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DESIGN AND PROCEDURES FOR THE 1981 CHILD HEALTH SUPPLEMENT TO THE NATIONAL HEALTH INTERVIEW SURVEY

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I. INTRODUCTION

In calendar year 1981 a comprehensive supplement on children was included in the National Health Interview Survey (NHIS), conducted by the National Center for Health Statistics (NCHS). Data were collected on a nationwide probability sample of 15,416 children 17 years of age and under. Questionnaire topic areas included:

- o family structure,
- o child care arrangements,
- o breastfeeding,
- o motor and social development,
- o medications
- o birth and prenatal events,
- o lifetime hospitalizations and surgery,
- o chronic conditions,
- o weight, eyes, and teeth,
- o school attendance, problems, and performance,
- o behavior problems,
- o social effects of ill health, and
- o sleep habits.

In addition, in the core NHIS questionnaire, data were collected for the same children on:

- short-term restricted activity due to health, including school loss days and bed days,
- chronic limitation of activity due to chronic health problems,
- accidents and injuries,
- illness or impairment conditions,
- doctor visits,
- dental visits, and
- basic socio-economic information such as race and family income.

Reproductions of the core and supplement questionnaires were published previously.1/ The objective of this report is to present the background and development of the Child Health Supplement (CHS), and its survey design and procedures.

The report will serve as a reference manual for persons using data from the CHS, especially those doing original analyses of public use data tapes. Persons who want more information about public use tapes from the CHS, or about other reports based on the CHS should contact the National Center for Health Statistics.

II. BACKGROUND AND DEVELOPMENT

Since July 1957 the NHIS has conducted household interviews with nationally representative samples of the noninstitutional population. The purpose of NHIS is to provide national data on the incidence of acute illness and accidental injuries, the prevalence of chronic conditions and impairments, the extent of disability, the utilization of health care services, and other health-related

topics. Interviews are conducted each week throughout the year by interviewers employed by the Bureau of the Census. The survey covers the noninstitutionalized, civilian population of the United States living at the time of the interview. Excluded from the sample because of technical or logistical reasons are patients in long-term care facilities, persons on active duty with the Armed Forces, United States nationals living in foreign countries, and persons who have died during the calendar year preceding the interview.

The sampling plan follows a multi-stage probability design which permits continuous sampling of households. The survey is designed to yield national estimates, although estimates can be obtained for the four geographic regions of the U.S. The households selected for interview each week are a probability sample representative of the target population. Each calendar year data are collected from approximately 40,000 households including about 110,000 persons.

Approximately 100 interviewers, about half of whom work each week, are used in the NHIS. Each interviewer is assigned an average of about 18 households as a week's work. The interviewers, as well as the entire field staff for the NHIS, are employees of the U.S. Bureau of the Census. Specifications for the survey are established by NCHS. In accordance with these specifications, the U.S. Bureau of the Census selects the sample, conducts the field interviewing as an agent of the Center, and checks questionnaire entries. Data preparation, consisting of the preliminary editing and the coding of questionnaires, is carried out by NCHS. Further editing and preparation of tabulations is done by NCHS using electronic computers.

Wherever possible, the visit of an interviewer is preceded by a letter from the Director of the U.S. Bureau of the Census announcing that an interviewer may be expected to visit and setting forth the general purposes of the survey. The confidential treatment that is accorded any information given is emphasized. The annual response rate of NHIS is usually at least 96 percent of the eligible households in the sample. The nonresponse is divided about equally between refusals and households where no eligible respondent could be found at home after repeated calls. Additional descriptive material on data collection, field procedures, and questionnaire development in the NHIS have been published.2/

The NHIS questionnaire consists of two basic parts: (1) a core set of health, socio-economic, and demographic items and (2) one or more sets of supplementary health items. The supplements change, usually on a yearly basis, in response to current interest in special health topics. In 1981 the supplemental topics were devoted entirely to children. For each NHIS family having one or more children under 18 years of age, one child was selected at random for the Child Health Supplement.

The Child Health Supplement originated in the deliberations of a Technical Consultant Panel of the U.S. National Committee on Vital and Health Statistics. The Panel submitted its final report in 1980 to the Secretary, Department of Health and Human Services, including its recommendations for supplements to the National Health Interview Survey. This Panel ranked child health among the top priorities for future NHIS supplemental topics. Development of the supplement began in the spring of 1978 when a panel of child health experts was formed by the National Institute of Child Health and Human Development (NICHD) to advise the DHIS staff. The panel met again in the fall of 1978 and in December 1979

and was instrumental in selecting specific child health topics. In addition, input was received from Federal agencies and programs concerned with child health. A list of the members of the Child Health Expert Panel, along with their specialities, and other consultants, along with their major area(s) of input, is contained in Appendix A.

The supplement went through many revisions before it reached its final form, as a result of small, informal pretests of the questionnaire. Each informal pretest consisted of interviewing 2-8 respondents (either NCHS employees, friends of employees, or households selected from the community). After interviewing, problems were resolved and a new version of the instrument was prepared for the next test. A formal pretest was conducted on 375 households in Florence, South Carolina, during the summer of 1980. Census Bureau interviewers conducted these interviews. Relatively minor changes were required to the questionnaire and procedures as a result of problems identified in this formal pretest.

III. OTHER DATA SOURCES

There are a number of other national data sources that are comparable, at least in part, with the Child Health Supplement. These sources include:

- Vital Records;
- the Vital Statistics Follow-back Surveys;
- the National Health Examination Surveys and the National Health and Nutrition Examination Surveys;
- the National Surveys of Family Growth;

- the Current Population Survey's annual Fertility Supplement;
- the Current Population Survey's supplements on child care, and
- the 1976 Foundation for Child Development National Survey.

Brief descriptions of these other data sources are included below.

