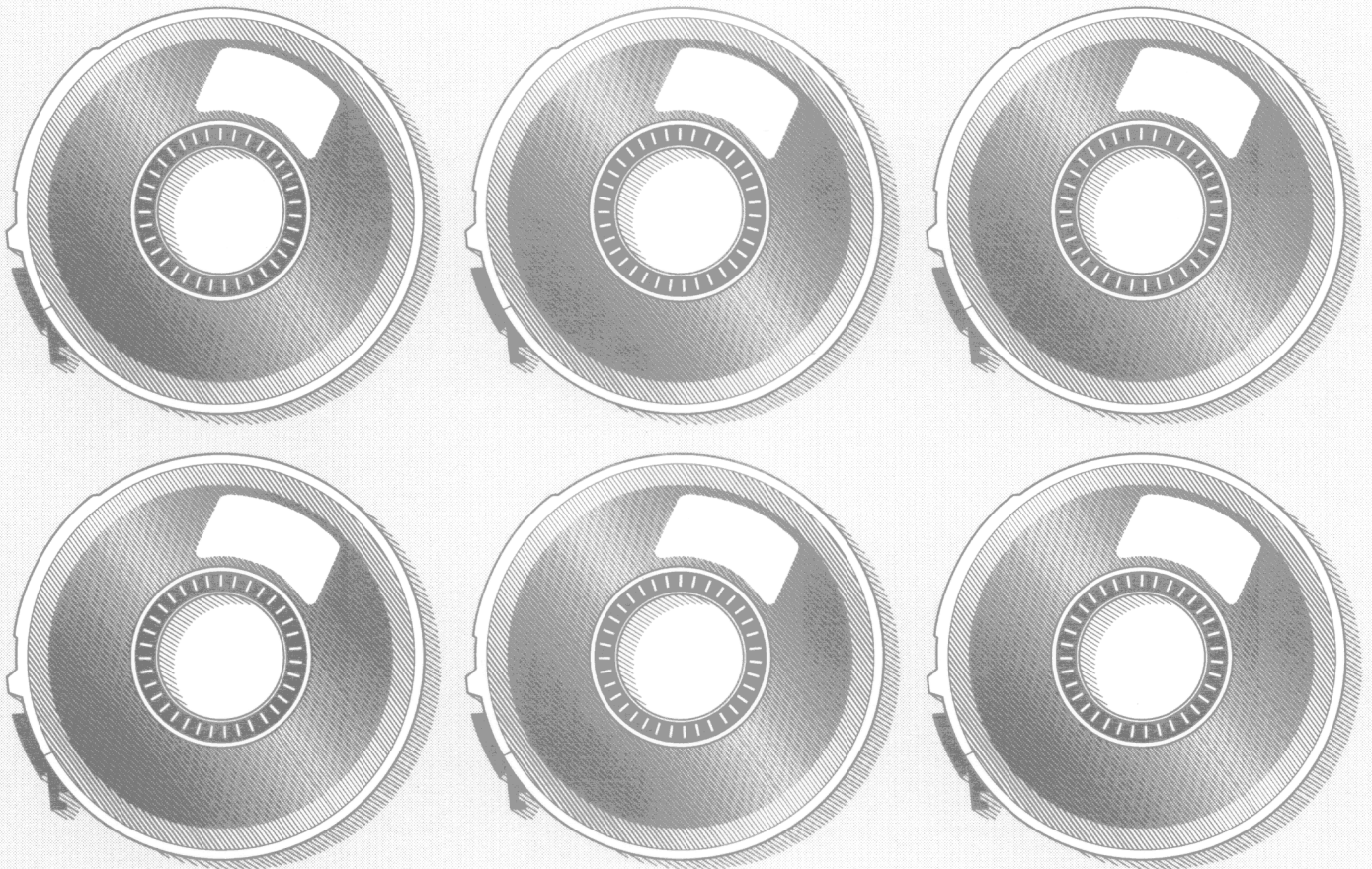


Public Use Data Tape Documentation

Blood and Urine Assessments, Ages 6 Months–74 Years
Tape Number 6511

Version 3 Hispanic Health and Nutrition Examination Survey, 1982-84



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control



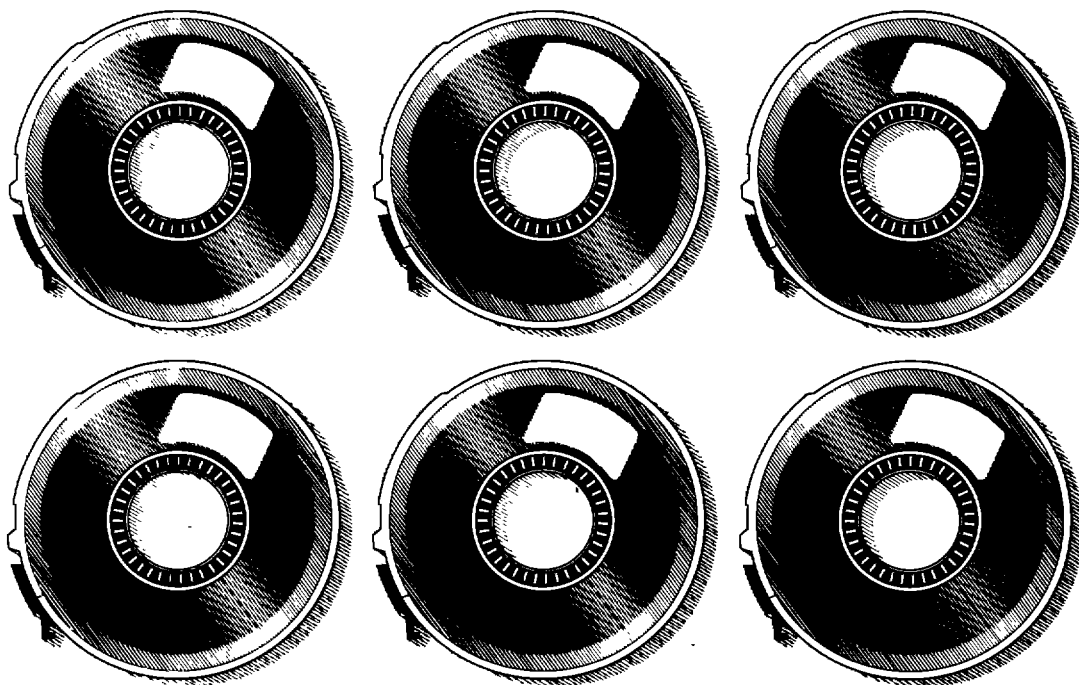
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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control
National Center for Health Statistics

Hyattsville, Maryland
March 1992

Hispanic Health and Nutrition Examination Survey

Mexican Americans
Cuban Americans
Puerto Ricans

Tape Number 6511

Blood and Urine Assessments

Ages 6 Months - 74 Years

Version 3

November 1991

The Hispanic Health and Nutrition Examination Survey (HHANES) was conducted from July 1982 through December 1984. The data on the tape documented here are from all three portions of the survey:

Mexican Americans

Residing in selected counties of Texas, Colorado, New Mexico,
Arizona, and California
Surveyed from July 1982 through November 1983
9,894 persons sampled; 8,554 interviewed; 7,462 examined

Cuban Americans

Residing in Dade County (Miami), Florida
Surveyed from January 1984 through April 1984
2,244 persons sampled; 1,766 interviewed; 1,357 examined

Puerto Ricans

Residing in the New York City area, including parts of New Jersey
and Connecticut
Surveyed from May 1984 through December 1984
3,786 persons sampled; 3,369 interviewed; 2,834 examined

This tape contains additional biochemical assessments not previously available on Version 2 of this data tape.

