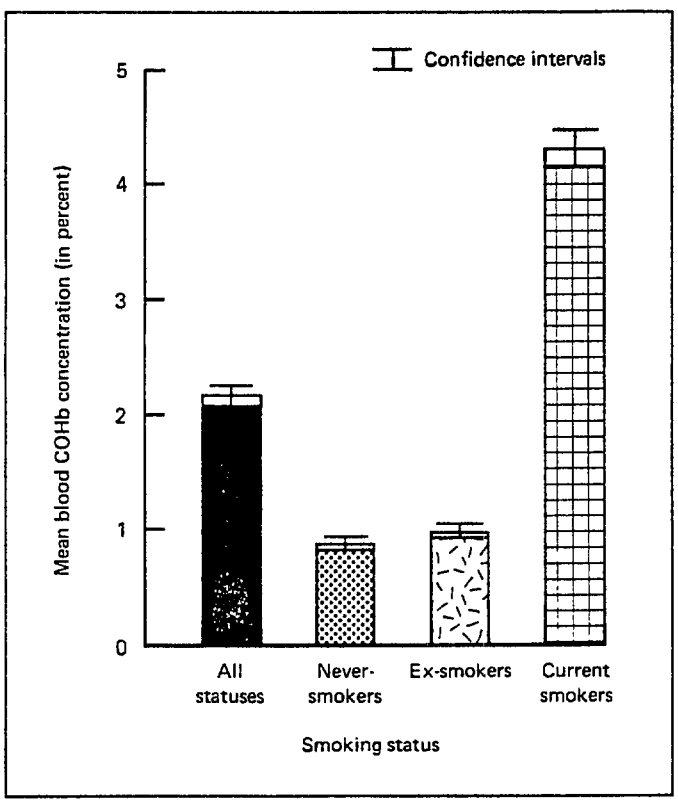

Figure 1. Mean blood COHb concentration for persons 12-74 years of age, by smoking status: United States, 1976-80

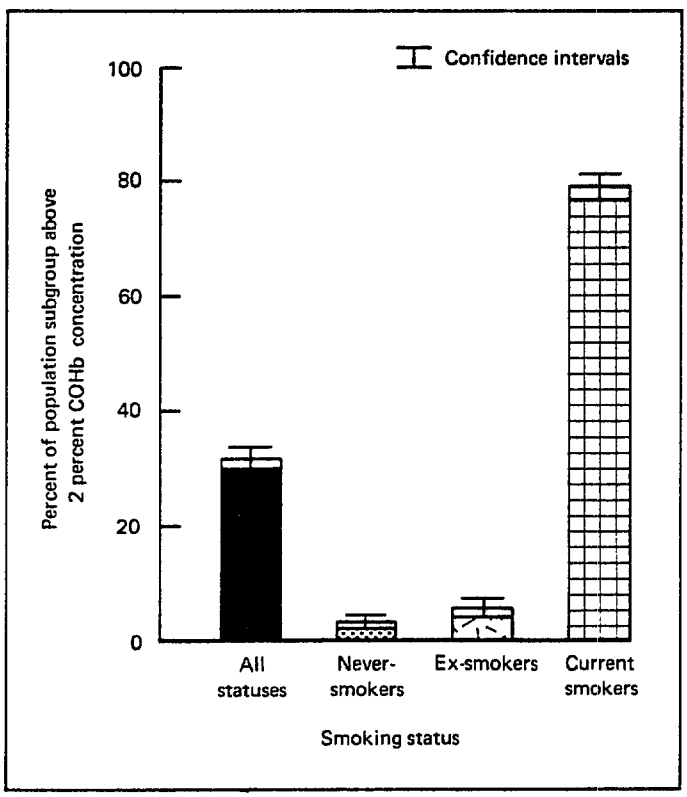

Figure 2. Percent of sample above 2 percent COHb concentration for persons 12-74 years of age, by smoking status: United States, 1976-80

who incorrectly reported a history of having stopped smoking. Incorrect reporting appears to be a particular problem among older teenagers.

The expected effect of smoking on COHb levels was shown clearly (figure 3), but it is of interest that 9.1 percent of the current smokers had COHb levels of 1 percent or less—within the usual range for never-smokers. While the prohibition against smoking in the examination unit may have resulted in lower COHb levels for some smokers, especially for those examined in the morning, this group with low values clearly cannot be inhaling much of their own cigarette smoke. Analysis by smoking level, which is not shown in this report, indicated that light smokers (1-5 cigarettes per day) contributed many of these low values.

The smoking population showed a mean COHb level of more than 4 percent; for never-smokers, the mean was less than 1 percent. The standard error for the smoking group was more than three times as large as that for the never-smoking group. The large variability of COHb levels for the smoking group, along with the relative insensitivity of this group to an incremental change in the environmental burden of CO when compared with the never-smoking group, made it necessary to limit subsequent analyses of demographic and environmental factors to the never-smoking subjects. For the one-third of the age 12 or over population that smokes, the subtle effects of environmental sources of CO are overwhelmed by the massive impact of smoking.

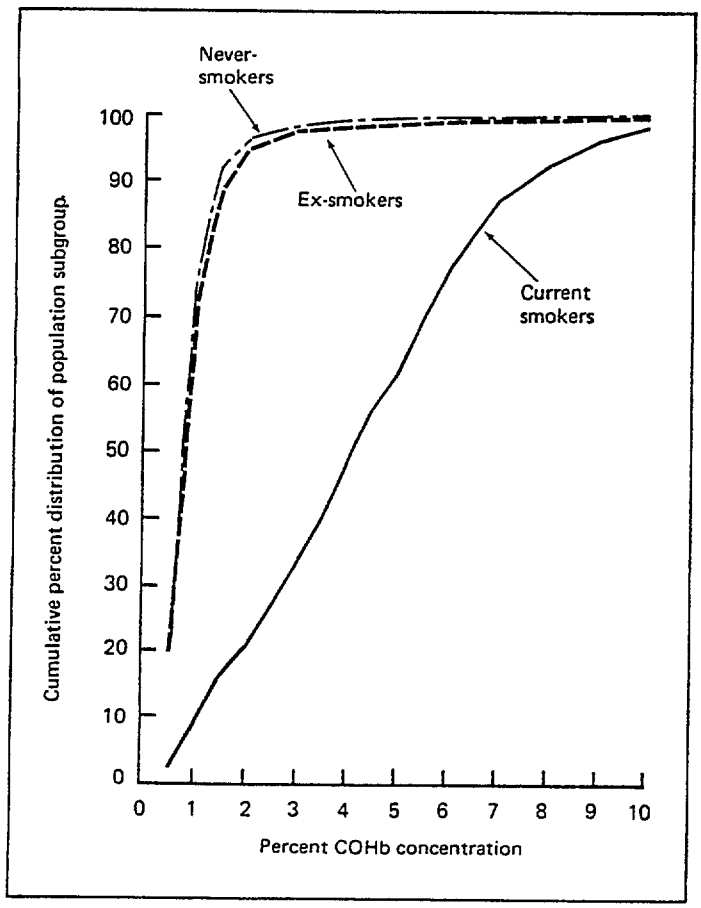

Figure 3. Cumulative distribution of percent COHb concentration for persons 12-74 years of age, by smoking status: United States, 1976-80

COHb concentrations for never-smokers by race and urbanization

The COHb levels for persons in the never-smoked category are shown in table 2 and figure 4 by urbanization, age, and race. The four urbanization classes used, based primarily on the population of the standard metropolitan statistical area (SMSA) in which the individuals resided, were: (1) population over 1,000,000, central city; (2) population over 1,000,000, not in the central city; (3) population under 1,000,000; and (4) rural. In some subsets, the numbers of subjects were small (especially among black persons), but the numbers are generally sufficient to permit reliable comparisons.

Several conclusions are apparent from table 2. First, among children ages 3-11 years, the mean COHb level is statistically significantly higher for those in large cities than for those in smaller cities and rural areas (mean difference of 0.27, $P < 0.01$). Central city children especially show higher values, with a mean difference of 0.19 percent COHb between those in the central city and those not in the central city; a further mean difference of less than 0.10 percent COHb was found between children living in the large cities but outside the central city and those in the smaller SMSA's or rural areas. These differences, however, are not physiologically significant and are in the reported range of variation of endogenous COHb production.[10] The proportion of the population with COHb levels greater than 2 percent does not vary systematically with degree of urbanization. These observations are very similar to those reported by Kahn et al. in their study of St. Louis, Mo., adults.[11] There is little indication that white and black children differ in mean COHb to any significant extent, although black children are observed to have slightly higher values in general.

Second, the urban-rural gradient is somewhat greater for adult never-smokers than for children, although it is still small (a mean difference of about 0.4 percent COHb). Confounding by occupational exposures to CO among adults may contribute to the larger urban-rural gradient.

Black adults were observed to have consistently higher COHb levels than white adults. This probably also is explained by greater likelihood of occupational exposure among black adults. Among white adults in the central city of SMSA's with over 1,000,000 population, 5.7 percent had COHb levels greater than 2 percent; the corresponding figure for black adults was 8.6 percent.

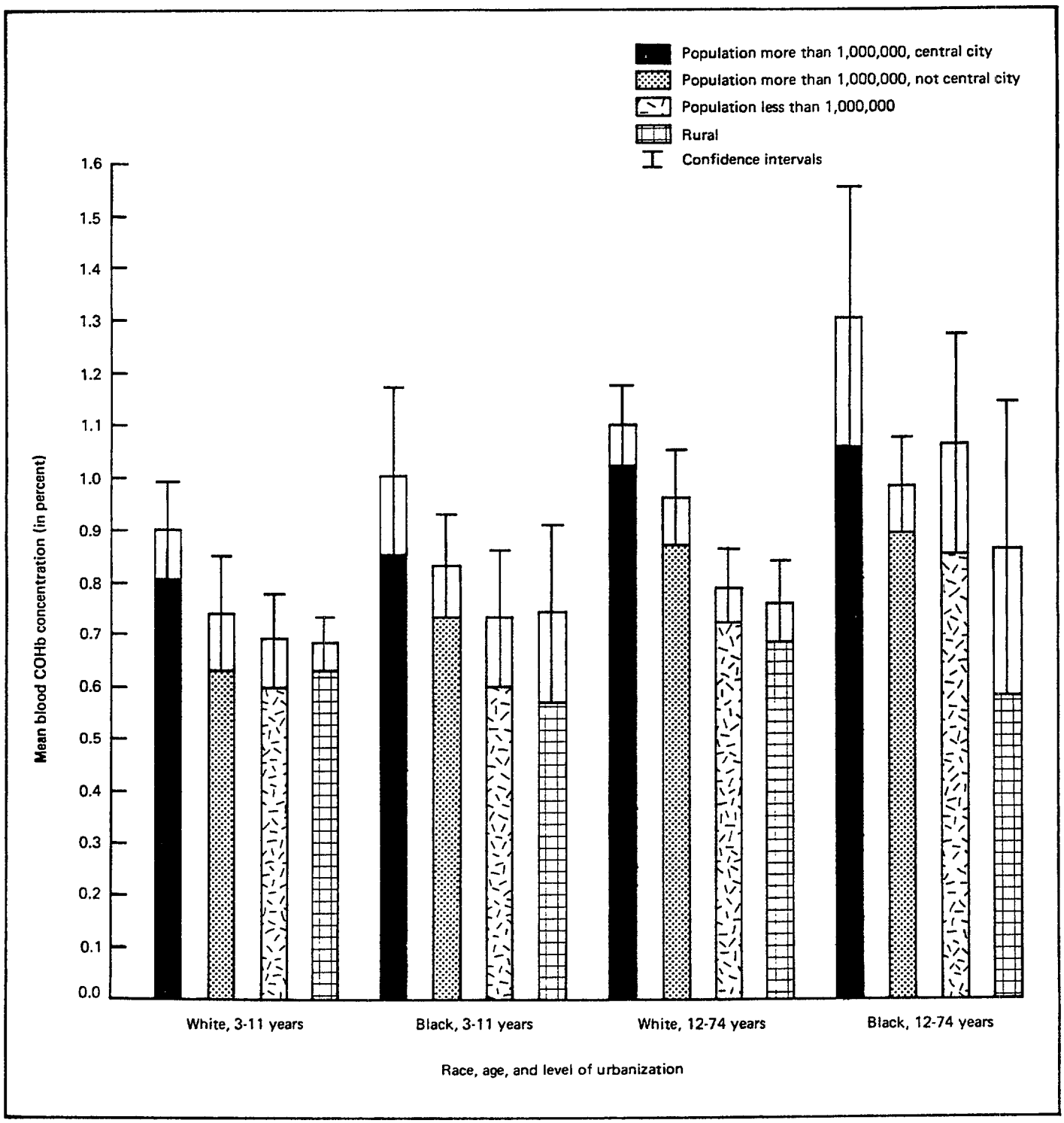

Figure 4. Mean blood COHb concentration for never-smokers 3-74 years of age by race, age, and level of urbanization: United States, 1976-80

The conclusions drawn above mask, to a large extent, the variability observed among locations. Although the design for NHANES II does not provide samples representative of the individual selected SMSA's, an examination of the proportion of the population with COHb levels greater than 1.5 percent[b] by sample PSU reveals striking differences, even within a single urbanization class. For instance, in the selected locations in SMSA's over 1 million population, this measure varies from a minimum of 2.4 percent to a maximum of 47.3 percent. This location-by-location variability will be examined in more detail in a subsequent report.

In summary, analysis of carboxyhemoglobin by degree of urbanization shows an urban-rural gradient for children and adults. The results for adults also may be affected by occupational exposures, apparently to a greater extent among black persons.

COHb concentrations for never-smokers by season and urbanization

Table 3 and figures 5 and 6 show the results for adult never-smokers and children by the season during which the blood was drawn. The urban-rural comparisons mentioned above are retained. As described in the Technical notes, itineraries of MEC's were designed to sample examinees in the more northern parts of the United States in the summer and in the more southern parts of the United States in the winter, thus mitigating the effects of the severest winter weather on COHb levels. Thus this sample does not provide precisely representative U.S. seasonal estimates.

Table 3 shows there is a significant effect of season on COHb concentration; values found during the summer months were about 0.3 percent COHb lower than those found in the winter for children and adults. The mean values are reflections primarily of the proportion of persons studied who had a COHb concentration more than 2 percent, and the seasonal difference may be ascribed largely to the fraction of persons with these higher values. The increased proportion of high COHb values observed in the winter months probably arises from indoor sources of CO, which are more important in winter, when homes are closed. Outdoor sources, especially in the urbanized areas, also may contribute to high COHb levels because of higher CO emissions in winter.

Indoor sources can include gas stoves, furnaces and other appliances, as well as possible effects of passive smoking. Separate analyses of NHANES data not presented in this report indicate that subjects living in dwellings in which the primary heating system was unvented space heaters (n=208) had significantly higher mean COHb levels than subjects reporting electric heating (1.06 percent COHb versus 0.74 percent COHb). These results support the hypothesis that subjects using unvented or portable space heaters are more likely to have a significant indoor exposure to CO, a reasonable conclusion given present knowledge regarding the likelihood of CO release from these units into living space.

One indication of the possible contribution of indoor sources is the significantly higher proportion of never-smokers with COHb concentrations greater than 2 percent found in the winter months ($P < 0.01$). For children aged 3-11 years, 2.9 percent had levels more than 2 percent COHb in November through March, compared with none in the summer; for adults, 5.4 percent had levels greater than 2 percent COHb in the winter, compared with 1.6 percent in the summer.

The urban-rural gradient persists and is similar for both seasons, at least for children, which confirms the likelihood that this gradient is derived primarily from exposure to ambient (outdoor) sources of CO. There may be a slight additional seasonal effect on adults in large urban central cities, but this effect does not appear to be large. The urban-rural difference could be due to greater occupational exposures in winter for persons in urban areas.

COHb concentrations for never-smokers by income and urbanization

Blood carboxyhemoglobin levels among the never-smoking group were analyzed by family income classification. Table 4 and figure 7 show the results of this evaluation by urbanization category. In general, the results showed that individuals in the lowest family income category (less than $10,000) had somewhat higher COHb levels than those in other income groups. However, the effect of family income was greatest and most clear for children ages 3-11 years. In terms of the percent of the population of children with COHb levels greater than 2 percent, there were 2.7 percent in the lowest income category, 0.9 percent in the middle income category, and none in the highest income category, when all urbanization categories were combined.

This income effect was observed in all four urbanization classes. In every category, the mean COHb level for children ages 3-11 years was highest for those in families whose income was less than $10,000, and the mean COHb level tended to decrease as income category increased. This trend was attributed primarily to indoor sources of CO because the other sources of CO either were eliminated (as in the case of smoking and occupational sources) or held constant (as in the case of outdoor sources) in this

[b] 1.5 percent is used here as the upper limit for COHb in the absence of ambient sources of CO (see section titled "Discussion").

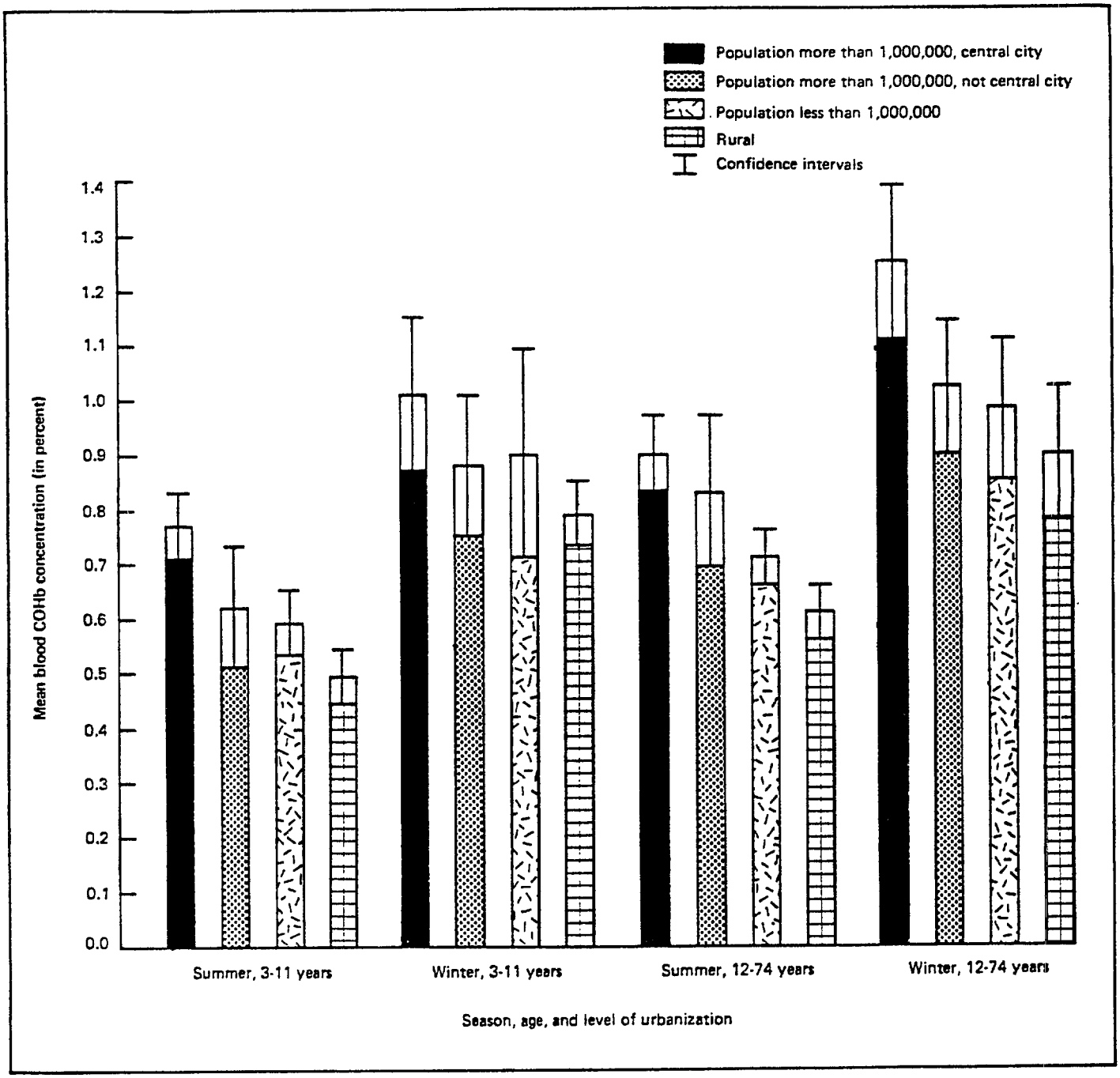

Figure 5. Mean blood CHOb concentration for never-smokers 3-74 years of age, by season of sample collection, age, and level of urbanization: United States, 1976-80

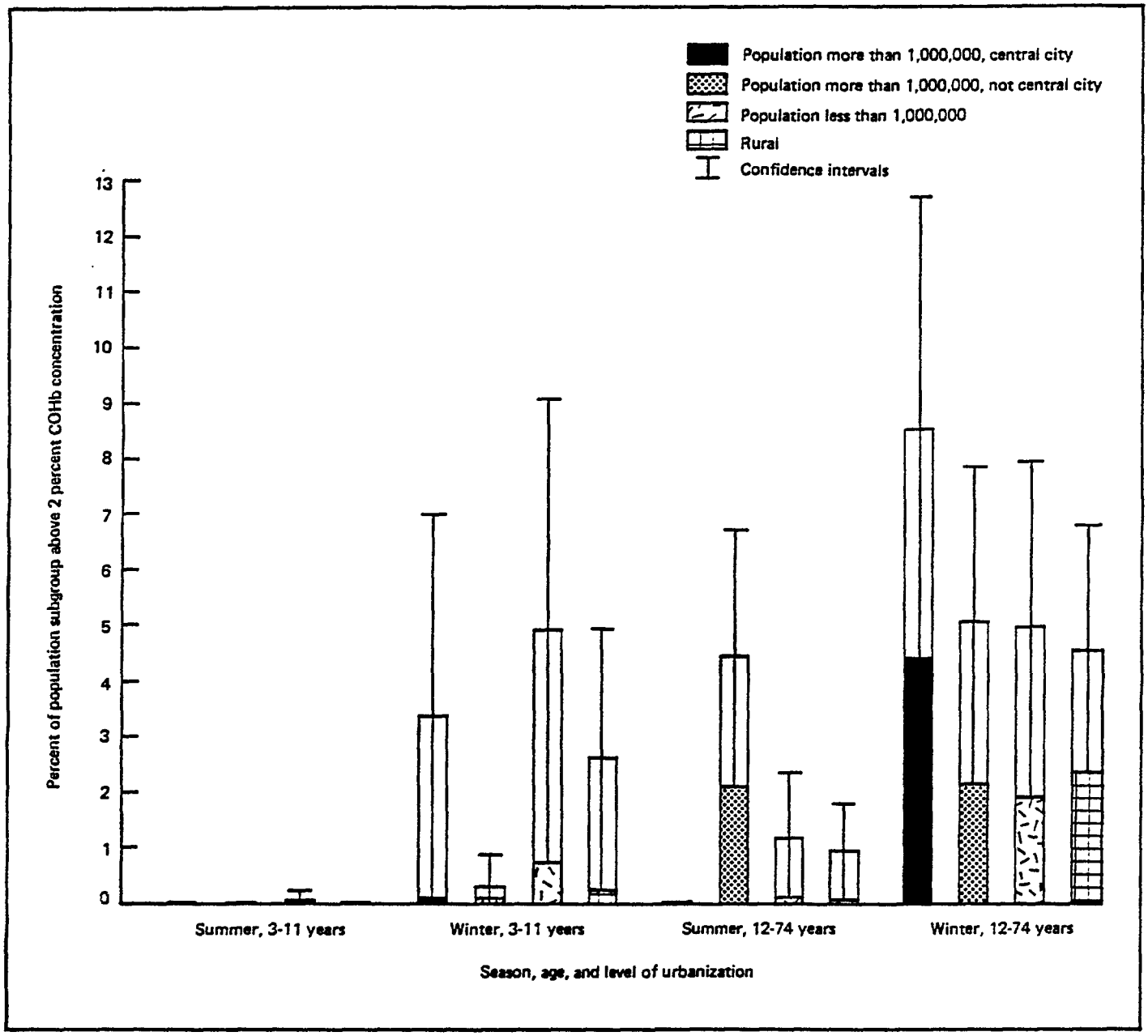

Figure 6. Percent of sample above 2 percent COHb for never-smokers 3-74 years of age, by season of sample collection, age, and level of urbanization: United States, 1976-80

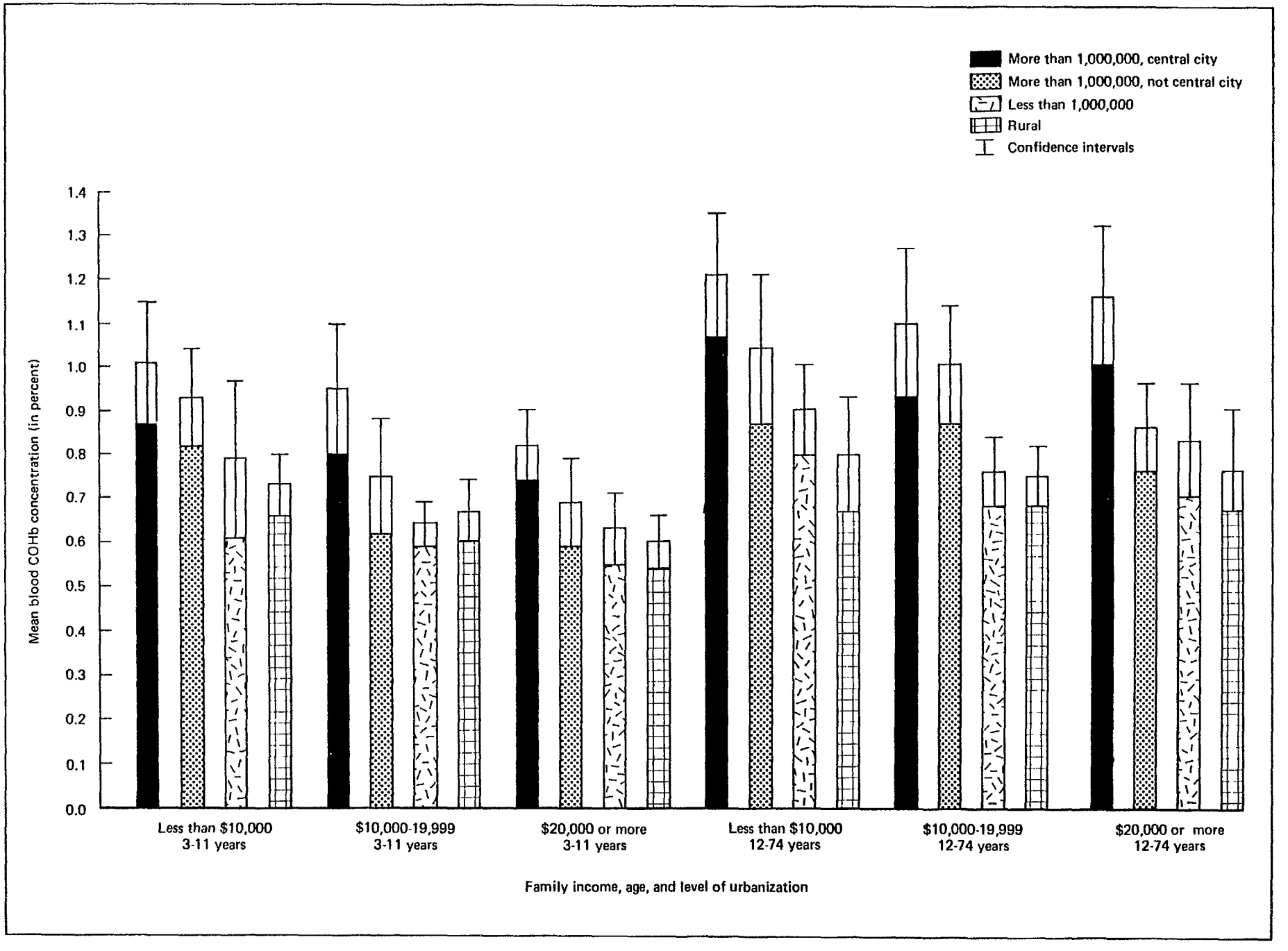

Figure 7. Mean blood COHb concentration for never-smokers 3-74 years of age, by family income, age, and level of urbanization: United States, 1976-80

analysis. The observed income effect suggests that economic status is a major factor in the likelihood of significant exposure to CO in the home environment.