Vital Statistics

Basic vital data come from records of live births, deaths, fetal deaths, induced terminations of pregnancy, marriages, and divorces or dissolutions of marriages. Registration of these events is a local or State function, but the use of the records for national statistics has been established through cooperative agreements between the States and NCHS and its predecessor organizations.

The items on the standard birth and fetal certifications which are similar to CHS items include mother's and father's age, number of live births to mother, gestation period, birthweight, prenatal care, and birth complications.

Vital Statistics Follow-back Surveys

Vital statistics follow-back surveys are periodic data collections based on samples of registered births and deaths occurring during a calendar year. These surveys extend, for statistical purposes, the range of items which are normally included on the vital records. They provide national estimates of births and deaths by numerous characteristics not available from the vital registration system. They also serve as a basis for evaluating the quality of information

reports on the vital records, and permit trend studies with follow-back survey data collected in earlier years.

The 1980 National Natality Survey (NNS) was a 1-in-425 sample of all U.S. live births and the mothers, physicians, hospitals, and other medical sources associated with those births. This included an oversampling of low-birthweight infants (under 2,500 grams) in order to do detailed analyses of high-risk infants. The 1980 National Fetal Mortality Survey (NFMS) was a 2-in-5 sample of fetal deaths of 28 weeks or more gestation and the mothers, physicians, hospitals, and other medical sources associated with those fetal deaths. Both surveys study 12 calendar months of births and fetal deaths from January 1980 through December 1980. The NNS studies approximately 10,500 births and the NFMS studies 7,000 fetal deaths. NCHS conducted the field work.

For births or fetal deaths information was collected from the mother on prenatal practices such as smoking and drinking, a complete pregnancy history, and occupational background of both the mother and the father. The mother was also requested to provide names and addresses of medical sources seen by the mother for x-rays, ultrasound, and nuclear medicine during the 12 months before the delivery. Sources named by the mother were mailed a form to assess the date, type, and purpose of the x-ray, ultrasound, or nuclear medicine procedure performed.

The physician named on the vital record as the attendant at delivery and the hospital where the delivery occurred also were mailed forms requesting information on the delivery episode, maternal health, prenatal and postpartum visits, characteristics of the infant, and x-ray, ultrasound, and nuclear

medicine procedures received by the mother during the 12 months before her delivery.

Items on the 1980 NNS/NFMS which are similar to those on the CHS include breastfeeding, birthweight, marital history, length of gestation, duration of labor, anesthetics during labor, type of delivery, when became pregnant, weight gain, complications of pregnancy, duration of hospital stay, smoking during pregnancy, and use of birth control pills during breastfeeding.

National Health Examination Surveys (NHES) and the National Health and Nutrition Examination Surveys (NHANES)

The examination surveys of NCHS obtain data through direct physical examinations of a sample of the U.S. civilian, noninstitutionalized population. The surveys produce data on illness, disability, the need for care or treatment and nutritional status, patterns of growth and development, measures of health and well-being, and national norms for blood pressure, serum cholesterol, hematocrit, visual acuity, hearing levels, height, weight, skeletal maturation, and other physiological measurements.

The first three programs of the NHES focused on different aspects of sickness and health:

- 1960-62: Adults (18-79 years of age)
- 1963-65: Children (6-11 years of age). Information on about 7,000 children was obtained on physical, mental, and behavioral growth and development.

- 1966-70: Youth (12-17 years of age). Information was gathered on about 7,000 persons on growth and development in the teenage years, with special emphasis on factors relating to adolescent health, health attitudes and behavior.

In 1971, the responsibility for monitoring nutritional status of the population was added and the program was renamed the National Health and Nutrition Examination Survey (NHANES). NHANES I was conducted in 1971-75 and NHANES II was conducted in 1976-1980. Both NHANES I and II had sample sizes of about 8,400 children under 18.

For many of the items in the CHS there have been similar questions in the NHES or NHANES. This will permit investigations of trends over time for many health indicators for the nation's children.

National Surveys of Family Growth (NSFG)

The NSFG of NCHS are multi-purpose statistical surveys which provide a wide range of information on factors influencing trends and differentials in fertility, family size preferences, family planning practices of the population, sources from which family planning advice and sources are received, the effectiveness and acceptability of the various methods of family planning, and those aspects of maternal and child health that are most directly related to fertility and family planning. The NSFG focuses on a nationally representative sample of women in the child-bearing years (15-44).

Cycle I of the NSFG was conducted in 1973, Cycle II in 1976, and Cycle III in 1982-83. In Cycle III approximately 8,000 survey responses were received. A major change in Cycle III was that the population coverage was expanded to include all women of child-bearing age regardless of marital status.

Items on the NSFG which are similar to those on the CHS include timing of first prenatal visit, subsequent prenatal visits, birthweight, place of birth, selected health conditions at birth and during the first year of life, breastfeeding and duration of breastfeeding, day care, smoking during pregnancy, and marital history.

Current Population Survey Fertility Supplement

In June of each year, starting in 1971, a supplement on number of children ever born and birth expectations of American women has been included in the Current Population Survey (CPS) conducted by the U.S. Bureau of the Census. The CPS is an ongoing survey dealing mainly with labor force data for the civilian, noninstitutionalized population. Questions relating to labor force participation are asked about each member 14 years old and over in each sample household. The number of survey responses for the fertility supplement in 1981 was approximately 42,000 women.

CPS Child Care Supplements

The CPS has included supplements on child care arrangements in June 1958, February 1965, June 1977, and June 1982. In 1972 questions were asked of all currently married women 14-44 years old and all separated, divorced, widowed and

never married women 18 to 64 years old who had any children less than 5 years old living in the household. In 1982 the population was the same except the lower age for married women was raised to 18. Data were collected on who takes care of the child, where the care is provided, the hours of day the care is provided (in 1982 but not 1977) and whether someone in the family pays for the care. Approximately 2,750 survey responses were obtained to these questions in 1977.