The following tape characteristics are those of the version of the tape kept at NCHS and of the tape transmitted to the National Technical Information Service for release to users:

Tape labels: IBM standard
Data set name: HHANES.DU651103
Data set organization: Physical sequential
Record format: Fixed block
Record length: 556
Block size: 22240
Density: 6250 BPI
Number of records: 11,653
Data code: EBCDIC

CAUTION

BEFORE USING THIS DATA TAPE,
PLEASE READ THIS PAGE

- o Read the accompanying description of the survey, "The Plan and Operation of the Hispanic Health and Nutrition Examination Survey", DHHS Publication No. (PHS) 85-1321 before conducting analyses of the data on this tape.
- o Two aspects of HHANES, especially, should be taken into account when conducting any analyses: the sample weights and the complex survey design.
- o Analyses should not be conducted on data combined from the three portions of the survey (Mexican-American, Cuban-American, Puerto Rican).
- o HHANES is a survey of Hispanic **households** and some of the **sample persons** included on this tape are not of Hispanic origin. A detailed description of the data codes dealing with national origin or ancestry appears in the NOTES section of this document.
- o Examine the range and frequency of values of a variable before conducting an analysis of data. The range may include unusual or unexpected values. The frequency counts may be useful to determine which analyses may be worthwhile.
- o Language of Interview, which may appear several places on this tape, can vary depending on the questionnaire (several used in the survey) and on whether the response was provided by the sample person or by a proxy.
- o For some data items, reference is made to a note. The notes (in a separate section of this document) may be very important in data analyses. Attention to them is strongly urged.

This Public Use Data Tape has been edited very carefully. Numerous consistency and other checks were also performed. Nevertheless, due especially to the large number of data items, some errors may have gone undetected.

Please bring to the attention of NCHS any errors in the data tape or the documentation. Errata sheets will be sent to people who have purchased the data tapes and corrections will be made to subsequently released data tapes.

In publications, please acknowledge NCHS as the original data source. The acknowledgment should include a disclaimer crediting the authors for analyses, interpretations, and conclusions; NCHS should be cited as being responsible for only the collection and processing of the data. In addition, NCHS requests that the acronym HHANES be placed in the abstracts of journal articles and other publications based on data from this survey in order to facilitate the retrieval of such materials through automated bibliographic searches. Please send reprints of journal articles and other publications that include data from this tape to NCHS.

Division of Health Examination Statistics
National Center for Health Statistics
Presidential Building, Room 900
6525 Belcrest Road
Hyattsville, MD 20782

Public Use Data Tapes for the Hispanic Health and Nutrition Examination Survey will be released through the National Technical Information Service (NTIS) as soon as the data have been edited, validated, and documented. A list of NCHS Public Use Data Tapes that can be purchased from NTIS may be obtained by writing the Scientific and Technical Information Branch, NCHS.

Scientific and Technical Information Branch
National Center for Health Statistics
Presidential Bulding, Room 1064
6525 Belcrest Road
Hyattsville, MD 20782
301-436-8500

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SECTION A. INTRODUCTION AND SURVEY DESCRIPTION

The National Center for Health Statistics (NCHS) collects, analyzes, and disseminates data on the health status of Americans. The results of surveys, analyses, and studies are made known primarily through publications and the release of computer data tapes. This document contains details required to guide programmers, statistical analysts, and research scientists in the use of a Public Use Data Tape.

From 1960 through 1980 NCHS conducted five population-based, national health examination surveys. Each survey involved collecting data by direct physical examination, the taking of a medical history, and laboratory and clinical tests and measurements. Questionnaires and examination components have been designed to obtain and support analyses of data on certain targeted conditions such as diabetes, hypertension, and anemia. Beginning with the first National Health and Nutrition Examination Survey (NHANES I) a nutrition component was added to obtain information on nutritional status and dietary practices. The numbers of Hispanics in these samples were, however, insufficient to enable adequate estimation of their health conditions. From 1982 through 1984 a Hispanic Health and Nutrition Examination Survey (HHANES) was conducted to obtain data on the health and nutritional status of three Hispanic groups: Mexican Americans from Texas, Colorado, New Mexico, Arizona, and California; Cuban Americans from Dade County, Florida; and Puerto Ricans from the New York City area, including parts of New Jersey and Connecticut.

