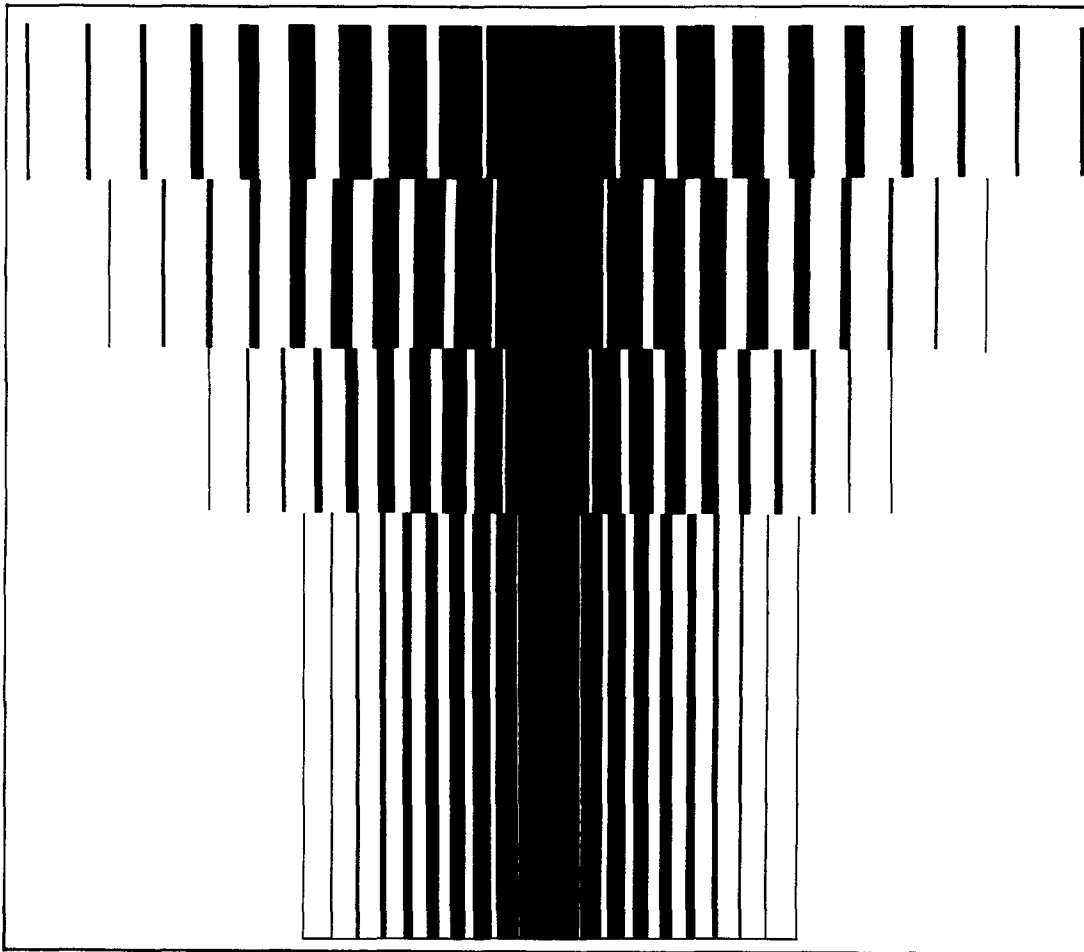# Insurance Coverage and Ambulatory Medical Care of Low-Income Children: United States, 1980

Series C, Analytical Report No. 1

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

National Medical Care Utilization and Expenditure Survey

The National Medical Care Utilization and Expenditure Survey (NMCUES) is a unique source of detailed national estimates on the utilization of and expenditures for various types of medical care. NMCUES is designed to be directly responsive to the continuing need for statistical information on health care expenditures associated with health services utilization for the entire U.S. population.

NMCUES will produce comparable estimates over time for evaluation of the impact of legislation and programs on health status, costs, utilization, and illness-related behavior in the medical care delivery system. In addition to national estimates for the civilian noninstitutionalized population, it will also provide separate estimates for the Medicaid-eligible populations in four States.

The first cycle of NMCUES, which covers calendar year 1980, was designed and conducted as a collaborative effort between the National Center for Health Statistics, Public Health Service, and the Office of Research and Demonstrations, Health Care Financing Administration. Data were obtained from three survey components. The first was a national household survey and the second was a survey of Medicaid enrollees in four States (California, Michigan, Texas, and New York). Both of these components involved five interviews over a period of 15 months to obtain information on medical care utilization and expenditures and other health-related information. The third component was an administrative records survey that verified the eligibility status of respondents for the Medicare and Medicaid programs and supplemented the household data with claims data for the Medicare and Medicaid populations.

Data collection was accomplished by Research Triangle Institute, Research Triangle Park, N.C., and its subcontractors, the National Opinion Research Center of the University of Chicago, Ill., and SysteMetrics, Inc., Berkeley, Calif., under Contract No. 233–79–2032.

Co-Project Officers for the Survey were Robert R. Fuchsberg of the National Center for Health Statistics (NCHS) and Allen Dobson of the Health Care Financing Administration (HCFA). Robert A. Wright of NCHS and Larry Corder of HCFA also had major responsibilities. Daniel G. Horvitz of Research Triangle Institute was the Project Director primarily responsible for data collection, along with Associate Project Directors Esther Fleishman of the National Opinion Research Center, Robert H. Thornton of Research Triangle Institute, and James S. Lubalin of SysteMetrics, Inc. Barbara Moser of Research Triangle Institute was the Project Director primarily responsible for data processing.

Contents

Figure

Symbols

- - - Data not available

... Category not applicable

- Quantity zero

0.0 Quantity more than zero but less than 0.05

* Test statistic is significant at 0.05 level

** Test statistic is significant at 0.01 level

Insurance Coverage and Ambulatory Medical Care of Low-Income Children: United States, 1980

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Executive Summary

In the household survey phase of the National Medical Care Utilization and Expenditure Survey of 1980, a survey was conducted of 17,123 persons who constituted a representative sample of the civilian population in the United States not residing in institutions. Through repeated interviews the survey obtained information on the health conditions of these people, the health care services they received in 1980, the costs of these services, and the sources of payment for services. This report, one of a series of reports on the survey findings, provides a profile of low-income children: Their health insurance coverage, health service use, and expenditures for physician visits. Children under 18 years of age in families below 150 percent of the 1980 Federal poverty level are considered low income. However, children who were ineligible to participate in the survey for part of the year are excluded, such as those who were born, who died, or who were institutionalized in 1980.

A physician visit is defined as a face-to-face contact with a physician or a nonphysician working under the supervision of a physician. In addition, visits to nurse practitioners and physician assistants who were reported as "independent providers" are included. Otherwise, visits to independent providers (primarily chiropractors and optometrists), mental health visits, visits by physicians to hospital inpatients, and telephone contacts are excluded.

Of the 63.9 million children under 18 years of age in the United States in 1980, about one-fourth (16.8 million) lived in low-income families, according to estimates from the National Medical Care Utilization and Expenditure Survey. Nearly one-half (46 percent) of the 16.8 million low-income children were covered by Medicaid

for all or part of 1980: 31 percent were covered by Medicaid only for the full year, 3 percent were covered by Medicaid for part of 1980 and uninsured for the remainder of the year, and 12 percent were covered by both Medicaid and private insurance during the year. An additional 30 percent of the low-income children were privately insured for the full year, while 8 percent had private insurance coverage for part of the year and were uninsured otherwise. Sixteen percent of the children in low-income families, or 2.7 million children, were uninsured for all of 1980. When added to the 3 percent with part year Medicaid coverage and the 8 percent with private coverage part of the year, over one-fourth (28 percent) were uninsured for at least part of 1980. This figure is almost twice as high as the percent of nonpoor children uninsured for at least part of the year (15 percent).

Comparisons were made on the characteristics, health service use, and health expenditures among four categories of low-income children: those on Medicaid the full year, those on Medicaid only part of the year, the privately insured, and the uninsured:

- In general, Medicaid coverage was more likely among—
  - Black children than among white children.
  - Children in families with more education than less.
  - Children in single-parent families than two-parent families.
  - Children in poor families than near-poor families.
  - Children living outside the South.
  - Children in fair or poor health or with an activity limitation.
  - Children hospitalized during the year.

- Low-income children were not more (or less) likely to have a regular source of care than those who were not on Medicaid. The convenience of the regular source—in terms of travel time—also did not differ among Medicaid and non-Medicaid low-income children.

- Low-income children had significantly fewer physician visits than nonpoor children. Within the low-

income population, the uninsured children had a lower likelihood of and fewer visits than those who were privately insured or on Medicaid.

- About one-half of the low-income children had no visits to an office-based physician in 1980. Children on Medicaid part of the year had the highest number of visits, on average. The data suggest that children on Medicaid part of the year are "medically needy."

- Children under 6 years of age who were covered by Medicaid were more likely to have a preventive exam that non-Medicaid children.

- Compared with nonpoor children, low-income children were significantly less likely to visit a physician's office, and were more likely to visit organized settings (such as health centers, hospital outpatient departments, and emergency rooms). Within the low-income population, Medicaid children were more likely than non-Medicaid children to visit a health center or clinic. In addition, children on Medicaid part of the year were most likely to visit an emergency room.

- In 1980, $1.4 billion reportedly was spent for physician visits by low-income children. As expected, children who were covered by Medicaid or who were privately insured had higher charges, on average, than those who were uninsured.

- The level of out-of-pocket expenditures is also as expected. The uninsured and the privately insured bear a significantly higher burden than the Medicaid children. The average out-of-pocket expense for non-Medicaid children was triple the average expense for Medicaid children.

Introduction

Over the past two decades, with the advent of Medicaid, increases in physician supply, and the establishment of community health centers, the utilization of physicians' services by low-income children has increased. Whereas in 1964, 33 percent of poor children and 15 percent of nonpoor children had no physician contact in the previous 2 years, by 1981 the figures had decreased to 11 percent of poor children and 10 percent of nonpoor children. The differential in average number of physician visits was reversed. Average use by poor children increased from 2.3 contacts in 1964 to 4.8 contacts in 1981; nonpoor children went from 4.0 to 4.1 contacts.

However, the low-income population is not synonymous with the Medicaid population. In 1977, 48 percent of the low-income children (defined as those who lived in families with incomes below 125 percent of the Federal poverty guidelines) had Medicaid coverage at least part of the year, 39 percent had private insurance for all or part of the year, and 13 percent were uninsured for the entire year (Wilensky and Berk, 1982). An important research question and policy issue is whether access to health services by low-income children varies depending on the type of insurance coverage.

Concept of Access in Health Care

Two broad measures of access typically have been employed in research concerning health service use. The first type, process indicators, reflects characteristics of the delivery system (e.g., physicians per population, waiting time, and travel time). The second type, outcome indicators, portrays an individual's entry into and journey through the health care system, as measured by various utilization rates (Aday and Andersen, 1975). In Andersen and Newman's (1973) terms, the first definition represents potential access, while the latter more directly measures realized access.