1976 Foundation for Child Development (FCD) National Survey

The FCD survey, conducted in the fall of 1976, was based on a national sample of households in the continental United States containing at least one child age 7 through 11 at that time. Interviews were conducted with the eligible child and a parent. There were about 2,279 total responses by children in 1,747 households. A follow-up study of schools attended by the children in the survey was carried out in the spring of 1977. (School information was obtained on 1,682 or 74 percent of those interviewed.)

Items on the FCD survey which are similar to CHS items include: mother's marital history, child care arrangements, residential mobility, parental deprivation, birthweight, gestation period, congenital problems, general health status, limitation of activity due to health, health conditions, school problems and performance, and behavior problems.

IV. GENERAL LIMITATIONS AND QUALIFICATIONS OF THE CHS DATA

A limitation of the data from the CHS and NHIS relates to the fact that the survey is cross-sectional. That is, questions were all asked at one point in time for a given sample household. For this reason, although relationships between some person characteristics and health outcomes may be investigated, it is difficult to infer causal relationships between some characteristics, for example, health related behavior, and health outcomes.

Furthermore, since the statistics from the National Health Interview Survey and the CHS are based on a sample, they may differ somewhat from the figures that would have been obtained if all persons in the population had been interviewed using the same schedules, instructions, and interviewing personnel and procedures.

The population covered by the sample for the National Health Interview Survey is the civilian, noninstitutionalized population of the United States living at the time of interview. The sample does not include members of the Armed Forces or U.S. nationals living in foreign countries. Children living with members of the Armed Forces were included in the CHS as long as the family did not live in a military installation, in which case the entire family was excluded.

Also excluded from the CHS were married children and children for whom there was no eligible respondent in the household, that is, a relative 19 years or older living with the child.

It should also be noted that the estimates shown do not represent a complete measure of events during the specified calendar period since data are not collected in the interview for persons who died during the reference period. For instance, if a person visited a doctor in the two weeks before his/her household was interviewed, but that person died before the interview, that doctor visit would not be included in the NHIS estimate of the number of doctor visits.

In addition to potential errors introduced by noncoverage of portions of the population and sampling error, the results are also subject to reporting errors, processing errors, and errors due to nonresponse. To the extent possible, these types of errors were kept to a minimum by methods built into survey procedures. A description of the quality control procedures employed in the survey is in the next section of this report.

As for reporting, there are limitations to the accuracy of information collected in household interviews. Sometimes respondents do not know the answers, or are not willing to give the answers to questions. For example, for diagnostic information, the household respondent can usually pass on to the interviewer only the information the physician has given to the family. For conditions not medically attended, diagnostic information is often no more than a description of symptoms. However, other facts, such as the number of disability days caused by a condition, can be obtained more accurately from household members than from any other source since only the persons concerned are in a position to report this information.

Regarding nonresponse, data were adjusted by a procedure which imputes to persons in a household who were not interviewed the characteristics of persons in households in the same segment who were interviewed.

V. QUALITY CONTROL PROCEDURES

The interviewer training program and the field quality control procedures have been thoroughly described.[2,3] The following is a brief summary of quality control measures which are the same for all NHIS supplements, including the Child Health Supplement, as they are for the core NHIS.

One of the most important field quality control procedures is the observation of interviewers. Each NHIS interviewer is observed in a group of households in her assignment by an interviewer supervisor or senior interviewer. An observation report is used to document the interviewer's performance. There are three types of observations: initial, systematic, and special needs. Initial observations are conducted for each new interviewer for 2 full days on her first assignment, for 1 full day on her second assignment, and for part of a day on her first listing of addresses assignment. In addition, systematic observations are regularly scheduled by supervisors. One-half of the experienced interviewers are observed each quarter and a systematic observation is made of newly trained interviewers in the quarter following their initial training. Special needs observations are made when supervisors determine that an interviewer needs more on-the-job training.

Approximately 5 percent of all interviews are designated for a reinterview quality control procedure. For each household so designated a subset of

questions is reasked of the household, over the telephone, by the interviewer supervisor. Responses are entered on a special form shown in Appendix C. Interviewers are not aware of which households are designated for reinterview. The reinterview serves as a periodic check on the interviewer to see that assignments are carried out as instructed. This process also provides an assessment of the reliability and accuracy of the NHIS data. The reinterview sample is divided into two parts: an 80 percent subsample and a 20 percent subsample. In the 80 percent subsample of households, the supervisor carries out a reconciliation of reinterview results with the results of the original interview. No reconciliation is carried out for the 20 percent subsample. In the next section of this report the results for the reinterview process are presented for the CHS.

Several types of edits are performed on the data collected in NHIS. First, interviewers are responsible for checking over all of their work, prior to turning it in, for completeness, consistency, and legibility of entries. In the Census Bureau regional offices additional editing is conducted on the questionnaires by office personnel. Specifications for these edits determine the percentage of each interviewer's work which will be edited, and the specific questionnaire edits. Additional editing is performed if previous edit results, observation results, or interview results show errors such as omissions and inconsistencies. The specifications for editing the work of experienced interviewers provide more editing at the beginning of the year when new items are added to the questionnaire. As the interviewers become more experienced with new items, the amount of editing is reduced. The first four assignments of new interviewers are always edited. A third type of editing is the machine checks for inconsistences and invalid responses. The specifications for these

edits are provided by NCHS data analysts. In these specifications, invalid item codes which cannot be resolved are either given imputed values or are converted to unknown categories.

The quality control procedure on the coding of the questionnaire information consisted in 1981 of the recoding of 10 percent of all questionnaires by two independent coders in addition to the regular "production" coder. An analysis of the coding results is made by comparing the codes for all three coders on the same items to determine if any coder is exceeding an acceptable level of error. If so, supervisory action is taken usually in the form of retraining. After coding, the data are keyed into a machine readable form. To maintain the quality of keying, there is a 100 percent independent verification of all data items for all questionnaires.