For adults, the differences of COHb level by income category were not striking, despite the fact that in their case occupational exposures may have contributed to higher levels that were found. Although the mean COHb level for subjects in the lowest income group was highest in every urbanization category, none of the differences was statistically significant. These results are similar to those of Kahn et al.,[11] who also were not able to substantiate a relationship between family income and COHb level among adults.

Discussion

Clearly, smoking constitutes the greatest source of exposure to carbon monoxide; the mean COHb level for smokers was more than four times the level for never-smokers, and the smoking effect completely overwhelmed the much more subtle contributions of indoor and ambient sources. In addition, adults who reported a history as ex-smokers may include some current smokers, and some adult never-smokers may have COHb levels more than 2 percent as a result of occupational exposures to CO.

The only population subgroup not subject to the possible confounding effects of smoking or occupational exposures is children ages 3-11. Their results were used to assess the contribution of indoor or ambient CO. The results of children in this age group (mean COHb of 0.73 percent) indicate that, on the average, exposures to ambient CO have been well below the current ambient standard of nine parts per million, an air concentration at which 8 hours of exposure generally would result in a COHb level more than 1.5 percent.[1]

Although a mean difference of 0.27 percent COHb was found between central cities and rural areas, most urban areas showed little evidence of ambient exposures leading to blood COHb levels greater than 1.5 percent. Nevertheless, in some large metropolitan areas, substantial elevations of CO in blood were observed. Moreover, by chance, no sampling locations were in cities at high altitudes, where outdoor CO emissions are likely to be more important than at sea level.[12]

The analysis of the seasonal changes in COHb levels in children indicates that in winter, especially in central city urban areas, a significant fraction is exposed to CO, causing levels of COHb in excess of 2 percent. This CO exposure probably is explained by indoor sources, such as improperly adjusted or vented heating or cooking units. Some contribution from outdoor sources or passive smoking (inhalation of ambient tobacco smoke products) also may be present.

The evidence of possible elevated indoor exposures to CO may be significant. If the results for children are extrapolated to the entire U.S. population, the fact that 2 percent or more may be exposed during the winter to indoor sources of CO in excess of the outdoor ambient standard (nine parts per million) emerges as a potential public health problem.

These observations differ from those reported by Stewart et al.,[13] who measured COHb in blood samples obtained from blood donor centers in several communities in the United States. These investigators found that for all urban and rural communities, a significant fraction of samples obtained from nonsmokers showed levels of COHb greater than 1.5 percent. Although NHANES II found similar evidence of exposure to outdoor CO in a few urban locations, in general, the values observed in this study were not indicative of physiologically important exposures from outdoor sources. The results presented in this report are consistent with measurements made on nonsmoking controls by other investigators in various regions of the country.[1,11,14,15]

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Table 1. Percent carboxyhemoglobin by age and smoking status—sample sizes, weighted population estimates, means, standard deviations, standard errors, selected percentiles, and cumulative frequency distributions: United States, 1976-80

Smoking status and age[1]	n[2]	N[3]	Mean	Standard deviation	Standard error	Percentiles			
						50th	75th	90th	95th
All smoking statuses			Percent COHb						
3-74 years	9,365	195,877	1.94	2.236	0.037	0.91	2.38	5.49	6.83
3-11 years	2,055	30,066	0.73	0.502	0.019	0.67	0.87	1.12	1.42
12-74 years	7,310	165,812	2.16	2.358	0.044	1.01	3.17	5.79	7.05
Never-smokers									
3-74 years	5,459	106,042	0.83	0.671	0.021	0.72	0.97	1.33	1.65
3-11 years	2,055	30,066	0.73	0.502	0.019	0.67	0.87	1.12	1.42
12-74 years	3,404	75,976	0.87	0.726	0.025	0.74	1.01	1.38	1.77
Ex-smokers									
12-74 years	1,366	28,655	0.97	0.999	0.031	0.77	1.04	1.58	2.08
Current smokers									
12-74 years	2,533	61,015	4.30	2.553	0.072	4.15	5.89	7.56	8.68

[1]Smoking histories are unavailable for children less than 12 years of age.
[2]n = unweighted sample size.
[3]N = population estimate in thousands.

Table 1. Percent carboxyhemoglobin by age and smoking status—sample sizes, weighted population estimates, means, standard deviations, standard errors, selected percentiles, and cumulative frequency distributions: United States, 1976-80—Con.

Percent COHb															
≤ 0.50	*≤ 1.00*	*≤ 1.50*	*≤ 2.00*	*≤ 2.50*	*≤ 3.00*	*≤ 3.50*	*≤ 4.00*	*≤ 4.50*	*≤ 5.00*	*≤ 5.50*	*≤ 6.00*	*≤ 7.00*	*≤ 8.00*	*≤ 9.00*	*≤ 10.00*
Cumulative percent distribution of population															
16.4	55.3	68.4	72.9	75.6	78.0	80.6	83.1	85.5	87.6	90.0	92.4	95.6	97.4	98.7	99.4
28.6	84.7	95.9	98.8	98.9	99.5	99.5	99.7	99.7	99.7	99.8	100.0	100.0	100.0	100.0	100.0
14.2	49.9	63.4	68.2	71.4	74.1	77.2	80.1	82.9	85.4	88.3	91.0	94.8	96.9	98.4	99.2
23.7	77.3	93.2	97.0	98.0	98.6	99.1	99.3	99.4	99.5	99.6	99.8	99.9	99.9	99.9	100.0
28.6	84.7	95.9	98.8	98.9	99.5	99.5	99.7	99.7	99.7	99.8	100.0	100.0	100.0	100.0	100.0
21.8	74.4	92.2	96.4	97.7	98.3	98.9	99.2	99.3	99.4	99.5	99.7	99.8	99.8	99.9	100.0
19.8	72.1	88.6	94.5	96.2	97.6	98.0	98.1	98.4	98.5	98.8	99.0	99.2	99.4	99.8	99.9
2.1	9.1	15.7	20.8	27.1	33.1	40.4	47.9	55.4	61.9	69.4	76.5	86.6	92.0	95.9	98.0

Table 2. Percent carboxyhemoglobin for never-smokers by age, race, and urbanization status—sample sizes, weighted population estimates, means, standard deviations, standard errors, selected percentiles, and cumulative frequency distributions: United States, 1976-80

Urbanization level, race, and age of never-smokers[1]	n[2]	N[3]	Mean	Standard deviation	Standard error	Percentiles				Percent COHb						
						50th	75th	90th	95th	≤ 1.00	≤ 1.25	≤ 1.50	≤ 1.75	≤ 2.00	≤ 2.25	≤ 2.50
All urbanization levels																
All races[4]			Percent COHb							Cumulative percent distribution of population						
3-74 years	5,459	106,042	0.83	0.671	0.021	0.72	0.97	1.33	1.65	77.3	88.4	93.2	95.7	97.0	97.5	98.0
3-11 years	2,055	30,066	0.73	0.502	0.019	0.67	0.87	1.12	1.42	84.7	93.0	95.9	97.7	98.8	98.9	98.9
12-74 years	3,404	75,976	0.87	0.726	0.025	0.74	1.01	1.38	1.77	74.4	86.6	92.2	94.9	96.4	97.0	97.7
White																
3-74 years	4,512	89,322	0.80	0.645	0.021	0.70	0.94	1.26	1.58	79.8	89.9	94.0	96.2	97.1	97.5	98.1
3-11 years	1,628	24,563	0.71	0.504	0.021	0.65	0.85	1.09	1.40	86.2	93.6	96.0	97.8	98.8	98.9	99.0
12-74 years	2,884	64,759	0.84	0.690	0.024	0.72	0.98	1.32	1.68	77.3	88.5	93.2	95.6	96.5	97.0	97.8
Black																
3-74 years	818	13,389	1.02	0.890	0.065	0.84	1.17	1.59	1.93	64.2	78.1	87.5	92.0	95.9	96.6	96.9
3-11 years	373	4,515	0.82	0.548	0.048	0.76	0.95	1.33	1.57	77.1	88.2	94.7	96.4	98.2	98.3	98.3
12-74 years	445	8,875	1.12	1.012	0.079	0.91	1.31	1.77	2.03	57.7	72.9	83.9	89.7	94.7	95.7	96.1
Population more than 1,000,000, central city																
All races																
3-74 years	629	12,151	1.11	0.691	0.045	1.02	1.31	1.69	2.02	49.5	71.2	83.6	91.0	94.8	96.0	97.1
3-11 years	231	3,099	0.95	0.480	0.047	0.87	1.11	1.51	1.76	66.2	80.6	89.5	95.0	98.3	98.3	98.3
12-74 years	398	9,052	1.17	0.746	0.051	1.07	1.36	1.78	2.22	43.7	68.0	81.5	89.6	93.6	95.2	96.7
White																
3-74 years	324	7,088	1.05	0.608	0.032	0.96	1.25	1.58	1.98	53.7	75.8	86.2	93.8	95.4	96.6	98.2
3-11 years	104	1,702	0.90	0.446	0.045	0.82	1.04	1.47	1.73	73.8	85.3	90.2	96.8	98.5	98.5	98.5
12-74 years	220	5,386	1.10	0.653	0.039	1.07	1.29	1.60	2.18	47.4	72.7	84.9	92.9	94.3	96.0	98.1
Black																
3-74 years	275	4,383	1.22	0.872	0.108	1.08	1.44	1.88	2.63	44.1	63.6	77.8	85.8	93.2	94.3	94.8
3-11 years	117	1,241	1.01	0.566	0.083	0.92	1.33	1.57	1.95	54.2	71.7	87.3	91.9	97.7	97.7	97.7
12-74 years	158	3,142	1.31	0.963	0.129	1.11	1.51	1.94	3.20	40.2	60.4	74.0	83.4	91.4	93.0	93.6
Population more than 1,000,000, not central city																
All races																
3-74 years	719	18,207	0.91	0.701	0.040	0.80	1.09	1.46	1.74	69.3	83.3	90.8	95.1	96.2	97.3	98.2
3-11 years	262	5,074	0.76	0.430	0.051	0.74	0.97	1.21	1.45	78.1	90.9	95.9	99.0	99.9	99.9	99.9
12-74 years	457	13,133	0.96	0.777	0.043	0.83	1.15	1.55	2.02	65.9	80.4	88.8	93.6	94.8	96.3	97.6
White																
3-74 years	632	16,170	0.90	0.739	0.045	0.79	1.08	1.51	1.80	70.3	82.9	89.9	94.5	95.8	97.0	98.0
3-11 years	228	4,458	0.74	0.449	0.055	0.69	0.97	1.28	1.46	77.9	89.7	95.3	98.9	99.9	99.9	99.9
12-74 years	404	11,712	0.96	0.817	0.047	0.83	1.12	1.58	2.03	67.4	80.3	87.8	92.8	94.2	95.8	97.3
Black																
3-74 years	76	1,658	0.93	0.330	0.028	0.89	1.15	1.36	1.50	59.3	83.4	97.3	100.0	100.0	100.0	100.0
3-11 years	30	515	0.83	0.297	0.052	0.84	0.92	1.16	1.17	79.7	99.1	100.0	100.0	100.0	100.0	100.0
12-74 years	46	1,143	0.98	0.361	0.048	0.93	1.20	1.36	1.50	50.1	76.4	96.1	100.0	100.0	100.0	100.0

See footnotes at end of table.

Table 2. Percent carboxyhemoglobin for never-smokers by age, race, and urbanization status—sample sizes, weighted population estimates, means, standard deviations, standard errors, selected percentiles, and cumulative frequency distributions: United States, 1976-80 - Con.

Urbanization level, race, and age of never-smokers[1]	n[2]	N[3]	Mean	Standard deviation	Standard error	Percentiles				Percent COHb						
						50th	75th	90th	95th	≤ 1.00	≤ 1.25	≤ 1.50	≤ 1.75	≤ 2.00	≤ 2.25	≤ 2.50
Population less than 1,000,000																
All races			Percent COHb							Cumulative percent distribution of population						
3-74 years	2,109	41,530	0.79	0.717	0.036	0.69	0.91	1.18	1.43	82.8	92.5	95.5	96.8	97.6	97.8	98.0
3-11 years	811	11,816	0.70	0.602	0.042	0.65	0.82	1.06	1.21	88.1	95.7	97.4	98.2	98.4	98.7	98.7
12-74 years	1,298	29,714	0.83	0.759	0.039	0.71	0.94	1.22	1.56	80.6	91.2	94.7	96.2	97.2	97.4	97.8
White																
3-74 years	1,654	33,691	0.76	0.659	0.034	0.68	0.89	1.11	1.34	84.4	93.8	96.3	97.2	97.7	97.8	98.1
3-11 years	599	9,071	0.69	0.618	0.047	0.63	0.81	1.03	1.21	89.0	95.8	97.4	98.2	98.5	98.8	98.8
12-74 years	1,055	24,620	0.79	0.678	0.037	0.69	0.92	1.13	1.36	82.6	93.0	95.9	96.9	97.4	97.5	97.8
Black																
3-74 years	383	5,883	0.94	1.071	0.087	0.76	0.97	1.49	1.92	77.5	85.5	90.8	93.9	96.2	96.8	97.1
3-11 years	182	2,214	0.73	0.623	0.068	0.67	0.81	1.10	1.35	87.1	94.6	96.7	97.6	97.6	97.9	97.9
12-74 years	201	3,669	1.06	1.259	0.108	0.82	1.10	1.59	1.98	71.8	80.0	87.2	91.7	95.3	96.1	96.6
Rural																
All races																
3-74 years	1,999	34,103	0.74	0.606	0.034	0.65	0.86	1.13	1.47	84.9	92.2	95.2	96.4	97.6	97.8	98.3
3-11 years	750	10,071	0.68	0.446	0.024	0.62	0.81	1.02	1.29	89.7	94.6	96.1	97.2	98.7	98.8	98.9
12-74 years	1,249	24,032	0.77	0.662	0.040	0.66	0.88	1.16	1.53	82.9	91.2	94.8	96.0	97.1	97.4	98.0
White																
3-74 years	1,899	32,321	0.74	0.610	0.035	0.65	0.85	1.12	1.44	85.4	92.5	95.4	96.5	97.6	97.7	98.2
3-11 years	696	9,325	0.68	0.455	0.027	0.62	0.80	1.02	1.29	89.7	94 8	96.0	97.2	98.6	98.7	98.8
12-74 years	1,203	22,995	0.76	0.664	0.041	0.66	0.88	1.15	1.49	83.6	91.5	95.1	96.2	97.1	97.3	98.0
Black																
3-74 years	84	1,465	0.82	0.640	0.106	0.74	0.98	1.48	1.77	76.6	85.5	92.4	93.4	97.8	98.7	98.7
3-11 years	44	544	0.74	0.419	0.085	0.72	0.94	1.28	1.28	86.8	89.7	98.3	98.3	100.0	100 0	100.0
12-74 years	40	920	0.86	0.762	0.143	0.74	1.08	1.69	1.77	70.5	83.1	88.9	90.5	96 5	97.9	97.9

[1]Smoking histories are unavailable for children less than 12 years of age.
[2]n = unweighted sample size.
[3]N = population estimate in thousands.
[4]Includes other racial groups in addition to white and black.

Table 3. *Percent carboxyhemoglobin for never-smokers by age, season, and urbanization status—sample sizes, weighted population estimates, means, standard deviations, standard errors, selected percentiles, and cumulative frequency distributions: United States, 1976-80*

Urbanization status, season, and age of never-smokers[1]	*n*[2]	*N*[3]	*Mean*	*Standard deviation*	*Standard error*	*Percentiles*				*Percent COHb*						
						50th	*75th*	*90th*	*95th*	*≤ 1.00*	*≤ 1.25*	*≤ 1.50*	*≤ 1.75*	*≤ 2.00*	*≤ 2.25*	*≤ 2.50*
All urbanization levels																
November-March			Percent COHb							Cumulative percent distribution of population						
3-74 years	2,105	43,285	0.96	0.787	0.033	0.80	1.09	1.55	1.94	69.4	82.4	89.0	92.8	95.3	96.1	97.0
3-11 years	795	12,421	0.87	0.655	0.034	0.75	0.97	1.39	1.76	77.3	87.3	91.8	94.9	97.1	97.3	97.4
12-74 years	1,310	30,865	1.00	0.835	0.037	0.83	1.14	1.59	2.07	66.1	80.5	87.9	91.9	94.6	95.6	96.9
May-September																
3-74 years	2,330	43,167	0.67	0.530	0.023	0.63	0.83	1.05	1.24	87.9	95.2	97.5	98.6	98.9	99.1	99.2
3-11 years	881	12,372	0.58	0.327	0.024	0.57	0.77	0.93	1.07	92.5	97.7	98.9	99.5	100.0	100.0	100.0
12-74 years	1,449	30,795	0.71	0.589	0.024	0.64	0.86	1.09	1.29	86.1	94.1	96.9	98.3	98.4	98.7	98.8
Population more than 1,000,000, central city																
November-March																
3-74 years	328	6,575	1.19	0.787	0.064	1.04	1.42	1.86	2.31	47.1	65.4	78.8	87.8	92.8	94.6	95.8
3-11 years	105	1,628	1.01	0.565	0.071	0.85	1.29	1.63	1.95	64.5	74.6	84.6	92.6	96.7	96.7	96.7
12-74 years	223	4,947	1.25	0.847	0.073	1.11	1.45	1.94	2.31	41.4	62.3	76.9	86.2	91.5	93.9	95.5
May-September																
3-74 years	165	2,879	0.86	0.377	0.029	0.82	1.11	1.28	1.52	65.4	86.4	94.4	99.0	100.0	100.0	100.0
3-11 years	76	844	0.77	0.369	0.030	0.78	0.92	1.11	1.34	80.6	94.5	96.5	96.5	100.0	100.0	100.0
12-74 years	89	2,034	0.90	0.379	0.034	0.85	1.15	1.29	1.52	59.1	83.0	93.5	100.0	100.0	100.0	100.0
Population more than 1,000,000, not central city																
November-March																
3-74 years	312	8,163	0.98	0.590	0.050	0.91	1.17	1.54	1.76	61.1	78.7	88.7	94.8	96.3	98.0	99.1
3-11 years	121	2,352	0.88	0.473	0.066	0.84	1.11	1.45	1.56	66.5	83.0	91.2	97.9	99.7	99.7	99.7
12-74 years	191	5,811	1.02	0.642	0.061	0.94	1.19	1.58	2.02	58.9	76.9	87.7	93.6	95.0	97.3	98.8
May-September																
3-74 years	289	7,145	0.78	0.826	0.066	0.68	0.89	1.20	1.58	82.9	90.7	94.6	96.6	96.8	97.5	98.0
3-11 years	102	1,938	0.62	0.350	0.058	0.65	0.84	0.99	1.07	90.2	99.0	100.0	100.0	100.0	100.0	100.0
12-74 years	187	5,207	0.83	0.936	0.070	0.70	0.93	1.42	1.59	80.1	87.6	92.6	95.3	95.6	96.6	97.3
Population less than 1,000,000																
November-March																
3-74 years	611	13,250	0.96	1.005	0.062	0.77	1.00	1.38	1.98	75.6	87.5	91.4	93.0	95.1	95.4	96.0
3-11 years	226	3,635	0.90	0.969	0.099	0.69	0.91	1.18	1.83	80.1	91.7	94.3	94.6	95.1	95.6	95.6
12-74 years	385	9,615	0.98	1.033	0.064	0.79	1.02	1.49	1.98	73.9	85.9	90.3	92.3	95.1	95.4	96.2
May-September																
3-74 years	1,075	20,147	0.67	0.460	0.027	0.64	0.84	1.04	1.20	88.8	96.1	98.1	98.9	99.1	99.3	99.4
3-11 years	435	6,220	0.59	0.343	0.032	0.59	0.76	0.94	1.11	92.4	96.9	98.4	99.7	99.9	100.0	100.0
12-74 years	640	13,927	0.71	0.499	0.026	0.65	0.86	1.07	1.22	87.1	95.7	97.9	98.6	98.8	99.0	99.1

See footnotes at end of table.

Table 3. Percent carboxyhemoglobin for never-smokers by age, season, and urbanization status—sample sizes, weighted population estimates, means, standard deviations, standard errors, selected percentiles, and cumulative frequency distributions: United States, 1976-80—Con.

Urbanization status, season, and age of never-smokers[1]	*n*[2]	*N*[3]	*Mean*	*Standard deviation*	*Standard error*	*Percentiles*				*Percent COHb*						
						50th	*75th*	*90th*	*95th*	*≤ 1.00*	*≤ 1.25*	*≤ 1.50*	*≤ 1.75*	*≤ 2.00*	*≤ 2.25*	*≤ 2.50*
Rural																
November-March			Percent COHb							Cumulative percent distribution of population						
3-74 years	854	15,298	0.86	0.703	0.051	0.73	0.95	1.41	1.84	77.9	87.4	91.5	93.7	96.1	96.4	97.3
3-11 years	343	4,806	0.79	0.528	0.032	0.71	0.88	1.23	1.76	84.9	90.3	92.7	94.6	97.4	97.5	97.8
12-74 years	511	10,492	0.90	0.772	0.062	0.74	1.01	1.45	1.86	74.7	86.1	91.0	93.3	95.5	95.8	97.1
May-September																
3-74 years	798	12,944	0.58	0.471	0.025	0.56	0.73	0.91	1.03	94.3	98.1	98.8	99.1	99.3	99.3	99.3
3-11 years	267	3,363	0.49	0.277	0.026	0.49	0.63	0.81	0.90	97.0	99.4	99.6	99.6	100.0	100.0	100.0
12-74 years	531	9,581	0.61	0.520	0.028	0.58	0.76	0.93	1.07	93.4	97.7	98.6	99.0	99.1	99.1	99.1

[1]Smoking histories are unavailable for children less than 12 years of age.
[2]n = unweighted sample size.
[3]N = population estimate in thousands.

Table 4. Percent carboxyhemoglobin for never-smokers by age, income, and urbanization status—sample sizes, weighted population estimates, means, standard deviations, standard errors, selected percentiles, and cumulative frequency distributions: United States, 1976-80

Urbanization status, age, and family income[1]	n[2]	N[3]	Mean	Standard deviation	Standard error	Percentiles				Percent COHb						
						50th	75th	90th	95th	≤ 1.00	≤ 1.25	≤ 1.50	≤ 1.75	≤ 2.00	≤ 2.25	≤ 2.50
All urbanization levels																
3-74 years			Percent COHb							Cumulative percent distribution of population						
Less than $10,000	2,153	36,114	0.91	0.799	0.031	0.76	1.03	1.41	1.85	73.5	85.3	91.5	94.2	95.9	96.7	97.2
$10,000-19,999	1,888	36,920	0.78	0.597	0.025	0.70	0.92	1.22	1.53	80.0	90.8	94.7	97.2	97.9	98.1	98.5
$20,000 or more	1,189	28,519	0.80	0.609	0.025	0.70	0.94	1.27	1.57	79.8	89.7	94.0	96.0	97.3	97.7	98.3
3-11 years																
Less than $10,000	795	10,025	0.81	0.695	0.041	0.71	0.92	1.31	1.71	79.3	89.0	92.8	95.5	97.3	97.6	97.7
$10,000-19,999	768	11,369	0.69	0.408	0.027	0.66	0.85	1.05	1.29	87.3	94.6	97.4	98.8	99.1	99.1	99.1
$20,000 or more	432	7,838	0.66	0.345	0.023	0.64	0.84	1.09	1.20	88.2	95.6	97.7	99.0	100.0	100.0	100.0
12-74 years																
Less than $10,000	1,358	26,089	0.94	0.839	0.035	0.78	1.07	1.45	1.93	71.2	83.8	90.9	93.6	95.4	96.3	97.0
$10,000-19,999	1,120	25,551	0.82	0.662	0.027	0.72	0.97	1.31	1.64	76.7	89.1	93.6	96.4	97.4	97.7	98.2
$20,000 or more	757	20,681	0.85	0.682	0.033	0.72	0.98	1.37	1.78	76.7	87.5	92.6	94.8	96.2	96.8	97.7
Population more than 1,000,000, central city																
3-74 years																
Less than $10,000	331	5,622	1.16	0.779	0.047	1.05	1.35	1.73	2.38	47.1	68.3	81.9	90.3	93.6	94.5	96.1
$10,000-19,999	152	3,017	1.06	0.689	0.081	0.97	1.21	1.50	1.83	51.8	79.5	90.5	94.6	96.6	96.6	96.6
$20,000 or more	108	2,834	1.05	0.544	0.066	0.94	1.32	1.72	2.14	55.4	70.3	81.7	90.4	94.9	98.0	99.6
3-11 years																
Less than $10,000	130	1,384	1.01	0.522	0.069	0.90	1.33	1.62	1.76	56.8	74.4	85.0	93.6	98.2	98.2	98.2
$10,000-19,999	54	726	0.95	0.508	0.074	0.87	1.04	1.33	1.51	71.9	83.4	94.7	96.1	96.1	96.1	96.1
$20,000 or more	38	912	0.82	0.409	0.042	0.79	0.95	1.35	1.61	77.3	87.7	93.0	97.3	100.0	100.0	100.0
12-74 years																
Less than $10,000	201	4,237	1.21	0.867	0.070	1.07	1.36	1.78	2.45	43.9	66.3	80.9	89.2	92.1	93.3	95.4
$10,000-19,999	98	2,291	1.10	0.736	0.087	1.07	1.22	1.52	1.83	45.5	78.3	89.2	94.1	96.7	96.7	96.7
$20,000 or more	70	1,921	1.16	0.570	0.083	1.08	1.45	1.86	2.18	45.0	62.0	76.3	87.1	92.4	97.1	99.4
Population more than 1,000,000, not central city																
3-74 years																
Less than $10,000	195	4,527	1.01	0.988	0.070	0.84	1.11	1.47	2.03	69.1	82.5	90.0	92.7	93.7	96.4	96.4
$10,000-19,999	239	5,790	0.91	0.654	0.058	0.82	1.17	1.54	1.72	66.2	79.4	89.4	95.6	97.0	97.6	98.2
$20,000 or more	249	6,957	0.81	0.498	0.046	0.78	1.04	1.36	1.53	72.6	88.1	94.0	96.8	97.9	98.4	99.5
3-11 years																
Less than $10,000	63	967	0.93	0.469	0.056	0.90	1.10	1.31	1.89	65.7	88.3	92.8	94.8	99.3	99.3	99.3
$10,000-19,999	107	2,057	0.75	0.433	0.064	0.75	0.98	1.29	1.44	77.7	88.6	95.5	100.0	100.0	100.0	100.0
$20,000 or more	84	1,822	0.69	0.407	0.051	0.67	0.92	1.13	1.45	82.8	93.7	97.5	100.0	100.0	100.0	100.0
12-74 years																
Less than $10,000	132	3,561	1.04	1.100	0.088	0.80	1.11	1.51	2.24	70.1	80.9	89.3	92.1	92.1	95.6	95.6
$10,000-19,999	132	3,732	1.00	0.742	0.069	0.90	1.26	1.69	1.97	59.8	74.3	86.0	93.2	95.4	96.2	97.2
$20,000 or more	165	5,135	0.86	0.523	0.049	0.83	1.05	1.41	1.66	69.0	86.1	92.7	95.6	97.1	97.9	99.3

See footnotes at end of table.

Table 4. Percent carboxyhemoglobin for never-smokers by age, income, and urbanization status—sample sizes, weighted population estimates, means, standard deviations, standard errors, selected percentiles, and cumulative frequency distributions: United States, 1976-80—Con.