The President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research (1983) raised the issue of "equitable" access. Its definition incorporates aspects of both realized and potential access. Concerning the "appropriate" level of care (realized access), the Commission rejected the notions that (1) an equal level of care should be available to all (given varying tastes and preferences) and (2) individuals

should receive as much care as they need or can benefit from (given limited resources). Instead, equitable access is defined as "enough care to achieve sufficient welfare, opportunity, information, and evidence of interpersonal concern to facilitate a reasonably full and satisfying life. That level can be termed 'an adequate level of health care.'"

The Commission points out two major strengths of this concept: (1) it does not generate an open-ended obligation and (2) it allows individuals to exceed an adequate level of care (subject to an income constraint), which may be unequal, but not inequitable, by definition.

The Commission concluded that a definition of equitable access should consider the burden involved in obtaining care (potential access), including the direct money costs associated with the care, and such indirect costs as waiting and travel time, and availability of transportation. While discrepancies among groups would not necessarily signify inequitable access, they might suggest that some individuals face greater burdens that others in obtaining care. Large disparities might be indicators of racial or ethnic discrimination.

This report approaches the issue of access from both perspectives by presenting data on realized access (such as percent of children with a physician visit or a preventive exam, and average number of physician visits), as well as data on potential access (such as the presence of a regular source of care and its convenience).

Background of Report

This report uses data from the 1980 National Medical Care Utilization and Expenditure Survey (NMCUES). NMCUES is ideally suited for exploring the question of whether health service use by low-income children varies according to the type of insurance coverage. Information on health insurance coverage, health problems, health care received, costs of care, and related areas was collected by means of NMCUES throughout calendar year 1980 from a sample of the U.S. civilian noninstitutionalized population. This report is a profile of low-income children: Their health insurance coverage, health service use, and expenditures for physician visits. Children under 18 years of age in families with incomes below 150 percent of the 1980 Federal poverty level are considered low

income. However, children who were ineligible to participate in the survey for part of the year are excluded, such as those who were born, who died, or who were institutionalized in 1980.

For the purpose of this report, a physician visit is defined as a face-to-face contact with a physician or a nonphysician working under the supervision of a physician. In addition, visits to nurse practitioners and physician assistants who were reported as "independent providers" are included. Otherwise, visits to independent providers (primarily chiropractors and optometrists) are excluded. Mental health visits are also excluded, as defined by the condition (mental disorder), the provider (psychiatrist, psychologist, or social worker), or the setting (psychiatric clinic). This definition is similar to that used by Taube, Kessler, and Feuerberg (1984) with the exception that visits to social workers (regardless of diagnosis) are excluded from this analysis. Physician visits to hospital inpatients are not counted; telephone contacts also are not included. Because the survey covered only the non-institutionalized population, visits involving residents of institutions are excluded. This report focuses on physician visits in hospital outpatient departments or emergency rooms, freestanding health clinics, doctors' offices, homes, laboratories, and other places.

For a discussion of the sample design, imputation procedures, estimation methods, and statistical hypothesis testing, see Appendix I. For a further definition of terms, see Appendix II. Bonham (1983) and the National Center for Health Statistics (1983) provide additional background on the procedures, questionnaires, and public use tape for NMCUES. Refer to Rosenbach (1985) for a more detailed description of the methods used in this report.

In this report, unless otherwise indicated in the text, differences between percents or totals are noted only if they are statistically significant at the .05 level. Only simple relationships of single factors are reported, even though it is recognized that underlying variables may account for the observed relationships.

Discussion

This report describes the population of low-income children in terms of their health insurance coverage, health service use, and expenditures for health care. The first section compares the insurance coverage of low-income children to that of children of all incomes. Next, the characteristics of low-income children covered by Medicaid versus those not on Medicaid are examined. Finally, an overview is presented on the use of and expenditures for physicians' services, according to type of coverage. The data presented in this report are weighted estimates for the civilian noninstitutionalized population in the United States.

Overview of Insurance Coverage

Of the 63.9 million children under age 18 in the United States in 1980, about one-fourth (16.8 million) lived in poor and near-poor families (defined as families with incomes below 150 percent of the Federal poverty level). Nearly one-half (46 percent) of the 16.8 million low-income children were covered by Medicaid for all or part of 1980: 31 percent were covered by Medicaid only for the full year, 3 percent were covered by Medicaid for part of 1980 and uninsured for the remainder of the year, and 12 percent were covered by both Medicaid and private insurance during the year. (See Table 1 and Figure 1.)

An additional 30 percent of the low-income children were privately insured for the full year, while 8 percent had private insurance coverage for part of the year and were uninsured otherwise. Sixteen percent of the children in low-income families, or 2.7 million children, were uninsured for all of 1980. When added to the 3 percent with part-year Medicaid coverage and the 8 percent with private coverage part of the year, over one-fourth (28 percent) were uninsured for at least part of 1980. This figure is almost twice as high as the percent of nonpoor children uninsured for at least part of the year (15 percent).

As expected, the predominant form of insurance coverage among nonpoor children is private insurance: 80 percent were covered the full year, 7 percent part of the year, and 3 percent in combination with Medicaid coverage.

For the remainder of this report, insurance coverage is divided into four categories: (1) Medicaid coverage the full year, (2) Medicaid coverage part of the year,
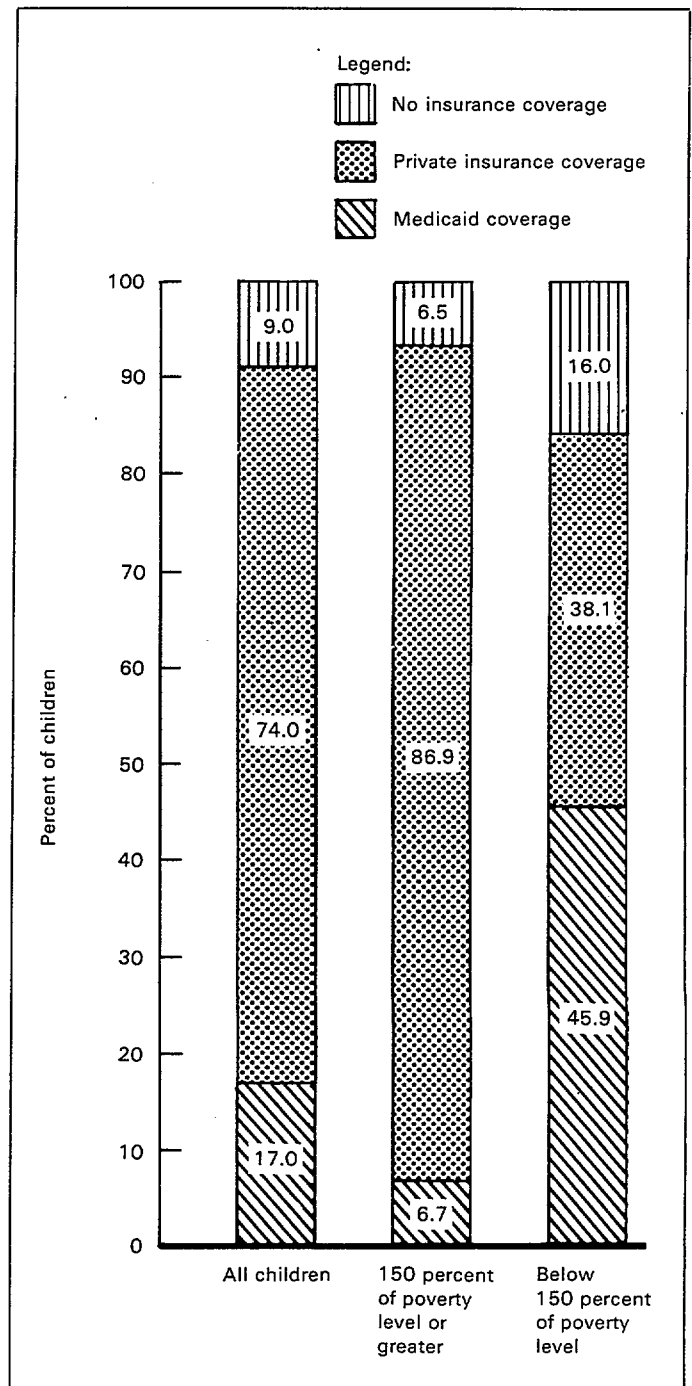

Figure 1

Insurance coverage of children: United States, 1980

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(3) private insurance coverage all or part of the year (and no Medicaid coverage), and (4) no insurance coverage the entire year. These figures are comparable to those presented in Table 1 with two modifications: (1) children receiving both Medicaid and private insurance in 1980 have been classified in the full-year and part-year Medicaid categories regardless of their private insurance coverage (the total with Medicaid is unchanged, however); and (2) the separate full-year and part-year private insurance categories have been collapsed into one category. These regroupings preserve the distinctions between the insured and uninsured children as well as between full-year and part-year Medicaid recipients, while maintaining cell sizes sufficient for analysis.

Criteria for Medicaid Eligibility

Medicaid eligibility is based on a variety of financial and categorical criteria. All States must provide Medicaid coverage to children in families receiving Aid to Families with Dependent Children (AFDC). However, there is considerable variation among States in the financial criteria because the States determine the payment standards upon which AFDC eligibility is based. The level of a State's payment standard reflects its fiscal capabilities and attitudes toward assisting the poor (Rymer et al., 1979). AFDC is targeted to children in single-parent families, although 25 States and the District of Columbia provided AFDC (as well as Medicaid) to children in two-parent families with an unemployed parent in 1980. (See Table 2.) In addition, 29 States and the District of Columbia provided Medicaid coverage to children in two-parent families that did not meet the categorical requirements of AFDC, but did meet the financial criteria (Muse and Sawyer, 1982).

Another optional group, covered by 29 States and the District of Columbia, is the medically needy. This group consists of those who did not qualify financially for public assistance (AFDC) but whose medical expenses enabled them to "spend down" their income to qualify for Medicaid. Blind and disabled children receiving Supplemental Security Income were automatically covered by Medicaid in 33 States and the District of Columbia; the remaining 17 States placed some restrictions on Medicaid coverage of Supplemental Security Income recipients (Muse and Sawyer, 1982).

Gaps exist in Medicaid coverage of children within States that do not cover one or more of the optional groups discussed above. In addition, States with very low AFDC payment standards exclude low-income children in single-parent families whose income exceeds the financial limit, but is still below the poverty level.

Characteristics of Low-Income Children According to Insurance Coverage

As shown in Table 3, Medicaid and non-Medicaid children did not differ significantly in age. The average

age was roughly 8 years in both groups. Also, there were no statistical differences between the two groups with respect to the proportion of females.

The type of coverage for black and white children was significantly different, with black children accounting for 45 percent of the low-income children covered by Medicaid the full year, 20 percent of the uninsured, and 21 percent of the privately insured. (Overall, black children constituted 30 percent of the low-income children.) The lower level of Medicaid coverage and higher level of no insurance among white children may result, in part, from the fact that a higher proportion of white children were living in two-parent families. As discussed previously, AFDC (and hence, Medicaid) is targeted to children in single-parent families, although 30 States extend Medicaid to children in two-parent families. (The small number of children of other races and the unreliability of the estimates preclude any separate discussion of this subpopulation.)

Half of the children on Medicaid the full year or uninsured the full year lived in families where no adult had graduated from high school. A significantly lower proportion (about one-fourth) of the children covered by private insurance lived in families with no high school graduate. Educational status may be associated with a parent's employment status or place of employment and, hence, insurance coverage.