VI. RESPONDENT RULES AND RESPONSE RATE

The respondent selection rules differed for the core NHIS interview and the CHS. For the core NHIS, each person 17 years or older who is home at the time of the interview may respond for himself or herself. For persons who are not present at the time of the interview and for children under 17, information is obtained from a related household member such as a spouse or the mother of a child.

For the CHS more stringent respondent rules were applied in order to obtain responses from the family member best able to provide the most accurate

information on the child. At the beginning of the CHS, following the core NHIS questions, the interviewers identified a "preferred" CHS respondent in the following order of priority.

(1) Either the biological mother, if in the household, regardless of the child's age, or, the biological father, if in the household, if the sample child was 6 years or older. Preference was given to the biological mother when both parents were household members and were available at the time of interview.

(2) The biological father, if in the household, regardless of the child's age, if the biological mother was not a household member.

(3) A family member identified by the respondent to the core NHIS as knowing the most about the health-related matters of the child. If more than one such person was identified the preferred respondent order with the biological father taking precedence was:

(a) An adoptive, step, or foster parent

(b) A legal guardian

(c) A primary caretaker (i.e., the person who cared for the child or was most knowledgeable)

(d) Other adult

If the preferred respondent was not available at the time of the initial interview, interviewers were required to make up to 2 return visits to contact that person. However, if the interviewer determined during the initial visit or first return visit that the preferred respondent would not be available at any time during the interview period, she was required to document the situation and interview the next preferred respondent. This same procedure was followed if the preferred respondent was mentally or physically incapable of answering the questions.

All callbacks were completed by personal visit. On the first callback, the interviewer was allowed to interview either of the biological parents, if household members, with the mother preferred. If the mother was not available, the father was interviewed regardless of the child's age. If neither biological parent was available, a second callback was made.

The response rate to the 1981 NHIS core questionnaire was 97.1 percent. CHS interviews were completed for 97.9 percent of the children in the core NHIS. Hence, the effective CHS response rate was 95.1 percent (the product of 97.1 and 97.9).

As shown in the table below, for 92 percent of the children the respondent was either the biological mother or father. For 82 percent of the children, the respondent was the biological mother.

Relationship of CHS Respondent to Sample Child

Type of Relative	Number of Respondents	Percent
Biological mother	12,596	81.7
Other mother (adoptive, step, foster, unknown type)	427	2.8
Biological father	1,565	10.2
Other father	125	0.8
Grandmother	238	1.5
Other relative	229	1.5
Unknown relationship or unknown if related	236	1.5

VII. REINTERVIEW STUDY RESULTS*

During 1981 certain items were selected for reinterview from the Child Health Supplement Questionnaire. The purpose for selecting these items for reinterview was to examine their levels of inconsistency in response. Since the purpose for selecting these items was to measure the level of inconsistency in response between the original interview and reinterview, it was not necessary to provide the reinterviewers with the responses from the original interview. This precluded any reconciliation of differences in response between the two interviews. Reinterviewers were instructed to reinterview the original respondent only for the Child Health items. If the original respondent was not at home, call-backs were required before taking a noninterview for these items.

There were a total of 939 units selected for reinterview for which the Child Health Supplement was completed on the original interview. Out of this number there were 152 units for which a reinterview was not obtained. There were 16 cases on which the original survey responses could not be matched with the reinterview responses leaving a total of 771 matched completed cases that could be both processed and analyzed.

For analytical purposes, range intervals have been established which provide general guidelines for interpreting the index of inconsistent response. The rule of thumb is that indices below 20 are low, those between 20 and 50 are

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*This section of this paper was abstracted from a report prepared by Irving Schreiner, Statistical Methods Division, Bureau of the Census.

moderate, and those over 50 are high. High values of the index may be an indication that 1) improvements are required in the methods used to collect these data, 2) the concept itself may not be measurable, or 3) respondents are not able to provide accurate information to the detail desired.

There were five instances in which the index was in the low range. Apparently respondents had little difficultly with consistent reporting of:

1) place of birth (Hospital, other)
2) birthweight (Under 5 lb., 5 up to 5½, 5½ up to 6, 6 up to 6½, 6½ up to 7, 7 up 7½, 7½ up to 8, 8 up to 9, 9 up to 10, 10 up to 11, 11+)
3) received intensive care (Yes, No)
4) number of cigarettes mother smoked during pregnancy (none, 1-9, 10-19, 20-29, 30-40+)

There were five items which exhibited moderate levels of response inconsistency between the two interviews. They were:

1) number of hospital nights for the mother (None, 1, 2, 3, 4, 5, 6, 7+)
2) number of hospital nights for the sample child (None, 1, 2, 3, 4, 5, 6, 7+)

3) number of hours in labor (0, more than 0 up to 3, 3 up to 6, 6 up to 9, 9 up to 12, 12 up to 15, 15 up to 18, 18 or more)

4) number of nights in intensive care (None, 1, 2, 3-6, 7+)

5) how often seat belts are used in car (all of the time, some of the time, once in while, never)

Finally, there were six items selected from Section 0, Behavior Problems Index, all of which had indices in the high range. These were items describing behavior problems that the sample child might have, such as "Has sudden changes in mood or feelings: Has that been OFTEN true, SOMETIMES true, or NOT true of (the sample child) in the past 3 months?" In addition, two behavior subscales were created from a combination of responses from items 7 (difficulty concentrating), 8 (easily confused), 15 (impulsive), and 19 (restless). A sample child could receive a score of from zero to four. For behavior subscale I, the sample child was given one point each time a response of "often true" was obtained. For behavior subscale II, the sample child was given one point each time a response of "often true" or "sometimes true" was obtained. Both of these subscales had indices in the high range.

An examination of the indices computed on the individual response categories within each item revealed that for the most part they did not deviate to any great degree from the overall; that is, they remained in the same range

interval of low, moderate, or high. The few response categories whose indices deviated from the overall index are shown below.