Urbanization status, age, and family income[1]	n[2]	N[3]	Mean	Standard deviation	Standard error	Percentiles				Percent COHb						
						50th	75th	90th	95th	≤ 1.00	≤ 1.25	≤ 1.50	≤ 1.75	≤ 2.00	≤ 2.25	≤ 2.50
Population less than 1,000,000																
3-74 years			Percent COHb							Cumulative percent distribution of population						
Less than $10,000	872	14,791	0.87	0.866	0.062	0.73	0.96	1.31	1.71	79.7	89.3	94.0	95.2	96.1	96.6	96.9
$10,000-19,999	717	14,404	0.72	0.564	0.033	0.68	0.86	1.09	1.26	85.4	94.9	96.6	98.4	99.1	99.2	99.3
$20,000 or more	441	10,728	0.78	0.738	0.055	0.67	0.90	1.14	1.38	84.3	93.8	95.7	96.5	97.2	97.2	97.6
3-11 years																
Less than $10,000	331	4,291	0.79	0.918	0.092	0.67	0.84	1.10	1.57	85.1	92.2	94.7	96.2	96.2	96.8	96.8
$10,000-19,999	299	4,529	0.64	0.350	0.027	0.64	0.80	0.98	1.15	91.1	97.3	98.2	98.9	99.5	99.5	99.5
$20,000 or more	161	2,777	0.63	0.316	0.039	0.63	0.80	1.05	1.16	89.4	98.3	100.0	100.0	100.0	100.0	100.0
12-74 years																
Less than $10,000	541	10,500	0.90	0.860	0.053	0.76	0.98	1.34	1.81	77.5	88.2	93.7	94.8	96.1	96.6	96.9
$10,000-19,999	418	9,875	0.76	0.638	0.039	0.69	0.89	1.10	1.31	82.8	93.8	95.9	98.1	98.9	99.0	99.2
$20,000 or more	280	7,952	0.83	0.837	0.067	0.69	0.93	1.16	1.57	82.5	92.2	94.2	95.3	96.2	96.2	96.7
Rural																
3-74 years																
Less than $10,000	755	11,174	0.78	0.654	0.054	0.68	0.92	1.29	1.71	80.2	89.6	93.5	95.3	97.7	97.9	98.6
$10,000-19,999	779	13,689	0.73	0.602	0.032	0.65	0.84	1.07	1.36	86.3	93.8	95.9	97.1	97.4	97.6	98.2
$20,000 or more	390	7,994	0.72	0.580	0.031	0.63	0.82	1.08	1.39	88.8	92.7	96.1	96.5	97.7	97.7	97.9
3-11 years																
Less than $10,000	271	3,383	0.73	0.528	0.036	0.64	0.85	1.13	1.71	84.9	91.2	93.7	95.7	97.7	97.8	98.2
$10,000-19,999	308	4,057	0.67	0.450	0.036	0.63	0.80	0.98	1.06	90.7	96.6	97.9	98.6	98.8	98.8	98.8
$20,000 or more	148	2,322	0.60	0.327	0.028	0.60	0.74	0.88	0.92	95.3	97.1	97.1	97.7	100.0	100.0	100.0
12-74 years																
Less than $10,000	484	7,791	0.80	0.706	0.066	0.69	0.94	1.30	1.71	78.2	88.8	93.5	95.1	97.6	98.0	98.8
$10,000-19,999	471	9,632	0.75	0.657	0.035	0.66	0.86	1.14	1.47	84.4	92.6	95.1	96.8	96.8	97.1	97.9
$20,000 or more	242	5,673	0.76	0.663	0.046	0.65	0.87	1.17	1.42	86.1	90.8	95.6	96.1	96.7	96.7	97.0

[1]Smoking histories are unavailable for children less than 12 years of age.
[2]n = unweighted sample size.
[3]N = population estimate in thousands.

Technical notes

Sample design

The information presented in this report is based on data from the direct standardized physical examinations, tests, measurements, and questionnaires collected in the second National Health and Nutrition Examination Survey during 1976-80. The target population of NHANES II encompassed the civilian noninstitutionalized population of the United States, including Alaska and Hawaii, of persons 6 months through 74 years of age.

NHANES II utilized a multistage probability design that involved selection of PSU's, segments (clusters of households) within PSU's, households, eligible persons, and finally sample persons. The sample design provided for oversampling among persons 6 months-5 years, persons 60-74 years of age, and persons living in poverty areas. The U.S. Bureau of the Census, under contract to the National Center for Health Statistics, selected, according to rigorous specifications, the NHANES II sample of 27,801 persons. Of this total sample, 20,322 (73.1 percent) were examined. A half-sample of persons 3-74 years of age was assigned to receive the test for levels of carbon monoxide. Of the 11,368 persons originally selected in the sample to receive the carbon monoxide test, 9,365 came in for examination, and acceptable blood samples were analyzed for 8,411.

The data in this report are presented as population estimates. Examination findings for each sample person have been inflated by the reciprocal of the probability of selecting a person, adjusted for persons who were not examined, and poststratified so that final extimates closely approximate the independent U.S. Bureau of the Census estimates for the civilian noninstitutionalized population of the United States by race, sex, and age as of the midpoint of the study, March 1, 1978.

Adjustment for item nonresponse

Carboxyhemoglobin and methemoglobin values were imputed for the 954 cases with no or unacceptable samples. The procedure used has been described as a "hot deck" process, in which the acceptable values for a case that matches the missing case on a number of key criteria are imputed to the case with missing data. For this study, the criteria on which the cases were required to match were smoking status, age group, race, and location. (Although certain locations were visited twice, each visit was assigned a unique number, so that matching on examination location had the effect of adjusting for both season and degree of urbanization.) Comparison of imputed and nonimputed data revealed no substantial changes in detailed means.

Estimation of standard errors

Because the statistics presented in the text and detailed tables of this report are national estimates based on a sample, they differ somewhat from the figures that would have been obtained if the survey had been conducted on the complete population. In other words, the statistics are subject to sampling variability.

The standard errors presented in tables 1-4 are primarily a measure of sampling variability, but they also include the variation that arises in the measurement process, usually called measurement error. These standard errors were calculated using a Taylor Series linearization method.[16] This process approximates the variance of nonlinear (or linear) statistics, for example, means and proportions, using the first two terms of a Taylor Series expansion. If the higher order terms of the expansion are negligible and the sample is of a reasonable size for the domains of interest, then this approximation provides variance estimates as reliable as those from the pseudoreplication method adapted for use in the analyses of NHANES II data.[17] Estimates of standard errors are themselves subject to errors that may be large if the number of cases or PSU's on which the estimates are based is small.

Statistical significance was determined using z-tests when individual subgroup statistics were compared and using a modified chi-square technique when testing for effects. Both methods were modified to incorporate the complex NHANES II sample design.

Carboxyhemoglobin quality control

Three procedures were employed in the laboratory to ensure validity and reliability of the spectrophotometric method and to maintain the necessary quality control on the laboratory determinations: (1) duplicate determinations on "blind" and arbitrarily selected samples using a completely different method of measurement, (2) duplicate measurements on every sample, and (3) regular determinations using Small's method and comparisons with previous values on an independent group of nonsmoking subjects whose COHb levels would be expected to be very stable. The first procedure provided a measure of the validity of the spectrophotometric method and was essential to detect any baseline drift, a significant problem when measuring low COHb concentrations by spectrophotometry. The second and third procedures provided measures of precision and established the reliability of the final raw data.

The validity of the spectrophotometric method was verified by a comparison of results obtained by

Small's method with those obtained using the more accurate and precise (but prohibitively costly and time-consuming) gas chromatography method. At regular intervals, seven or eight samples selected to represent a range of COHb levels were sent to an independent laboratory (that of Dr. F. Lee Rodkey and Mr. R. Robertson of the Naval Medical Research Institute, Bethesda, Maryland) for COHb determinations using the reference standard methodology of gas chromatography.[18] The values obtained by gas chromatography were compared to those obtained by spectrophotometry, and the results were used to "fine-tune" the baseline adjustment on the spectrophotometric equipment.

At regular intervals, four or five "blind" samples were sent directly from the MEC's to both laboratories. About 200 comparisons resulted from this procedure, with a mean difference of 0.00 percent COHb and a standard deviation of 0.31 percent COHb. The correlation coefficient was 0.99.

The precision or reliability of the spectrophotometric method was confirmed through dual determinations on each sample. Theoretically, the standard deviation of repeated COHb measurements on a single sample by this method should be about 0.25 percent.[9] If measurements on a sample differed by more than 1 percent COHb (that is, by more than four standard deviations), the sample was rerun. The distribution of differences between duplicate determinations followed a Gaussian (normal) probability curve, with a standard deviation of approximately 0.25 percent.

Finally, samples were drawn regularly from a group of nonsmoking laboratory personnel as a test of the stability of the spectrophotometric method. After analysis, the COHb values were compared with previous values from the same person. Occasional high values (greater than 1.2 percent) were verified by the gas chromatography method and were found to occur on days when the ambient carbon monoxide level was high. Thus Small's method reliably detected increases in COHb of as low as 0.3 percent.

With the strict quality control on the spectrophotometric method, it was possible to reduce the baseline uncertainty of the method to ±0.1 percent COHb. This source of error is the only one contributing to the error of mean results obtained from groups of individuals; all other sources of error would average to zero. Thus for group comparisons, the method is considered to be accurate to ±0.1 percent COHb.

Limitations of data

Although the quality control and methodological verification previously described justify a high degree of confidence in the validity and precision of the results reported here, because of a number of factors the reader should be cautious not to "over-interpret" the data, particularly when comparing an individual subject's results with population distributions. Chief among these factors is the relative imprecision of a single measurement, estimated to be perhaps as much as 0.25 percent COHb on repeated measurements. For children, in particular, this variability may represent 25 or more percentile points. For the entire population, however, this measurement error was estimated to be no more than 0.10 percent COHb, so that cross-population comparisons should be only minimally affected.

Another possible confounding factor is the interaction between the seasonal effect noted in the results and the itineraries of the Mobile Examination Centers. To minimize the effects of adverse weather on response rates, MEC's traveled through the more northern parts of the United States in the summer and the more southern parts in the winter. Thus the effects of the severest winter weather on carbon monoxide levels are not represented in these data.

Several logistical factors also must be considered while interpreting these data. For instance, on rare occasions, an MEC was situated near major traffic arteries. These sites may have manifested ambient carbon monoxide levels that were atypically high for the given locale, but it is not possible to quantify this effect with the available data.

Another logistical factor with possible implications for the interpretation of these data was the shipping and handling of the samples. After collection, the samples were refrigerated until a sufficient number had accumulated for shipment (on ice) to the lab for analysis. In general, this procedure has not been identified as a factor that influences the resulting COHb test results. However, several shipments were lost; others were mishandled and arrived at the lab in an unanalyzable condition. Finally, some samples showed such high methemoglobin levels (greater than 5 percent) that the associated values for COHb were considered unreliable; the high metHb was evidence of sample deterioration. Of the 9,365 examined subjects who should have had values for COHb, acceptable samples were not available for 954 (10.2 percent). The distribution of these missing values did not show any race or sex bias, and the statistical weights for the remaining cases were adjusted to compensate for this item nonresponse as well as sample person nonresponse (see the section on Item nonresponse).

The definition and reporting of smoking status (see page 6) may have had some impact on the interpretation of results in this report. The remarkably high COHb values for a few of the ex-smokers leads to the suspicion that some incorrect reporting may have occurred in the history. In addition, the surprisingly low values for some current smokers indicate that their smoking levels (in cigarettes per day or

amount inhaled) are so low that they have little or no effect on COHb levels.

Finally, the possibility exists that there is a relationship between the time of day of sample collection and the COHb level, particularly for current smokers. This relationship will be examined in the Series 11 paper in the *Vital and Health Statistics* series.

nchs advancedata

From Vital and Health Statistics of the National Center for Health Statistics Number 77 • February 22, 1982

1980 Summary: National Ambulatory Medical Care Survey

by Thomas McLemore and Hugo Koch, Division of Health Care Statistics

During 1980 an estimated 575.7 million office visits were made to nonfederally employed, office-based physicians in the conterminous United States, an average of 2.7 office visits per person per year. These and other estimates presented in this report are based on data collected in the 1980 National Ambulatory Medical Care Survey, a probability sample survey conducted annually by the Division of Health Care Statistics of the National Center for Health Statistics. The physician sample for the National Ambulatory Medical Care Survey (NAMCS) is selected, with the cooperation of the American Medical Association and the American Osteopathic Association, from a list of nonfederally employed physicians who are principally engaged in office-based practice. Physicians practicing in Alaska and Hawaii, and physicians in the specialties of anesthesiology, pathology, and radiology are excluded from the survey.

This report provides an overview of the data from the 1980 NAMCS. Utilization of office-based ambulatory medical care services is described in terms of the number and percent of office visits and of annual visit rates. Utilization statistics are presented on patient, physician, and visit characteristics as follows:

Table 1	Patient sex and age
Table 2	Patient race and ethnicity
Table 3	Physician specialty and type of practice
Tables 4 and 5	Principal reason for visit as expressed by the patient
Table 6	Major reason for visit, prior visit status, and referral status
Table 7	Diagnostic services ordered or provided
Tables 8 and 9	Principal diagnosis rendered by the physician
Tables 10 and 11	Medication therapy ordered or provided
Table 12	Non-medication therapy
Table 13	Disposition and duration of visit

Since the estimates presented in this report are based on a sample rather than on the entire universe of office visits, the data are subject to sampling variability. The technical notes at the end of this report provide a brief description of the sample design, an explanation of sampling errors, and guidelines for judging the precision of the estimates. A more detailed description of the NAMCS sample design and survey methodology has been published.[1]

Figure 1 is a facsimile of the 1980 NAMCS Patient Record used by participating physicians to record information about their office visits. The Patient Record can be a useful reference as survey findings are reviewed.

Data highlights

Patient characteristics

Office visit data according to patient demographic characteristics are presented in tables 1 and 2. As shown in table 1, the annual visit rate for 1980 varied from 2.1 visits per person per year for the 15-24 year age group to 4.2 visits per person per year for the 65 years and over age group. Females accounted for about 60 percent of all visits. The annual visit rate for females (3.1 visits per person per year) was higher than the visit rate for males (2.2 visits per person per year). White persons accounted for approximately 90 percent of all offiice visits (table 2). As also shown in table 2, persons of Hispanic origin accounted for 5 percent of all visits.

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[1]National Center for Health Statistics: The National Ambulatory Medical Care Survey, 1977 Summary, United States, January-December 1977, by T. Ezzati and T. McLemore. *Vital and Health Statistics*. Series 13-No. 44. DHEW Pub No. (PHS) 80-1795., Public Health Service. Washington. U.S. Government Printing Office, Apr. 1980.

ASSURANCE OF CONFIDENTIALITY—All information which would permit identification of an individual, a practice, or an establishment will be held confidential, will be used only by persons engaged in and for the purposes of the survey and will not be disclosed or released to other persons or used for any other purpose

Department of Health, Education, and Welfare
Public Health Service
Office of Health Research, Statistics, and Technology
National Center for Health Statistics

A No. 003904

1. DATE OF VISIT Month / Day / Year

PATIENT RECORD
NATIONAL AMBULATORY MEDICAL CARE SURVEY

2. DATE OF BIRTH Month / Day / Year

3. SEX
1 ☐ FEMALE
2 ☐ MALE

4. COLOR OR RACE
1 ☐ WHITE
2 ☐ BLACK
3 ☐ ASIAN/PACIFIC ISLANDER
4 ☐ AMERICAN INDIAN/ ALASKAN NATIVE

5. ETHNICITY
1 ☐ HISPANIC ORIGIN
2 ☐ NOT HISPANIC

6. PATIENT'S COMPLAINT(S), SYMPTOM(S), OR OTHER REASON(S) FOR THIS VISIT *[In patient's own words]*
a MOST IMPORTANT
b OTHER

7. MAJOR REASON FOR THIS VISIT *[Check one]*
1 ☐ ACUTE PROBLEM
2 ☐ CHRONIC PROBLEM, ROUTINE
3 ☐ CHRONIC PROBLEM, FLAREUP
4 ☐ POST SURGERY/POST INJURY
5 ☐ NON-ILLNESS CARE (ROUTINE PRENATAL, GENERAL EXAM., WELL BABY, ETC.)

8. DIAGNOSTIC SERVICES THIS VISIT *[Check all ordered or provided]*
1 ☐ NONE
2 ☐ LIMITED HISTORY/EXAM.
3 ☐ GENERAL HISTORY/EXAM
4 ☐ PAP TEST
5 ☐ CLINICAL LAB TEST
6 ☐ X-RAY
7 ☐ BLOOD PRESSURE CHECK
8 ☐ EKG
9 ☐ VISION TEST
10 ☐ ENDOSCOPY
11 ☐ MENTAL STATUS EXAM.
12 ☐ OTHER *(Specify)* _____

9. PHYSICIAN'S DIAGNOSES
a PRINCIPAL DIAGNOSIS/PROBLEM ASSOCIATED WITH ITEM 6a.
b. OTHER SIGNIFICANT CURRENT DIAGNOSES

10. HAVE YOU SEEN PATIENT BEFORE?
1 ☐ YES 2 ☐ NO
IF YES, FOR THE CONDITION IN ITEM 9a?
1 ☐ YES 2 ☐ NO

11. MEDICATION THERAPY THIS VISIT ☐ NONE
[Using brand or generic names, record all new and continued medications ordered, injected, administered, or otherwise provided at this visit. Include immunizing and desensitizing agents]
a. FOR PRINCIPAL DIAGNOSES IN ITEM 9a.
1. _____
2. _____
3. _____
4. _____
b. FOR ALL OTHER REASONS.
1. _____
2. _____
3. _____
4. _____

12. NON-MEDICATION THERAPY *[Check all services ordered or provided this visit]*
1 ☐ NONE
2 ☐ PHYSIOTHERAPY
3 ☐ OFFICE SURGERY
4 ☐ FAMILY PLANNING
5 ☐ PSYCHOTHERAPY/ THERAPEUTIC LISTENING
6 ☐ DIET COUNSELING
7 ☐ FAMILY/SOCIAL COUNSELING
8 ☐ MEDICAL COUNSELING
9 ☐ OTHER *(Specify)* _____

13. WAS PATIENT REFERRED FOR THIS VISIT BY ANOTHER PHYSICIAN?
1 ☐ YES
2 ☐ NO

14. DISPOSITION THIS VISIT *[Check all that apply]*
1 ☐ NO FOLLOW-UP PLANNED
2 ☐ RETURN AT SPECIFIED TIME
3 ☐ RETURN IF NEEDED, P.R.N.
4 ☐ TELEPHONE FOLLOW-UP PLANNED
5 ☐ REFERRED TO OTHER PHYSICIAN
6 ☐ RETURNED TO REFERRING PHYSICIAN
7 ☐ ADMIT TO HOSPITAL
8 ☐ OTHER *(Specify)* _____

15. DURATION OF THIS VISIT *[Time actually spent with physician]*
_____ Minutes

PHS-6105-A (9/79) OMB No. 68-R1498

Figure 1. 1980 National Ambulatory Medical Care Survey Patient Record

Physician characteristics

Among office-based physicians, general and family practitioners led all other specialties in volume of office visits, accounting for one-third of all office visits made during 1980 (table 3). The distribution of visits by the physician's type of practice shows that 55 percent of all visits were made to solo practitioners and 45 percent were made to physicians engaged in multiple member practice.

Visit characteristics

Reason for visit.—Data in tables 4 and 5 represent the principal reason for visiting the physician's office as expressed in the patient's own words. The principal reason for visit is the problem, complaint, or reason listed first in item 6 of the Patient Record. These data have been classified and coded according to the *Reason for Visit Classification for Ambulatory Care*.[2] As shown in table 4, reasons falling into the Symptom Module accounted for over half of all visits, with symptoms of the respiratory and musculoskeletal systems accounting for about 19 percent

[2]National Center for Health Statistics: A Reason for Visit Classification for Ambulatory Care, by D. Schneider, L. Appleton, and T. McLemore. *Vital and Health Statistics*. Series 2-No. 78. DHEW Pub. No. (PHS) 79-1352. Public Health Service. Washington. U.S. Government Printing Office. Feb. 1979.

Table 1. Number, percent distribution, and annual rate of office visits by sex and age of patient: United States, 1980

Sex and age	Number of visits in thousands	Percent distribution of visits	Number of visits per person per year[1]
Both sexes			
All ages	575,745	100.0	2.7
Under 15 years	109,356	19.0	2.2
15-24 years	81,561	14.2	2.1
25-44 years	154,695	26.9	2.6
45-64 years	129,645	22.5	3.0
65 years and over	100,488	17.5	4.2
Female			
All ages	346,106	60.1	3.1
Under 15 years	50,503	8.8	2.1
15-24 years	54,879	9.5	2.7
25-44 years	103,562	18.0	3.3
45-64 years	76,385	13.3	3.4
65 years and over	60,777	10.6	4.3
Male			
All ages	229,639	39.9	2.2
Under 15 years	58,852	10.2	2.3
15-24 years	26,682	4.6	1.4
25-44 years	51,134	8.9	1.8
45-64 years	53,260	9.3	2.6
65 years and over	39,712	6.9	4.0

[1]Rates are based on estimates of the civilian noninstitutionalized population of the United States, excluding Alaska and Hawaii, as of July 1, 1980.

Table 2. Number and percent distribution of office visits by race and ethnicity of patient: United States, 1980

Race and ethnicity	Number of visits in thousands	Percent distribution
All visits	575,745	100.0
Race		
White	516,616	89.7
All other	59,129	10.3
Black	52,872	9.2
Asian or Pacific Islander	4,133	0.7
American Indian or Alaskan native	2,124	0.4
Ethnicity		
Hispanic	28,720	5.0
Not Hispanic	547,025	95.0

Table 3. Number and percent distribution of office visits by physician specialty and type of practice: United States, 1980

Physician specialty and type of practice	Number of visits in thousands	Percent distribution
All visits	575,745	100.0
Physician specialty		
General and family practice	191,744	33.3
Medical specialties	177,127	30.8
Internal medicine	69,481	12.1
Pediatrics	64,223	11.2
Other	43,423	7.5
Surgical specialties	172,524	30.0
General surgery	28,315	4.9
Obstretrics and gynecology	55,123	9.6
Other	89,086	15.5
Other specialties	34,350	6.0
Psychiatry	15,856	2.8
Other	18,494	3.2
Type of practice		
Solo	313,963	54.5
Partnership	123,643	21.5
Other[1]	138,140	24.0

[1]Includes group practice and other.

of all visits. The 20 most common principal reasons for visit are listed in table 5. The reader is cautioned that the rankings presented in table 5 may be somewhat artificial because some estimates may not be statistically different from other near estimates due to sampling variability. Detailed tabulations of reason for visit data from the 1977-78 NAMCS are in *Vital and Health Statistics*, Series 13, Number 56.[3]

Table 6 shows the number and percent distribution of office visits by major reason for visit, patient's prior visit status, and referral status.

Major reason for visit.—In item 7 of the Patient Record, the physician was instructed to check the one major reason for the patient's office visit. Approximately equal proportions of visits were made for acute problems and chronic problems (36 percent and 37 percent, respectively).

Prior visit status.—Approximately 85 percent of the visits to office-based physicians were by patients who had seen the physician before ("old" patients). Furthermore, the majority of visits (63 percent) were made by "old" patients with an "old" problem, i.e., problems which had previously been treated by the physician.

Referral status.—Approximately 4 percent of all visits were the result of referrals from another physician. However, about 26 percent of all "new" patient visits were referrals.

Diagnostic services.—Information on various diagnostic services that may be ordered or provided during an office visit is presented in table 7. A limited

[3]National Center for Health Statistics: Patients' Reasons for Physician Visits, NAMCS, U.S. 1977-78, by B. Cypress. *Vital and Health Statistics.* Series 13-No. 56. DHEW Pub. No. (PHS) 82-1717. Public Health Service. Washington. U.S. Government Printing Office, In press.

Table 4. Number and percent distribution of office visits by patient's principal reason for visit: United States, 1980

Principal reason for visit and RVC code[1]	Number of visits in thousands	Percent distribution
All visits	575,745	100.0
Symptom module S001-S999	313,162	54.4
General symptoms S001-S099	43,730	7.6
Symptoms referable to psychological and mental disorders S100-S199	15,529	2.7
Symptoms referable to nervous system (excluding sense organs) S200-S259	17,449	3.0
Symptoms referable to the cardiovascular and lymphatic systems S260-S299	3,336	0.6
Symptoms referable to the eyes and ears S300-S399	33,360	5.8
Symptoms referable to the respiratory system S400-S499	54,710	9.5
Symptoms referable to the digestive system S500-S639	26,011	4.5
Symptoms referable to the genitourinary system S640-S829	26,475	4.6
Symptoms referable to the skin, nails, and hair S830-S899	38,330	6.7
Symptoms referable to the musculoskeletal system S900-S999	54,233	9.4
Disease module D001-D999	46,279	8.0
Diagnostic, screening, and preventive module X100-X599	112,726	19.6
Treatment module T100-T899	59,110	10.3
Injuries and adverse effects module J001-J999	23,151	4.0
Test results module R100-R700	2,601	0.5
Administrative module A100-A140	8,830	1.5
Other[2] U990-U999	9,887	1.7

[1]Based on "A Reason for Visit Classification for Ambulatory Care," Vital and Health Statistics, Series 2-No. 78, Feb. 1979

[2]Includes blanks, problems and complaints not elsewhere classified, entries of "none," and illegible entries.

Table 5. Number and percent of office visits, by the 20 most common principal reasons for visit: United States, 1980

Rank	Most common principal reason for visit and RVC code[1]	Number of visits in thousands	Percent
1	General medical examination X100	33,853	5.9
2	Prenatal examination X205	25,347	4.4
3	Postoperative visit T205	16,573	2.9
4	Progress visit not otherwise specified T800	14,392	2.5
5	Symptoms referable to the throat .S455	14,337	2.5
6	Cough .S440	13,233	2.3
7	Back symptoms .S905	9,948	1.7
8	Well-baby examination X105	9,936	1.7
9	Skin rash .S860	9,625	1.7
10	Head cold, upper respiratory infection .S445	9,535	1.7
11	Fever .S010	9,499	1.6
12	Earache, or ear infection .S355	9,470	1.6
13	Blood pressure test X320	9,354	1.6
14	Headache, pain in head .S210	8,279	1.4
15	Abdominal pain, cramps, spasms .S550	8,250	1.4
16	Chest pain and related symptoms .S050	7,910	1.4
17	Acne or pimples .S830	7,643	1.3
18	Hypertension D510	6,813	1.2
19	Vision dysfunctions .S305	6,659	1.2
20	Eye examination X230	6,543	1.1
	All other reasons	338,547	58.8

[1]Based on "A Reason for Visit Classification for Ambulatory Care" (RVC) Vital and Health Statistics, Series 2-No. 78, Feb. 1979.

Table 6. Number and percent distribution of office visits by patient's major reason for visit, prior visit status, and referral status: United States, 1980

Visit characteristic	Number of visits in thousands	Percent distribution
All visits	575,745	100.0
Major reason for visit		
Acute problem	208,428	36.2
Chronic problem, routine	162,075	28.2
Chronic problem, flareup	52,703	9.2
Postsurgery or postinjury	50,169	8.7
Nonillness care[1]	102,370	17.8
Prior visit status		
New patient	85,519	14.9
Old patient	490,226	85.1
New problem	130,294	22.6
Old problem	359,932	62.5
Referral status		
Referred by another physician	25,370	4.4
Not referred by another physician	550,375	95.6

[1]Includes, for example, routine prenatal care, general examination, and well-baby examination.

history or examination was rendered at 64 percent of all visits. The procedures ordered or provided most often were blood pressure checks (34 percent) and clinical laboratory tests (22 percent). Although a Pap test was ordered or provided during about 4 percent of all visits, this represents about 7 percent of the visits by women.

Principal diagnosis.—Tables 8 and 9 present data on the principal diagnosis rendered by the physician. The principal diagnosis refers to the first-listed diagnosis in item 9 on the Patient Record, the one associated with the patient's presenting problem. The *International Classification of Diseases-9-Clinical Modification (ICD-9-CM)*[4] was used to classify these

[4]Commission on Professional and Hospital Activities: *International Classification of Diseases, 9th Revision, Clinical Modification.* Ann Arbor. Edwards Brothers, Inc., 1978.

Table 7. Number and percent of office visits by diagnostic service ordered or provided: United States, 1980

Diagnostic service	Number of visits in thousands	Percent
None	47,126	8.2
Limited history/exam	367,467	63.8
General history/exam	90,790	15.8
Pap test	25,419	4.4
Clinical lab test	125,613	21.8
X-ray	41,925	7.3
Blood pressure check	195,382	33.9
Electrocardiogram	16,294	2.8
Vision test	32,726	5.7
Endoscopy	4,687	0.8
Mental status exam	8,907	1.5
Other	29,222	5.1

data. The Supplementary Classification of the *ICD-9-CM*, which contains categories for entries other than diseases and injuries, e.g., general medical and normal pregnancy examinations, accounted for the largest proportion of visits (18 percent), with diseases of the respiratory system accounting for the second largest proportion (13 percent). The 20 most common three digit *ICD-9-CM* categories are presented in table 9. The presence of several large catogories from the Supplementary Classification is evident. As in table 5, these rankings may vary somewhat due to sampling variability.