As expected from the Medicaid eligibility criteria, children covered by Medicaid either full year or part year were significantly more likely to be living in single-parent families (72 percent) than those not on Medicaid (25 percent). Both Medicaid and non-Medicaid children lived in families having an average of three children in the household.

Low-income children covered by Medicaid lived in families with an average income of $7,138. This was significantly lower than the average family income of non-Medicaid children ($10,024). Children on Medicaid the full year had the lowest family income on average ($6,907), while the privately insured had the highest ($10,318).

Restrictive financial and categorical criteria clearly prevented some of the uninsured population from qualifying for Medicaid. About half of the uninsured children lived in families below the poverty level. The remaining half of the uninsured were near poor (100 to 150 percent of poverty). As would be expected, three-fourths of the Medicaid children were below the poverty level.

Low-income children living in the South represented 35 percent of the total, but only 28 percent of those covered by Medicaid for all or part of the year. Children in the South accounted for a disproportionate share of the non-Medicaid population (both the uninsured and privately insured). Southern States tend to have lower income eligibility criteria for AFDC and, as a result, provide public assistance to a smaller proportion of the children in poverty (Kovar and Meny, 1981).

Of the low-income children on Medicaid for all or

part of the year, 12 percent were in fair or poor health or had an activity limitation, compared with 8 percent of the non-Medicaid children. A significantly higher proportion of the Medicaid children were hospitalized in 1980. Both groups had roughly the same number of bed days on average.

It would appear that low-income children who were covered by Medicaid part of the year may be in poorer health than other children, as indicated by the percent hospitalized in 1980. It should be noted, however, that a causal relationship among health status, health service use, and Medicaid coverage is likely. Children in poor health who have high medical care costs may be covered by Medicaid in the 30 States that cover the medically indigent if they meet the financial and categorical eligibility criteria.

Regular Source of Care

Low-income children are more likely than higher income children to report a particular place as a regular source of care, whereas higher income children tend to have a physician's office as a regular source. This disparity has been attributed, in part, to the effects of Medicaid. However, data have not been published on the regular source of care of low-income children, according to their insurance coverage. This section presents such data, as well as information on the convenience of the regular source, measured by the average travel and waiting times. These data reflect indicators of potential access, as discussed in the introduction.

Overall, 85 percent of the low-income children were reported to have a regular source of care, ranging from 82 percent for those who were uninsured to 87 percent for the privately insured. (See Table 4.) Children covered by Medicaid part of the year were most likely to report a physician's office as a regular source (59 percent), probably due to their lower health status and thus greater need for specialized care. Uninsured children were least likely to report a physician's office as a regular source (49 percent). Overall, non-Medicaid children were more likely to report a particular place as a regular source of care. These differences, however, were not statistically significant.

Of those with a regular source of care, the average travel time was 18 minutes, while the average waiting time in the physician's office, health center, or other place was 43 mintues. (See Table 5). Average travel time was lower (although not significantly lower) for the privately insured children (16.3 minutes), compared to the uninsured (20.8 minutes), the part-year Medicaid children (19.2 minutes), and the full-year Medicaid children (18.6 minutes). Compared with privately insured children, only the children on Medicaid the full year had a significantly longer waiting time (on average). Thus it would appear from these data that there are few significant differences among Medicaid and non-Medicaid low-income children in the type of regular source and its convenience.

Health Service Use

This section provides baseline data on health service utilization by low-income children, according to type of insurance coverage. The data are presented unadjusted, and then adjusted for selected factors (self-reported health status, whether the child had a regular source of care, and age).

Low-income children had significantly fewer physician visits than nonpoor children, 2.7 versus 3.3 visits per child. However, the number of visits per child with at least one visit was not statistically different, 3.8 visits for low-income children and 4.2 visits for non-poor children. (See Table 6.)

Within the low-income population, non-Medicaid children were significantly less likely than Medicaid children to have a physician visit—33 percent of the non-Medicaid children had no physician visits in 1980. (See Table 6.) Uninsured children had an average of 1.8 physician visits, significantly less than the averages for the other three groups. In fact, the average number of visits for children covered by Medicaid part of the year was twice that for uninsured children.

Another comparative measure is the average number of visits per child with at least one visit. Because this measure excludes children with no visits, it reflects the intensity of physician contact among users. The average number of visits per child with at least one visit ranged from 2.8 visits (uninsured) to 4.4 visits (part-year Medicaid). Again, the uninsured had significantly fewer visits than each of the other three groups.

Although Table 6 clearly indicates that uninsured children were less likely than insured children to see a physician, it is inappropriate to make such a comparison without adjusting for perceived health status. Using the direct method of adjustment, disparities remained between insured and uninsured children in the percent with no physician visits in 1980: uninsured, 36.3 percent; privately insured, 30.6 percent; Medicaid full year, 26.9 percent; and Medicaid part year, 17.1 percent (data not shown).

Another comparison was made by adjusting for whether the child had a regular source of care. (See Table 7.) Having a regular source did not increase the likelihood of a physician visit among uninsured children; nor was it reduced. Slightly more than one-third of the uninsured children had no physician visits in 1980, regardless of whether they had a regular source of care. In contrast, for the children on Medicaid all year and the privately insured, the likelihood of a physician visit was significantly higher among children with a regular source. (The estimates for the part-year Medicaid children are unreliable due to the small sample size.)

The average number of visits for children with a

regular source generally was not significantly different from the average for the children with no regular source with one exception. Privately insured children with a regular source averaged twice as many visits as those with no regular source (3.0 visits versus 1.6).

About one-half of the low-income children had no visits to an office-based physician in 1980. (See Table 8.) The average number of visits to a private physician was 1.3 visits. Of those with at least one visit, the average number per child was 2.7 visits. Children on Medicaid part of the year were most likely to visit private physicians although the differences among the four groups were not statistically significant.

Children on Medicaid part of the year had an average of 1.9 visits to a private physician, but among those making at least one visit, the average was 2.7 visits. The average number of visits for this group was significantly higher than the average for the other three groups. These figures, as well as the data presented above on aggregate physician use, are consistent with the notion that the children on Medicaid part of the year are medically needy.

Overall, 18 percent of the low-income children had one or more preventive visits in 1980. Because of varying protocols for preventive care, depending on the age of the child, the data in Table 9 are shown by age. Children under 6 years of age were twice as likely (26 percent) as elementary-school-age children (11 percent) and adolescents (13 percent) to have a preventive exam. In all age groups, children covered by Medicaid were more likely to receive preventive care than children who were not covered by Medicaid, although the difference is significant only among the youngest children. This pattern is also observed when the figures are age adjusted.

Within the youngest age group, children on Medicaid the entire year were more likely to have a preventive examination than privately insured children. However, no statistically significant differences were found between the full-year Medicaid children and the uninsured or part-year medicaid children.

Place of Visit

Differences in the place of visit according to type of insurance coverage may be an indicator of the nature of supply-side incentives as well as a reflection of individual preferences. For example, low levels of physician reimbursement under Medicaid may reduce the availability of office-based care for Medicaid recipients and increase the use of hospital-based ambulatory care from outpatient departments (OPD's) and emergency rooms (ER's). Similarly, limited coverage of physicians' services among those who are privately insured may also lead to the use of hospital-based care. Additionally, utilization patterns may reflect an individual's or a group's preferences for office-based or hospital-based ambulatory care (subject to supply constraints).

Table 10 shows the percent of children with at least one physician visit, who had visits to specified places. Of the low-income children with a physician visit in 1980, 68 percent visited a physician's office, 29 percent went to a health center, 35 percent to an ER, and 25 percent to a hospital OPD. Compared with nonpoor children, low-income children were significantly less likely to visit a physician's office and more likely to use each of the three other facilities. (There were no significant differences in the percent of visits to "other" places, including laboratory and home visits, and visits to unspecified places.)

Within the low-income population, utilization patterns varied according to a child's insurance coverage. About 45 percent of the children on Medicaid part of the year (who used any ambulatory care), had one or more visits to an ER. In addition, children on Medicaid full year or part year (and who had at least one visit) were more likely than non-Medicaid children to visit a health center or clinic, perhaps because of the effort among community health centers to serve Medicaid recipients. There were no statistical differences in the use of OPD's, office-based physicians, and other places among the four groups.

Table 10 shows the percent distribution of visits, according to place of visit. Among nonpoor children, visits to a physician's office accounted for over two-thirds of the visits, compared with one-half for the low-income children. A higher proportion of the visits among low-income children were to organized settings (health centers or clinics, hospital ER's, and OPD's). In particular, the percent of visits by low-income children to hospital OPD's was about three times that by nonpoor children.

Within the low-income population, uninsured children had the highest percent of visits to a physician's office, while privately insured children had the lowest (although this difference was not significant). Unexpectedly, the privately insured children had the highest percent of visits to hospital OPD's (although this difference, also, was not significant at the 0.05 level). Compared with non-Medicaid children, the Medicaid children (full and part year combined) did have a significantly higher percent of visits to health centers as well as to hospital ER's.

Two points should be emphasized about Table 10. Low-income children who have any ambulatory care make greater use of hospital-based facilities than children of higher incomes. However, within the low-income population, privately insured children had a higher proportion of visits to such facilities.

The higher use of hospital OPD's and ER's has both cost and quality implications. The average charge for a hospital ER visit in 1980 was $77.21, compared with $44.86 for an OPD visit, $22.09 for an office visit, and $21.06 for a clinic visit. (These data are from the 1980 NMCUES based on visits by low-income children that had a charge.) Visits to a physician's office or to a health center are lower in cost than those to an OPD or ER. Thus, from a cost perspective, OPD's and ER's should be providers of last resort.

From a quality perspective, ER's in particular are generally considered inappropriate providers of primary care or nonurgent care because they lack continuity and comprehensiveness. As Davidson (1978) notes: "Nonurgent care provided in ER's necessarily lacks continuity and followup, for one thing, since ER's must be established to respond to emergency episodes. Furthermore, ER personnel are trained and selected for their ability to treat emergency and urgent conditions; in many instances they have neither the experience nor the interest needed to provide effective primary care."

Expenditures for Physicians' Visits

In 1980, $1.4 billion reportedly was spent for physician visits by low-income children. Expenditures for physicians' services are a function of two components: The number of visits and the cost per visit. An additional factor affects the estimates that are obtained from a household survey such as the NMCUES; that is, the individual's knowledge of the cost of care. The expenditure data are based on reported charges, not the actual cost of care. Thus, the data underestimate the amounts for subsidized care (e.g., community health centers and public hospitals).

The reported charges were disproportionately high (relative to the distribution of children) for children covered by Medicaid part year and those who were privately insured. In contrast, they were disproportionately low for uninsured children. (See Table 11.) The differentials in charges are also illustrated by the average charge per child and the average charge per visit, as shown in Table 12. (These estimates are based on children or visits with charges, and exclude those with no charges.) Children on

Medicaid full year or part year and those who were privately insured had significantly higher average charges than the uninsured children.

The considerably lower charges among uninsured children deserve further comment. While the previous analysis indicated that the uninsured had fewer visits than other children, it was not on the order of magnitude that the lower average charges per child would suggest. Clearly, subsidized care accounts for a large amount of this difference. The average charge per visit for uninsured children was less than that for the three other groups, for office visits as well as visits to ER's and OPD's (data not shown).