Item	Overall index	Category	Index
Hospital nights - child	37.4	Six	51.1
Birthweight (4a)	14.8	7 to 7½	22.5
Hours in labor	31.9	Zero	19.3
Liftime hospitalizations	15.3	Two times	23.7
		Three or more times	24.0
Impulsive	51.3	Often true	48.2
Behavior subscale II	62.2	None	48.8
Seat belts	35.6	All the time	14.6
		Some of the time	53.4
		Once in a while	55.5

With the exception of the "lifetime hospitalizations" and "seat belts" items, there was no definitive pattern to the deviations and in some instances the deviations were only on the borderline of the next range interval. Regarding the reporting of the number of lifetime hospitalizations for the sample child, the fewer the number, including none, the more consistent was the reporting. However, even when there were several hospitalizations, the reporting was still moderately consistent. Reporting on the frequency that seat belts or restraints are worn when the sample child is riding in a car was moderately inconsistent as a whole, but there were significant deviations for certain categories within. Respondents were consistent when reporting all or most of the time, moderately consistent when reporting never, and rather inconsistent when reporting some of the time or once in a while. Apparently respondents had difficulty distinguishing between these two middle categories, because when they were collapsed into one category, the index fell well into the moderate range (38.3).

In conclusion, the items selected for reinterview from the Child Health Supplement exhibited mixed results. Several items fell into each of the three descriptive range intervals for interpreting levels of inconsistent response. There is no cause for concern regarding those items falling into the low range. Some concern is expressed for those items falling into the middle range and particular concern is expressed for those items whose level of inconsistent response was deemed high. All of these latter items were selected from the section used for measuring behavior problems. One point worth mentioning is the tendency on the part of respondents to tone down the frequency of behavior problems during the reinterview. For all six items the number of respondents reporting a behavior problem as being OFTEN true went down in the reinterview.

How much of a "real" difference this is, is difficult to say, as no attempt was made to reconcile for differences in response.

VIII. SAMPLE DESIGN

A detailed description of the NHIS sample design has been published[4]. Basically, the sampling plan of the survey follows a multistage probability design which permits a continuous sampling of the civilian, noninstitutionalized population of the United States. The sample is evenly distributed throughout the year, so that interviews are conducted in approximately 800 households each week. Since household members interviewed each week are a random sample of the population, samples for successive weeks can be combined into larger samples. Thus the design permits both continuous measurement of characteristics of high incidence or prevalence in the population and, through the larger consolidated samples, more detailed analysis of less common characteristics and small categories. This continuous collection of information has administrative, operational, and technical advantages since it permits field work to be handled by an experienced, stable staff. In addition, this design eliminates biases due to the seasonal nature of certain conditions or the occurrences of short-run epidemics.

The overall sample is designed so that tabulations can be provided for each of the four major geographic regions and for selected places of residence in the United States.

The first stage of the sample design consists of drawing a sample of 376 primary sampling units (PSU's) from approximately 1,900 geographically defined

PSU's. A PSU consists of a county, a small group of contiguous counties, or a standard metropolitan statistical area. The PSU's collectively cover the 50 States and the District of Columbia.

With no loss in general understanding, the remaining stages can be combined and treated in this discussion as an ultimate stage. Within PSU's, then, ultimate stage units called segments are defined in such a manner that each segment contains an expected six households. Three general types of segments are used.

Area segments which are defined geographically.

List segments, using 1970 census registers as the frame.

Permit segments, using updated lists of building permits issued in sample PSU's since 1970.

Census address listings were used for all areas of the country where addresses were well defined and could be used to locate housing units. In general the list frame included the larger urban areas of the United States from which about two-thirds of the NHIS sample was selected.

The usual NHIS sample consists of approximately 12,000 segments containing about 51,000 assigned households, of which 9,000 were vacant, demolished, or occupied by persons not in the scope of the survey. The 42,000 eligible occupied households yield a probability sample of about 111,000 persons.

For each NHIS family with a child under age 18, one child was randomly selected for the CHS. Because sometimes a household contained more than one family with a child some households contained more than one sample child.

The methods of subsampling for the CHS may be described as follows:

When administering the core NHIS series, the interviewer listed all children in the family in order according to age, from the oldest to youngest. Before asking the supplemental questions, she referred to a computer generated label indicating which child to select, given the number of children in the family. An example of the label for one household is shown below:

NUMBER OF CHILDREN IN FAMILY:	1	2	3	4	5	6	7	8	9+
SELECT THE:	1	2	1	3	2	6	3	2	8

For example, the interviewer listed five children. She then referred to the label and saw that for a five-child family, the second oldest child should be selected. The labels were generated systematically in such a way that for all five-child families, the oldest, second oldest, third oldest, fourth oldest, and youngest child were selected an equal number of times. For families with more than nine related children, interviewers were given instructions in how to make a random selection.

Once the subsample child was selected, the Child Health Supplement was asked only for that child. Some sections were skipped for the sample child,

depending on his/her age and the presence or absence of biological parents in the family. Such skips were handled easily by the use of interviewer check items.

The child care section was asked for children under age 15. For all children questions were asked in the relationships and residential mobility section, questions 1-3 of the breastfeeding section, as well as the hospitalization and surgery, conditions, weight, medicine use, activities and sleep, and social effects of illness sections.

Nearly all mothers of sample children were asked the birth section, although a small percentage of these skipped most of the section because neither biological parent was living in the household. Question 7 in this section was only asked for children under 6 whose biological parent was the respondent; the prenatal care section was also asked only for the same sample children. In the breastfeeding section, question 4 was asked for children under 6 and question 6 was asked for children under 3. Questions on motor and social development were asked for children under 5. The questions on eyes and teeth, school and behavior problems were asked for different age groups, with sample sizes varying from about 11,000 to 14,000 children.