Medication therapy.—During 1980, specific information on medication therapy was collected for the first time in the NAMCS. In item 11 of the Patient Record, the physician was asked to record, using brand or generic names, all new or continued medications ordered, injected, administered, or otherwise provided at this visit, including immunization and desensitizing agents. The physician was instructed to list drugs prescribed for the principal diagnosis in item 11a and all other drugs prescribed at that visit in item 11b. As used in the NAMCS, the term *drug* is interchangeable with the term *medication*, and the term *prescribing* is used in the broad sense to mean the ordering or providing of any medication, either prescription or nonprescription.

The NAMCS drug data have been classified and coded according to a scheme developed at NCHS based on the American Society of Hospital Pharmacists' Drug Product Information File. This new scheme permits classification by such variables as specific product name; generic class; entry form chosen by the physician, i.e., brand name, generic name, or therapeutic effect desired; prescription status, i.e., prescription (Rx) or nonprescription (OTC); Federally controlled substance status (for addicting or habituating drugs); composition status, i.e., single or multiple ingredient; and therapeutic category. Future scheduled reports include one describing the development of collection and processing procedures for the NAMCS drug data and several reports exploring various aspects of the NAMCS drug data.

Table 8. Number and percent distribution of office visits by principal diagnosis: United States, 1980

Principal diagnosis and ICD-9-CM code[1]	Number of visits in thousands	Percent distribution
All diagnoses	575,745	100.0
Infectious and parasitic diseases .001-139	19,628	3.4
Neoplasms .140-239	16,021	2.8
Endocrine, nutritional, and metabolic diseases and immunity disorders .240-279	24,166	4.2
Mental disorders .290-319	24,343	4.2
Diseases of the nervous system and sense organs .320-389	52,593	9.1
Diseases of the circulatory system .390-459	53,691	9.3
Diseases of the respiratory system .460-519	72,886	12.7
Diseases of the digestive system .520-579	23,421	4.1
Diseases of the genitourinary system .580-629	32,936	5.7
Diseases of the skin and subcutaneous tissue .680-709	36,214	6.3
Diseases of the musculoskeletal system and connective tissue .710-739	36,839	6.4
Symptoms, signs, and ill-defined conditions .780-799	19,020	3.3
Injury and poisoning .800-999	46,187	8.0
Supplementary classification V01-V82	102,237	17.8
All other diagnoses[2]	7,951	1.4
Unknown diagnoses[3]	7,613	1.3

[1] Based on the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM).

[2] Includes diseases of the blood and blood-forming organs (280-289); complications of pregnancy, childbirth, and the puerperium (630-676); congenital anomalies (740-759); and certain conditions originating in the perinatal period (760-779).

[3] Includes blank diagnosis, noncodable diagnosis, and illegible diagnosis.

Data on the provision of medication by office-based physicians are highlighted in tables 10 and 11. Data on drug visits, that is, visits at which at least one medication was prescribed, are presented in table 10. Forty percent of all drug visits were made to general and family practitioners. As calculated from tables 3 and 10, some 63 percent of all office visits resulted in the use of a drug, chiefly for therapy, but also as a diagnostic or preventive agent. The percent of drug visits ranged from 35 percent for general surgeons to 76 percent for internists and other medical specialists.

Data on the number and percent of drug mentions, that is, the total number of medications listed in items 11a and 11b (figure 1), are presented in tables 10 and 11. As shown in table 10, there were 679.6 million drug mentions in 1980, an average of 1.2 drug mentions for every office visit or 1.9 mentions for every visit at which one or more medications were prescribed. Three physician specialties—general and family practice, internal medicine, and

Table 9. Number and percent of office visits, by the 20 most common principal diagnoses: United States, 1980

Rank	Most common principal diagnosis and ICD-9-CM code[1]	Number of visits in thousands	Percent
1	Normal pregnancy V22	26,256	4.6
2	Essential hypertension 401	25,137	4.4
3	Health supervision of infant or child . V20	17,496	3.0
4	General medical examination V70	16,078	2.8
5	Acute upper respiratory infections of multiple or unspecified sites . . . 465	15,050	2.6
6	Suppurative and unspecified otitis media. 382	11,748	2.0
7	Neurotic disorders 300	11,251	2.0
8	Diseases of sebaceous glands. 706	10,578	1.8
9	Followup examinations V67	9,682	1.7
10	Diabetes mellitus 250	9,551	1.7
11	Special investigations and examinations V72	9,530	1.7
12	Acute pharyngitis. 462	9,361	1.6
13	Allergic rhinitis 477	8,439	1.5
14	Obesity and other hyperalimentation. 278	8,081	1.4
15	Other forms of chronic ischemic heart disease 414	6,958	1.2
16	Disorders of refraction and accommodation 367	6,271	1.1
17	Bronchitis, not specified as acute or chronic 490	6,024	1.0
18	Asthma. 493	5,921	1.0
19	Contact dermatitis and other eczema. 692	5,720	1.0
20	Other diseases due to viruses and Chlamydiae 078	5,093	0.9
	All other diagnoses	351,522	61.1

[1]Based on International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM).

pediatrics—accounted for 70 percent of all drug mentions. The distribution of drug mentions by therapeutic category is shown in table 11. Central nervous system drugs and anti-infective agents were the leading therapeutic categories, accounting for 32 percent of all drug mentions. Of the drug mentions for anti-infective agents, 86 percent were for antibiotics.

Non-medication therapy.—Table 12 presents data on various types of non-medication therapy that may be ordered or provided during an office visit. Office surgery was ordered or performed at about 7 percent of all visits.

Disposition of visit.—Data on disposition show that the majority of office visits involved some type of scheduled followup. At about 64 percent of the visits a return visit or telephone followup was planned (table 13). Approximately 2 percent of the office visits ended in hospital admission.

Duration of visit.—Duration of visit is that amount of time spent in face-to-face contact between physician and patient. It does not include time spent waiting to see the physician, time spent receiving care from someone other than the physician without the presence of the physician, or time spent reviewing records, test results, etc. In cases where the patient received care from a member of the physician's staff, but did not see the physician during the visit, the duration of visit was recorded as zero minutes. Some 73 percent of the visits had a duration of 15 minutes or less (table 13).

More detailed 1980 NAMCS data are forthcoming in the *Vital and Health Statistics* series. Questions regarding this report, future reports, or the NAMCS may be directed to the Ambulatory Care Statistics Branch by calling (301) 436-7132.

Table 10. Number and percent distribution of drug visits and drug mentions by physician specialty: United States, 1980

Physician specialty	Number of drug visits in thousands[1]	Percent distribution	Number of drug mentions in thousands	Percent distribution
All specialties	363,489	100.0	679,593	100.0
General and family practice	144,478	39.7	279,186	41.1
Medical specialties	131,775	36.3	262,209	38.6
Internal medicine	53,091	14.6	118,943	17.5
Pediatrics.	45,575	12.5	72,825	10.7
Other	33,108	9.1	70,442	10.4
Surgical specialties	67,912	18.7	100,953	14.9
General surgery	9,860	2.7	15,881	2.3
Obstetrics and gynecology	23,984	6.6	33,026	4.9
Other	34,068	9.4	52,047	7.7
Other specialties.	19,325	5.3	37,245	5.5
Psychiatry	5,706	1.6	9,655	1.4
Other	13,619	3.7	27,590	4.1

[1]Those visits at which one or more drugs was prescribed.

Table 11. Number and percent distribution of drug mentions by therapeutic categories: United States, 1980

Therapeutic categories[1]	*Number of drug mentions in thousands*	*Percent distribution*
All categories	679,593	100.0
Antihistamine drugs	43,939	6.5
Anti-infective agents	104,898	15.4
Antibiotics	90,081	13.3
Antineoplastic agents	5,371	0.8
Autonomic drugs	25,237	3.7
Blood formation and coagulation	8,312	1.2
Cardiovascular drugs	64,463	9.5
Cardiac drugs	26,331	3.9
Hypotensive agents	22,633	3.3
Vasodilating agents	14,646	2.2
Central nervous system drugs	110,706	16.3
Analgesics and antipyretics	57,800	8.5
Psychotherapeutic agents	16,395	2.4
Sedatives and hypnotics	25,036	3.7
Diagnostic agents	4,673	0.7
Electrolytic, caloric, and water balance	51,956	7.6
Diuretics	42,834	6.3
Expectorants and cough preparations	18,899	2.8
Eye, ear, nose, and throat preparations	26,076	3.8
Gastrointestinal drugs	24,140	3.6
Hormones and synthetic substances	55,843	8.2
Adrenals	18,312	2.7
Local anesthetics	968	0.1
Serums, toxiods, and vaccines	23,711	3.5
Skin and mucous membrane preparations	55,188	8.1
Spasmolytic agents	11,541	1.7
Vitamins	24,244	3.6
Other therapeutic agents; pharmaceutic devices and aids	9,410	1.4
Therapeutic category undetermined	10,017	1.5

[1]Based on the pharmacologic-therapeutic classification of the American Society of Hospital Pharmacists, selected categories reproduced with the permission of the Society.

Table 12. Number and percent of office visits by non-medication therapy ordered or provided: United States, 1980

Non-medication therapy	*Number of visits in thousands*	*Percent*
None	303,017	52.6
Physiotherapy	29,281	5.1
Office surgery	43,089	7.5
Family planning	12,828	2.2
Psychotherapy/therapeutic listening	29,024	5.0
Diet counseling	48,886	8.5
Family/social counseling	13,148	2.3
Medical counseling	133,425	23.2
Other	15,618	2.7

Table 13. Number and percent distribution of office visits by disposition and duration of visit: United States, 1980

Disposition and duration	*Number of visits in thousands*	*Percent distribution*
Disposition[1]		
No followup planned	67,442	11.7
Return at specified time	34,641	60.2
Return if needed	131,404	22.8
Telephone followup planned	19,955	3.5
Referred to other physician	15,157	2.6
Returned to referring physician	3,677	0.6
Admit to hospital	13,088	2.3
Other	1,380	0.2
Duration		
0 minutes[2]	13,813	2.4
1-5 minutes	71,894	12.5
6-10 minutes	175,660	30.5
11-15 minutes	157,619	27.4
16-30 minutes	120,900	21.0
31 minutes or more	35,858	6.2

[1]May not add to 100.0 since more than one disposition was possible.

[2]Represents office visits in which there was no face-to-face contact between the patient and the physician.

Technical notes

Source of data and sample design

The information presented in this report is based on data collected in the National Ambulatory Medical Care Survey (NAMCS) during 1980. The target universe of NAMCS includes office visits made within the conterminous United States by ambulatory patients to nonfederally employed physicians who are principally engaged in office practice, but not in the specialties of anesthesiology, pathology, or radiology. Telephone contacts and nonoffice visits are excluded.

NAMCS utilizes a multistage probability sample design that involves samples of primary sampling units (PSU's), physicians' practices within PSU's, and patient visits within physician practices. For 1980 a sample of 2,959 non-Federal, office-based physicians was selected from master files maintained by the American Medical Association and the Amercian Osteopathic Association. The physician response rate for 1980 was 77.2 percent. Sampled physicians were asked to complete Patient Records (figure 1) for a systematic random sample of office visits taking place during a randomly assigned weekly reporting period. During 1980, responding physicians completed 46,081 Patient Records. Characteristics of the physician's practice, such as primary specialty and type of practice, were obtained during an induction interview. The National Opinion Research Center, under contract to the National Center for Health Statistics, was responsible for the survey's field operations.

For a more detailed discussion of the limitations, qualifications, and definitions of the data collected in the NAMCS, see *Vital and Health Statistics*, Series 13, Number 44.[1]

Estimates presented in this report differ from the estimates reported in the National Medical Care Utilization and Expenditure Survey (NMCUES), another program of the National Center for Health Statistics (NCHS). The variation in estimates is due to differences in survey populations, data collection methodology, and definitions. The NMCUES, cosponsored by NCHS and the Health Care Financing Administration (HCFA), is a national panel survey of households that collected information on visits to physicians' offices and hospital outpatient departments. Preliminary survey data as well as a discussion of the survey methodology are forthcoming from NCHS and HCFA.

Sampling errors and roundings of numbers

The standard error is primarily a measure of the sampling variability that occurs by chance because only a sample, rather than the entire universe, is surveyed. The relative standard error of an estimate is obtained by dividing the standard error by the estimate itself and is expressed as a percent of the estimate. Approximate relative standard errors of selected aggregate statistics are shown in tables I and II. Standard errors for percents of visits and standard errors for estimates of drug mentions will be included in future reports.

Table I. Approximate relative standard errors of estimated number of office visits based on all physician specialties: NAMCS, 1980

Estimated number of office visits in thousands	*Relative standard error in percent*
500	27.3
1,000	19.5
2,000	16.1
5,000	9.4
10,000	7.3
20,000	5.9
50,000	4.9
100,000	4.5
550,000	4.1

Example of use of table: An aggregate of 35,000,000 visits has a relative standard error of 5.4 percent or a standard error of 1,890,000 visits (5.4 percent of 35,000,000).

Table II. Approximate relative standard errors of estimated number of office visits based on an individual physician specialty: NAMCS, 1980

Estimated number of office visits in thousands	*Relative standard error in percent*
500	28.0
1,000	20.3
2,000	15.1
5,000	10.8
10,000	9.0
20,000	7.9
50,000	7.1
100,000	6.9

Example of use of table: An aggregate of 7,500,000 visits has a relative standard error of 9.9 percent or a standard error of 742,500 visits (9.9 percent of 7,500,000).

Estimates of office visits have been rounded to the nearest thousand. For this reason detailed figures within tables do not always add to totals. Rates and percents were calculated on the basis of original, unrounded figures and will not necessarily agree precisely with percents calculated from rounded data.

Definitions

Ambulatory patient.—An ambulatory patient is an individual presenting himself for personal health services who is neither bedridden nor currently admitted to any health care institution on the premises.

Physician.—A physician is a duly licensed doctor of medicine (M.D.) or doctor of osteopathy (D.O.) currently in office-based practice who spends time in caring for ambulatory patients. Excluded from NAMCS are physicians who are hospital based; physicians who specialize in anesthesiology, pathology, or radiology; physicians who are Federally employed; physicians who treat only institutionalized patients; physicians employed full time by an institution; and physicians who spend no time seeing ambulatory patients.

Office.—An office is a place that the physician identifies as a location for his ambulatory practice. Responsibility over time for patient care and professional services rendered there generally resides with the individual physician rather than an institution.

Visit.—A visit is a direct personal exchange between an ambulatory patient and a physician or a staff member working under the physician's supervision, for the purpose of seeking care and rendering health services.

nchs advancedata

From Vital and Health Statistics of the National Center for Health Statistics Number 78 • May 12, 1982

Drugs Most Frequently Used in Office-Based Practice: National Ambulatory Medical Care Survey, 1980

by Hugo Koch, Division of Health Care Statistics

This report lists and describes the 200 drugs most frequently utilized in 1980 by physicians engaged in office-based practice. (Inclusion of trade names is for identification only and does not imply endorsement by the Public Health Service or the U.S. Department of Health and Human Services.) Data are based on findings from the National Ambulatory Medical Care Survey.

The National Center for Health Statistics uses the National Ambulatory Medical Care Survey (NAMCS) to collect descriptive data about the medical care provided in doctors' offices. Each year NAMCS data collectors contact a representative sample of the Nation's doctors of medicine and osteopathy whose primary jobs are office-based, patient-care practice. The sampled physicians in turn complete records (figure 1) for a systematic random sample of their office visits over a weekly reporting period.

The year 1980 was the first in the 8-year history of NAMCS that respondents reported the number and names of the specific drugs they used (see figure 1, item 11). This resulted in an estimated 679,593,000 mentions of pharmaceutical agents ordered or provided for the purpose of prevention, diagnosis, or treatment. Mentions included new or continued medications and nonprescription as well as prescription drugs. The methodology used to collect and process drug information for the 1980 NAMCS is reported elsewhere.[1]

Since the estimates presented in this report are based on a sample rather than on the entire universe of office visits, the data are subject to sampling variability. The technical notes at the end of this report provide a brief explanation of the sampling errors, and guidelines for judging the precision of estimates.

Table 1 lists, in rank order, the 200 drugs that physicians most frequently ordered or provided at their office visits. The listing is arbitrarily restricted to the mentions of drugs that were specifically named by respondents. This led to the exclusion of four entry choices that did not identify a specific agent, indicating only the therapeutic effect desired. These four therapeutic effects were:

- *Allergy relief or shots (unspecified),* with 9,986,000 mentions.
- *Vitamin(s) (unspecified),* with 2,124,000 mentions.
- *Vaccination (unspecified),* with 1,233,000 mentions.
- *Skin preparations (unspecified),* with 948,000 mentions.

A superscript[f] following a listed drug indicates a *drug family*; i.e., a grouping of drugs whose members have the same core identifier and the same or a closely similar therapeutic effect. Example: the drug family ARISTOCORT[f] includes the following members: ARISTOCORT, ARISTOCORT A, ARISTOCORT FORTE, ARISTOCORT HP, ARISTOCORT INTRALESIONAL, and ARISTOCORT R.

The reader is cautioned that these rankings, due to sampling variability, may be somewhat artificial because some estimates may not enjoy a clear statistical difference from other near estimates.

The 200 drugs comprise only 8 percent of the total 2,632 drugs named by respondents. However, they accounted for about 448,707,000 mentions, or 66 percent of the total 679,593,000 drug mentions.

Tables 2, 3, 4, 5, and 6 characterize the 1980 drug mentions according to certain key dimensions, the knowledge of which is basic to any study of drug utilization. From these tables the reader may judge the degree that the ranking 200 drugs are representative of all drug mentions.

Entry status.—The data in table 2 characterize the drug mentions by their entry status; that is, they reveal whether the doctor recorded the mention by

[1]National Center for Health Statistics, H. Koch: The collection and processing of drug information, National Ambulatory Medical Care Survey, United States, 1980. *Vital and Health Statistics.* Series 2-No. 90. DHHS Pub. No. (PHS) 82-1364. Public Health Service. Washington. U.S. Government Printing Office. In press.

ASSURANCE OF CONFIDENTIALITY—All information which would permit identification of an individual, a practice, or an establishment will be held confidential, will be used only by persons engaged in and for the purposes of the survey and will not be disclosed or released to other persons or used for any other purpose

Department of Health, Education, and Welfare
Public Health Service
Office of Health Research, Statistics, and Technology
National Center for Health Statistics

A No. 001743

PATIENT RECORD
NATIONAL AMBULATORY MEDICAL CARE SURVEY

1. DATE OF VISIT — Month / Day / Year

2. DATE OF BIRTH — Month / Day / Year

3. SEX
- 1 ☐ FEMALE
- 2 ☐ MALE

4. COLOR OR RACE
- 1 ☐ WHITE
- 2 ☐ BLACK
- 3 ☐ ASIAN/PACIFIC ISLANDER
- 4 ☐ AMERICAN INDIAN/ ALASKAN NATIVE

5. ETHNICITY
- 1 ☐ HISPANIC ORIGIN
- 2 ☐ NOT HISPANIC

6. PATIENT'S COMPLAINT(S), SYMPTOM(S), OR OTHER REASON(S) FOR THIS VISIT *[In patient's own words]*
- a MOST IMPORTANT _____
- b OTHER

7. MAJOR REASON FOR THIS VISIT *[Check one]*
- 1 ☐ ACUTE PROBLEM
- 2 ☐ CHRONIC PROBLEM, ROUTINE
- 3 ☐ CHRONIC PROBLEM, FLAREUP
- 4 ☐ POST SURGERY/POST INJURY
- 5 ☐ NON-ILLNESS CARE (ROUTINE PRENATAL, GENERAL EXAM., WELL BABY, ETC.)

8. DIAGNOSTIC SERVICES THIS VISIT *[Check all ordered or provided]*
- 1 ☐ NONE
- 2 ☐ LIMITED HISTORY/EXAM.
- 3 ☐ GENERAL HISTORY/EXAM.
- 4 ☐ PAP TEST
- 5 ☐ CLINICAL LAB TEST
- 6 ☐ X-RAY
- 7 ☐ BLOOD PRESSURE CHECK
- 8 ☐ EKG
- 9 ☐ VISION TEST
- 10 ☐ ENDOSCOPY
- 11 ☐ MENTAL STATUS EXAM.
- 12 ☐ OTHER *(Specify)* _____

9. PHYSICIAN'S DIAGNOSES
- a. PRINCIPAL DIAGNOSIS/PROBLEM ASSOCIATED WITH ITEM 6a. _____
- b. OTHER SIGNIFICANT CURRENT DIAGNOSES

10. HAVE YOU SEEN PATIENT BEFORE?
- 1 ☐ YES 2 ☐ NO

IF YES, FOR THE CONDITION IN ITEM 9a?
- 1 ☐ YES 2 ☐ NO

11. MEDICATION THERAPY THIS VISIT ☐ NONE

[Using brand or generic names, record all new and continued medications ordered, injected, administered, or otherwise provided at this visit. Include immunizing and desensitizing agents]

a. FOR PRINCIPAL DIAGNOSES IN ITEM 9a.	b. FOR ALL OTHER REASONS.
1.	1.
2.	2.
3.	3.
4.	4.

12. NON-MEDICATION THERAPY *[Check all services ordered or provided this visit]*
- 1 ☐ NONE
- 2 ☐ PHYSIOTHERAPY
- 3 ☐ OFFICE SURGERY
- 4 ☐ FAMILY PLANNING
- 5 ☐ PSYCHOTHERAPY/ THERAPEUTIC LISTENING
- 6 ☐ DIET COUNSELING
- 7 ☐ FAMILY/SOCIAL COUNSELING
- 8 ☐ MEDICAL COUNSELING
- 9 ☐ OTHER *(Specify)* _____

13. WAS PATIENT REFERRED FOR THIS VISIT BY ANOTHER PHYSICIAN?
- 1 ☐ YES
- 2 ☐ NO

14. DISPOSITION THIS VISIT *[Check all that apply]*
- 1 ☐ NO FOLLOW-UP PLANNED
- 2 ☐ RETURN AT SPECIFIED TIME
- 3 ☐ RETURN IF NEEDED, P.R.N.
- 4 ☐ TELEPHONE FOLLOW-UP PLANNED
- 5 ☐ REFERRED TO OTHER PHYSICIAN
- 6 ☐ RETURNED TO REFERRING PHYSICIAN
- 7 ☐ ADMIT TO HOSPITAL
- 8 ☐ OTHER *(Specify)* _____

15. DURATION OF THIS VISIT *[Time actually spent with physician]* _____ Minutes

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Figure 1. Patient Record from the National Ambulatory Medical Care Survey

Table 1. The 200 drugs most frequently used in office-based practice, by name of drug, generic class, and number of mentions: United States, 1980

Rank	Name of drug[1]	Generic class	Number of mentions in thousands
	All drugs		679,593
	200 drugs most frequently used		
1	LASIX	FUROSEMIDE	9,879
2	AMPICILLIN	AMPICILLIN	9,795
3	PENICILLIN[f]	PENICILLIN	9,736
4	INDERAL	PROPRANOLOL	9,625
5	TETRACYCLINE[f]	TETRACYCLINE	9,478
6	ASPIRIN[f]	ASPIRIN	8,800
7	DYAZIDE	COMBINATION DRUG	7,435
8	LANOXIN	DIGOXIN	7,105
9	POLIO VACCINE	POLIO VACCINE	6,535
10	VALIUM	DIAZEPAM	6,499
11	DIPHTHERIA TETANUS TOXOIDS PERTUSSIS	DIPHTHERIA TETANUS TOXOIDS PERTUSSIS	6,067
12	PREDNISONE	PREDNISONE	5,879
13	MOTRIN	IBUPROFEN	5,819
14	VITAMIN B-12[f]	VITAMIN B-12	5,813
15	HYDROCHLOROTHIAZIDE[f]	HYDROCHLOROTHIAZIDE	5,751
16	AMOXICILLIN	AMOXICILLIN	5,506
17	DIMETAPP	COMBINATION DRUG	5,377
18	ERYTHROMYCIN	ERYTHROMYCIN	5,363
19	INSULIN	INSULIN	5,248
20	ALDOMET	METHYLDOPA	5,237
21	DIGOXIN	DIGOXIN	4,801
22	TUBERCULIN TINE TEST[f]	TUBERCULIN	4,488
23	TAGAMET	CIMETIDINE	4,482
24	HYDRODIURIL	HYDROCHLOROTHIAZIDE	4,395
25	KEFLEX	CEPHALEXIN	4,268
26	E.E.S.	ERYTHROMYCIN	4,176
27	ACTIFED	COMBINATION DRUG	4,019
28	ISORDIL	ISOSORBIDE	3,905
29	TYLENOL	ACETAMINOPHEN	3,815
30	HYGROTON	CHLORTHALIDONE	3,772
31	TYLENOL W/CODEINE[f]	COMBINATION DRUG	3,661
32	PHENERGAN[f]	PROMETHAZINE	3,541
33	CLINORIL	SULINDAC	3,393
34	BENADRYL	DIPHENHYDRAMINE	3,366
35	AMOXIL	AMOXICILLIN	3,284
36	KENALOG	TRIAMCINOLONE	3,279
37	DIABINESE	CHLORPROPAMIDE	3,204
38	INDOCIN	INDOMETHACIN	3,181
39	NITROGLYCERIN	NITROGLYCERIN	3,132
40	THYROID	THYROID	3,071
41	DARVOCET-N	COMBINATION DRUG	3,043
42	CORTISPORIN	COMBINATION DRUG	3,009
43	BACTRIM[f]	COMBINATION DRUG	2,943
44	CLEOCIN[f]	CLINDAMYCIN	2,908
45	NAPROSYN	NAPROXEN	2,857
46	E-MYCIN	ERYTHROMYCIN	2,844
47	DIMETANE[f]	BROMPHENIRAMINE	2,824
48	PHENERGAN W/CODEINE[f]	COMBINATION DRUG	2,783
49	SEPTRA[f]	COMBINATION DRUG	2,781
50	PREMARIN[f]	ESTROGENS	2,683
51	LOPRESSOR	METOPROLOL	2,633
52	DONNATAL	COMBINATION DRUG	2,520
53	DECADRON[f]	DEXAMETHASONE	2,449
54	NEOSPORIN	COMBINATION DRUG	2,386
55	ELAVIL	AMITRIPTYLINE	2,363
56	ALDACTAZIDE	COMBINATION DRUG	2,257
57	INFLUENZA VIRUS VACCINE	INFLUENZA VIRUS VACCINE	2,225
58	TRANXENE	CLORAZEPATE	2,217
59	DALMANE	FLURAZEPAM	2,202
60	POTASSIUM	POTASSIUM REPLACEMENT SOLUTIONS	2,161
61	ALDORIL	COMBINATION DRUG	2,133
62	COUMADIN	WARFARIN	2,106
63	SYNTHROID	LEVOTHYROXINE	2,105

See footnote at end of table.

Table 1. The 200 drugs most frequently used in office-based practice, by name of drug, generic class, and number of mentions: United States, 1980—Con.