Finally, the level of out-of-pocket expenditures, according to insurance coverage, is as one would expect. The uninsured and the privately insured bear a significantly higher burden than the Medicaid children. (See Table 13.) The average expense for non-Medicaid children ($42.27) was more than triple the average expense for Medicaid children ($13.47). However, the children on Medicaid part of the year had significantly higher out-of-pocket expenses than those covered by Medicaid the full year ($26.51 versus $9.98). In part, this may be due to the "spend-down" requirements to qualify for a State's medically needy program under Medicaid.

It should be noted that these data on out-of-pocket expenditures relate only to physician visits. Expenditures for inpatient hospital care, dental care, and prescribed medicines, which can be quite substantial, are not shown in Table 13. When these expenditures are included, 13 percent of the low-income children had $100 or more in out-of-pocket expenses for all types of medical care (including 3 percent of the full-year Medicaid children; 17 percent of the part-year Medicaid children; 21 percent of the privately insured; and 17 percent of the uninsured) (data not shown).

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List of Detailed Tables

Table 1

Number and percent distribution of children by insurance coverage, according to poverty status: United States, 1980

Insurance coverage	All children		Low-income children		Nonpoor children	
	Number in thousands	Percent distribution	Number in thousands	Percent distribution	Number in thousands	Percent distribution
Total.	63,871	100.0	16,846	100.0	47,026	100.0
Medicaid	10,855	17.0	7,726	45.9	3,129	6.7
Full year.	6,494	10.2	5,264	31.2	1,230	2.6
Part year	973	1.5	515.	3.1	458	1.0
With private insurance	3,388	5.3	1,947	11.6	1,441	3.1
Private insurance.	47,276	74.0	6,425	38.1	40,851	86.9
Full year.	42,532	66.6	5,011	29.7	37,521	79.8
Part year	4,744	7.4	1,414	8.4	3,330	7.1
No insurance	5,740	9.0	2,695	16.0	3,045	6.5

NOTE: Low-income children live in families with incomes below 150 percent of the Federal poverty level. Nonpoor children live in families with incomes at or above 150 percent of the Federal poverty level.

Table 2

Eligibility criteria for State Medicaid programs: United States, 1980

State	Families with unemployed parent covered by AFDC	Poor children in 2-parent families not on AFDC	Medically needy	All Supplemental Security Income recipients
Total	26	30	30	34
Alabama	-	X	-	X
Alaska	-	-	-	X
Arizona[1]	-	-	-	-
Arkansas	-	X	X	X
California	X	X	X	X
Colorado	X	-	-	X
Connecticut	X	X	X	-
Delaware	X	-	-	X
District of Columbia	X	X	X	X
Florida	-	-	-	X
Georgia	-	X	-	X
Hawaii	X	X	X	-
Idaho	-	X	-	X
Illinois	X	-	X	-
Indiana	-	-	-	-
Iowa	X	-	-	X
Kansas	X	-	X	X
Kentucky	-	X	X	X
Louisiana	-	X	X	X
Maine	-	X	X	X
Maryland	X	X	X	X
Massachusetts	X	X	X	X
Michigan	X	X	X	X
Minnesota	X	X	X	-
Mississippi	-	-	-	-
Missouri	X	-	-	-
Montana	X	X	X	X
Nebraska	X	-	X	-
Nevada	-	X	-	X
New Hampshire	-	X	X	-
New Jersey	X	X	-	X
New Mexico	-	-	-	X
New York	X	-	X	-
North Carolina	-	-	X	-
North Dakota	-	X	X	-
Ohio	X	-	-	-
Oklahoma	-	X	X	-
Oregon	-	X	-	X
Pennsylvania	X	X	X	X
Rhode Island	X	X	X	X
South Carolina	-	X	-	X
South Dakota	-	-	-	X
Tennessee	-	X	X	X
Texas	-	-	-	X
Utah	X	X	X	-
Vermont	X	X	X	X
Virginia	-	-	X	-
Washington	X	X	X	X
West Virginia	X	-	X	X
Wisconsin	X	X	X	X
Wyoming	-	-	-	X

[1]As of December 1980 Arizona did not have a Medicaid program.

NOTES: See text for description of eligibility criteria. X = coverage offered by the State; - = coverage not offered by the State.

SOURCE: Muse, D. N., and Sawyer, D.: Health care financing program statistics. *The Medicare and Medicaid Data Book, 1981*. DHHS Pub. No. (HCFA) 03128. Health Care Financing Administration. Washington. U.S. Government Printing Office, 1982.

Table 3

Characteristics of low-income children, by insurance coverage: United States, 1980

Characteristic	Low-income children	Medicaid			No Medicaid		
		Total	Full year	Part year	Total	Private insurance	No insurance
Number of children in thousands	16,846	7,726	6,248	1,478	9,120	6,425	2,695
Percent distribution	100.0	45.9	37.1	8.8	54.1	38.1	16.0
Average age in years	8.0	7.7	7.5	8.7	8.2	8.3	7.9
Percent female	49.7	48.6	47.9	51.3	50.7	49.3	54.1
Percent black	30.3	41.9	45.2	27.7	20.5	20.8	19.9
Percent no high school graduate in family	41.0	48.4	50.8	38.4	34.7	27.1	52.8
Percent single-parent families	46.5	72.2	72.8	70.0	24.8	22.0	31.4
Average number of children in family	3.1	3.2	3.2	3.0	3.1	3.2	3.0
Average income in dollars	8,700	7,138	6,907	8,117	10,024	10,318	9,323
Percent below poverty level	58.2	76.2	79.0	64.7	42.9	41.2	47.0
Percent living in South	34.9	27.6	25.7	35.4	41.2	40.8	42.2
Percent in fair/poor health or with activity limitation	9.5	11.7	11.1	14.2	7.6	6.7	9.7
Percent hospitalized in 1980	7.8	10.4	9.4	13.4	5.9	7.2	2.6
Average number of bed days	3.9	4.0	3.9	4.7	3.7	3.8	3.4

Table 4

Percent distribution of low-income children by regular source of medical care, according to insurance coverage: United States, 1980

Insurance coverage	Total	Regular source		No regular source
		Physician's office	Particular place	
		Percent distribution		
Total	100.0	52.3	32.6	15.1
Medicaid	100.0	53.6	30.6	15.8
Full year	100.0	52.5	32.2	15.3
Part year	100.0	58.5	23.6	17.9
No Medicaid	100.0	51.1	34.3	14.6
Private insurance	100.0	52.2	34.8	13.0
No insurance	100.0	48.6	33.2	18.2

Table 5

Percent distribution of low-income children by regular source of medical care, according to insurance coverage; and convenience of regular source, by insurance coverage: United States, 1980[1]

Insurance coverage	Low-income children	Regular source			Convenience of regular source	
		Total	Physician's office	Particular place	Travel time	Waiting time
	Number in thousands	Percent distribution			Average time in minutes	
Total	14,295	100.0	61.6	38.4	18.1	43.0
Medicaid	6,504	100.0	63.7	36.3	18.7	46.8
Full year	5,291	100.0	61.9	38.1	18.6	48.9
Part year	1,213	100.0	71.3	28.7	19.2	37.8
No Medicaid	7,792	100.0	59.8	40.2	17.5	39.8
Private insurance	5,588	100.0	60.0	40.0	16.3	35.4
No insurance	2,204	100.0	59.4	40.6	20.8	51.1

[1]Includes only children with a regular source of medical care.

Table 6

Percent distribution of low-income children by number of physician visits, according to insurance coverage; with average number of visits: United States, 1980

Insurance coverage	Number of physician visits					Visits	
	Total	None	1 or 2	3 to 6	7 or more	Per child	Per child with visit
	Percent distribution					Average number	
All children	100.0	23.6	37.5	26.7	12.3	3.1	4.1
Nonpoor children	100.0	21.6	38.1	27.5	12.7	3.3	4.2
Low-income children	100.0	29.0	35.6	24.3	11.1	2.7	3.8
Medicaid	100.0	24.8	35.6	25.9	13.7	2.9	3.9
Full year	100.0	26.6	35.8	25.6	12.0	2.8	3.8
Part year	100.0	17.0	35.2	27.0	20.8	3.6	4.4
No Medicaid	100.0	32.6	35.5	23.0	8.9	2.5	3.8
Private insurance	100.0	31.0	33.8	24.7	10.4	2.8	4.1
No insurance	100.0	36.3	39.5	18.9	[1]5.3	1.8	2.8

[1] Relative standard error equal to or greater than 0.30.

Table 7

Percent of low-income children with 1 or more physician visits and average number of visits per child, by insurance coverage: United States, 1980

Insurance coverage	Children with 1 or more visits		Visits per child	
	Regular source	No regular source	Regular source	No regular source
	Percent of children		Average number	
Total	72.7	61.4	2.9	1.8
Medicaid	76.7	67.3	3.1	2.1
Full year	75.7	60.7	2.9	1.9
Part year	81.1	91.3	3.8	[1]2.6
No Medicaid	69.3	56.0	2.7	1.5
Private insurance	71.5	51.9	3.0	1.6
No insurance	63.8	63.0	1.9	1.5

[1] Relative standard error equal to or greater than 0.30.

Table 8

Percent distribution of low-income children by number of private physician visits, according to insurance coverage; with average number of visits: United States, 1980

Insurance coverage	Number of physician visits					Visits	
	Total	None	1 or 2	3 to 6	7 or more	Per child	Per child with visit
	Percent distribution					Average number	
Total	100.0	52.2	30.9	13.2	3.8	1.3	2.7
Medicaid	100.0	49.2	31.3	14.4	5.2	1.4	2.8
Full year	100.0	50.2	32.1	13.4	4.4	1.3	2.7
Part year	100.0	45.1	27.7	18.7	8.6	1.9	2.7
No Medicaid	100.0	54.7	30.6	12.2	2.5	1.2	2.6
Private insurance	100.0	55.5	29.9	11.5	3.2	1.2	2.7
No insurance	100.0	52.9	32.9	13.8	[1]1.0	1.1	2.3

[1] Relative standard error equal to or greater than 0.30.

Table 9

Number of low-income children and percent with preventive visits, by age of child and insurance coverage: United States, 1980

Insurance coverage	Low-income children	All ages	Under 6 years	6–11 years	12–17 years	Age adjusted[1]
	Number in thousands			Percent		
Total	16,846	17.5	26.4	11.4	13.1	17.5
Medicaid coverage	7,725	21.7	30.8	14.8	16.5	21.2
Full year	6,248	21.5	31.9	14.0	15.1	21.0
Part year	1,478	22.4	26.1	19.3	20.5	22.2
No Medicaid	9,120	13.9	22.0	8.8	10.5	14.2
Private insurance	6,425	14.3	21.9	9.6	11.0	14.6
No insurance	2,695	12.9	22.2	7.0	8.9	13.2

[1]Age adjusted by the direct method.