IX. ESTIMATION PROCEDURES

Since the design of the NHIS is a complex multistage probability sample, it is necessary to use complex procedures in the derivation of estimates. Four basic operations are involved. A fifth and sixth operation were employed for the CHS.

1. Inflation by the reciprocal of the probability of selection.--The probability of selection is the product of the probabilities of selection from each step of selection in the design (PSU, segment, and household).

2. Nonresponse adjustment.--The estimates are inflated by a multiplication factor which has as its numerator the number of sample households in a given segment and as its denominator the number of households interviewed in that segment.

3. First-stage ratio adjustment.--Sampling theory indicates that the use of auxiliary information which is highly correlated with the variables being estimated improves the reliability of the estimates. To reduce the variability between PSU's within a region, the estimates are ratio adjusted to the 1970 populations within 12 color-residence classes.

4. Poststratification by age-sex-color.--The estimates are ratio adjusted within each of 60 age-sex-color cells to an independent estimate of the population of each cell for the survey period. These independent estimates are prepared by the Bureau of the Census. Both the first-stage and poststratified ratio adjustments take the form of multiplication factors applied to the weight of each elementary unit (person, household, condition, and hospitalization).

In addition to the above four operations for the CHS the following steps are taken:

5. Inflation by the reciprocal of the probability of selection of a child within a family.--The probability of selection of a child within a family is one divided by the number of children under 18 in the family.

6. Poststratification by age-sex-color.--Because there is additional nonresponse to the CHS the estimates are ratio adjusted within each of sixteen age-sex-color cells to an independent estimate of the population of each cell for the survey period. These independent estimates are also prepared by the Bureau of the Census and the adjustments take the form of multiplication factors applied to the weight of each child.

The effect of the ratio-estimating processes is to make the sample more closely representative of the civilian, noninstitutionalized population by age, sex, color, and residence, which thereby reduces sampling variance.

As noted, each week's sample represents the population living during that week and characteristics of the population. Consolidation of samples over a time period, e.g., a calendar quarter, produces estimates of average characteristics of the U.S. population for the calendar quarter. Similarly, population data for a year are averages of the four quarterly figures.

For prevalence statistics, such as number of persons with speech impairments or number of persons classified by time interval since last physician visit, figures are first calculated for each calendar quarter by

averaging estimates for all weeks of interviewing in the quarter. Prevalence data for a year are then obtained by averaging the four quarterly figures.

For other types of statistics--namely those measuring the number of occurrences during a specified time period--such as incidence of acute conditions, number of disability days, or number of visits to a doctor or dentist, a similar computational procedure is used, but the statistics are interpreted differently. For these items, the questionnaire asks for the respondent's experience over the 2 calendar weeks prior to the week of interview. In such instances the estimated quarterly total for the statistic is 6.5 times the average 2-week estimate produced by the 13 successive samples taken during the period. The annual total is the sum of the four quarters. Thus the experience of persons interviewed during a year--experience which actually occurred for each person in a 2-calendar-week interval prior to week of interview--is treated as though it measured the total of such experience during the year. Such interpretation leads to no significant bias.

Explanation of Hospital Recall

The survey questionnaire used a 12-month-recall period for hospitalizations. That is, the respondent is asked to report hospitalizations which occurred during the 12 months prior to the week of interview. Information is also obtained as to the date of entry into the hospital and duration of stay. Analysis of this information, and also the results of special studies, has shown that there is an increase in underreporting of hospitalizations with increase in time interval between the discharge and the interview. Exclusive of the hospital experience of decedents, the net underreporting with a 12-month recall

is about 10 percent, but underreporting of discharges within 6 months of the week of interview is estimated to be less than 5 percent. For this reason hospital discharge data in NHIS reports are based on hospital discharges reported to have occurred within 6 months of the week of interview. Since the interviews were evenly distributed according to weekly probability samples throughout any interviewing year, no seasonal bias was introduced by doubling the 6-month-recall data to produce an annual estimate for that year of interviewing. Doubling the 6-month data in effect imputes to the entire year preceding the interview the rate of hospital discharges actually observed during the 6 months prior to interview. However, estimates of the number of persons with hospital episodes (as opposed to estimates of the number of hospital discharges) are based on 12-month recall.

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APPENDIX A

CONSULTANTS TO THE CHILD HEALTH SUPPLEMENT

In determining the specific content of the Child Health Supplement, the DHIS staff consulted extensively with the following members of the Child Health Expert Panel sponsored by the National Institute of Child Health and Human Development.

Name	Specialty
Henry Barnett, M.D. - Chairman Professor, Department of Pediatrics Albert Einstein College of Medicine Bronx, New York	Organ Systems
Michael Katz, M.D. Reuben S. Carpentier Professor and Chairman Department of Pediatrics College of Physicians and Surgeons of Columbia University New York, New York	Acute Illness
Barry Pless, M.D. Director of Community Pediatrics Research Montreal Children's Hospital Montreal, Canada	Chronic Illness
Lawrence M. Gartner, M.D. Director, Division of Neonatality and Rose F. Kennedy Clinical Research Unit Albert Einstein College of Medicine Bronx, New York	Perinatology
Leonard Graziani, M.D. Department of Pediatrics Jefferson Medical College Philadelphia, Pennsylvania	Neurologic and Perceptual Disorders
Nicholas Zill, Ph.D. Senior Staff Scientist Foundation for Child Development New York, New York	Psychosocial Disturbances
Randall Bloomfield, M.D. Director Department of Obstetrics and Gynecology New York City Health and Hospital Corp. Kings County Hospital Center Brooklyn, New York	Obstetric and Fetal Problems

In addition, the following persons were consulted. (Affiliations have changed in several cases).