Rank	Name of drug[1]	Generic class	Number of mentions in thousands
64	DIURIL	CHLOROTHIAZIDE	2,101
65	ANTIVERT	MECLIZINE	2,093
66	PRENATAL VITAMINS[f]	MULTIVITAMINS PRENATAL	2,082
67	BUTAZOLIDIN[f]	PHENYLBUTAZONE	2,023
68	MONISTAT[f]	MICONAZOLE	1,976
69	CELESTONE[f]	BETAMETHASONE	1,970
70	SLOW-K	POTASSIUM REPLACEMENT SOLUTIONS	1,951
71	PEN-VEE-K	PENICILLIN	1,932
72	V-CILLIN[f]	PENICILLIN	1,928
73	XYLOCAINE[f]	COMBINATION DRUG	1,887
74	DILANTIN	PHENYTOIN	1,877
75	TIMOPTIC	TIMOLOL	1,875
76	VIBRAMYCIN	DOXYCYCLINE	1,844
77	PHENOBARBITAL	PHENOBARBITAL	1,790
78	SINEQUAN	DOXEPIN	1,766
79	MINOCIN	MINOCYCLINE	1,760
80	DEPO-MEDROL	METHYLPREDNISOLONE	1,742
81	ATARAX	HYDROXYZINE	1,737
82	HYDROCORTISONE	HYDROCORTISONE	1,732
83	MACRODANTIN	NITROFURANTOIN	1,724
84	ORTHO-NOVUM	COMBINATION DRUG	1,697
85	EMPIRIN W/CODEINE[f]	COMBINATION DRUG	1,687
86	LIBRAX	COMBINATION DRUG	1,670
87	DRIXORAL	COMBINATION DRUG	1,656
88	MYCOLOG	COMBINATION DRUG	1,649
89	NALFON	FENOPROFEN	1,642
90	BICILLIN[f]	PENICILLIN	1,629
91	ROBITUSSIN[f]	GUAIFENESIN	1,617
92	LOMOTIL	COMBINATION DRUG	1,610
93	FLUOROURACIL	FLUOROURACIL	1,609
94	PERSANTINE	DIPYRIDAMOLE	1,605
95	MYLANTA	COMBINATION DRUG	1,598
96	CECLOR	CEFACLOR	1,597
97	TETANUS TOXOID	TETANUS TOXOID	1,583
98	CHORIONIC GONADOTROPIN	CHORIONIC CONADOTROPIN	1,568
99	CHLOR-TRIMETON[f]	CHLORPHENIRAMINE	1,559
100	NOVAHISTINE[f]	COMBINATION DRUG	1,557
101	LAROTID	AMOXICILLIN	1,539
102	ORNADE	COMBINATION DRUG	1,511
103	ARISTOCORT[f]	TRIAMCINOLONE	1,510
104	ATIVAN	LORAZEPAM	1,503
105	MATERNA	MULTIVITAMINS PRENATAL	1,491
106	ACHROMYCIN[f]	TETRACYCLINE	1,482
107	SUDAFED[f]	PSEUDOEPHEDRINE	1,482
108	COMBID	COMBINATION DRUG	1,443
109	FIORINAL	COMBINATION DRUG	1,435
110	NITRO-BID	NITROGLYCERIN	1,433
111	MAALOX	COMBINATION DRUG	1,400
112	ASCRIPTIN	ASPIRIN	1,389
113	LIDEX	FLUOCINONIDE	1,388
114	ORINASE	TOLBUTAMIDE	1,352
115	APRESOLINE	HYDRALAZINE	1,351
116	LIBRIUM	CHLORDIAZEPOXIDE	1,343
117	ACTH	CORTICOTROPIN	1,315
118	GANTRISIN	SULFISOXAZOLE	1,315
119	ZYLOPRIM	ALLOPURINOL	1,314
120	SER-AP-ES[f]	COMBINATION DRUG	1,306
121	TRIAVIL	COMBINATION DRUG	1,305
122	ESIDRIX	HYDROCHLOROTHIAZIDE	1,299
123	ILOSONE	ERYTHROMYCIN	1,284
124	BRETHINE	TERBUTALINE	1,273
125	ENDURON	METHYCLOTHIAZIDE	1,253
126	LO/OVRAL	COMBINATION DRUG	1,244
127	MELLARIL	THIORIZAZINE	1,242
128	RONDEC[f]	COMBINATION DRUG	1,241
129	NORGESIC	COMBINATION DRUG	1,224

See footnote at end of table.

Table 1. The 200 drugs most frequently used in office-based practice, by name of drug, generic class, and number of mentions: United States, 1980—Con.

Rank	Name of drug[1]	Generic class	Number of mentions in thousands
130	VALISONE	BETAMETHASONE	1,222
131	TERRAMYCIN	OXYTETRACYCLINE	1,178
132	RETIN-A	TRETINOIN	1,178
133	PARAFON FORTE	COMBINATION DRUG	1,171
134	RESERPINE	RESERPINE	1,170
135	M-M-R	COMBINATION DRUG	1,170
136	DIPHTHERIA TETANUS TOXOIDS	DIPHTHERIA TETANUS TOXOIDS	1,167
137	NALDECON	COMBINATION DRUG	1,166
138	MAXITROL	COMBINATION DRUG	1,162
139	METAMUCIL	PSYLLIUM	1,160
140	ROBAXIN	METHOCARBAMOL	1,138
141	MINIPRESS	PRAZOSIN	1,128
142	BENTYL	DICYCLOMINE	1,116
143	IONAMIN	PHENTERMINE	1,108
144	QUINIDINE[f]	QUINIDINE	1,107
145	PERCODAN[f]	COMBINATION DRUG	1,105
146	DARVON[f]	PROPOXYPHENE	1,104
147	CORTISONE	CORTISONE	1,100
148	THEO-DUR	THEOPHYLLINE	1,075
149	FLAGYL	METRONIDAZOLE	1,072
150	DIPROSONE	BETAMETHASONE	1,057
151	METHOTREXATE	METHOTREXATE	1,044
152	ESTROGEN	ESTROGENS	1,043
153	CYTOXAN	CYCLOPHOSPHAMIDE	1,030
154	FASTIN	PHENTERMINE	1,012
155	TOLECTIN	TOLMETIN	1,007
156	LINCOCIN	LINCOMYCIN	1,003
157	TRIAMINIC[f]	COMBINATION DRUG	997
158	NEO-SYNEPHRINE[f]	PHENYLEPHRINE	987
159	PILOCARPINE	PILOCARPINE	979
160	ALUPENT	METAPROTERENOL	979
161	OVRAL	COMBINATION DRUG	956
162	FLURESS	COMBINATION DRUG	952
163	SOMA[f]	CARISOPRODOL	947
164	MEPROBAMATE	MEPROBAMATE	945
165	CHLOROPTIC[f]	CHLORAMPHENICOL	942
166	TIGAN	TRIMETHOBENZAMIDE	937
167	MYCOSTATIN	NYSTATIN	935
168	ZAROXOLYN	METOLAZONE	932
169	TUSS-ORNADE	COMBINATION DRUG	929
170	DONNAGEL[f]	COMBINATION DRUG	924
171	SALICYLIC ACID[f]	SALICYLIC ACID	922
172	DESQUAM-X[f]	COMBINATION DRUG	909
173	NITROGEN	NITROGEN	901
174	LIMBITROL	COMBINATION DRUG	900
175	CORDRAN[f]	FLURANDRENOLIDE	896
176	BENYLIN SYRUP	DIPHENHYDRAMINE	895
177	LOTRIMIN	CLOTRIMAZOLE	894
178	BETADINE[f]	IODINE TOPICAL PREPARATIONS	891
179	CATAPRES	CLONIDINE	890
180	AMINOPHYLLINE[f]	AMINOPHYLLINE	887
181	CORGARD	NADOLOL	885
182	QUIBRON[f]	COMBINATION DRUG	882
183	DEMEROL	MEPERIDINE	879
184	FLEXERIL	CYCLOBENZAPRINE	879
185	IRON PREPARATION	IRON PREPARATIONS	874
186	SORBITRATE	ISOSORBIDE	872
187	TOLINASE	TOLAZAMIDE	870
188	BENZAC[f]	COMBINATION DRUG	868
189	TOFRANIL	IMIPRAMINE	837
190	MEDROL	METHYLPREDNISOLONE	834
191	FERROUS SULFATE	IRON PREPARATIONS	834
192	ERYTHROCIN	ERYTHROMYCIN	832
193	PAVABID	PAPAVERINE	828
194	DRAMAMINE	DIMENHYDRINATE	825
195	SLO-PHYLLIN[f]	THEOPHYLLINE	822

See footnote at end of table.

Table 1. The 200 drugs most frequently used in office-based practice, by name of drug, generic class, and number of mentions: United States, 1980—Con.

Rank	Name of drug[1]	Generic class	Number of mentions in thousands
196	VASODILAN	ISOXUPRINE	818
197	TOPICORT	DESOXIMETASONE	805
198	COMPAZINE	PROCHLORPERAZINE	782
199	VELOSEF	CEPHRADINE	781
200	TALWIN[f]	PENTAZOCINE	779

[1]Superscript[f] denotes drug family.

Table 2. Number and percent distribution of all drug mentions, and number, percent distribution, and percent of all drug mentions of the 200 drugs most frequently named, by entry status: United States, 1980

Entry status	All drugs		200 drugs most frequently named		
	Number of mentions in thousands	Percent distribution	Number of mentions in thousands	Percent distribution	Percent of all drug mentions
Total	679,593	100.0	448,707	100.0	66.0
Generic name	164,464	24.2	128,501	28.6	78.1
Brand name	483,587	71.2	320,206	71.4	66.2
Unknown	31,542	4.6	...	...	...

Table 3. Number and percent distribution of all drug mentions, and number, percent distribution, and percent of all drug mentions of the 200 drugs most frequently named, by prescription status: United States, 1980

Prescription status	All drugs		200 drugs most frequently named		
	Number of mentions in thousands	Percent distribution	Number of mentions in thousands	Percent distribution	Percent of all drug mentions
Total	679,593	100.0	448,707	100.0	66.0
Prescription drug	561,228	82.6	403,807	90.0	72.0
Nonprescription drug	85,344	12.6	44,900	10.0	52.6
Unknown	33,021	4.9	...	...	...

Table 4. Number and percent distribution of all drug mentions, and number, percent distribution, and percent of all drug mentions of the 200 drugs most frequently named, by Federal control status: United States, 1980

Federal control status	All drugs		200 drugs most frequently named		
	Number of mentions in thousands	Percent distribution	Number of mentions in thousands	Percent distribution	Percent of all drug mentions
Total	679,593	100.0	448,707	100.0	66.0
Controlled by DEA[1]	58,550	8.6	40,076	8.9	68.4
Schedule II	5,763	0.8	1,984	0.4	34.4
Schedule III	12,037	1.8	6,750	1.5	56.1
Schedule IV	30,305	4.5	22,228	5.0	73.3
Schedule V	10,445	1.5	9,114	2.0	87.3
Uncontrolled	588,022	86.5	408,631	91.1	69.5
Unknown	33,021	4.9	...	...	...

[1]Drug Enforcement Administration.

Table 5. Number and percent distribution of all drug mentions, and number, percent distribution, and percent of all drug mentions of the 200 drug most frequently named, by composition status: United States, 1980

Composition status	All drugs		200 drugs most frequently named		
	Number of mentions in thousands	Percent distribution	Number of mentions in thousands	Percent distribution	Percent of all drug mentions
Total	679,593	100.0	448,707	100.0	66.0
Single-ingredient drug	468,752	69.0	348,294	77.6	74.3
Combination drug	165,798	24.4	96,840	21.6	58.4
Multivitamins	13,500	2.0	3,573	0.8	26.5
Unknown	31,542	4.6	...	...	...

Table 6. Number and percent distribution of all drug mentions, and number, percent distribution, and percent of all drug mentions of the 200 drug most frequently named, by therapeutic category: United States, 1980

Therapeutic category[1]	All drugs		200 drugs most frequently named		
	Number of mentions in thousands	Percent distribution	Number of mentions in thousands	Percent distribution	Percent of all drug mentions
All categories	679,593	100.0	448,707	100.0	66.0
Antihistamine drugs	43,939	6.5	26,269	5.9	59.8
Anti-infective agents (nontopical)	104,898	15.4	84,046	18.7	80.1
Antibiotics	90,081	13.3	75,526	16.8	83.8
Antineoplastic agents	5,371	0.8	3,683	0.8	68.6
Autonomic drugs	25,237	3.7	13,653	3.0	54.1
Blood formation and coagulation	8,312	1.2	2,940	0.7	35.4
Cardiovascular drugs	64,463	9.5	52,010	11.6	80.7
Cardiac drugs	26,331	3.9	24,397	5.4	92.7
Hypotensive agents	22,633	3.3	15,848	3.5	70.0
Vasodilating agents	14,646	2.2	11,765	2.6	80.3
Central nervous system drugs	110,706	16.3	80,271	17.9	72.5
Analgesics and antipyretics	57,800	8.5	47,408	10.6	82.0
Psychotherapeutic agents	16,395	2.4	9,195	2.0	56.1
Sedatives and hypnotics	25,036	3.7	19,671	4.4	78.6
Diagnostic agents	4,673	0.7	4,488	1.0	96.0
Electrolytic, caloric, and water balance	51,956	7.6	43,186	9.6	83.1
Diuretics	42,834	6.3	39,074	8.7	91.2
Expectorants and cough preparations	18,899	2.8	8,881	2.0	47.0
Eye, ear, nose, and throat preparations	26,076	3.8	10,798	2.4	41.4
Gastrointestinal drugs	24,140	3.6	15,029	3.3	62.3
Hormones and synthetic substances	55,843	8.2	41,781	9.3	74.8
Adrenals	18,312	2.7	15,425	3.4	84.2
Serums, toxoids, and vaccines	23,711	3.5	18,747	4.2	79.1
Skin and mucous membrane preparations	55,188	8.1	25,783	5.7	46.7
Spasmolytic agents	11,541	1.7	4,494	1.0	38.9
Vitamins	24,244	3.6	9,386	2.1	38.7
Other agents	10,378	1.5	3,262	0.7	31.4
Undetermined	10,017	1.5			

[1]Based on the pharmacologic-therapeutic classification of the American Society of Hospital Pharmacists.

brand name or by generic name. (Note: NAMCS respondents were instructed to use the same entry status on the NAMCS visit record (figure 1) that they used on the patient's medical record and/or on any prescription written.)

Extensive discussion has occurred during the past decade about the costs and merits of prescribing by brand name versus the usually less costly generic name. Since 1970, the generic drug business has grown faster than the total pharmaceutical market. To cite one study: "While the market expanded by 10 percent from 1977 to 1979, generics grew by 12.6 percent during that period. By 1979, 14 percent of all new prescriptions written by physicians were for generic drugs, up from 7 percent in 1970."[2]

It should be emphasized that the extent of generic utilization revealed by the NAMCS data in table 2 (24 percent of all drugs mentioned–29 percent of the leading 200) reflects the *total* utilization of generic drugs in office-based practice. Thus along with the generic prescriptions–new ones or refills–that the doctor intended to be filled by a dispensing pharmacist, the NAMCS generic fraction includes such other agents as: nonprescription generics (e.g., ASPIRIN or INSULIN); most serums, toxoids and vaccines (e.g., DIPHTHERIA TETANUS TOXOID PERTUSSIS); most diagnostic agents (e.g., TUBERCULIN); and a substantial number of other agents–chiefly antibiotic-injectibles–administered in the doctor's office.

Prescription status.–The data in table 3 characterize the drug mentions by their Federal legal classification. These data reveal whether the doctor recorded a prescription (Rx) drug or a nonprescription (over-the-counter or OTC) drug. The choice of a prescription drug by a prescribing physician indicates relatively more judgmental control by the physician than does the choice of a nonprescription drug, which represents a greater reliance on self-care by the patient. Also, OTC drugs are usually less expensive than their Rx counterparts. (However, except for INSULIN, they are not usually covered as an insured benefit in third-party programs.) Thus it is interesting to learn from table 3 that at least 13 percent of all drug mentions were nonprescription drugs.

[2]Mayer, C. E.: Drug industry war heats up over generics. Washington Post, Dec. 20, 1981. pp K1-2.

Federal control status.—A very important issue in health and social policy is the use of medications having significant potential for addiction or habituation. Such medications are under the regulatory control of the Drug Enforcement Administration (DEA), an agency of the U.S. Department of Justice. In table 4 the medications used in office-based practice are characterized by their DEA control level ("Schedule"). Each successive Schedule, from II through V, reflects a decreasing potential for abuse, as follows:

- Schedule II (MORPHINE, DEMEROL, AMPHETAMINES) High potential for abuse. Abuse may lead to severe psychological or physical dependence.
- Schedule III (FIORINAL, PHENDIMETRAZINE, etc.) Potential for abuse less than for drugs in Schedule II. Abuse may lead to moderate or low physical dependence or high psychological dependence.
- Schedule IV (VALIUM, PHENOBARBITAL, etc.) Potential for abuse less than for drugs in Schedule III. Abuse may lead to limited physical or psychological dependence.
- Schedule V (LOMOTIL, CHERACOL SYRUP, etc.) Potential for abuse and dependence less than for drugs in Schedule IV.

AMCS data in table 4 reveal that a small but critical proportion (9 percent) of all drug mentions were controlled drugs, of which drugs in Schedule IV enjoyed the highest frequency of mention.

Composition status.—Table 5 reveals that about 26 percent of all drug mentions were combination drugs. An issue of long-standing debate in drug utilization concerns the use of drugs in fixed-ratio combinations as opposed to single-ingredient drugs. Combination drugs usually cost more and offer less flexibility in dosage adjustment; however, they offer more potential convenience to the patient. The NAMCS data base permits differentiating single-ingredient drugs from combination drugs and can identify the specific ingredients of the combinations if this information is required.

Therapeutic category.—Table 6 characterizes the 1980 drug mentions by the chief therapeutic effect that each was intended to produce. An obvious preeminence is enjoyed by two therapeutic categories, nontopical anti-infectives and central nervous system drugs, which together accounted for 32 percent of all drug mentions. The preeminence was even stronger (37 percent) among the leading 200.

Inquiries about the NAMCS drug data base or its 1980 findings may be addressed to:

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Ambulatory Care Statistics Branch
Division of Health Care Statistics
National Center for Health Statistics
Center Bldg. 2, Room 2-43
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Hyattsville, Maryland 20782
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Symbols

- - -	Data not available
. . .	Category not applicable
	Quantity zero
0.0	Quantity more than zero but less than 0.05
Z	Quantity more than zero but less than 500 where numbers are rounded to thousands
*	Figure does not meet standards of reliability or precision

Technical notes

Source of data and sample design

The estimates presented in this report are based on data collected during 1980 by the National Center for Health Statistics by means of the Survey (NAMCS). The target universe of NAMCS comprises office visits made by ambulatory patients to non-Federal physicians who are principally engaged in office-based, patient care practice. Visits to physicians practicing in Alaska and Hawaii are excluded from the range of NAMCS, as are visits to physicians who specialize in anesthesiology, pathology, and radiology.

NAMCS uses a multistage probability sample design that involves a step-wise sampling of: primary sampling units (PSU's), physicians' practices within PSU's, and patient visits within physicians' practices. For 1980 a sample of 2,959 physicians was selected from master files maintained by the American Medical Association and the American Osteopathic Association. The physician response rate was 77.2 percent. Sampled physicians were asked to complete Patient Records (figure 1) for a systematic random sample of office visits made during a randomly assigned weekly reporting period. Telephone contacts were excluded. During 1980, responding physicians completed 46,081 Patient Records, on which they recorded 51,372 drug mentions. Characteristics of the physician's practice, such as primary specialty and type of practice, were obtained during an induction interview. The National Opinion Research Center, under contract to the National Center for Health Statistics, was responsible for the survey's field operations.

For a more detailed discussion of the limitations, qualifications, and definitions of the data collected by NAMCS, see Vital and Health Statistics, Series 13, Number 44.

Sampling errors and rounding of numbers

The standard error is a measure of the sampling variability that occurs by chance because only a sample, rather than an entire universe, is surveyed. The relative standard error of the estimate is obtained by dividing the standard error by the estimate itself and is expressed as a percent of the estimate. Tables I and II apply these measurements to drug mentions.

Estimates have been rounded to the nearest thousand. For this reason detailed figures within tables do not always add to totals. Rates and percents were calculated from original, unrounded figures and will not necessarily agree precisely with rates or percents calculated from rounded data.

Definitions

An *ambulatory patient* is an individual seeking personal health services who is neither bedridden nor currently admitted to any health care institution on the premises.

A *physician eligible for NAMCS* is a duly licensed doctor of medicine or osteopathy currently in office-based practice whose primary job is caring for ambulatory patients. Excluded from NAMCS are: physicians who are hospital based; physicians who specialize in anesthesiology, pathology, or radiology; physicians who are Federally employed; physicians who treat only institutionalized patients; physicians employed full time by an institution; and physicians who spend no time seeing ambulatory patients.

An *office* is a place that the physician identifies as a location for his ambulatory practice. Responsibility over time for patient, care and professional services rendered there generally resides with the individual physician rather than an institution.

A *visit* is a direct personal exchange between an ambulatory patient and a physician or a staff member working under the physician's supervision, for the respective purpose of seeking care or rendering health services.

A *drug mention* is the physician's entry of a pharmaceutical agent ordered or provided for prevention, diagnosis, or treatment. Generic as well as brand-name drugs are included, as are nonprescription as well as prescription drugs. Along with all new drugs, the physician also records continued medications, if the patient was specifically instructed during the visit to continue the medication.

Table I. Approximate relative standard errors of estimated number of drug mentions based on all physician specialties: National Ambulatory Medical Care Survey, 1980

Estimated number of drug mentions in thousands	*Relative standard error*
1,000	27.3
2,000	19.7
5,000	13.2
10,000	10.1
20,000	8.2
50,000	6.8
100,000	6.2
300,000	5.8
650,000	5.8

Example of use of table: An aggregate estimate of 175,000,000 drug mentions has a relative standard error of 6.5 percent or a standard error of 4,875,000 mentions (6.5 percent of 75,000,000).

Table II. Approximate standard errors of percent of estimated numbers of drug mentions based on all physician specialties: NAMCS, 1980

Base of percent (number of drug mentions in thousands)	*Estimated percent*					
	1 or 99	*5 or 95*	*10 or 90*	*20 or 80*	*30 or 70*	*50*
	Standard error in percentage points					
1,000	2.7	5.8	8.0	10.7	12.2	13.3
2,000	1.9	4.1	5.7	7.6	8.7	9.4
5,000	1.2	2.6	3.6	4.8	5.5	6.0
20,000	0.6	1.3	1.8	2.4	2.7	3.0
100,000	0.3	0.6	0.8	1.1	1.2	1.3
600,000	0.1	0.2	0.3	0.4	0.5	0.5

Example of use of table: An estimate of 30 percent based on an aggregate of 12,500,000 drug mentions was a standard error of 4.1 percent or a relative standard error of 13.7 percent (4.1 percent ÷ 30 percent).

nchs advancedata

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Blood Lead Levels for Persons 6 Months-74 Years of Age: United States, 1976-80

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Introduction

One of the more recent growing public health concerns is the impact of the changing environment on health.[1] As a part of this concern, the Division of Health Examination Statistics of the National Center for Health Statistics has measured the degree of exposure of the U.S. civilian noninstitutionalized population to certain toxic substances, including lead. This has accomplished by determining blood lead concentrations, a common index of lead exposure, on examinees from the second National Health and Nutrition Examination Survey (NHANES II). The rationale for measuring exposure to this environmental hazard was to (1) provide information for the first time about the distribution of blood lead levels in the general U.S. population, (2) establish baseline estimates for future studies to monitor changes in such exposure over time, (3) provide normative information for use in health policy and regulatory decisions, and (4) correlate levels of exposure to these toxic substances with other health and nutritional parameters measured on examinees in NHANES II.[2]

Surveillance data, from the Centers for Disease Control (CDC) on childhood lead poisoning in the United States gives some indication of the extent to which lead exposure is a public health problem among children. A recent Centers for Disease Control Morbidity and Mortality Weekly Report[3] states that for the first 6 months of fiscal year 1981, almost 20,000 children were known to be under pediatric management for lead toxicity. These CDC surveillance data come from approximately 60 federally funded screening projects located in about 25 States. Hazards of industrial exposure to lead are well documented, but the actual magnitude and significance of general community exposure to lead in the environment has been a controversial subject for years.[4]

This report presents statistics on the distribution of blood lead levels of persons ages 6 months-74 years in the United States with respect to age, race, sex, annual family income, and degree of urbanization (of place of residence). These are the first national estimates of lead levels in whole blood obtained on a representative sample of the U.S. population. A future NCHS Series 11 publication[5] is planned to provide detailed descriptive statistics for blood lead levels for selected demographic, socioeconomic, health, and nutritional factors.

NHANES II survey sample design

A brief description of the sample design of NHANES II is presented in the Technical Notes. A detailed description of the survey design has been published.[2]

From a total of 27,801 NHANES II sample persons, 16,563 persons were asked to provide blood specimens for use in the assessment of blood lead levels. These included all children ages 6 months-6 years and a half-sample (those assigned odd sample numbers for the examination) of persons ages 7-74 years. However, some parents refused to have their young children examined and/or give blood. Some adults, especially the elderly, were reluctant or unable to come to the mobile examination units (set up at centralized locations within the 64 sampling areas) for examination. Also, to a lesser degree, a number of blood specimens were lost during shipment and processing. As a result, reliable blood lead levels were determined for blood specimens from 10,049 examinees. Capillary blood was obtained from 113 children ages 6 months-7 years by fingerstick, and venous blood from the remaining 9,936 examinees by venipuncture.

To estimate the potential bias of missing data, the distribution of sample persons in the lead subsample

with missing blood lead data was investigated with respect to the relevant demographic variables. The results suggest that sample persons with missing blood lead data are distributed randomly by race, sex, income, and degree of urbanization. However, some caution should be exercised in using these findings because of the high percent of missing data. Approximately 40 percent of the 16,563 sample persons had no blood lead determinations. Details (tables I and II) on nonresponse are presented in the Technical Notes. Further investigation of potential bias due to nonresponse with respect to demographic variables and related medical history components is planned for the Series 11 report in preparation.[5]

In this report, statistics are presented for three age categories to ensure subsamples of sufficient size for reliable national estimates—preschool children ages 6 months-5 years, youths ages 6-17 years, and adults ages 18-74 years.

It should be noted that the mean blood lead levels and the proportion of children with elevated blood lead levels presented in this study would be expected to differ from those obtained from the community-based lead poisoning prevention programs directed by the CDC. The CDC program is designed to screen selectively or on request for individuals at potentially high risk of exposure to lead using initially an erythrocyte protoporphorin (EP) test followed by blood lead tests on those with EP levels of 50 micrograms per deciliter (μg/dl) of whole blood or more.[6] On the other hand, the NHANES II utilizes a probability sample representative of the general U.S. population selecting individuals for examination and blood lead determinations independent of their risk of exposure to lead or their EP test results.

Methods and procedures

The laboratory determinations of blood lead levels for this national survey were performed by the Clinical Chemistry Division, Center for Environmental Health, Centers for Disease Control (CDC), Atlanta, Georgia, and financed by the Division of Nutrition, Bureau of Foods, FDA, Cincinnati, Ohio. Descriptions of the materials, methods, and quality control procedures are presented elsewhere.[7,8] Lead concentrations of NHANES II whole blood specimens and control specimens were determined by atomic absorption spectrophotometry using a modified Delves cup micromethod.[9] Specimens were analyzed in duplicate with the two assessments done independently in the same analytic run. The average of the two measures was used in the analysis presented in this report.

The following national estimates are based on data obtained on 9,933 NHANES II examinees with blood lead levels ranging from 2.0-66.0 μg/dl of whole blood among those who received venipunctures. Although the fingertips were carefully prepared to minimize contamination, potential for contamination during the capillary blood collection by fingerstick (pricking the finger) is recognized.[10] Statistical analysis of the unweighted data suggested that inclusion of the fingerstick data in this analysis would have introduced bias to the estimates of mean venous blood lead levels in children. Overall, for children ages 6 months-5 years, unweighted mean blood lead level for those receiving fingersticks was observed to be approximately 6.0 μg/dl higher than for those receiving venipunctures. This observed mean difference was consistent for black and white people. The three examinees with venipunctures showing blood lead levels greater than 70.0 μg/dl are extreme cases of lead exposure. These have been considered a separate part of the distribution of blood lead levels in the general population. Therefore, the fingerstick data and values for the three extreme venipuncture cases were excluded from detailed tables 1-7 and further stages of the analysis. A description (table III) of blood lead levels for 113 children ages 6 months-7 years receiving fingersticks and of the three extreme cases of lead exposure is given in the Technical Notes.

Findings

Mean blood lead levels by age, race, and sex

Mean blood lead level estimates for the U.S. population differ substantially with respect to age, race, and sex (figures 1-3 and tables 1-3).

For young children ages 6 months-5 years, mean blood lead levels are similar among those of the same age and sex (figure 1). The differences between means among age and sex groups shown in figure 1 are not statistically significant at the 0.05 level. However, mean blood lead levels of black children significantly exceed those of white children. Overall for this age, blood lead levels among black children are, on the average, 6.0 μg/dl higher than among white children.

Overall for children and youths ages 6-17 years, there is a significant decreasing trend in mean blood lead levels with increasing age. Eliminating the effect of age, significant race and sex differences are evident. Generally, as age increases the difference in mean blood lead levels between boys and girls progressively increases. There is a significant inverse relationship of blood lead level with age for black persons; that is, mean blood lead levels decrease as age (successive age groups) increases through the age of 17 years. The relationship between blood lead level and age for white children and youths is similar to that for the respective black groups, except that mean blood lead levels decline with increasing age until about age 15 (or the 15-17-year age group) where the mean blood lead levels are observed to be higher (figure 2).