Table 10

Number, percent of children with at least 1 visit, and percent distribution of physician visits, by place of visit and insurance coverage: United States, 1980

Insurance coverage	Total	Children with at least 1 visit					
		Place of visit[1]					
		Total	Physician's office	Health center or clinic[2]	ER	OPD	Other[3]
	Number of children in thousands			Percent of children[4]			
All children	48,821	...	79.8	19.5	29.2	16.3	9.7
Nonpoor children	36,865	...	83.7	16.5	27.2	13.5	9.6
Low-income children	11,956	...	67.8	28.7	35.2	24.8	10.1
Medicaid	5,810	...	67.5	34.1	36.9	24.1	10.2
Full year	4,585	...	68.1	33.6	34.9	24.7	10.2
Part year	1,226	...	65.3	35.6	44.5	21.5	10.4
No Medicaid	6,146	...	68.0	23.7	33.6	25.5	9.9
Private insurance	4,430	...	66.1	23.0	35.6	27.2	10.8
No insurance	1,716	...	73.0	25.5	28.5	21.3	7.7
	Number of visits in thousands			Percent distribution of visits			
All children	199,911	100.0	66.8	9.3	10.0	10.4	3.5
Nonpoor children	154,120	100.0	71.9	8.4	8.7	7.3	3.6
Low-income children	45,792	100.0	49.5	12.2	14.3	20.8	3.2
Medicaid	22,649	100.0	50.4	15.1	15.9	15.3	3.2
Full year	17,288	100.0	49.3	16.2	15.6	15.6	3.3
Part year	5,361	100.0	54.0	11.4	16.9	14.7	3.0
No Medicaid	23,142	100.0	48.6	9.5	12.7	26.1	3.2
Private insurance	18,255	100.0	45.5	9.1	12.5	29.4	3.2
No insurance	4,887	100.0	59.0	10.7	13.5	13.7	3.1

[1]Excludes telephone contacts.
[2]Includes visits to community health centers and school clinics.
[3]Includes laboratory and home visits as well as visits to unspecified places.
[4]Some children visited more than 1 place; therefore, the rows do not total 100 percent.

Table 11

Number and percent distribution of low-income children and amount and percent distribution of expenditures for physicians' services by insurance coverage: United States, 1980

Insurance coverage	Low-income children		Expenditures for physicians' services[1]	
	Number in thousands	Percent distribution	Number in thousands of dollars	Percent distribution
Total	16,846	100.0	1,427,057	100.0
Medicaid.	7,725	45.9	692,089	48.5
Full year	6,248	37.1	514,598	36.1
Part year.	1,478	8.8	177,491	12.4
No Medicaid.	9,120	54.1	734,969	51.5
Private insurance	6,425	38.1	632,839	44.3
No insurance	2,695	16.0	102,130	7.2

[1]The data in this column represent the expenditures for children in each of the insurance categories. They do not represent the amounts spent by the Medicaid program for those covered full or part year nor by private insurers for those who were privately insured. These figures are the sum of all sources of payment on behalf of children in each of the groups. (Payments for insurance premiums are excluded.)

Table 12

Number of low-income children, number of physician visits, and average charge per child and per physician visit, by insurance coverage: United States, 1980

Insurance coverage	Low-income children			Average charge per child with charge	Physician visits		Average charge per visit with charge
	Total	With visit	With charge		Total	With charge	
	Number in thousands				Number in thousands		
Total	16,846	11,956	11,347	$125.77	45,792	40,555	$35.19
Medicaid.	7,726	5,810	5,545	124.82	22,649	19,780	34.99
Full year.	6,248	4,585	4,366	117.85	17,288	15,037	34.22
Part year	1,478	1,226	1,178	150.64	5,361	4,743	37.42
No Medicaid	9,120	6,146	5,802	126.67	23,142	20,775	35.38
Private insurance	6,425	4,430	4,216	150.09	18,255	16,454	38.46
No insurance.	2,695	1,716	1,586	64.40	4,887	4,320	23.64

NOTE: The average charges per child and per visit include charges that were imputed. Altogether, 58 percent of the charges were imputed, ranging from 21 percent for those who were uninsured to 86 percent for those who had Medicaid only the entire year.

Table 13

Percent distribution of low-income children by out-of-pocket expenditures for physician visits, according to insurance coverage; with average out-of-pocket expenditures: United States, 1980

Insurance coverage	Out-of-pocket expenditures for physician visits						Average out-of-pocket expenditures[1]
	Total	None	$1–$49	$50–$99	$100 or more	No contact	
	Percent distribution of children						
Total	100.0	36.3	21.2	8.2	5.2	29.0	$28.27
Medicaid.	100.0	58.6	10.7	4.0	2.0	24.8	13.47
Full year	100.0	62.5	7.5	2.2	[2]1.2	26.6	9.98
Part year	100.0	41.9	24.4	11.8	[2]5.0	17.0	26.51
No Medicaid.	100.0	17.5	30.1	11.7	8.0	32.6	42.27
Private insurance	100.0	19.8	30.9	10.4	7.8	31.0	39.22
No insurance	100.0	12.1	28.4	14.7	8.5	36.3	50.16

[1]Average based only on children with 1 or more physician visits.
[2]Relative standard error equal to or greater than 0.30.

Appendixes

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Appendix I. Technical Notes on Methods

Survey Background

The National Medical Care Utilization and Expenditure Survey (NMCUES) was a panel survey designed to collect data about the U.S. civilian noninstitutionalized population in 1980. During the course of the survey, information was obtained on health, access to and use of medical services, associated charges and sources of payment, and health insurance coverage. The survey was cosponsored by the National Center for Health Statistics (NCHS) and the Health Care Financing Administration. Data collection was provided under contract by the Research Triangle Institute and its subcontractors, National Opinion Research Center and SysteMetrics, Inc.

The basic survey plan for NMCUES drew heavily on two surveys, the National Health Interview Survey (NHIS), conducted by NCHS, and the National Medical Care Expenditure Survey (NMCES), cosponsored by the National Center for Health Services Research and NCHS.

NHIS is a continuing, multipurpose, cross-sectional survey first conducted in 1957. The main purpose of NHIS is to collect information on illness, disability, and the use of medical care. Although some information on medical expenditures and insurance payments has been collected in NHIS, the cross-sectional nature of the survey design is not well suited for providing annual data on expenditures and payments.

NMCES was a panel survey in which a sample of households was interviewed six times over an 18-month period in 1977 and 1978. NMCES was specifically designed to provide comprehensive data on how health services were used and paid for in the United States in 1977.

NMCUES is similar to NMCES in survey design and questionnaire wording, so that analysis of some of the change during the 3 years between 1977 and 1980 is possible. Both NMCUES and NMCES used question wording that was similar to NHIS in areas common to the three surveys. Together they provide extensive information on illness, disability, use of medical care, costs of medical care, sources of payment for medical care, and health insurance coverage at two points in time.

Sample Design of NMCUES

The NMCUES sample of housing units and group quarters, hereafter jointly referred to as dwelling units, is a concatenation of two independently selected national samples, one provided by the Research Triangle Institute and the other by the National Opinion Research Center. The sample designs used by these two organizations are similar with respect to principal design features; both can be characterized as stratified, four-stage area probability designs. The principal differences between the two designs are the type of stratification variables and the specific definitions of sampling units at each stage. The salient design features of the two sample surveys are summarized in the following sections.

The target population for NMCUES consisted of all persons who were members of the U.S. civilian noninstitutionalized population at any time between January 1 and December 31, 1980. All persons living in a sample dwelling unit at the time of the first interview contact became part of the national sample. Unmarried students 17–22 years of age who lived away from home were included in the sample when a parent or guardian was included in the sample. In addition, persons who died or were institutionalized between January 1 and the date of first interview were included in the sample if they were related to persons living in the sampled dwelling units. All of these persons were considered key persons, and data were collected for them for the full 12 months of 1980 or for the proportion of time they were part of the U.S. civilian noninstitutionalized population. In addition, babies born to key persons were considered key persons, and data were collected for them from the time of birth. Relatives from outside the original population (that is, institutionalized, in the Armed Forces, or outside the United States between January 1 and the first interview) who moved in with key persons after the first interview were also considered key persons, and data were collected for them from the time they joined the key person. Relatives who moved in with key persons after the first interview but were part of the civilian noninstitutionalized population on January 1, 1980, were classified as "nonkey" persons. Data were collected for nonkey persons for the time that they lived with a key

person but, because they had a chance of selection in the initial sample, their data are not used for general person-level analysis. However, data for nonkey persons are used in family analysis because they do contribute to the family's utilization of and expenditures for health care during the time they are part of the family.

Persons included in the sample were grouped into "reporting units" for data collection purposes. Reporting units were defined as all persons related to each other by blood, marriage, adoption, or foster care status and living in the same dwelling unit. The combined NMCUES sample consisted of 7,244 eligible reporting units, of which 6,599 agreed to participate in the survey. In total, data were obtained on 17,123 key persons. The Research Triangle Institute sample yielded 8,326 key persons and the National Opinion Research Center sample yielded 8,797.

Research Triangle Institute Sample Design

A primary sampling unit (PSU) is defined as a county, a group of contiguous counties, or parts of counties with a combined minimum 1970 population size of 20,000. A total of 1,686 disjoint PSU's exhausts the land area of the 50 States and Washington, D.C. The PSU's are classified as one of two types. The 16 largest standard metropolitan statistical areas (SMSA's) are designated as self-representing PSU's, and the remaining 1,670 PSU's in the primary sampling frame are designated as non-self-representing PSU's.

PSU's are grouped into strata whose members tend to be relatively alike within strata and relatively unlike between strata. PSU's derived from the 16 largest SMSA's had sufficient population in 1970 to be treated as primary strata. The 1,659 non-self-representing PSU's from the continental United States were stratified into 42 primary strata with approximately equal populations. Each of these primary strata had a 1970 population of about 3.3 million. One supplementary primary stratum of 11 PSU's, with a 1970 population of about 1 million, was added to the Research Triangle Institute primary frame to include Alaska and Hawaii.

The total first stage sample for Research Triangle Institute consisted of 59 PSU's, of which 16 were self-representing PSU's. The non-self-representing PSU's were obtained by selecting one PSU from each of the 43 non-self-representing primary strata. These PSU's were selected with probability proportional to 1970 population size.

In each of the 59 sample PSU's the entire PSU was divided into smaller disjoint area units called secondary sampling units (SSU's). Each SSU consisted of one or more 1970 census-defined enumeration districts or block groups. Within each PSU the SSU's were ordered and then partitioned to form secondary strata of approximately equal size. Two secondary strata were formed in the non-

self-representing PSU drawn from Alaska and Hawaii and four secondary strata were formed in each of the remaining 42 non-self-representing PSU's. Thus, the non-self-representing PSU's were partitioned into a total of 170 secondary strata. In a similar manner the 16 self-representing PSU's were partitioned into 144 secondary strata.

In the second stage of selection, one SSU was selected from each of the 144 secondary strata covering the self-representing PSU's, and two SSU's were selected from each of the remaining secondary strata. All second-stage sampling was with replacement and with probability proportional to the SSU's total noninstitutionalized population. The total number of sample SSU's was $2 \times 170 + 144 = 484$.

For the third stage of selection, each SSU was first divided into smaller, disjoint geographic areas, and one area within the SSU was selected with probability proportional to the total number of housing units in 1970. Next, one or more disjoint segments of at least 60 housing units were formed in the selected area. One segment was selected from each SSU with probability proportional to the segment housing unit count. In response to the sponsoring agencies' request that the expected household sample size be reduced, a systematic sample of one-sixth of the segments was deleted from the sample. Thus, the total third-stage sample was reduced to 404 segments.