Name	Specialty
Duane Alexander, M.D. Office of Planning and Evaluation National Institute of Child Health and Human Development Bethesda, Maryland	Total Supplement
Sandra Huffman, Ph.D. Nutritionist Office of Policy Planning and Evaluation U.S. Department of Agriculture Food and Nutrition Service Washington, D.C.	Breastfeeding
Vince Hutchins, M.D. Director Office of Maternal and Child Health Programs Bureau of Community Health Services, HSA	Total Supplement
Sheppard Kellam, M.D. Social Psychiatry Studies Center University of Chicago Chicago, Illinois	Relationships and Family Structure
Chris Johanson, Ph.D. Research Psychologist National Institute of Drug Abuse Rockville, Maryland	Medicine Use
Stephen Hersh, M.D. Director, Division of Child and Adolescent Services Saint Elizabeth's Hospital Washington, D.C.	Behavior Problems
Paula Botstein, M.D. Special Assistant to the Director Bureau of Drugs Food and Drug Administration Rockville, Maryland	Medicine Use
Mary Tierney, M.D. Acting Director Office of Child Health Health Care Financing Administration Rockville, Maryland	Total Supplement
Thomas M. Achenbach, Ph.D. Laboratory of Developmental Psychology National Institute of Mental Health Rockville, Maryland	Behavior Problems

APPENDIX B

DEFINITIONS OF CERTAIN TERMS USED IN THE CHILD HEALTH SUPPLEMENT

TERMS RELATING TO FAMILY STRUCTURE

Biological mother - the female who gave birth to the sample child, i.e., the natural mother.

Biological father - the natural father of the sample child, i.e., the man who impregnated the biological mother.

Stepparent - the husband or wife of the sample child's biological mother or father by a subsequent marriage.

Adoptive mother/father - the legal guardian (other than the biological parent) of the sample child who voluntarily and legally was declared the child's mother/father.

Foster mother/father - the guardian who provides parental care to the sample child though not related by blood or legal ties.

Full brother/sister - the brother/sister who shares both biological parents with the sample child.

Stepbrother/sister - the biological children of the sample child's stepparent.

Half brother/sister - the brother/sister who shares only one common biological parent with the sample child.

Adoptive brother/sister - the biological children of the sample child's adoptive parent, or other adoptive children of the sample child's adoptive parents who are not the sample child's full or half brothers/sisters.

Foster brother/sister - the biological children of the sample child's foster parents, or other unrelated children in the care of the sample child's foster parents.

TERMS RELATING TO CHILD CARE

Day care center/nursery - a place which provides supervision and facilities for children during the day.

"Takes care" - supervises the activities of the child.

TERMS RELATING TO MOTOR AND SOCIAL DEVELOPMENT

Roll over - the act or process of changing positions from lying on the stomach to lying on the back, or vice versa.

Recognizable word - a word which sounds enough like the correct pronunciation so that a person would understand the meaning.

Crawl - intentional forward or backward movement by children of their entire body when they are lying on their stomach or forward/backward movement when they are going up/down stairs.

Sentence - a group of words in which each word has a relation to the others in a way that expresses either a statement, question, comment, or wish, etc.

Tricycle - any child's vehicle which has three wheels and is propelled by foot pedals.

Somersault - a leap or roll in which a person turns forward or backward in a complete revolution bringing the feet over the head.

Dressed - completely putting on all clothes, except for tying shoes or buttoning the backs of dresses.

Toilet trained - the child uses the bathroom when he/she needs to. If the child uses the bathroom during the day when he/she needs to but wets or soils the bed at night, the child is not considered toilet trained. If the child needs help because of a physical disability, or because the seat is too high, can't unbutton pants, etc., but knows and indicates when he/she needs to go to the bathroom, the child is considered toilet trained.

TERMS RELATING TO BIRTH

Labor (onset of labor) - the onset of contractions that lead to the delivery. Excluded are such things as false labor, Braxton-Hicks contractions (irregular contractions that may occur throughout the pregnancy), or rupturing of the sac. Labor does not relate to the degrees of pain since the pain, if any, may vary between women.

Spinal Shot - a shot given in the spinal column, including an epidural shot as a spinal shot. Some other common spinal shots are caudal and saddle block.

Delivery - delivery begins when the baby starts to show, or the doctor starts to use forceps or to operate in the case of a caesarean section.

Caesarean section - a delivery by a surgical incision through the abdominal and uterine wall.

Special care facility - this term was respondent defined, but includes, for example, intensive care units and premature nurseries.

Miscarriage - the expulsion of a fetus before it is sufficiently developed, that is, before it is capable of living outside the uterus. This includes spontaeous abortion but excludes induced abortion.

CHRONIC CONDITIONS

This definition deviates a bit from the definition used in the NHIS core. For children 3 months old or older a condition is considered chronic if (1) it is described by the respondent as having been noticed more than 3 months before the week of the interview, or (2) it is one of the following conditions:

Asthma	Epilepsy
Hay fever	Diabetes
Arthritis	Rheumatic heart disease
Rheumatism	Missing finger, hand, arm, toe, foot or leg

Eczema	Permanent stiffness or any deforming of back, foot, leg, fingers, hand, arm
Autistic	Psoriasis
Cerebral palsy	Chorea
Other palsy	St. Vitus' dance
Paralysis	Goiter
Mental Retardation	Cystic fibrosis
	Sickle cell anemia

For children under 3 months all conditions reported to the CHS are considered chronic <u>except</u> the following:

Digestive system disease

Pneumonia

Other lung, pulmonary or respiratory condition

Tendon, muscle, or cartilage disease

Skin rash

Trouble hearing - one or both ears

Other trouble hearing

Trouble seeing - one or both eyes

Other trouble seeing

Other eye trouble

Urinary infection

Other kidney trouble

Other speech defect

Other heart trouble

Other liver trouble

Other bowel trouble

TERMS RELATING TO TEETH

Braces or bands - dental appliances worn on the teeth to correct irregularities of growth and/or position.

Filling - something used to fill a cavity, which is a pitted area in a tooth caused by decay or breakage. Root canal therapy is counted as "filling" regardless of whether or not there was any surface decay. Not included are capping or crowning of teeth as fillings, baby or other teeth the child no longer has.