For adults ages 18-74 years, the sex difference in blood lead levels is pronounced and significant. The mean blood lead levels of men are consistently higher than those of women in all age groups. The differences in these levels between the sexes are similar for

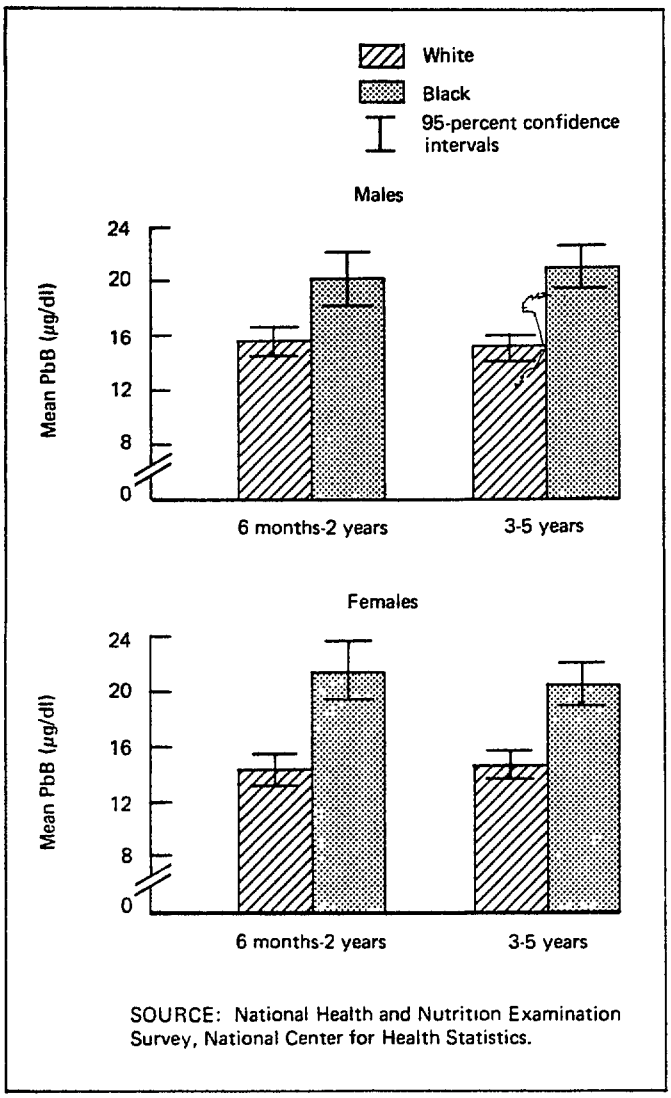


Figure 1. Mean blood lead levels (PbB) of children ages 6 months-5 years: United States, 1976-80

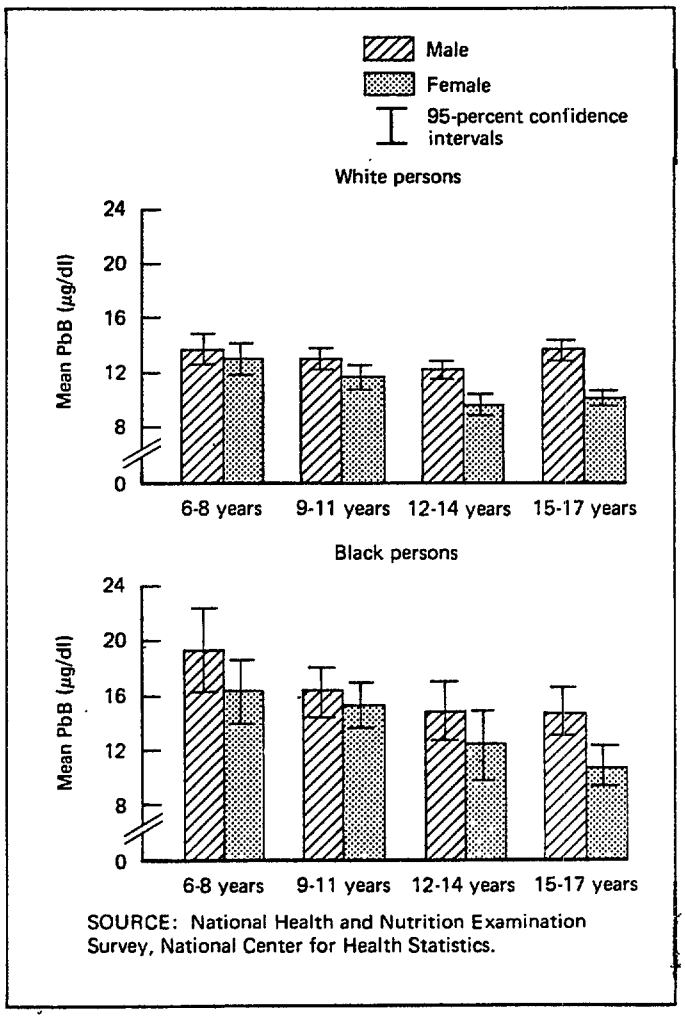


Figure 2. Mean blood lead levels (PbB) of youths ages 6-17 years: United States, 1976-80

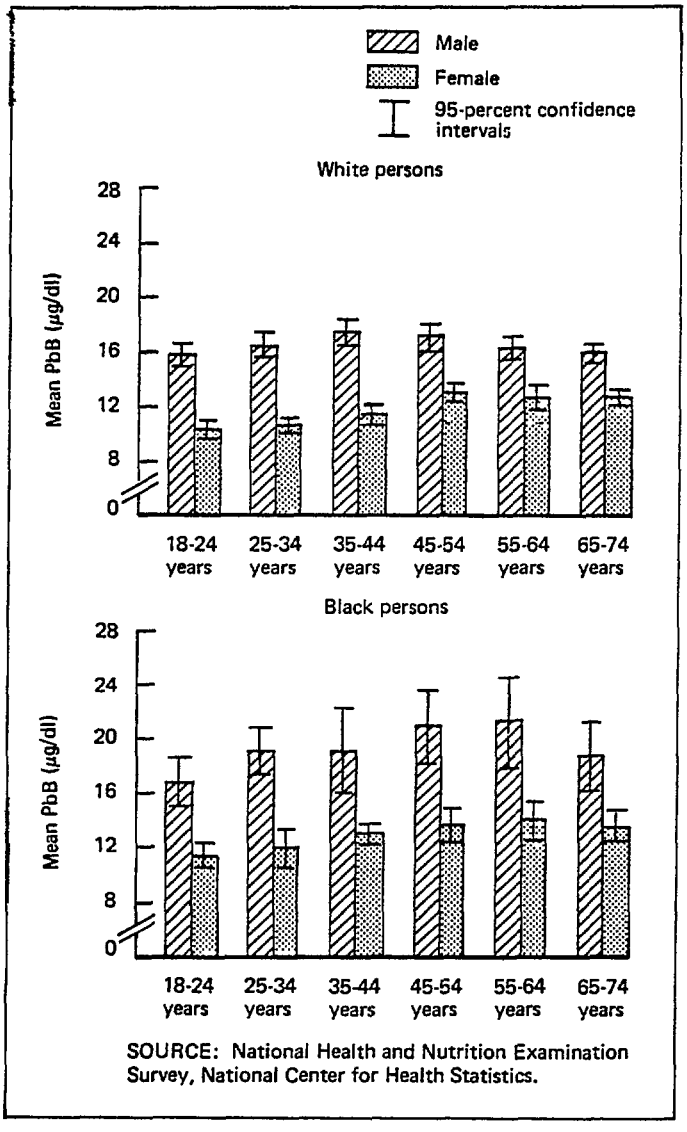


Figure 3. Mean blood lead levels (PbB) of adults ages 18-74 years: United States, 1976-80

white and for black persons (figure 3). In addition, there is a significant relationship between mean blood lead level and age. However, the trend in mean blood lead levels with age differs for white and for black men. For instance, when the mean blood lead levels for white and black men are compared, those for white men increase with age until age group 35-44 years and then decrease while those for black men remain high through age group 55-64 years. After accounting for differences in the age distributions for both races, there are significantly higher mean blood lead levels among black than among white adults.

Blood lead levels for children by income and degree of urbanization

The associations of family income and of the degree of urbanization with blood lead levels are generally consistent across all three broad age groups in the population with lower mean blood lead levels among the more affluent than among the poor and those in rural than in urban areas (tables 4 and 5). These associations were most pronounced, however, in children ages 6 months-5 years. Hence, further consideration of blood lead levels in this report with respect to these demographic variables will be limited to the findings among preschool-aged children.

The most common sources of environmental lead for young children are air, food, dust, dirt, soil, water, and lead-based paint. Lead usually enters the body by ingestion or inhalation. In very young children, clinical studies have shown that approximately 40 percent of the lead ingested is absorbed from the gastrointestinal tract, while adults absorb about 5 to 10 percent of ingested lead.

The rate of absorption of airborne lead in relation to age is not as clearly understood. Although percent retention of inhaled lead is influenced greatly by particle size, clinical studies[12] suggest that, in general, 20 to 40 percent of the inhaled lead will be deposited in the respiratory tract. However, because of higher metabolic rates and greater physical activity of children, it is estimated[13] that under comparable exposure, children inhale two to three times as much airborne lead per unit of body weight as adults do. Even at relatively low levels of lead, subclinical effects of lead exposure in children, including impaired hematopoiesis and neuropsychologic deficits, have been reported in the literature.[14,15]

In each of the three income groups, the mean blood lead levels of black children are significantly greater than those of white children (figure 4). The smallest race difference is in the highest income group. There is also a significant inverse relationship between mean blood lead level and income. For this analysis, three income categories were selected to ensure subsamples of adequate size for computing these national estimates. In 1978, the income level of $6,000 was near the poverty threshold for a family of four as determined by the U.S. Bureau of the Census.[16]

Mean blood lead levels are observed to be higher in the urban areas than in the rural areas for white and black children with statistically significant differences only for the white group (figure 5). Also, mean blood lead levels for black children are significantly higher than those for white children within all three urban-rural groups. This consistent mean difference between black and white children indicates that the observed racial effects are not simply explained by the degree of urbanization. No clearcut explanation can be given from the results of this study; however, these results are consistent with the findings of other studies regarding this racial difference.[17-19]

Further investigation of those living in the large urban areas (1 million or more people) (figure 6 and table 6) revealed that mean blood lead levels of black

Table 1. Blood lead levels of persons 6 months-74 years, with mean, standard error of the mean, median, and percent distribution, by race and age: United States, 1976-80

Race and age	Estimated population in thousands[1]	Number examined[2]	Blood lead level (µg/dl)									
			Mean	Standard error of the mean	Median	Less than 10	10-19	20-29	30-39	40-49	50-59	60-69
						Percent distribution[4]						
All races[3]												
All ages	203,554	9,933	13.9	0.24	13.0	22.1	62.9	13.0	1.6	0.2	0.1	0.0
6 months-5 years	16,862	2,372	16.0	0.42	15.0	12.2	63.3	20.5	3.5	0.3	0.1	0.0
6-17 years	44,964	1,720	12.5	0.30	12.0	27.6	64.8	7.1	0.5	-	-	-
18-74 years	141,728	5,841	14.2	0.25	13.0	21.2	62.3	14.3	1.8	0.3	0.1	0.0
White												
All ages	174,528	8,369	13.7	0.24	13.0	23.3	62.8	12.2	1.5	0.2	0.1	0.0
6 months-5 years	13,641	1,876	14.9	0.43	14.0	14.5	67.5	16.1	1.8	0.1	0.1	0.0
6-17 years	37,530	1,424	12.1	0.30	11.0	30.4	63.4	5.8	0.4	-	-	-
18-74 years	123,357	5,069	14.1	0.25	13.0	21.9	62.3	13.7	1.8	0.3	0.1	0.0
Black												
All ages	23,853	1,332	15.7	0.48	15.0	13.3	63.7	20.0	2.3	0.3	0.2	0.1
6 months-5 years	2,584	419	20.9	0.61	20.0	2.5	45.4	39.9	10.2	1.4	0.5	0.1
6-17 years	6,529	263	14.8	0.53	14.0	12.8	70.9	15.6	0.7	-	-	-
18-74 years	14,740	650	15.5	0.54	14.0	14.7	62.9	19.6	2.0	0.4	0.3	0.2

[1]At the midpoint of the survey, March 1, 1978.
[2]With lead determinations from blood specimens drawn by venipuncture.
[3]Includes data for races not shown separately.
[4]Numbers may not add to totals due to rounding.

Table 2. Blood lead levels of males 6 months-74 years, with mean, standard error of the mean, median, and percent distribution, by race and age: United States, 1976-80

Race and age	Estimated population in thousands[1]	Number examined[2]	Blood lead level (µg/dl)									
			Mean	Standard error of the mean	Median	Less than 10	10-19	20-29	30-39	40-49	50-59	60-69
						Percent distribution[4]						
All races[3]												
All ages	99,062	4,945	16.1	0.26	15.0	10.4	65.4	20.8	2.8	0.3	0.1	0.1
6 months-5 years	8,621	1,247	16.3	0.46	15.0	11.0	63.5	21.2	4.0	0.3	0.0	0.0
6-17 years	22,887	902	13.6	0.32	13.0	19.1	70.1	10.2	0.7	-	-	-
18-74 years	67,555	2,796	16.8	0.28	16.0	7.6	64.1	24.2	3.4	0.4	0.1	0.1
White												
All ages	85,112	4,153	15.8	0.27	15.0	11.3	66.0	19.6	2.6	0.3	0.1	0.0
6 months-5 years	6,910	969	15.2	0.46	14.0	13.0	67.6	17.3	2.0	0.1	-	-
6-17 years	19,060	753	13.1	0.33	13.0	21.4	69.5	8.4	0.7	-	-	-
18-74 years	59,142	2,431	16.6	0.29	16.0	8.1	64.8	23.3	3.3	0.4	0.1	0.1
Black												
All ages	11,171	664	18.3	0.52	17.0	4.0	59.6	31.0	4.1	0.7	0.4	0.2
6 months-5 years	1,307	231	20.7	0.74	19.0	2.7	48.8	35.1	11.1	1.9	0.2	0.3
6-17 years	3,272	129	16.0	0.62	15.0	8.0	69.9	21.1	1.0	-	-	-
18-74 years	6,592	304	19.1	0.70	18.0	2.3	56.4	34.9	4.5	0.8	0.6	0.4

[1]At the midpoint of the survey, March 1, 1978.
[2]With lead determinations from blood specimens drawn by venipuncture.
[3]Includes data for races not shown separately.
[4]Numbers may not add to totals due to rounding.

Table 3. Blood lead levels of females 6 months-74 years, with mean, standard error of the mean, median, and percent distribution, by race and age: United States, 1976-80

Race and age	Estimated population in thousands[1]	Number examined[2]	Blood lead level (μg/dl)									
			Mean	Standard error of the mean	Median	Less than 10	10-19	20-29	30-39	40-49	50-59	60-69
						Percent distribution[4]						
All races[3]												
All ages	104,492	4,988	11.9	0.23	11.0	33.3	60.5	5.7	0.4	0.1	0.1	-
6 months-5 years	8,241	1,125	15.8	0.42	15.0	13.5	63.2	19.8	3.0	0.3	0.2	-
6-17 years	22,077	818	11.4	0.32	11.0	36.6	59.3	3.9	0.2	-	-	-
18-74 years	74,173	3,045	11.8	0.22	11.0	33.7	60.6	5.2	0.3	0.1	0.1	-
White												
All ages	89,417	4,216	11.7	0.23	11.0	34.8	59.6	5.0	0.4	0.1	0.1	-
6 months-5 years	6,732	907	14.7	0.44	14.0	16.1	67.3	14.8	1.6	0.1	0.1	-
6-17 years	18,470	671	11.0	0.31	11.0	40.0	56.9	2.9	0.2	-	-	-
18-74 years	64,215	2,638	11.7	0.23	11.0	34.6	59.9	5.0	0.4	0.1	0.1	-
Black												
All ages	12,682	668	13.4	0.45	13.0	21.5	67.3	10.3	0.7	0.1	0.0	-
6 months-5 years	1,277	188	21.0	0.69	20.0	2.2	41.6	45.3	9.2	0.9	0.8	-
6-17 years	3,256	134	13.6	0.64	13.0	17.7	71.9	10.0	0.4	-	-	-
18-74 years	8,148	346	12.7	0.44	12.0	24.7	68.1	7.2	-	-	-	-

[1]At the midpoint of the survey, March 1, 1978.
[2]With lead determinations from blood specimens drawn by venipuncture.
[3]Includes data for races not shown separately.
[4]Numbers may not add to totals due to rounding.

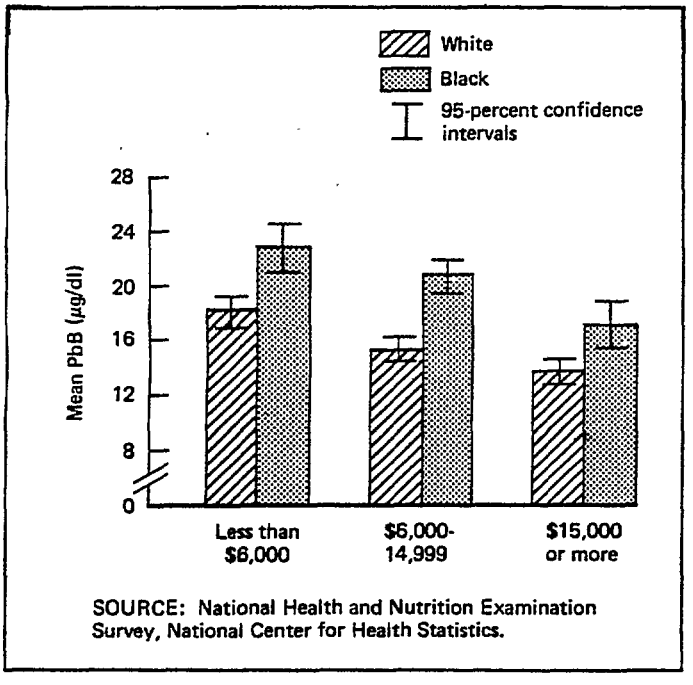


Figure 4. Mean blood lead levels (PbB) of children ages 6 months-5 years by annual family income: United States, 1976-80

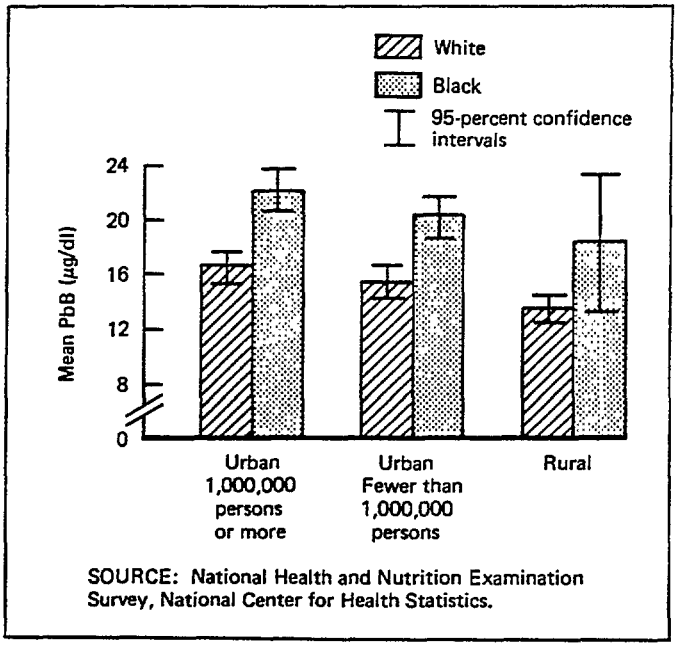


Figure 5. Mean blood lead levels (PbB) of children ages 6 months-5 years by degree of urbanization: United States, 1976-80

Table 4. Blood lead levels of persons 6 months-74 years, with mean, standard error of the mean, and selected percentiles, by annual family income, race, and age: United States, 1976-80

Race and age	Annual family income: Under $6,000						
	Estimated population in thousands[1]	Number examined[2]	Mean	Standard error of the mean	Percentile		
					10th	50th	90th
			Blood lead level (μg/dl)				
All races[3]							
All ages	29,410	1,862	14.5	0.40	8.0	13.0	23.0
6 months-5 years	2,465	448	20.0	0.56	11.0	19.0	31.0
6-17 years	5,046	230	14.6	0.61	8.0	13.0	22.0
18-74 years	21,898	1,184	14.1	0.38	7.0	13.0	23.0
White							
All ages	21,542	1,315	14.0	0.44	7.0	12.0	23.0
6 months-5 years	1,408	256	18.1	0.61	11.0	17.0	26.0
6-17 years	3,067	140	14.0	0.69	8.0	13.0	22.0
18-74 years	17,067	919	13.7	0.43	7.0	12.0	22.0
Black							
All ages	7,355	512	15.8	0.47	9.0	15.0	24.0
6 months-5 years	917	176	22.9	0.89	14.0	21.0	34.0
6-17 years	1,927	87	15.7	0.76	10.0	15.0	22.0
18-74 years	4,512	249	15.0	0.53	8.0	14.0	23.0

[1] At the midpoint of the survey, March 1, 1978.
[2] With lead determinations from blood specimens drawn by venipuncture.
[3] Includes data for races not shown separately.

Table 4. Blood lead levels of persons 6 months-74 years, with mean, standard error of the mean, and selected percentiles, by annual family income, race, and age: United States, 1976-80—Con.

Annual family income												
$6,000-14,999							$15,000 or more					
Estimated population in thousands[1]	Number examined[2]	Mean	Standard error of the mean	Percentile			Estimated population in thousands[1]	Number examined[2]	Mean	Standard error of the mean	Percentile	
				10th	50th	90th					10th	50th	90th
		Blood lead level (μg/dl)							Blood lead level (μg/dl)				
80,416	4,033	14.2	0.25	8.0	13.0	22.0	87,062	3,718	13.5	0.24	8.0	13.0	20.0
7,534	1,083	16.2	0.46	9.0	15.0	24.0	6,428	774	14.1	0.41	8.0	13.0	21.0
17,533	672	12.9	0.41	7.0	12.0	19.0	20,814	761	11.7	0.25	7.0	11.0	17.0
55,349	2,278	14.4	0.26	8.0	13.0	22.0	59,820	2,183	14.1	0.27	8.0	13.0	21.0
68,135	3,413	13.9	0.26	8.0	13.0	21.0	79,707	3,401	13.4	0.26	8.0	13.0	20.0
6,252	887	15.3	0.48	9.0	14.0	22.0	5,707	690	13.7	0.44	8.0	13.0	20.0
13,936	531	12.4	0.39	7.0	12.0	18.0	19,174	705	11.6	0.28	7.0	11.0	16.0
47,946	1,995	14.2	0.26	8.0	13.0	22.0	54,826	2,006	14.0	0.28	8.0	13.0	21.0
10,334	533	16.1	0.48	9.0	15.0	24.0	4,995	224	14.9	0.58	9.0	14.0	22.0
1,037	163	20.7	0.64	13.0	20.0	30.0	502	60	17.2	0.83	11.0	16.0	24.0
3,159	125	14.9	0.71	10.0	14.0	21.0	1,225	42	13.6	0.79	7.0	13.0	20.0
6,137	245	16.2	0.60	9.0	15.0	24.0	3,267	122	15.1	0.65	9.0	14.0	22.0

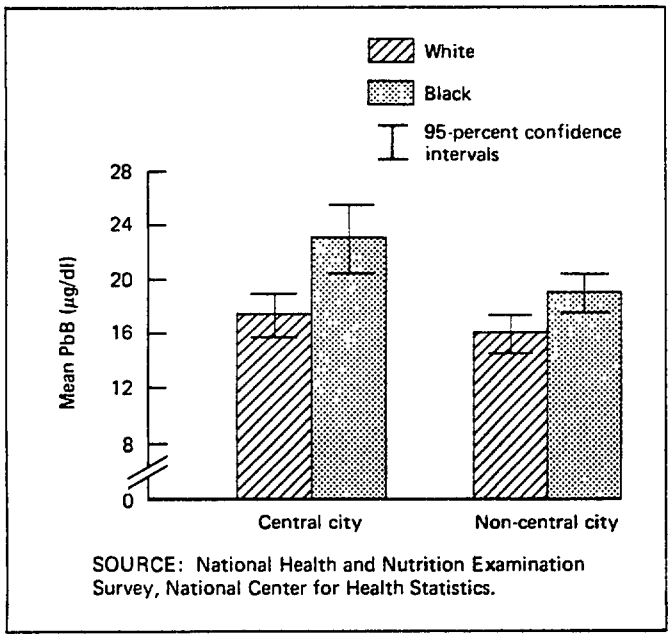
Table 5. Blood lead levels of persons 6 months-74 years, with mean, standard error of the mean, and selected percentiles, by degree of urbanization, race, and age: United States, 1976-80

Race and age	Degree of urbanization						
	Urban, 1 million persons or more						
	Estimated population in thousands[1]	Number examined[2]	Mean	Standard error of the mean	Percentile		
					10th	50th	90th
			Blood lead level (μg/dl)				
All races							
All ages	59,532	2,395	15.0	0.37	9.0	14.0	22.0
6 months-5 years	4,344	544	18.0	0.53	10.0	17.0	27.0
6-17 years	12,893	414	13.8	0.53	9.0	13.0	20.0
18-74 years	42,295	1,437	15.2	0.39	9.0	14.0	23.0
White							
All ages	46,407	1,767	15.0	0.31	9.0	14.0	22.0
6 months-5 years	3,112	358	16.6	0.59	10.0	16.0	24.0
6-17 years	9,681	294	13.3	0.55	9.0	12.0	20.0
18-74 years	33,615	1,115	15.3	0.31	9.0	14.0	23.0
Black							
All ages	11,687	570	15.5	0.84	9.0	14.0	23.0
6 months-5 years	1,093	172	22.2	0.83	14.0	20.0	35.0
6-17 years	3,010	111	15.3	0.83	10.0	15.0	22.0
18-74 years	7,585	287	15.0	0.89	8.0	14.0	22.0

[1] At the midpoint of the survey, March 1, 1978.
[2] With lead determinations from blood specimens drawn by venipuncture.
[3] Includes data for races not shown separately.

Table 5. Blood lead levels of persons 6 months-74 years, with mean, standard error of the mean, and selected percentiles, by degree of urbanization, race, and age: United States, 1976-80—Con.

Degree of urbanization													
Urban, fewer than 1 million persons							Rural						
Estimated population in thousands[1]	Number examined[2]	Mean	Standard error of the mean	Percentile			Estimated population in thousands[1]	Number examined[2]	Mean	Standard error of the mean	Percentile		
				10th	50th	90th					10th	50th	90th
		Blood lead level (μg/dl)							Blood lead level (μg/dl)				
79,906	3,869	13.9	0.32	8.0	13.0	21.0	64,116	3,669	13.0	0.40	7.0	12.0	20.0
6,891	944	16.5	0.67	9.0	16.0	24.0	5,627	884	13.9	0.64	8.0	13.0	20.0
16,988	638	12.6	0.35	7.0	12.0	19.0	15,083	668	11.4	0.52	7.0	11.0	16.0
56,027	2,287	14.1	0.33	8.0	13.0	22.0	43,405	2,117	13.4	0.38	7.0	12.0	21.0
67,707	3,144	13.6	0.32	8.0	13.0	21.0	60,414	3,458	12.8	0.39	7.0	12.0	20.0
5,297	699	15.4	0.67	9.0	15.0	23.0	5,233	819	13.5	0.57	8.0	13.0	19.0
13,871	510	12.2	0.36	7.0	11.0	18.0	13,978	620	11.2	0.48	7.0	11.0	16.0
48,540	1,935	13.8	0.32	8.0	13.0	21.0	41,203	2,019	13.3	0.38	7.0	12.0	21.0
9,783	612	15.9	0.54	9.0	15.0	24.0	2,383	150	16.2	0.68	9.0	14.0	25.0
1,246	205	20.3	0.78	12.0	20.0	30.0	245	42	18.3	2.60	11.0	16.0	32.0
2,717	113	14.5	0.64	8.0	14.0	20.0	802	39	13.9	1.33	8.0	13.0	20.0
5,820	294	15.9	0.70	9.0	15.0	24.0	1,336	69	17.0	0.89	9.0	15.0	26.0



SOURCE: National Health and Nutrition Examination Survey, National Center for Health Statistics.