For the fourth stage of selection, all of the dwelling units within the segment were listed, and a systematic sample of dwelling units was selected. The procedures used to determine the sampling rate for segments guaranteed that all dwelling units had an approximately equal overall probability of selection. All of the reporting units within the selected dwelling units were included in the sample.

National Opinion Research Center Sample Design

The land area of the 50 States and Washington, D.C., was also divided into disjoint PSU's for the National Opinion Research Center design. A PSU consisted of SMSA's, parts of SMSA's, counties, parts of counties, or independent cities. Grouping of counties into a single PSU occurred when individual counties had a 1970 population of less than 10,000.

The PSU's were classified into two groups according to metropolitan status—SMSA or not SMSA. These two groups were individually ordered and then partitioned into zones with a 1970 census population size of approximately 1 million.

A single PSU was selected within each zone with a probability proportional to its 1970 population. It should be noted that this procedure allowed a PSU to be selected more than one time. For instance, an SMSA primary sampling unit with a population of 3 million could be selected at least twice and possibly as many as four times. The full general-purpose sample contained 204 PSU's.

These 204 PSU's were systematically allocated for 4 subsamples of 51 PSU's. The final set of 76 sample PSU's was chosen by randomly selecting 2 complete subsamples of 51 PSU's; 1 subsample was included in its entirety, and 25 of the PSU's in the other subsample were selected systematically for inclusion in NMCUES.

For the second stage, each of the PSU's selected in the first stage was partitioned into a disjoint set of SSU's defined by block groups, enumeration districts, or a combination of the two types of census units. Within each sample PSU, the SSU's were ordered and then partitioned into 18 zones such that each zone contained approximately the same number of households. One SSU had the opportunity to be selected more than once, as was the case in the PSU selection. If a PSU had been hit more than once in the first stage, the second stage selection process was repeated as many times as there were first-stage hits. The 405 SSU's were identified by selecting 5 SSU's from each of the 51 PSU's in the subsample that was included in its entirety, and 6 SSU's from each of the 25 PSU's in the group for which only one-half of the PSU's were included.

The SSU's selected in the second stage were then subdivided into area segments with a minimum size of 100 housing units each. One segment was then selected with probability proportional to the estimated number of housing units.

The fourth stage selection of housing units for the National Opinion Research Center was essentially the same as that used by the Research Triangle Institute.

Collection of Data

Field operations for NMCUES were performed by the Research Triangle Institute and the National Opinion Research Center under specifications established by the sponsoring agencies. Persons in the sample dwelling units were interviewed at approximately 3-month intervals beginning in February 1980 and ending March 1981. The Core Questionnaire was administered during each of the five rounds of interviews to collect data on health, health care, health care charges, sources of payment, and health insurance coverage. A summary of responses was used to update information reported in previous rounds. Supplements to the Core Questionnaire were used during the first, third, and fifth rounds of interviews to collect data that were not expected to change during the year or that were needed only once. Approximately 80 percent of the third and fourth rounds of interviews were conducted by telephone; all remaining interviews were conducted in person. The respondent for the interview was required to be a household member 17 years of age or older. A proxy respondent not residing in the household was permitted only if all eligible household members were unable to respond because of health, language, or mental condition.

Imputation

Nonresponse in panel surveys such as NMCUES occurs when sample individuals refuse to participate in the survey (total nonresponse), when initially participating individuals drop out of the survey (attrition nonresponse), or when data for specific items on the questionnaire are not collected (item nonresponse). In general, response rates for NMCUES were excellent. Approximately 90 percent of the sample reporting units agreed to participate in the survey, and approximately 94 percent of the individuals in the participating reporting units supplied complete annual information. Even though the overall response rates are quite high for NMCUES, the estimates of means and proportions may be biased if nonrespondents have different health care experiences than respondents, or if there is a substantial response rate differential across subgroups of the target population. Furthermore, totals will tend to be underestimated unless allowance is made for the loss of data due to nonresponse.

Two methods commonly used to compensate for survey nonresponse are data imputation and the adjustment of sampling weights. For NMCUES, imputation was used to compensate for attrition and item nonresponse, and weight adjustment was used to compensate for total nonresponse. Calculation of the weight adjustment factors is discussed in the section on sampling weights.

A specialized form of the sequential hot-deck imputation method was used for attrition imputation. First, each sample person with incomplete annual data (hereafter referred to as a "recipient") was linked to a sample person with similar demographic and socioeconomic characteristics who had complete annual data (hereafter referred to as a "donor"). Second, the time periods for which the recipient had missing data were divided into two categories—imputed eligible days and imputed ineligible days. The imputed eligible days were those days for which the donor was eligible (that is, in scope), and the imputed ineligible days were those days for which the donor was ineligible (that is, out of scope). For the recipient's imputed eligible days, the donor's medical care experiences (such as medical provider visits, dental visits, or hospital stays) were imputed into the recipient's record. Finally, the results of the attrition imputation were used to make the final determination of a person's respondent status. If more than two-thirds of the person's total eligible days (both reported and imputed) were imputed, then the person was considered to be a total nonrespondent, and all data for the person were removed from the analytic data file.

The data collection methodology and field quality control procedures for NMCUES were designed so that the data would be as accurate and complete as possible subject to budget considerations. However, individuals cannot report data that are unknown to them, or they may choose not to report the data even if they are known. This latter situation is especially true for data relating to

expenditures, income, and other sensitive topics. Because of the size and complexity of the NMCUES data base, it was not feasible, from a cost standpoint, to replace all missing data for all data items. The 12-month data files, for example, contain approximately 1,400 data items per person. With this in mind, the NMCUES approach was to designate a subset of the total items on the data base for imputation of the missing data. Thus for 5 percent of the NMCUES data items, the responses were edited and missing data imputed by a combination of logic and hot-deck procedures to produce revised variables for use in analysis. Items for which imputations were made cover the following data areas:

- Visit charges.
- Source of payment codes and amounts.
- Annual disability days.
- Health insurance premium amount.
- Length of hospital stay.
- Total weeks worked in 1980.
- Average hours worked per week.
- Educational level.
- Hispanic origin.
- Income.
- Age and birthdate.
- Race.
- Sex.
- Health insurance coverage.
- Visit dates.

These items were selected as the most important variables for statistical analyses.

Weighting and Estimation

For the analysis of NMCUES data, sample weights are required to reflect the complex sample design and to adjust for the potential biasing effects of systematic non-sampling errors related to total nonresponse and sampling frame undercoverage. Data imputation procedures, discussed in the preceding section, were used to compensate for attrition and item nonresponse.

Development of weights reflecting the sample design of NMCUES was the first step in the computation of person-level analytical weights. The basic sample-design weight for a dwelling unit is the product of four weight components that correspond to the four stages of sample selection. Each of the four weight components is the inverse of the probability of selection at the stage when sampling was without replacement, or it is the inverse of the expected number of selections when sampling was with replacement and multiple selection of the sample unit was possible.

As previously discussed, the NMCUES sample is composed of two independently selected samples. Each sample, together with its basic sampling weights, yields independent unbiased estimates of population parameters. Because the two NMCUES samples were of approximately equal size, a simple average of the two independent estimators was used for the combined sample estimator. This is equivalent to defining an adjusted basic weight by dividing each basic sample weight by 2. Hereafter only the combined sample and the adjusted basic weights are considered.

The total nonresponse-undercoverage adjustment factor is computed at the reporting unit (RU) level. Because every RU within a dwelling unit is included in the sample, the adjusted basic weight assigned to an RU is simply the adjusted basic weight for the dwelling unit in which the RU is located. As noted above, an RU was classified as responding if the RU initially agreed to participate in NMCUES and as nonresponding otherwise.

Initially 96 RU weight adjustment cells were formed by cross-classifying the following RU variables: race of RU head (white or all other), type of RU head (female, male, husband-wife), age of RU head (four levels), and size of RU (four levels). These cells were then collapsed to 63 cells so that each cell contained at least 20 responding RU's.

The formula for computing the total nonresponse-undercoverage adjustment factor for RU's in cell C was

$$A_1(C) = \frac{\text{CPS}(C)}{\sum_{k \in C} \phi(k) W_1(k)}$$

where CPS(C) = March 1980 Current Population Survey estimate of the number of RU's in cell C

$$\phi(k) = \begin{cases} 1 & \text{if } k\text{th RU was classified as responding} \\ 0 & \text{otherwise} \end{cases}$$

$W_1(k)$ = the adjusted basic weight for the kth RU

The nonresponse-undercoverage adjusted weight for the kth RU, denoted by $W_2(k)$, was then computed as the product of the adjusted basic weight for kth RU and the nonresponse-undercoverage adjustment factor for the cell containing the RU.

The poststratification adjustment factor is computed at the person level. As each person within an RU is included in the sample, the nonresponse-undercoverage adjusted weight for a sample person is the nonresponse-undercoverage adjusted weight for the RU in which the person resides. Each person was classified as responding or nonresponding as discussed in the section on attrition imputation.

Initially, 60 poststrata were formed by cross-classifying the following three variables: age (15 levels), race (black or all other), and sex (male or female). One poststratum (black males over 75 years of age) had fewer

than 20 respondents so it was combined with an adjacent poststratum (black males 65–74 years of age), resulting in 59 poststrata.

Estimates based on the 1980 census of the U.S. civilian noninstitutionalized population by age, race, and sex for February 1, May 1, August 1, and November 1, 1980, were obtained from the U.S. Bureau of the Census. The mean of the mid-quarter population estimates for each of the poststrata was computed and used as the 1980 average target population in calculating the poststrata adjustment factors.

The poststratification adjustment was designed to produce population estimates consistent with the 1980 census for 59 poststrata. Population estimates from NMCUES for other subpopulations (such as income groups) will differ from those estimates produced by the 1980 census and the March 1981 Current Population Survey (CPS). According to NMCUES, there were 9.8 million children under 18 years of age living below the poverty level in 1980. The figure from the 1981 CPS was 11.1 million related children under 18 years of age (U.S. Bureau of the Census, 1983). This represents a difference of 1.3 million children, or 13.3 percent. This difference may result from two factors. First, the NMCUES estimate excludes children who were born, who died, or who were institutionalized in 1980, as well as others who were not eligible to participate in the survey for the entire year. Only institutionalized children were excluded from the CPS estimate. Second, NMCUES employs slightly different poverty thresholds that do not distinguish between farm and nonfarm families and that do not take into account the number of children in the family. The net effect of these two factors is to lower the NMCUES estimate of the number of children in poverty.

Survey-based estimates of the average poststrata population were developed using the nonresponse-undercoverage adjusted weights. First, a survey-based estimate of the target population of poststratum p at mid-quarter q was computed as follows:

$$S(p,q) = \sum_{j \in p} \delta(q,j) W_2(j)$$

where

$$\delta(q,j) = \begin{cases} 1 & \text{if survey respondent } j \text{ was in scope at mid-quarter } q \\ 0 & \text{otherwise} \end{cases}$$

$W_2(j)$ = nonresponse-undercoverage adjusted weight of respondent j.