TERMS RELATING TO SCHOOL

Going to school - attendance at public or private schools. Included are special schools (for example, for retarded children) and nursery school or kindergarten. Not included are education or training received in nonregular schools, such as vocation, trade or business schools, outside the regular school system.

Regular school - schools in which persons are given formal education in graded public or private schools, whether day or night school, and whether attendance was full-time or part-time. A "regular" school (including kindergarten) is one which advances a person toward an elementary or high school diploma, or a college, university, or professional school degree. Vocational, trade or business schools outside the regular school system are not considered "regular schools."

Certain type of school - respondent defined.

Suspended/excluded - when the student is temporarily prohibited by school officials from attending school.

Expelled - when the student is permanently prohibited from attending school by school officials for the remainder of that school term or longer.

Routine conferences - meetings which are routinely scheduled by teachers or school officials for the purpose of meeting either individually or as a group with all parents or guardians during the school year.

TERMS RELATING TO SLEEP

Sleep - the actual time spent sleeping. This does not include the time spent in bed but not sleeping.

Appendix C

Child Health Supplement Portion of the 1981 NHIS Reinterview Form

CHILD HEALTH SUPPLEMENT

☐ Supplement not completed in original interview – *END REINTERVIEW*

1. Sample Child (*From HIS-1 page 2 or 43*)	1.	First name Age ___ Yrs. ___ Mos. Person number
2. Original Respondent (*From HIS-1(CH) Check Item B1*)	2.	☐ Same respondent as HIS-1 _____ Person number ☐ New respondent _____ Person number
3. Relationship of respondent to child (*From HIS-1(CH) Section A, item B1*)	3.	_____
4. Final status of reinterview of Child Health Supplement	4.	1 ☐ Completed 2 ☐ Refused . . . . . . 3 ☐ Original respondent not available . . . 4 ☐ Other noninterview reason . . . . . . } *Explain in footnotes*

FOOTNOTES

Section A. INTRODUCTION		
The next questions will be used to study the health of the Nation's children. *If more than one child in family read:* **The only child I will ask the rest of my questions about is --.**		
Section F. BIRTH		
In studying the health of children, it is important to have information about their birth.		
CHECK ITEM F3 ▶	F3	1 ☐ Respondent is biological mother or biological father 8 ☐ Other *(13a)*
3a. Was -- born in a hospital or some other place?	3a.	1 ☐ Hospital *(3b)* 8 ☐ Other – *Specify (4)* _____
b. How many nights was *(Biological mother)* **in the hospital during this stay?**	b.	0 ☐ None _____ Nights
c. How many nights was -- in the hospital during this stay?	c.	0 ☐ None _____ Nights
4a. How much did -- weigh at birth? *Probe for ounces if not reported.*	4a.	9999 ☐ DK _____ Lbs. _____ Oz. *(6)*
b. Did -- weigh more than 5½ pounds or less?	b.	☐ More than 5½ lbs. 2 ☐ Less than 5½ lbs. } *(6)* 7 ☐ DK . . . . .
c. Did -- weigh more than 9 pounds or less?	c.	3 ☐ More than 9 lbs. 4 ☐ Less than 9 lbs. 9 ☐ DK
6. How many hours was -- *(Biological mother)* **in labor?**	6.	00 ☐ None _____ Hours
13a. Did -- receive any newborn care in an intensive care unit, premature nursery, or any other type of special care facility?	13a.	1 Y 2 N *(Section G)*
b. How many nights did -- stay in the special care facility?	b.	00 ☐ None _____ Nights
Section G. PRENATAL CARE		
CHECK ITEM G1 ▶	G1.	1 ☐ Under 6 years old AND biological mother respondent *(9)* 8 ☐ Other *(Section H)*
9. DURING your pregnancy with --, about how many cigarettes a day did you usually smoke?	9.	00 ☐ None _____ Number
10a. At any time during your pregnancy with --, did you take tranquilizers?	10a.	1 Y 2 N

Section H. HOSPITALIZATIONS AND SURGERY		
1a. Since --was born, how many different times has -- stayed in the hospital overnight? Do not include the hospitalization when -- was born.	1a.	00 ☐ None _____ Number of times

Section O. BEHAVIOR PROBLEMS INDEX		
CHECK ITEM 01 ▶ *Refer to age of sample child.*	01	1 ☐ Under 4 years old *(Section Q)* 2 ☐ 4 + years old *(INTRO)*

Hand card B if personal interview

INTRO – Now I am going to read some statements that describe behavior problems many children have. Please tell me whether each statement has been OFTEN true, SOMETIMES true, or NOT true of -- during the past 3 months.

The first statement is: "Has sudden changes in mood or feelings." Has that been OFTEN true, SOMETIMES true, or NOT true of -- in the past 3 months?

Record response and continue with statement 3.

Read list repeating categories and/or time reference as needed.

		Often true (A)	Sometimes true (B)	Not true (C)
1. Has sudden changes in mood or feelings.	1.	1 ☐	2 ☐	3 ☐
3. Is rather high strung, tense, or nervous.	3.	1 ☐	2 ☐	3 ☐
7. Has difficulty concentrating, cannot pay attention for long.	7.	1 ☐	2 ☐	3 ☐
8. Is easily confused, seems to be in a fog.	8.	1 ☐	2 ☐	3 ☐
impulsive, or acts without thinking.	15.	1 ☐	2 ☐	3 ☐
19. Is restless or overly active, cannot sit still.	19.	1 ☐	2 ☐	3 ☐

Section Q. SLEEP AND SEAT BELTS		
4. When riding in a car, does -- wear a seat belt or restraint all or most of the time, some of the time, once in a while, or never?	4.	1 ☐ All/most of time 2 ☐ Some of the time 3 ☐ Once in a while 0 ☐ Never

FOOTNOTES