Figure 6. Mean blood lead levels (PbB) of children ages 6 months-5 years in large urban areas: United States, 1976-80

children in the central cities were observed to be higher than those of black children living in the non-central cities and rural areas, respectively. These differences were neither statistically significant nor reliable because of the small number of black children in the sample. However, within the central cities, the mean blood lead level of black children was significantly higher than that of white children. Other studies indicate that[13] exposure to lead in central city children may be associated, to some degree, with socioeconomic factors. It was observed in this study that 43 percent of black compared with 22 percent of white children living in the central city areas were from households with annual family incomes of under $6,000 during the year preceding the time of interview.

The literature[13] suggests that preschool-aged children from low income households living in the inner cities (the "urban lead-belt") are at higher risk of exposure to environmental sources contaminated with lead than the general child population. Attempts to include such cross-classifications using the NHANES II data resulted in group sizes too small to be reliable estimators for the general population. For example, while it would have been of interest to determine if the association between race and blood lead level differed between various degrees of urbanization by income groups, the number of examinees within such groups was too small.

Elevated blood lead levels in children

The consistent difference in blood lead levels between black and white children ages 6 months-5 years and the presence of higher blood lead levels among those in the low income group and large urban areas can also be distinguished by looking at the percent of children with blood lead levels of 30 µg/dl or more. According to CDC guidelines published in 1978,[6] 30 µg/dl is the cutoff used in the CDC community-based lead poisoning prevention programs for referring children for followup.

Based on the CDC guidelines (30.0 µg/dl or more), NHANES II data indicate than an estimated 4.0 percent or approximately 675,000 U.S. children 6 months-5 years of age have elevated blood lead levels (table 7). Among children of this age, 12.2 percent of black children compared to 2.0 percent of white children had blood lead levels of 30 µg/dl or more. This difference is significant for boys and for girls. The percent with elevated blood lead levels are observed to be slightly higher in boys than girls, but this difference is not statistically significant at the 0.05 level of probability.

There was a significant decrease in the proportion of children with elevated blood lead levels with increased family income. This relationship was stronger for black than for white children. The highest percent of elevated blood lead levels (18.5 percent) was found among black children from low income families. For both white and black children, the percent of persons with elevated blood lead levels was lowest in the high income group.

With respect to degree of urbanization, the percent with elevated blood lead levels living in the central cities was significantly higher for black than white children. Even in the smaller urban and rural areas, 10.0 percent of black children were observed to have elevated blood lead levels compared with less than 2.0 percent for white children. Caution should be exercised in interpreting racial differences in rural areas because of a relatively small number of examined persons (42 cases) in the estimation cell for rural black children.

Trends in lead levels

Preliminary analyses suggest that in the 4-year period of this survey there was a 37-percent decrease in the mean blood lead levels from 15.8 µg/dl during the first 6 months of the survey to 10.0 µg/dl during the last 6 months (figure 7).

Decreases were found for both black and white races, all age groups, and both sexes (figure 8). Further analysis indicated that the decline was not due to seasonal, income, geographic region, or urban-rural differences. Nor was it due to laboratory measurement error or chance.[20]

Table 6. Blood lead levels of persons 6 months-74 years, with mean, standard error of the mean, and selected percentiles, by large urban areas, race, and age: United States, 1976-80

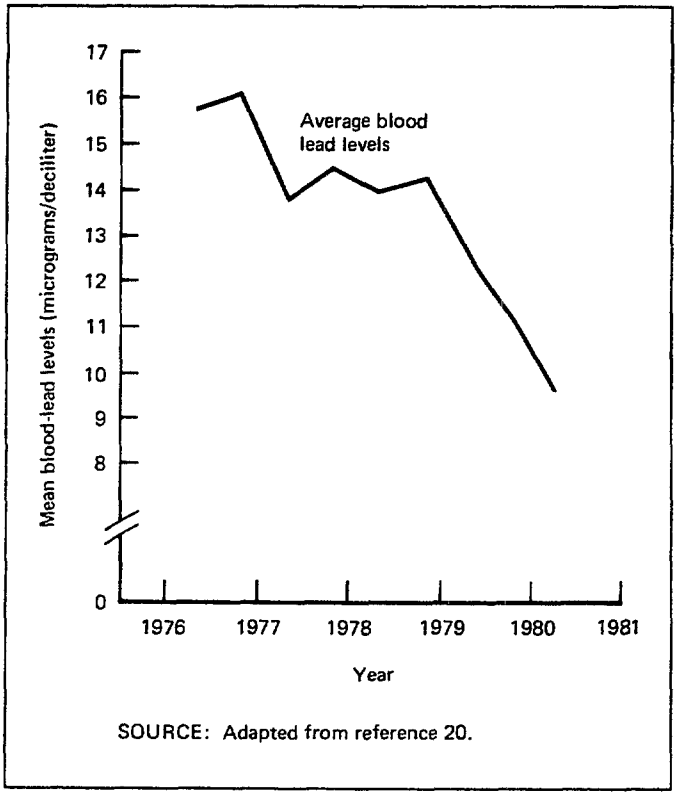
Race and age	Large urban areas												
	Central city							Non-central city					
	Estimated population in thousands[1]	Number examined[2]	Mean	Standard error of the mean	Percentile			Estimated population in thousands[1]	Number examined[2]	Mean	Standard error of the mean	Percentile	
					10th	50th	90th					10th	50th	90th
All races[3]			Blood lead level (μg/dl)							Blood lead level (μg/dl)				
All ages	24,560	1,123	14.9	0.67	9.0	14.0	22.0	34,908	1,268	15.1	0.30	9.0	14.0	23.0
6 months-5 years	1,822	286	20.0	0.71	11.0	19.0	31.0	2,519	257	16.5	0.60	10.0	16.0	24.0
6-17 years	5,124	177	14.6	0.87	9.0	14.0	21.0	7,746	236	13.3	0.59	9.0	12.0	19.0
18-74 years	17,614	660	14.7	0.70	8.0	14.0	22.0	24,643	775	15.6	0.29	9.0	14.0	23.0
White														
All ages	14,602	625	14.8	0.56	9.0	14.0	22.0	31,741	1,138	15.1	0.32	9.0	14.0	23.0
6 months-5 years	885	133	17.4	0.84	10.0	17.0	25.0	2,223	224	16.2	0.65	10.0	15.0	24.0
6-17 years	2,710	86	14.3	0.93	9.0	14.0	21.0	6,949	207	13.0	0.63	8.0	12.0	18.0
18-74 years	11,007	406	14.8	0.59	9.0	14.0	22.0	22,569	707	15.6	0.30	9.0	14.0	23.0
Black														
All ages	8,856	452	15.4	0.94	8.0	14.0	23.0	2,831	118	16.0	0.60	9.0	15.0	22.0
6 months-5 years	855	143	23.1	1.30	14.0	21.0	36.0	238	29	19.2	0.74	14.0	19.0	26.0
6-17 years	2,259	84	15.0	1.00	9.0	14.0	21.0	751	27	16.0	0.67	10.0	16.0	22.0
18-74 years	5,742	225	14.8	0.95	8.0	14.0	22.0	1,842	62	15.7	0.80	9.0	15.0	22.0

[1]At the midpoint of the survey, March 1, 1978.
[2]With lead determinations from blood specimens drawn by venipuncture.
[3]Includes data for races not shown separately.

Table 7. Percent of children ages 6 months-5 years with blood lead levels of 30.0 μg/dl or more,[1] with standard error of the percent, by selected demographic variables: United States, 1976-80

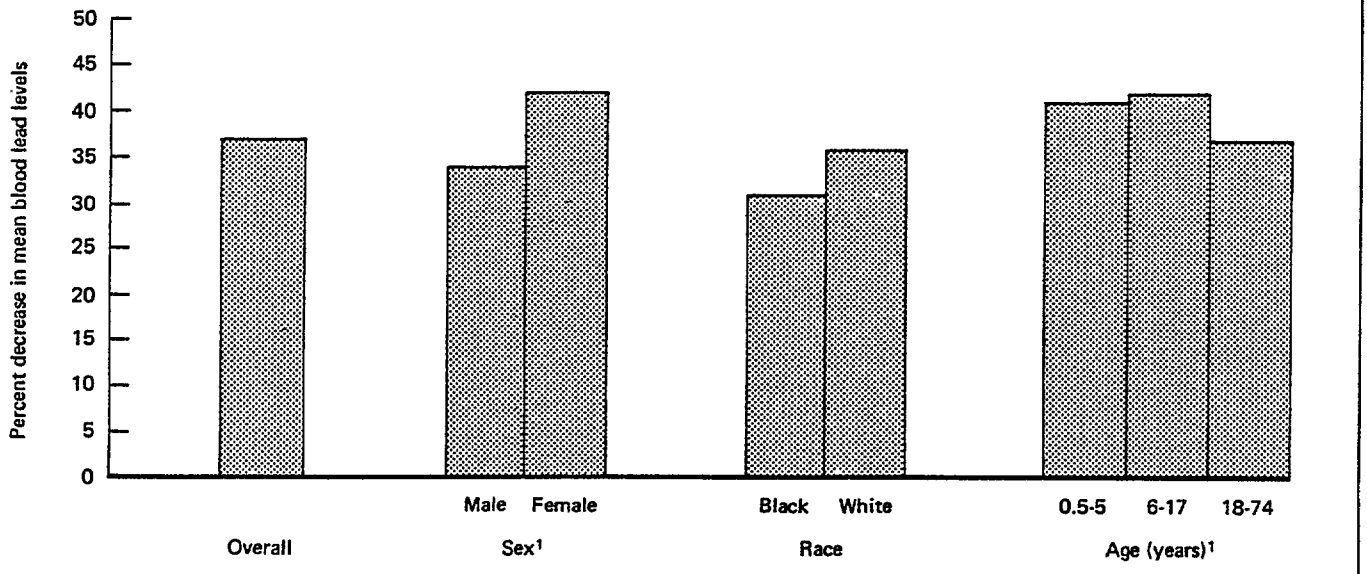
Demographic variable	All races[2]	White	Black	All races[2]	White	Black
	Percent of children[1,3]			Standard error		
Both sexes	4.0	2.0	12.2	0.5	0.3	1.5
Boys	4.4	2.1	13.4	0.7	0.5	2.0
Girls	3.5	1.8	10.9	0.5	0.4	2.4
Annual family income						
Under $6,000	10.9	5.9	18.5	1.4	1.3	3.6
$6,000-14,999	4.2	2.2	12.1	0.7	0.5	1.9
$15,000 or more	1.2	0.7	2.8	0.4	0.3	1.2
Degree of urbanization of place of residence						
Urban, 1 million persons or more	7.2	4.0	15.2	0.7	0.7	1.5
Central city	11.6	4.5	18.6	1.9	1.9	2.8
Non-central city	3.7	3.8	3.3	0.8	0.8	1.4
Urban, fewer than 1 million persons	3.5	1.6	10.2	0.6	0.4	2.4
Rural	2.1	1.2	10.3	0.9	0.5	5.3

[1]The one child (a black male, family income under $6,000, in a rural area) with an excessively high Pb-B level (76.0 μg/dl) was excluded. This exclusion has a negligible effect on the national estimates shown here.
[2]Includes data for races not shown separately.
[3]Estimated using data on blood lead levels determined from specimens drawn by venipuncture.



SOURCE: Adapted from reference 20.

Figure 7. Mean blood levels of U.S. population 6 months-74 years: United States, February 1976-February 1980



SOURCE: Adapted from reference 20.

[1]For white persons only.

Figure 8. Percent decrease in mean blood lead levels of U.S. population 6 months-74 years, by sex, race, and age: United States, February 1976-February 1980

Summary

For years excessive exposure to lead has been a serious public health concern for selected groups of the population--particularly young children and lead smelter and other industrial workers. This report provides the first national estimates of the blood lead levels in the U.S. population, based on the findings from the National Health and Nutrition Examination Survey of 1976-80 (NHANES II). Blood lead levels were determined on a cross-sectional sample representative of the U.S. civilian noninstitutionalized population 6 months-74 years of age examined in NHANES II. These data were obtained for baseline use in studies of the effect of lead contamination on health and for identifying areas or groups at high risk throughout the country.

Based on the CDC guideline for elevated blood lead levels (30 micrograms or more per deciliter of whole blood), an estimated 4.0 percent or approximately 675,000 U.S. children ages 6 months-5 years show evidence of excessive amounts of lead in their blood. The percent of children with this degree of elevated blood lead level is significantly higher in black (12.2 percent) than in white (2.0 percent) children. Almost one-fifth (18.5 percent) of black children from low income families have elevated blood lead levels.

Among children 6 months-5 years of age, mean blood lead levels are significantly higher in black than in white children across all family income levels and degrees of urbanization of their place of residence. Mean blood lead levels are significantly higher among children from families with low income levels and those in the large urbanized communities (1 million or more population) than among children from families with moderate or high income levels and those living in smaller cities or rural areas, respectively.

Among children ages 6-17 years, mean blood lead levels decrease across successive age groups until about adolescence. For persons 18-74 years of age, mean blood lead levels are positively associated with age until the middle ages (45-54 year group), with a moderate decline in the older age groups. Across all adult age groups, the mean blood lead levels of men substantially exceed those of women.

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Symbols	
- - -	Data not available
. . .	Category not applicable
-	Quantity zero
0.0	Quantity more than zero but less than 0.05
Z	Quantity more than zero but less than 500 where numbers are rounded to thousands
*	Figure does not meet standards of reliability or precision

Technical notes

Sample design

The information presented in this report is based on data from the direct standardized physical examination, tests and measurements, and medical histories collected in the second National Health and Nutrition Examination Survey (NHANES II) during 1976-80. The target population of NHANES II encompassed the civilian noninstitutionalized population (ages 6 months through 74 years) of the United States, including Alaska and Hawaii.

NHANES II utilized a multistage probability design that involved selection of primary sampling units (PSU's), segments (clusters of households) within PSU's, households, eligible persons, and finally sample persons. PSU's are typically composed of a county or group of contiguous counties. The sample design provided for oversampling among those persons ages 6 months-5 years, those ages 60-74 years, and those living in poverty areas (as defined by the United States Bureau of the Census for the 1970 census[16]).

The U.S. Bureau of the Census selected the NHANES II sample of 27,801 persons according to specifications from the National Center for Health statistics. Of this sample, 20,322 (73.1 percent) were examined. A total of 16,563 persons in the NHANES II sample, including all persons ages 6 months-6 years and a half-sample of persons ages 7-74 years, were assigned to receive the test for lead levels in the blood. Of these sample persons, blood specimens were drawn and analyzed for blood lead on 10,049 persons giving an overall response rate of 60.7 percent.

Blood lead levels and related data in this report are presented as population estimates; examination findings for each sample person have been inflated by the reciprocal of selection probabilities, adjusted to account for persons who were not examined, and poststratified by race, sex, and age. The final estimates will then closely approximate the independent U.S. Bureau of Census estimates for the civilian noninstitutionalized population of the United States as of March 1, 1978. No further adjustment was made for examined persons in the lead subsample with missing blood lead data due to refusal to give a blood specimen or otherwise.

Standard errors and tests of significance

The statistical methods used to analyze the data take into account the complex survey design of NHANES II.[2] Complex survey techniques were used to decrease the cost of sampling a large population. Although complex survey designs complicate data analysis, they must be taken into consideration to avoid the erroneous assumptions that would be made using a simple random sampling method. The latter usually results in an inferential analysis with too many significant test results due solely to underestimation of variances.

The standard errors of the weighted means and proportions of persons with elevated blood lead levels presented in this report were calculated using the Taylor Series linearization method.[21] This process approximates the variance of nonlinear statistics, e.g., means and proportions, by using a first order Taylor Series expansion. If the higher order terms of the expansion are negligible, and if the sample is of a reasonable size for the domains of interest, then this approximation provides variance estimates as reliable as those from the pseudoreplication method adapted for analyzing NHANES II data.[22]

For blood lead analysis in this study, the population was divided into three age groups—children 6 months-5 years, youths 6-17 years, and adults 18-74 years. Regression analysis was performed within each age group using blood lead level as the dependent variable and age as a covariate. The effect on blood lead level of each of the demographic variables—race, sex, income, and degree of urbanization—were tested in this analysis after accounting for age. Tests of significance for comparing the means shown in figure 1 through 6 were performed using a regression program, called SURREGR,[23] which takes into consideration the complex survey sample design.

Using the Grizzle-Starner-Koch (GSK) approach to categorical data analysis,[24] tests of the hypothesis that there is no difference among population subgroups in proportions of persons with elevated blood lead levels (table 7) were performed. This analysis involved two stages, (1) estimation of the proportion of those with elevated blood lead levels for the subgroups of interest and (2) estimation of an appropriate variance-covariance matrix and hypothesis testing using categorical data analysis. The computation for this analysis involved interfacing two programs—SURREGR for the first stage calculations and GENCAT, a program for generalized chi-square analysis of categorical data, for the second stage.[26,27]

Description of nonrespondents and exclusions

All NHANES II sample persons ages 6 months-6 years and a half-sample of those ages 7-74 years were to have had blood lead determinations. However, 39.3 percent of these sample persons had missing lead values due to nonresponse at various stages of partici-

NOTE: A list of references follows the text.

pation in the survey. The rate of nonresponse was greater among preschool-aged children than among youths or adults (table I). About half (51.0 percent) of the children ages 6 months-5 years compared with 28.6 percent of persons ages 6-17 years and 35.7 percent of adults ages 18-74 years had no blood lead determinations. Among medically examined persons in the lead subsample (table II), those with missing blood lead values were randomly distributed by demographic (other than age) and socioeconomic categories. The analysis of the distribution of nonresponse for noninterviewed and nonexamined persons in these categories is planned for a forthcoming report.[5]

Blood lead data from blood specimens drawn by fingerstick (pricking the finger) and from extreme cases of lead exposure (blood lead values of 70.0 μg/dl or more) were excluded from computation of national estimates. A description of blood lead levels for persons receiving fingersticks is given in table III. Seventy-five percent of the 113 children with blood lead values who received fingersticks were under 3 years of age. Table IV shows the characteristics of three persons receiving venipunctures who had blood lead values greater than 70.0 μg/dl. Each of these three individuals was referred to his personal physician for medical attention.

Quality control methods

Lead concentrations were measured in whole blood by atomic absorption spectroscopy using a modification of the Delves method.[9,27] All materials used for collecting and processing specimens were screened for possible lead contamination. All preparatory work on the specimens, including field and laboratory procedures, were conducted under laminar flow hoods that provided class 100 air (i.e., air containing less than 100 particles/m^3 of greater than 0.5 micron diameter).

Two quality control systems using bovine whole blood were set up by CDC. These two systems were (1) "bench" quality control pools inserted by the analyst and measured 2-4 times in each analytical run to make judgments on the day of analysis and (2) "blind" quality control specimens placed in vials, labeled, and processed in duplicate to be indistinguishable from regular NHANES II specimens. If the average of replicate values of either "bench" or "blind" quality control specimens fell outside of their respective previously established 95-percent confidence limits, the run was repeated. Also, NHANES II specimens were run in duplicate. When replicate absorbance values differed by more than 0.025 absorbance or the difference between calculated concentrations for duplicates was greater than 7 μg Pb/dl, analysis was repeated for the specimen.

The "normal blind" pool with a mean of 13.7 μg/dl had a standard deviation (SD) of 2.2 μg/dl (0.022 ppm) while the "high blind" pool with a mean of 25.5 μg/dl had a SD of 3.2 μg/dl (0.032 ppm). The coefficients of variation, that is, the standard deviation expressed as a fraction of the mean blood lead level for a given pool, for the "bench" quality controls having blood lead levels of 30.0 μg/dl or more ranged from 7.0 to 15.0 percent.[7]

Limitations of the data

Rigorous quality control methods were implemented throughout specimen collection and processing and in data processing to ensure validity and accuracy of the results reported. However, there are some factors that might affect the data. Foremost is the relative imprecision of a measurement or measurement error. Based on an analysis of the quality control pools,[8] the coefficient of variation for the laboratory methods used are approximately 15.0 percent

NOTE: A list of references follows the text.

Table I. Nonresponse among sample persons ages 6 months-74 years in the lead subsample by age: National Health and Nutrition Examination Survey, 1976-80

Age	Number of sample persons								Percent of sample persons[2] without lead values	Percent of examinees[2] without lead values
	In lead subsample	Interviewed	Not interviewed	Examined	Not examined	Examined but missing blood lead values				
						Overall	Refused to give blood specimen	Blood specimen drawn[1]		
All ages	16,563	15,179	1,384	12,288	2,891	2,239	1,197	1,042	39.3	18.2
6 months-5 years	5,069	4,876	193	4,118	758	1,634	988	646	51.0	39.7
6-17 years	2,413	2,261	152	1,967	294	245	122	123	28.6	12.5
18-74 years	9,081	8,042	1,039	6,203	1,839	360	87	273	35.7	5.8

[1]By venipuncture or fingerstick.
[2]In the lead subsample.

Table II. Nonresponse among examined persons ages 6 months-74 years in the lead subsample by age, race, sex, income, and degree of urbanization: National Health and Nutrition Examination Survey, 1976-80

Demographic variables	Age											
	6 months-74 years			6 months-5 years			6-17 years			18-74 years		
	Number of persons examined	Examined persons with missing lead values		Number of persons examined	Examined persons with missing lead values		Number of persons examined	Examined persons with missing lead values		Number of persons examined	Examined persons with missing lead values	
		Number	Percent		Number	Percent		Number	Percent		Number	Percent
Total	12,288	2,239	18.2	4,118	1,634	39.7	1,967	245	12.5	6,203	360	5.8
Race												
White	10,253	1,806	17.6	3,264	1,311	40.2	1,616	192	11.9	5,373	303	5.6
Black	1,737	367	21.1	723	269	37.2	313	48	15.3	701	50	7.1
Other	298	66	22.1	131	54	41.2	38	5	13.2	129	7	5.4
Sex												
Male	6,123	1,119	18.3	2,143	840	39.2	1,022	119	11.6	2,958	160	5.4
Female	6,165	1,120	18.2	1,975	794	40.2	945	126	13.3	3,245	200	6.2
Annual family income												
Under $6,000	2,291	404	17.6	752	281	37.4	268	37	13.8	1,271	86	6.8
$6,000-$14,999	5,082	994	19.6	1,876	739	39.4	780	107	13.7	2,426	148	6.1
$15,000 or more	4,509	758	16.8	1,368	562	41.1	852	91	10.7	2,289	105	4.6
Unknown	406	83	20.4	122	52	42.6	67	10	14.9	217	21	9.7
Degree of urbanization												
Large urban[1]	2,993	583	19.5	949	391	41.2	483	69	14.3	1,561	123	7.9
Smaller urban[2]	4,805	869	18.1	1,647	639	38.8	721	81	11.2	2,437	149	6.1
Rural	4,490	787	17.5	1,522	604	39.7	763	95	12.5	2,205	88	4.0

[1]With 1 million or more persons.
[2]With fewer than 1 million persons.

and 12.0 percent for control pools with low (less than 30.0 μg/dl) and high (30.0 μg/dl or more) mean lead levels, respectively. In addition, there are significant within-day and among-day components of variance.

A possible logistical factor indirectly influencing the blood lead data is the itinerary of the Mobile Examination Centers (MEC's). To minimize the effects of adverse weather conditions on response rates, MEC's were set up in the northern States during the summer and more southern States during the winter. The potential environmental effects on blood lead levels associated with seasonality[28] and geographic location may be confounded, to some undetermined degree, with those associated with degree of urbanization of place of residence.

NOTE: A list of references follows the text.

Table III. Description of raw data on blood lead determinations from specimens collected by fingersticks in children ages 6 months-7 years: National Health and Nutrition Examination Survey, 1976-80

Race	Number examined	Mean	Standard deviation	Mode	Median	Minimum	Maximum	Skewness
		(μg/dl)						
All races[1]	113	24.8	15.4	18.0	22.2	7.0	116.0	3.5
White	77	23.2	17.6	18.0	19.0	7.0	116.0	3.7
Black	36	28.3	8.0	27.0	28.0	12.0	47.0	0.1

[1]Includes data for races not shown separately.

Table IV. Characteristics of three persons with blood lead values greater than 70.0 μg/dl who received venipuncture: National Health and Nutrition Examination Survey, 1976-80

Blood lead value (μg/dl)	Demographic factors				
	Age in years	Sex	Race	Family income	Degree of urbanization
76.0	1	Male	Black	Under $6,000	Rural
80.0	42	Male	White	$15,000 or more	Large urban[1]
90.0	18	Male	Black	Under $6,000	Smaller urban[2]

[1]With 1 million or more persons.
[2]With fewer than 1 million persons.

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From Vital and Health Statistics of the National Center for Health Statistics Number 80 • July 22, 1982

Medication Therapy in Office Visits for Hypertension: National Ambulatory Medical Care Survey, 1980

by Beulah K. Cypress, Ph.D., Division of Health Care Statistics

According to data collected by the National Center for Health Statistics by means of the National Ambulatory Medical Care Survey, patients with essential hypertension made an estimated 25.1 million visits to office-based physicians in 1980. During these visits there were about 46.5 million mentions of drugs, either new or continued, for an average of 1.85 drug mentions per visit.

The National Ambulatory Medical Care Survey (NAMCS) is a probability sample survey conducted annually by the Division of Health Care Statistics of the National Center for Health Statistics. The technical notes at the end of this report provide brief information about the source of the data, sampling errors, and definitions of terms. A complete description of the survey including limitations and definitions was published in *Vital and Health Statistics,* Series 13, No. 44.[1]

Until 1980, an item on the Patient Record form (figure 1) indicating whether or not medication therapy was offered by the physician was the only available information from NAMCS regarding drug utilization by office-based physicians. In 1980, the item was expanded to include the reporting of specific drugs, prescription or nonprescription, ordered or provided by any route of administration during the visit (see figure 1, item 11). The methodology used to collect and process this drug information is described in *Vital and Health Statistics,* Series 2, No. 90.[2]

Data on drugs utilized during visits with essential hypertension as the principal (first-listed) diagnosis are presented in this report. In order to report accurately what the physician prescribed, drug mentions used in this report are based on the physicians' entries on the Patient Record forms. These entries may be brand or generic names of prescription or over-the-counter drugs. "Drug mentions" includes all drugs listed in item 11, parts a and b. Part b, it should be noted, may relate to diagnoses other than hypertension. Therefore, it is assumed that medications described in this report were ordered for patients with hypertension but may not necessarily be therapeutic agents for that condition.

Medication therapy status and number of medications

During 1980, hypertension was the leading illness–related principal diagnosis and accounted for 9 percent of all visits. In about 89 percent of these visits patients were provided medication therapy (table 1). This proportion exceeded the average proportion of drug visits for all diagnoses (63 percent). Table 1 shows that a hypertension visit with one drug ordered or provided was the most likely event (36 percent), and proportions of visits decreased as the number of drugs increased. This paralleled the average prescription pattern shown in figure 2, except that proportions of visits for hypertension were higher in every category greater than zero.

Drug mentions

Table 2 shows the number of visits for hypertension by sex, age, and race of the patient, and by problem status and major reason for the visit. The number and percent of visits in which one or more drugs were mentioned are shown. These two sets of visit frequencies provide the denominators for the drug mention rates (DMR) and the drug intensity rates (DIR). The numerator for both rates is the number of all-listed

[1] National Center for Health Statistics, T. Ezzati and T. McLemore: The National Ambulatory Medical Care Survey, 1977 Summary, United States, January-December 1977. *Vital and Health Statistics.* Series 13-No. 44. DHEW Pub. No. (PHS) 80-1795. Public Health Service. Washington. U.S. Government Printing Office, Apr. 1980.

[2] National Center for Health Statistics, H. Koch: The collection and processing of drug information, National Ambulatory Medical Care Survey, United States, 1980. *Vital and Health Statistics.* Series 2-No. 90. DHHS Pub. No. (PHS) 82-1364. Public Health Service. Washington. U.S. Government Printing Office. In press.