The survey-based estimate of the 1980 average population for poststratum p was computed as the mean of the four mid-quarter estimates, or

$$S(p) = \frac{1}{4} \times \sum_{q=1}^{4} S(p,q)$$

The post-stratification adjustment factor for the pth poststratum was then computed as

$$A_2(p) = \frac{C(p)}{S(p)}$$

where $C(p)$ = mean 1980 population for poststratum p based on U.S. Bureau of Census data. The poststratified weight for the jth respondent, denoted by $W_3(j)$, was then computed as the product of the nonresponse-undercoverage adjusted weight for the jth respondent and poststratification adjustment factor for the poststrata containing the respondent.

For many analyses estimates of the average 1980 population are required. Because some respondents were eligible for only a portion of the year, the aggregation of the W_3 weights over all respondents is an estimate of the total number of persons who were in the civilian noninstitutionalized population of the United States in 1980 and is an overestimate of the average 1980 population size. Therefore an adjustment factor was calculated for each respondent to reflect the proportion of time during 1980 the respondent was eligible to report NMCUES data. This adjustment factor for respondent j is

$$A_3(j) = \frac{E(j)}{366}$$

where $E(j)$ = number of days during 1980 respondent j was in scope.

Estimators

Weighted linear estimators are used for estimating population and population subdomain aggregates. Suppose, for example, an estimate of the parameter "total doctor visit charges for persons under 18 years of age" is desired.

The estimator of this parameter, denoted by $\hat{\theta}$, is given by

$$\hat{\theta} = \sum_{j \in A} W_3(j) X_j$$

where A is the collection of all NMCUES respondents under 18 years of age and X_j is the total doctor visit charges reported by the jth respondent during the eligible period.

Ratio estimators are used for estimating population and population subdomain in parameters such as means, proportions, and rates. As will be illustrated in the following examples, care must be taken in determining the appropriate weights to be used in the denominator of the ratio estimator.

Example 1—The NMCUES estimator for the proportion of doctor visits attributable to persons under 18

years of age is given by

$$\hat{\theta} = \frac{\displaystyle\sum_{j \in A} W_3(j) Y_j}{\displaystyle\sum_{\text{All } j} W_3(j) Y_j}$$

where y_j is the number of doctor visits reported by the jth respondent.

Example 2—The NMCUES estimator for mean annual doctor visit charges for persons under 18 years of age is given by

$$\hat{\theta} = \frac{\displaystyle\sum_{j \in A} W_3(j) X_j}{\displaystyle\sum_{j \in A} W_3(j) A_3(j)}$$

where X_j is the total doctor visit charges reported by the jth respondent during his or her eligible period, and $A_3(j)$ is the time adjustment factor for the jth respondent. The time adjustment factor is used in this situation to adjust for the fact that the jth respondent contributed doctor visit charges to the numerator only during the period of eligibility.

Reliability of Estimates

The estimates presented in this report are based on a sample of the target population rather than the entire population. Thus the values of the estimates may be different from values that would be obtained from a complete census. The difference between a sample estimate and the population value is referred to as the sampling error, and the expected magnitude of the sampling error is measured by a statistic called the standard error.

Because of the NMCUES complex sample design, simple random sampling assumptions cannot be used to compute variances and standard errors. The SESUDAAN (Shah, 1981) standard error estimation software package was used to produce the estimates of standard errors, taking into account the complex sample design. SESUDAAN is a Taylor Series procedure, developed at and released by the Research Triangle Institute. It runs within the Statistical Analysis System (SAS Institute, Inc., 1982). For the purpose of this report, PSU's with no sample cases were collapsed to permit the computation of standard errors.

The ratio of the variance under the complex sample design to the variance under simple random sampling assumptions is called the design effect. Average design effects for the percents presented in the detailed tables are shown in Table I, and estimated standard errors for the means are shown in Table II.

It should also be noted that in addition to sampling error, the estimates presented in this report are subject to nonsampling errors such as biased interviewing and reporting, undercoverage, and nonresponse. The standard error does not provide an estimate of these types of errors. However, as discussed in preceding sections, every effort was made to minimize these errors.

Suppose that $\hat{\theta}$ is an unbiased estimator for the

Table I
Average design effects for percents

Insurance coverage	Total[1]	Regular source[2]	No regular source[3]	Preventive care[4]	Children with a visit[5]	Number of visits[6]
All children	2.17 (5,074)	...	...	...	3.22 (3,876)	16.66 (15,811)
Nonpoor children	2.27 (3,665)	...	...	...	3.03 (2,879)	18.16 (12,016)
Low-income children	2.73 (1,409)	3.10 (1,191)	1.91 (218)	1.42 (470)	2.07 (997)	6.53 (3,795)
Medicaid	2.42 (654)	2.44 (552)	1.53 (102)	1.29 (218)	1.53 (490)	8.96 (1,495)
Full year	2.04 (529)	2.45 (449)	1.50 (80)	1.21 (176)	1.33 (384)	3.83 (1,903)
Part year	1.88 (125)	1.61 (103)	1.68 (22)	1.35 (42)	1.36 (106)	8.83 (1,892)
No Medicaid	2.56 (755)	2.86 (639)	1.74 (116)	1.13 (252)	2.74 (507)	2.09 (397)
Private insurance	2.58 (532)	2.76 (459)	1.54 (73)	1.08 (177)	2.65 (364)	4.18 (1,437)
No insurance	2.12 (223)	2.43 (180)	1.57 (43)	1.16 (74)	1.50 (143)	2.52 (466)

[1]For Tables 1, 3, 4, 6, and 13. The denominators for Table 1 are the "totals" for the subpopulations, rather than the separate insurance categories.
[2]For Tables 5 and 7.
[3]For Table 7.
[4]For Table 9. Denominators and design effects averaged for 3 age groups.
[5]For Table 10, top.
[6]For Table 10, bottom.

NOTE: Sample size in parentheses.

Table II

Standard errors of estimates for means

Means	All children	Nonpoor children	Low-income children	Medicaid			No Medicaid		
				Total	Full year	Part year	Total	Private insurance	No insurance
Table 3									
Average age in years	...	...	0.20	0.31	0.34	0.60	0.29	0.37	0.37
Average number of children in family...	...	...	0.10	0.13	0.12	0.32	0.14	0.18	0.19
Average income in dollars............	...	...	272.20	231.51	280.49	371.58	385.39	534.85	564.75
Average number of bed days..........	...	...	0.27	0.47	0.53	0.81	0.26	0.37	0.45
Table 5									
Average travel time in minutes	...	...	0.83	1.00	1.23	1.67	1.10	1.24	2.22
Average waiting time in minutes	...	...	3.11	4.16	4.55	6.38	3.63	3.29	7.78
Table 6									
Average number of physician visits:									
Per child......................	0.09	0.12	0.16	0.15	0.16	0.36	0.26	0.33	0.19
Per child with visit...............	0.10	0.14	0.18	0.17	0.19	0.41	0.32	0.40	0.20
Table 7									
Average number of physician visits:									
With regular source	...	...	0.18	0.15	0.16	0.35	0.29	0.36	0.22
No regular source................	...	...	0.25	0.51	0.58	1.02	0.24	0.35	0.23
Table 8									
Average number of visits to private physicians:									
Per child......................	...	...	0.07	0.10	0.12	0.26	0.10	0.12	0.14
Per child with visit...............	...	...	0.10	0.16	0.19	0.27	0.14	0.19	0.18
Table 12									
Average charge:									
Per child with visit...............	...	...	12.48	9.11	8.22	24.99	22.91	29.39	5.29
Per visit with charge	...	...	2.13	2.21	2.21	4.37	3.67	4.16	1.40
Table 13									
Average out-of-pocket expenditures....	...	...	2.20	2.94	3.35	5.99	3.86	4.36	5.18

parameter θ and $\hat{S}_{\hat{\theta}}$ is a consistent estimator for the standard error of $\hat{\theta}$. Under appropriate central limit theorem assumptions regarding $\hat{\theta}$, the statistic $Z = (\hat{\theta} - \theta)/S_{\hat{\theta}}$ has an approximate standard normal distribution for large samples. Thus, an approximate $(1 - \alpha) \times 100$ percent confidence interval for θ is given by

$$(\hat{\theta} + z_{\alpha/2} S_{\hat{\theta}}, \; \hat{\theta} + z_{1-\alpha/2} S_{\hat{\theta}})$$

where $z_{\alpha/2}$ and $z_{1-\alpha/2}$ are the appropriate values from a standard normal table.

As an example, Table 1 shows the estimate that 16.0 percent of all low-income children in the civilian noninstitutionalized population of the United States in 1980 were uninsured the entire year. From Table I, the average design effect is 2.73. Therefore, the estimated variance is

$$\frac{(.16)(.84)}{1,409} \times (2.73) = .0003$$

and the standard error is .016. Because 68 percent of the area under the normal curve is within 1 standard error of the midpoint, 95 percent of the area within 2 standard errors, and 99 percent within 2.5 standard errors, the following may be inferred: Chances are 68 out of 100 that the true value is $16.0 \pm .016$, or between 15.98 and 16.02 percent; chances are 95 out of 100 that the true value is $16.0 \pm 2(.016)$, or between 15.97 and 16.03 percent; and chances are 99 out of 100 that the true value is $16.0 \pm 2.5(.016)$, or between 15.96 and 16.04 percent.

Confidence intervals for the difference of two parameters can be constructed in a similar manner. Suppose θ_1 and θ_2 are the values of the parameter of interest in two mutually exclusive population subgroups. If $\hat{\theta}_1$ and $\hat{\theta}_2$ are unbiased estimators of θ_1 and θ_2, respectively, then $\hat{d} = \hat{\theta}_1$ and $\hat{\theta}_2$ is unbiased for $d = \theta_1 - \theta_2$ and

$$\text{Var}(\hat{d}) = \text{Var}(\hat{\theta}_1) + \text{Var}(\hat{\theta}_2) - 2\,\text{Cov}(\hat{\theta}_1, \hat{\theta}_2)$$

Unfortunately the estimation of $\text{Var}(\hat{d})$ presents a problem because it is not possible for NCHS to provide

the reader with covariance estimates for all possible pairs of subdomains of potential interest. However, if it is reasonable to assume that $\text{Cov}(\hat{\theta}_1, \hat{\theta}_2) = 0$, the standard error of $\hat{d}$ can be estimated by

$$S_{\hat{d}} = \sqrt{S_{\hat{\theta}_1}^2 + S_{\hat{\theta}_2}^2}$$

Then, under appropriate central limit theorem assumptions regarding d, the statistic $Z_d = (\hat{d} - d)/S_{\hat{d}}$ has an approximate standard normal distribution for large samples, and the interval

$$(\hat{d} + z_{\alpha/2} S_{\hat{d}}, \hat{d} + z_{1-\alpha/2} S_{\hat{d}})$$

is an approximate $(1 - \alpha) \times 100$ percent confidence interval for the difference d.

By way of example, suppose construction of a 95-percent confidence interval for the difference between the percent of Medicaid children with no physician visits (θ_1) and the percent of non-Medicaid children with no physician visits (θ_2) is desired. From Table 6, it is seen that $\theta_1 = 24.8$ and $\theta_2 = 32.6$, therefore,

$$\hat{d} = \hat{\theta}_1 - \hat{\theta}_2$$

$$= 24.8 - 32.6$$

$$= -7.8$$

The standard errors may also be derived from Table 1 so that

$$S_{\hat{\theta}_1}^2 = \frac{(.248)(.752)}{654}(2.42) = .0007$$

$$S_{\hat{\theta}_2}^2 = \frac{(.326)(.674)}{755}(2.56) = .0007$$

$$S_{\hat{d}} = \sqrt{S_{\hat{\theta}_1}^2 + S_{\hat{\theta}_2}^2}$$

$$= \sqrt{.0007 + .0007}$$

$$= .0386$$

Then, as $\alpha = .05$, it follows that $Z_{\alpha/2} = -1.96$ and $Z_{1-\alpha/2} = 1.96$, so that the 95-percent confidence interval for the difference of interest is $(-7.88, -7.72)$.

The reader should be aware that the assumption that $\text{Cov}(\hat{\theta}_1, \hat{\theta}_2) = 0$ is frequently not true for complex sample surveys. This warning is especially germane for sample designs, such as the NMCUES design, which rely on cluster sampling at one or more stages of sample selection. If $\text{Cov}(\hat{\theta}_1, \hat{\theta}_2)$ is positive, the confidence interval will tend to be too large, and hence the confidence level will be understated. More seriously, if $\text{Cov}(\hat{\theta}_1, \hat{\theta}_2)$ is negative,

the confidence interval will tend to be too small, and the confidence level will be overstated.

The statistics Z and Z_d can be used to test hypotheses. For example, the size α critical region for the composite hypothesis

$$H_0 : d \geq d_0$$

versus

$$H_A : d < d_0$$

is given by

$$Z_{d_0} = \frac{\hat{d} - d_0}{S_{\hat{d}}} \leq z_\alpha$$

As an example, suppose there is an a priori reason to believe that the average out-of-pocket expenditure for Medicaid children (θ_1) is less than the average out-of-pocket expenditure for non-Medicaid children (θ_2). Letting $d = \theta_1 - \theta_2$, this can be restated as a formal hypothesis as

$$H_0 : d \geq 0$$

versus

$$H_A : d < 0$$

Note that what is believed to be the true state of nature is reflected by the one-sided alternative.

From Tables 10 and II, respectively, it is seen that

$$\hat{d} = 13.47 - 42.27$$

$$= -28.80$$

and

$$S_{\hat{d}} = \sqrt{4.84 + 14.90}$$

$$= 4.44$$

so that $Z_{d_0} = -6.49$. Then, assuming that the level of significance had been set at $\alpha = .01$ (which implies the one-tailed critical value as $z_\alpha = -2.33$), H_0 would be rejected in favor of H_A as $Z_{d_0} \leq Z_\alpha$.

As discussed in connection with the construction of confidence intervals, the assumption that $\text{Cov}(\hat{\theta}_1, \hat{\theta}_2) = 0$ must be carefully evaluated. If, in fact, the covariance is positive, the size of the test will be smaller than α; if the covariance is negative, the size of the test will be larger than α.

The reader desiring to conduct more sophisticated analysis of the NMCUES data is advised to consult with a statistician knowledgeable in the analysis of data from complex sample surveys.

Appendix II. Definition of Terms

Age—The age of the child as of January 1, 1980. Babies born during the survey period were excluded from this analysis.

Average charge per visit—The arithmetic mean calculated from charges reported by the household respondent without consideration for the amount actually paid or the source of payment. Zero charges were assigned to visits the household reported as free from the provider in response to three separate questions.

Average expenditures per child—Calculated by dividing the total expenditures by the number of children in the population.

Case #—A unique identification number for the basic sample unit of NMCUES. This basic sample unit was the case in the State Medicaid household component, and the housing unit or group quarters in the national household component.

CC—Interviewer instructions to refer to the control card to record a new condition or to obtain the condition number.

Continuation section—An additional set of questions about dental visits, emergency room visits, outpatient department visits, hospital stays, medical provider visits, prescribed medicines, other medical expenses, conditions, or flat fees. They were identical to the sections in the Core Questionnaire and used when the Core Questionnaire did not contain enough sets. They were also used for events that occurred before the reference data of the current interview that were remembered by the respondent during the review of the Summary of Responses.

Control Card—A computer-generated instrument providing administrative control of the samples, information to help the interviewer to locate and identify sample persons, procedures for determining reporting unit composition, and places to record information required across rounds of interviewing.

Core Questionnaire—The basic interview instrument used during each interview to obtain data about health, health care, charges for health care, sources of payment, and health insurance coverage.

Educational status of family—(For this analysis) The highest number of years of school completed for people in the family who were 17 years of age and over. Only years completed in regular schools, where persons are given a formal education, were included. A "regular" school is one that advances a person toward an elemen- tary or high school diploma or a college, university, or professional school degree. Thus, education in vocational, trade, or business schools outside the regular school system was not counted in determining the highest grade of school completed.

Emergency room—A hospital facility organized to provide medical services to people needing immediate medical or surgical intervention. The emergency room is staffed 24 hours a day. People receiving care in the emergency room may be admitted into a hospital.

Emergency room visit—A face-to-face encounter between a patient (not necessarily ambulatory) and a medical person. Emergency room visits include encounters by patients transported to the emergency room by police or the emergency medical service. The visit may result in a hospital admission.

ER—Emergency room visit.

Family—A group of people living together related to each other by blood, marriage, adoption, or foster care status. An unmarried student 17–22 years of age living away from home was also considered part of the family even though his or her residence was in a different location during the school year.

Family head—Person named by respondent as "family head" at time of first interview. If no head was designated or this information was missing, a family head was imputed.

Family income in 1980—Total income of the family of which a person is a member. Because some persons changed families during the year, their family income is defined as the income of the family they were in the longest. If a family did not exist for the entire year, the family income is annualized, by dividing actual income by the proportion of the year the family existed. Unrelated persons are classified according to their own income. For each person, 12 categories of income were collected, including income from employment for persons 14 years of age and older and income from various government programs, pensions, alimony or child support, interest, and net rental income. Where information was missing, it was imputed. For persons who were members of more than one family, their total income was allocated to each family in proportion to the amount of time they were in that family.

Family structure—(For this analysis) An indicator of single-parent and two-parent families. Those families

in which one parent was absent for any part of the year were considered single-parent families.

Hospital outpatient department—A hospital-based ambulatory care facility organized to provide nonemergency medical services. Examples of outpatient departments or clinics are Pediatric, Obstetrics and Gynecology, Eye, and Psychiatric.

Hospital outpatient department visits—A face-to-face encounter between an ambulatory patient and a medical person. The patient comes to a hospital-based ambulatory care facility to receive services and departs on the same day. If more than one department or clinic is visited on a single trip, each department or clinic visited is counted as a separate visit.

Household—Occupants of a housing unit or group quarters that was included in the sample. This could have been one person, a family of related people, a number of unrelated people, or a combination of related and unrelated people.

Housing unit—A group of rooms or a single room occupied or intended for occupancy as separate living quarters. The occupants did not live and eat with any other persons in the structure, and there was either direct access from the outside or through a common hall, or there were complete kitchen facilities for the use of the occupants only.

Institution—A place providing room, board, and certain other services for the residents or patients. Correctional institutions, military barracks, and orphanages were always considered institutions for NMCUES. Places that provided health care were also identified as institutions if they provided either nursing or personal care services. Certain other facilities licensed, registered, or certified by a State agency or affiliated with a Federal, State, or local government agency were also defined as institutions. People residing in institutions were not included in the household samples.

Insurance coverage—(For this analysis) Four categories of insurance coverage: 1. Medicaid coverage full year. 2. Medicaid coverage part year. 3. Private insurance full or part year (and no Medicaid coverage). 4. No insurance coverage during 1980. The designation of full- or part-year Medicaid coverage was based on the number of quarters of coverage, as of the midpoint of each quarter (February 15, May 15, August 15, and November 15). Children who were covered by the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) were considered privately insured. Children who received services through the Indian Health Service program or from a community health center and had no other public or private coverage were considered uninsured.

Limitation of activity—Four categories of limitation of activity: 1. Cannot perform usual activity. 2. Can perform usual activity but limited in kind or amount. 3. Can perform usual activity but limited in kind or amount of other activity. 4. Not limited. All children 6 years of age and over were classified into any of the categories; chil-

dren 1–5 years of age were classified into categories 1, 2, and 4; and children under 1 year of age were classified into categories 1 and 4.

Low-income children—(For this analysis) The population of children under 17 years of age who lived in families with incomes below 150 percent of the Federal poverty guidelines and who were eligible for the survey the entire year. This excludes children who were born, who died, or who were institutionalized during 1980.

National household component—One component of NMCUES, consisting of multiple household interviews with an area probability sample of people in the civilian noninstitutionalized population of the United States in 1980.

NMCUES—National Medical Care Utilization and Expenditure Survey.

OPD—Hospital outpatient department visit.

Perceived health status—The family respondent's judgment of the health of the child compared with others the same age, as reported at the time of the first interview. The categories were "excellent," "good," "fair," or "poor."

Physician visit—(For this analysis) A face-to-face contact with a physician or a nonphysician working under the supervision of a physician. In addition, visits to nurse practitioners and physician assistants who were reported as "independent providers" are included. Otherwise, visits to independent providers (primarily chiropractors and optometrists) are excluded. Mental health visits are also excluded, as defined by the condition (mental disorder), the provider (psychiatrist, psychologist, or social worker), or the setting (psychiatric clinic). Physician visits to hospital inpatients are not counted; telephone contacts also are not included.

Preventive visit—(For this analysis) A general checkup for the purpose of determining the state of a child's health. This category includes physical examinations required for employment, entrance to school, and insurance; routine annual physical examinations; and visits to the well-baby clinic. To be considered a preventive visit, two criteria had to be met: 1. The primary reason for visit was a preventive exam, and no secondary reason for visit was reported. 2. No medical condition was reported as causing the visit.

Private physician visit—(For this analysis) Visit to a physician in office-based (group or solo) practice.

Race—Derived from the race of other family members for persons under 17 years of age. If the head of the family was male and had a wife who was living in the household, her race was assigned to any children under 17 years of age. In all other cases, the race of the head of the family (male or female) was assigned to any children under 17 years of age. Race is classified as "white," "black," or "other." The "other" race category includes American Indian, Alaskan Native, Asian, and Pacific Islander.

Region—Northeast: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania; North Central:

Michigan, Wisconsin, Ohio, Indiana, Illinois, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas; South: Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas; West: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, and Hawaii.

Reporting unit—The basic unit for reporting data in the household components of NMCUES. A reporting unit consisted of all related persons residing in the same housing unit or group quarters. One person could give information for all members of the reporting unit.

Round—Administrative term used to designate all interviews that occurred within a given period of time and that used the same instruments and procedures.

RU—Reporting unit.

Sex—Recorded by the interviewer in the initial NMCUES interview.

Summary of responses—A computer-generated report sent to the interviewer and reporting unit just prior to a followup interview. It contained summary information of previously reported health care, charges for the care, sources of payment, and health insurance coverage. It was designed for updating information, especially charges and sources of payment that may have not been available to the respondent at the time the health care was originally reported.

Supplements—Sets of questions asked only once across the five interviews, generally in rounds 1, 3, and 5.

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