ASSURANCE OF CONFIDENTIALITY—All information which would permit identification of an individual, a practice, or an establishment will be held confidential, will be used only by persons engaged in and for the purposes of the survey and will not be disclosed or released to other persons or used for any other purpose

Department of Health, Education, and Welfare
Public Health Service
Office of Health Research, Statistics, and Technology
National Center for Health Statistics

A No. 001735

PATIENT RECORD
NATIONAL AMBULATORY MEDICAL CARE SURVEY

1. DATE OF VISIT ___/___/___ (Month Day Year)

2. DATE OF BIRTH ___/___/___ (Month Day Year)

3. SEX
1 ☐ FEMALE
2 ☐ MALE

4. COLOR OR RACE
1 ☐ WHITE
2 ☐ BLACK
3 ☐ ASIAN/PACIFIC ISLANDER
4 ☐ AMERICAN INDIAN/ALASKAN NATIVE

5. ETHNICITY
1 ☐ HISPANIC ORIGIN
2 ☐ NOT HISPANIC

6. PATIENT'S COMPLAINT(S), SYMPTOM(S), OR OTHER REASON(S) FOR THIS VISIT *[In patient's own words]*
a. MOST IMPORTANT _____
b. OTHER _____

7. MAJOR REASON FOR THIS VISIT *[Check one]*
1 ☐ ACUTE PROBLEM
2 ☐ CHRONIC PROBLEM, ROUTINE
3 ☐ CHRONIC PROBLEM, FLAREUP
4 ☐ POST SURGERY/POST INJURY
5 ☐ NON-ILLNESS CARE (ROUTINE PRENATAL, GENERAL EXAM., WELL BABY, ETC.)

8. DIAGNOSTIC SERVICES THIS VISIT *[Check all ordered or provided]*
1 ☐ NONE
2 ☐ LIMITED HISTORY/EXAM
3 ☐ GENERAL HISTORY/EXAM
4 ☐ PAP TEST
5 ☐ CLINICAL LAB TEST
6 ☐ X-RAY
7 ☐ BLOOD PRESSURE CHECK
8 ☐ EKG
9 ☐ VISION TEST
10 ☐ ENDOSCOPY
11 ☐ MENTAL STATUS EXAM.
12 ☐ OTHER *(Specify)* _____

9. PHYSICIAN'S DIAGNOSES
a. PRINCIPAL DIAGNOSIS/PROBLEM ASSOCIATED WITH ITEM 6a. _____
b. OTHER SIGNIFICANT CURRENT DIAGNOSES

10. HAVE YOU SEEN PATIENT BEFORE?
1 ☐ YES 2 ☐ NO
↓
IF YES, FOR THE CONDITION IN ITEM 9a?
1 ☐ YES 2 ☐ NO

11. MEDICATION THERAPY THIS VISIT ☐ NONE
[Using brand or generic names, record all new and continued medications ordered, injected, administered, or otherwise provided at this vist. Include immunizing and desensitizing agents]

a. FOR PRINCIPAL DIAGNOSES IN ITEM 9a.	b. FOR ALL OTHER REASONS.
1.	1.
2.	2.
3.	3.
4.	4.

12. NON-MEDICATION THERAPY *[Check all services ordered or provided this visit]*
1 ☐ NONE
2 ☐ PHYSIOTHERAPY
3 ☐ OFFICE SURGERY
4 ☐ FAMILY PLANNING
5 ☐ PSYCHOTHERAPY/THERAPEUTIC LISTENING
6 ☐ DIET COUNSELING
7 ☐ FAMILY/SOCIAL COUNSELING
8 ☐ MEDICAL COUNSELING
9 ☐ OTHER *(Specify)* _____

13. WAS PATIENT REFERRED FOR THIS VISIT BY ANOTHER PHYSICIAN?
1 ☐ YES
2 ☐ NO

14. DISPOSITION THIS VISIT *[Check all that apply]*
1 ☐ NO FOLLOW-UP PLANNED
2 ☐ RETURN AT SPECIFIED TIME
3 ☐ RETURN IF NEEDED, P.R.N.
4 ☐ TELEPHONE FOLLOW-UP PLANNED
5 ☐ REFERRED TO OTHER PHYSICIAN
6 ☐ RETURNED TO REFERRING PHYSICIAN
7 ☐ ADMIT TO HOSPITAL
8 ☐ OTHER *(Specify)* _____

15. DURATION OF THIS VISIT *[Time actually spent with physician]*
_____ Minutes

PHS-6105-A (9/79) OMB No. 68-R1498

Figure 1. Patient Record from the National Ambulatory Medical Care Survey

Table 1. Number and percent distribution of office visits for essential hypertension, by medication therapy status and number of medications: United States, 1980

Medication therapy status and number of medications	*Number of visits in thousands*	*Percent distribution*
Total	25,137	100.0
Medication therapy status		
With medication	22,282	88.6
Without medication	2,855	11.4
Number of medications		
None	2,855	11.4
1	8,932	35.5
2	6,894	27.4
3	3,561	14.2
4	2,040	8.1
5 or more	856	3.4

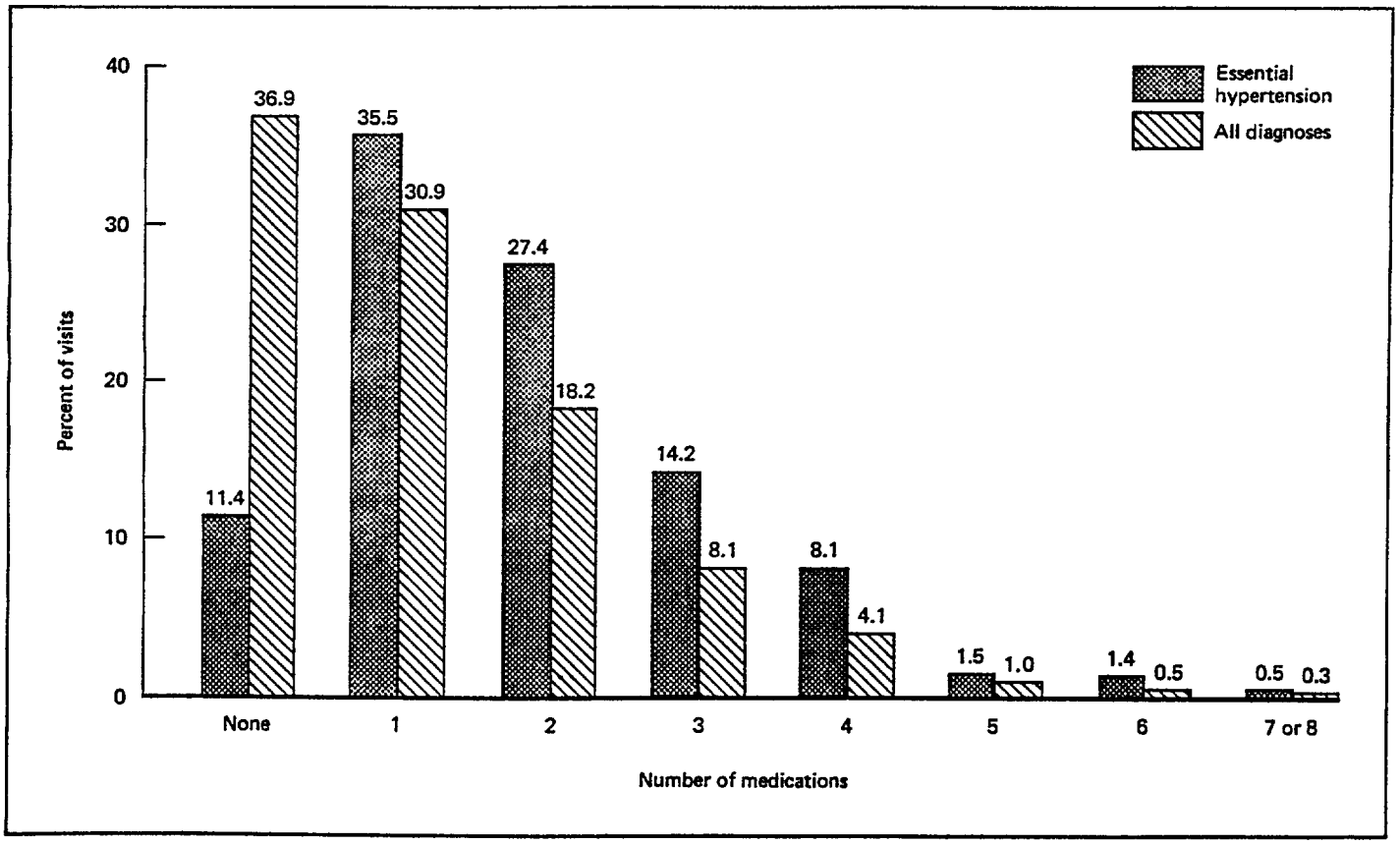

Figure 2. Percent of office visits for essential hypertension and for all diagnoses by number of medications: United States, 1980

Table 2. Number of office visits for essential hypertension, number and percent of drug visits, and number of all-listed drug mentions, drug mention rate, and drug intensity rate, by selected characteristics: United States, 1980

Selected characteristic	Office visits			All-listed drug mentions (number in thousands)	Drug mention rate per visit[2]	Drug intensity rate per visit[3]
	All visits (number in thousands)	Drug visits[1] (number in thousands)	Percent of drug visits			
Total	25,137	22,282	88.6	46,484	1.85	2.09
Sex						
Female	15,787	14,203	90.0	30,365	1.92	2.14
Male	9,350	8,079	86.4	16,119	1.72	2.00
Age						
Under 45 years	3,019	2,532	83.9	5,068	1.68	2.00
45 years and over	22,118	19,750	89.3	41,416	1.87	2.10
Race						
White	22,048	19,507	88.5	40,965	1.86	2.10
Black	2,940	2,637	89.7	5,245	1.78	1.90
Other	*148	*138	*93.2	*274	*1.85	*1.99
Problem status						
New problem	2,155	1,692	78.5	3,380	1.57	2.00
Old problem	22,981	20,590	89.6	43,103	1.88	2.09
Major reason for visit						
Acute problem	1,985	1,611	81.2	3,218	1.62	2.00
Chronic problem, routine	19,209	17,339	90.3	36,471	1.90	2.10
Chronic problem, flareup	2,114	1,946	92.1	4,376	2.07	2.25
Postsurgery or postinjury	*81	*63	*78.6	*197	*2.43	*3.13
Nonillness care	1,748	1,322	75.6	2,221	1.27	1.68

[1]A visit in which one or more drugs were ordered.
[2]All-listed drugs ÷ number of visits.
[3]All-listed drugs ÷ number of drug visits.

drug mentions. Using for the denominator the total number of visits for hypertension (25.1 million) and for the numerator the total number of drug mentions during hypertension visits (46.5 million) yields a drug *mention* rate of 1.85 drugs per hypertension visit. Using *drug visits* (22.2 million) for the denominator yields a drug *intensity* rate of 2.09 drugs per hypertension visit in which a drug was mentioned. While the DMR provides an average drug use for hypertension visits, the DIR shows that when patients do receive medication therapy during office visits they are likely to receive an average of 2.09 drugs. The DIR is always higher than the DMR because it is based on only those visits in which one or more drugs are utilized, except in the rare case where drug visits equal all visits. The DMR was higher for hypertension than for the average of all diagnoses regardless of the patient's age group. As figure 3 shows, the DMR increased as the age group of the patient with hypertension increased. The curve for all diagnoses shows a similar pattern, but the rates for hypertension were consistently higher. The DMR was higher for females than for males, but other rates detailed in table 2 did not vary significantly, probably due to the large sampling error associated with these relatively small estimates.

Drug status characteristics

Table 3 provides information about the drugs that were utilized for hypertension patients. The entry status, or more specifically the physician's prescribing mode, in about 80 percent of the 46.5 million drug mentions was the brand name; 18 percent were entered by their generic names. An example of the former is Hydrodiuril; the latter, hydrochlorothiazide. Both entries represent the same drug. The proportion designated by brand names during hypertension visits (80 percent) exceeded the average of 71 percent similarly entered during visits for all diagnoses.[3]

Most drugs (92 percent) were prescription drugs (Rx) with nonprescription or over-the-counter (OTC) drugs accounting for only 6 percent. (Table 4 shows that of all drugs entered by *brand names*, 95 percent were prescription drugs and 5 percent were OTC drugs.) About 73 percent of the drugs mentioned consisted of a single ingredient, suggesting the poten-

[3]National Center for Health Statistics, H. Koch: Drugs most frequently used in office-based practice: National Ambulatory Medical Care Survey, 1980. *Advance Data From Vital and Health Statistics*, No. 78. DHHS Pub. No. (PHS) 82-1250. Public Health Service. Hyattsville, Md., May 13, 1982.

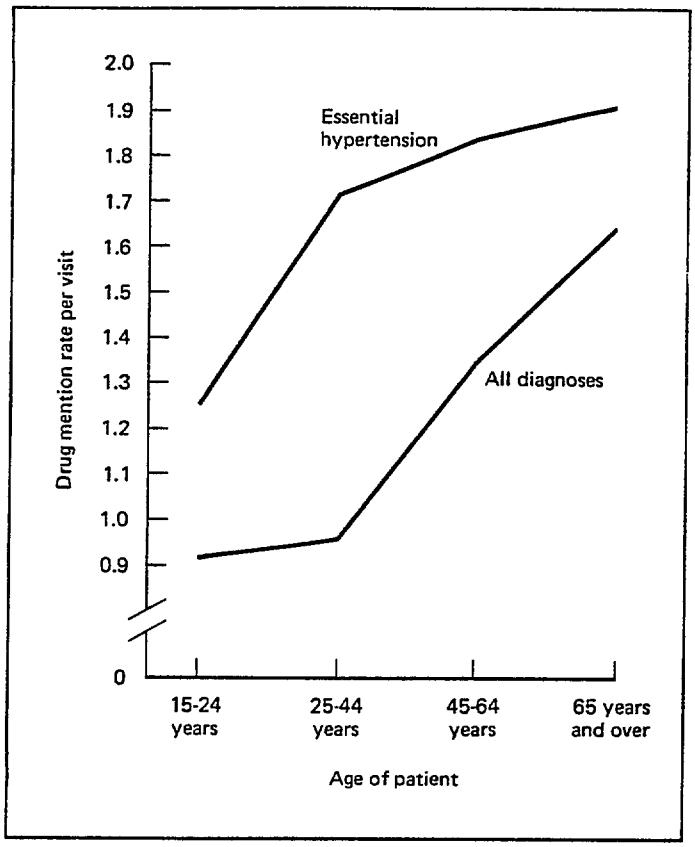

Figure 3. Drug mention rate per office visit for essential hypertension and for all diagnoses, by age of patient: United States, 1980

tial for ordering by generic name. On the average, 69 percent of drugs mentioned for all visits regardless of diagnosis were single ingredient drugs.

Only 6 percent of the total drug mentions during hypertension visits consisted of drugs under the regulatory control of the Drug Enforcement Administration, compared with 9 percent during visits for all diagnoses.

Most frequently mentioned drugs

The 30 drugs listed in table 5 accounted for about 60 percent of all drug mentions in office visits for hypertension. The reader is cautioned that the ranking may be somewhat artificial because some estimates do not differ significantly from other near estimates due to sampling variability.

As may be expected, 2 therapeutic categories, hypotensive agents and diuretics, were predominant among drug mentions when patients visited for hypertension. (In NAMCS, therapeutic categories were based on the classification system of the American Hospital Formulary Service.[4]) Of the 30 listed drugs, 10 are hypotensive agents, 9 are diuretics, 4 are cardiac drugs, and 2 are replacement solutions (potassium). Only one is a tranquilizer.

The most frequently utilized generic substances are shown in table 6. The data in this table represent the utilization of the generic substance regardless of whether the substance was prescribed by brand or generic name. The form of use indicates whether the substance was used as a single ingredient or in combination with other substances. Hydrochlorothiazide (10.5 million) was clearly the most frequently used generic ingredient. About 53 percent of its use was in combination with other drugs. Some generic drugs such as diazepam, digoxin, furosemide, ibuprofen, metoprolol, metalozone, nadolol, and prazosin were never prescribed in combination with another substance. Others, such as spironolactone and triamterene, were almost always found in combination prescriptions.

Additional data on medication therapy in office visits for hypertension, as well as for other diagnoses, will appear in a future *Vital and Health Statistics* publication. Questions regarding this report may be directed to the Ambulatory Care Statistics Branch by calling 301-436-7132.

[4]American Society of Hospital Pharmacists, Inc., *The American Hospital Formulary Service.* Washington. Jan. 1980.

Table 3. Number and percent distribution of all-listed drug mentions in office visits for essential hypertension, and percent distribution for all diagnoses, by drug status characteristics: United States, 1980

Drug status characteristic	*Hypertension*		*All diagnoses*
	Number in thousands	*Percent distribution*	*Percent distribution*
Total	46,484	100.0	100.0
Entry status			
Generic name	8,495	18.3	24.2
Brand name	37,067	79.7	71.2
Therapeutic effect	649	1.4	3.2
Undetermined	*272	*0.6	1.5
Prescription status			
Prescription (Rx) drug	42,664	91.8	82.6
Nonprescription (OTC) drug	2,899	6.2	12.6
Undetermined	921	2.0	4.9
Composition status			
Single ingredient	34,037	73.2	69.0
Combination	11,038	23.8	24.4
Multivitamin	*487	*1.1	2.0
Undetermined	921	2.0	4.6
Federal control status			
Controlled	2,673	5.8	8.6
Uncontrolled	42,889	92.3	86.5
Undetermined	921	2.0	4.9

Table 4. Percent distribution of brand name drug mentions in office visits for hypertension by drug status characteristics: United States, 1980

Drug status characteristic	*Percent distribution*
Prescription status	
Prescription (Rx) drug	95.4
Nonprescription (OTC) drug	4.6
Composition status	
Single ingredient	70.9
Combination	28.0
Multivitamin	1.1

Table 5. Number and percent distribution of most frequently mentioned drugs in office visits for essential hypertension, described by principal generic ingredient(s) and principal therapeutic category: United States, 1980

Name of drug[1]	*Number in thousands*	*Percent distribution*	*Principal generic ingredient(s)*[2]	*Principal therapeutic category*[3]
All drug mentions	46,484	100.0	...	...
Dyazide	2,583	5.6	triamterene, hydrochlorothiazide	diuretics
Hydrochlorothiazide	2,449	5.3	hydrochlorothiazide	diuretics
Aldomet	2,284	4.9	methyldopa	hypotensive agents
Inderal	2,090	4.5	propranolol	cardiac drugs
Hydrodiuril	1,836	4.0	hydrochlorothiazide	diuretics
Hygroton	1,779	3.8	chlorthalidone	diuretics
Lopressor	1,569	3.4	metoprolol	hypotensive agents
Lasix	1,325	2.9	furosemide	diuretics
Aldoril	910	2.0	methyldopa, hydrochlorothiazide	hypotensive agents
Diuril	869	1.9	chlorothiazide	diuretics
Ser-ap-es	787	1.7	reserpine, hydralazine, hydrochlorothiazide	hypotensive agents
Aldactazide	786	1.7	spironolactone, hydrochlorothiazide	diuretics
Reserpine	730	1.6	reserpine	hypotensive agents
Apresoline	650	1.4	hydralazine	hypotensive agents
Potassium	644	1.4	potassium replacement solution	replacement solution
Slow-K	619	1.3	potassium replacement solution	replacement solution
Esidrix	588	1.3	hydrochlorothiazide	diuretics
Valium	578	1.2	diazepam	sedatives or hypnotics
Motrin	557	1.2	ibuprofen	hypotensive agents
Minipres	529	1.1	prazosin	hypotensive agents
Corgard	479	1.0	nadolol	cardiac drugs
Lanoxin	447	1.0	digoxin	cardiac drugs
Influenza virus vaccine type A, B	415	0.9	influenza virus vaccine	vaccines
Enduron	402	0.9	methyclothiazide	diuretics
Catapres	402	0.9	clonidine	hypotensive agents
Aspirin	*362	*0.8	aspirin	analgesics and antipyretics
Digoxin	*353	*0.8	digoxin	cardiac drugs
Enduronyl	*344	*0.7	methyclothiazide, deserpidine	hypotensive agents
Diabinese	*319	*0.7	chlorpropamide	anti-diabetic agents
Vitamin B-12	*303	*0.7	vitamin B-12	vitamin B complex
Residual	18,496	39.8	...	...

[1]Based on the physicians entry on the Patient Record form. The entry may be a brand or generic name. Inclusion of trade names for identification only and does not imply endorsement by the U.S. Public Health Service or the Department of Health and Human Services.

[2]If one generic ingredient is listed, the physician's entry is the generic drug or the physician's entry is a brand name drug which consists chiefly of a single generic ingredient.

[3]Based on the classification system of the American Hospital Formulary Service (A.H.F.S.).

Table 6. Number and percent distribution of drugs used in office visits for essential hypertension by form of use, according to most frequently used generic substances: United States, 1980

Generic substance	Number in thousands	Total	Form of use	
			Single ingredient	In combinations
		Percent distribution		
Aspirin	730	100.0	65.6	33.4
Chlorothiazide	1,304	100.0	69.2	30.8
Chlorthalidone	2,435	100.0	78.5	21.5
Clonidine	737	100.0	62.4	37.6
Diazepam	588	100.0	100.0	-
Digoxin	800	100.0	100.0	-
Furosemide	1,325	100.0	100.0	-
Hydralazine	1,763	100.0	44.5	55.5
Hydrochlorothiazide	10,536	100.0	46.8	53.2
Ibuprofen	557	100.0	100.0	-
Metoprolol	1,583	100.0	100.0	-
Methyclothiazide	784	100.0	53.8	46.2
Methyldopa	3,410	100.0	68.2	31.8
Metolazone	405	100.0	100.0	-
Nadolol	479	100.0	100.0	-
Prazosin	542	100.0	100.0	-
Propranolol	2,379	100.0	94.1	5.9
Rauwolfia	437	100.0	61.2	38.8
Reserpine	2,665	100.0	30.7	69.3
Spironolactone	847	100.0	7.1	92.9
Triamterene	2,612	100.0	1.1	98.9

Symbols

- - -	Data not available
. . .	Category not applicable
-	Quantity zero
0.0	Quantity more than zero but less than 0.05
Z	Quantity more than zero but less than 500 where numbers are rounded to thousands
*	Figure does not meet standards of reliability or precision (more than 30 percent relative standard error)
#	Figure suppressed to comply with confidentiality requirements

Technical notes

Source of data and sample design

The information presented in this report is based on data collected by the National Center for Health Statistics through its National Ambulatory Medical Care Survey (NAMCS) during 1980. The target universe of NAMCS includes office visits made within the conterminous United States by ambulatory patients to nonfederally employed physicians who are principally engaged in office practice, but not in the specialties of anesthesiology, pathology, or radiology. Telephone contacts and nonoffice visits are excluded.

NAMCS utilizes a multistage probability sample design that involves samples of primary sampling units (PSU's), physicians' practices within PSU's, and patient visits within physician practices. For 1980 a sample of 2,959 non-Federal, office-based physicians was selected from master files maintained by the American Medical Association and the American Osteopathic Association. The physician response rate for 1980 was 77.2 percent. Sampled physicians were asked to complete Patient Records (figure 1) for a systematic random sample of office visits taking place during a randomly assigned weekly reporting period. During 1980, responding physicians completed 46,081 Patient Records, on which they recorded 51,372 drug mentions. Characteristics of the physician's practice, such as primary specialty and type of practice, were obtained during an induction interview. The National Opinion Research Center, under contract to the National Center for Health Statistics, was responsible for the survey's field operations.

For a more detailed discussion of the limitations, qualifications, and definitions of the data collected in the NAMCS, see *Vital and Health Statistics*, Series 13, Number 44.

Estimates presented in this report differ from the estimates reported in the National Medical Care Utilization and Expenditure Survey (NMCUES), another program of the National Center for Health Statistics (NCHS). The variation in estimates is due to differences in survey populations, data collection methodology, and definitions. The NMCUES, cosponsored by NCHS and the Health Care Financing Administration (HCFA), is a national panel survey of households which collected information on visits to physicians' offices and hospital outpatient departments. Preliminary survey data as well as a discussion of the survey methodology are forthcoming from NCHS and HCFA.

Sampling errors and rounding of numbers

The standard error is primarily a measure of the sampling variability that occurs by chance because only a sample, rather than the entire universe, is surveyed. The relative standard error of an estimate is obtained by dividing the standard error by the estimate itself and is expressed as a percent of the estimate. Relative standard errors of selected aggregate statistics are shown in tables I and III. Standard errors for estimated percents of visits are shown in table II and IV. Tables I and II should be used to obtain the standard error of a specific drug mention (e.g., Dyazide). Tables III and IV should be used to obtain the standard error of a group of drug mentions (e.g., all drugs prescribed for hypertension).

Estimates of office visits have been rounded to the nearest thousand. For this reason detailed figures within tables do not always add to totals. Rates and percents were calculated on the basis of original, unrounded figures and will not necessarily agree precisely with percents calculated from rounded data.

Definitions

An *ambulatory patient* is an individual presenting himself for personal health services who is neither bedridden nor currently admitted to any health care institution on the premises.

A *physician eligible for NAMCS* is a duly licensed doctor of medicine (M.D.) or doctor of osteopathy (D.O.) currently in office-based practice who spends time in caring for ambulatory patients. Excluded from NAMCS are physicians who are hospital based; physicians who specialize in anesthesiology, pathology, or radiology; physicians who are federally employed; physicians who treat only instutionalized patients; physicians employed full time by an institution; and physicians who spend no time seeing ambulatory patients.

An *office* is a place that the physician identifies as a location for his ambulatory practice. Responsibil-

Table I. Approximate relative standard errors of estimated numbers of office visits based on all physician specialties: NAMCS, 1980

Estimated number of office visits in thousands	*Relative standard error in percent*
500	27.3
1,000	19.5
2,000	14.1
5,000	9.4
10,000	7.3
20,000	5.9
50,000	4.9
100,000	4.5
550,000	4.1

Example of use of table: An aggregate of 75,000,000 visits has a relative standard error of 4.7 percent, or a standard error of 3,525,000 visits (4.7 percent of 75,000,000).

Table II. Approximate standard errors of percents of estimated numbers of office visits based on all physician specialties: NAMCS, 1980

Base of percent (number of office visits in thousands)	*Estimated percent*					
	1 or 99	*5 or 95*	*10 or 90*	*20 or 80*	*30 or 70*	*50*
	Standard error in percent					
500	2.7	5.9	8.1	10.8	12.4	13.5
1,000	1.9	4.2	5.7	7.6	8.7	9.5
2,000	1.3	2.9	4.0	5.4	6.2	6.7
5,000	0.8	1.9	2.6	3.4	3.9	4.3
10,000	0.6	1.3	1.8	2.4	2.8	3.0
20,000	0.4	0.9	1.3	1.7	2.0	2.1
50,000	0.3	0.6	0.8	1.1	1.2	1.3
100,000	0.2	0.4	0.6	0.8	0.9	1.0
500,000	0.1	0.2	0.3	0.3	0.4	0.4

Example of use of table: An estimate of 30 percent based on an aggregate of 15,000,000 visits has a standard error of 2.4 percent, or a relative standard error of 8 percent (2.4 percent ÷ 30 percent).

ity over time for patient care and professional services rendered there generally resides with the individual physician rather than an institution.

A *visit* is a direct personal exchange between an ambulatory patient and a physician or a staff member working under the physician's supervision, for the purpose of seeking care and rendering health services.

A *drug mention* is the physician's entry of a pharmaceutical agent ordered or provided—by any route of administration—for prevention, diagnosis, or treatment. Generic as well as brand-name drugs are included, as are nonprescription as well as prescription drugs. Along with all new drugs, the physician also records continued medications, if the patient was specifically instructed during the visit to continue the medication.

Table III. Approximate relative standard errors of estimated number of drug mentions based on all physician specialties: NAMCS, 1980

Estimated number of drug mentions in thousands	*Relative standard error in percent*
1,000	27.3
2,000	19.7
5,000	13.2
10,000	10.1
20,000	8.2
50,000	6.8
100,000	6.2
300,000	5.8
650,000	5.7

Example of use of table: An aggregate estimate of 75,000,000 drug mentions has a relative standard error of 6.5 percent or a standard error of 4,875,000 mentions (6.5 percent of 75,000,000).

Table IV. Approximate standard errors of percents of estimated numbers of drug mentions based on all physician specialties: NAMCS, 1980

Base of percent (number of drug mentions in thousands)	*Estimated percent*					
	1 or 99	*5 or 95*	*10 or 90*	*20 or 80*	*30 or 70*	*50*
	Standard error in percentage points					
1,000	2.7	5.8	8.0	10.7	12.2	13.3
2,000	1.9	4.1	5.7	7.6	8.7	9.4
5,000	1.2	2.6	3.6	4.8	5.5	6.0
20,000	0.6	1.3	1.8	2.4	2.7	3.0
100,000	0.3	0.6	0.8	1.1	1.2	1.3
600,000	0.1	0.2	0.3	0.4	0.5	0.5

Example of use of table: An estimate of 30 percent based on an aggregate of 12,500,000 drug mentions has a standard error of 4.1 percent or a relative standard error of 13.7 percent (4.1 percent ÷ 30 percent).

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