The general structure of the HHANES sample design was similar to that of the previous National Health and Nutrition Examination Surveys. All of these studies have used complex, multistage, stratified, clustered samples of defined populations. The major difference between HHANES and the previous surveys is that HHANES was a survey of three special subgroups of the population in selected areas of the United States rather than a national probability sample. A detailed presentation of the design specifications is found in Chapter 5 of "Plan and Operation of the Hispanic Health and Nutrition Examination Survey, 1982-84" (Ref. No. 1).

Data collection began with a household interview. Several questionnaires were administered:

- o A Household Screener Questionnaire (HSQ), administered at each selected address, for determining household eligibility and for selecting sample persons.
- o A Family Questionnaire (FQ), administered once for each family containing sample persons, which included sections on family relationships, basic demographic information for sample persons and head of family, Medicare and health insurance coverage, participation in income assistance programs, and housing characteristics.
- o An Adult Sample Person Questionnaire (ASPQ), for persons 12 through 74 years which, depending on age, included sections on health status measures, health services utilization, smoking (20 through 74 years), meal program participation, and acculturation. Information on the use of medicines and vitamins in the past two weeks was also obtained.
- o A Child Sample Person Questionnaire (CSPQ), for sample persons 6 months through 11 years which included sections on a number of health status issues, health care utilization, infant feeding practices, participation in meal programs, school attendance, and language use. Information on the use of medicines and vitamins in the past two weeks was also obtained.

At the Mobile Examination Center two questionnaires were administered and an examination performed:

- o An Adult Sample Person Supplement (ASPS), for sample persons 12 through 74 years, which included sections on alcohol consumption, drug abuse, depression, smoking (12 through 19 years), pesticide exposure, and reproductive history.
- o A Dietary Questionnaire (DQ), for persons 6 months through 74 years, by which trained dietary interviewers collected information about "usual" consumption habits and dietary practices, and recorded foods consumed 24-hours prior to midnight of the interview.
- o An examination which included a variety of tests and procedures. Age at interview and other factors determined which procedures were administered to which examinees. A dentist performed a dental examination and a vision test. Technicians took blood and urine specimens and administered a glucose tolerance test, X-rays, electrocardiograms, and ultrasonographs of the gallbladder. Technicians also performed hearing tests and took a variety of body measurements. A physician performed a medical examination focusing especially on the cardiovascular, gastrointestinal, neurological, and musculoskeletal systems. The physician's impression of overall health, nutritional and weight status, and health care needs were also recorded. Some blood and urine specimen analyses were performed by technicians in the examination center; others were conducted under contract at various laboratories.

Because the HHANES sample is not a simple random one, it is necessary to incorporate sample weights for proper analysis of the data. These sample weights are a composite of individual selection probabilities, adjustments for noncoverage and nonresponse, and poststratification adjustments. The HHANES sample weights, which are necessary for the calculation of point estimates, are located on all data tapes in positions 184-213. Because of the complex sample design and the ratio adjustments used to produce the sample weights, commonly used methods of point and variance estimation and hypothesis testing which assume simple random sampling may give misleading results. In order to provide users with the capability of estimating the complex sample variances in the HHANES data, Strata and Pseudo Primary Sampling Unit (PSU) codes have been provided on all data tapes in positions 214-217. These codes and the sample weights are necessary for the calculation of variances.

There are computer programs available designed for variance estimation for complex sample designs. The balanced repeated replication approach (Ref. No. 2) is used in &REPERR and a linearization approach is used in &PSALMS to calculate variance-covariance matrixes. Both routines are available within the OSIRIS IV library (Ref. No. 3). SURREGR (Ref. No. 4) and SUPERCARP (Ref. No. 5) are programs that calculate variance-covariance matrixes using a linearization approach (Ref. No. 6) (Taylor series expansion). Another program, SESUDAAN (Ref. No. 7) calculates standard errors, variances, and design effects. (Note: This version of SESUDAAN should not be used to obtain variances for totals.) SURREGR and SESUDAAN are special procedures which run data under the SAS system (Ref. No. 8).

Even though the total number of examined persons in this survey is quite large, subclass analyses can lead to estimates that are unstable, particularly estimates of variances. Consequently, analyses of subclasses require that the user pay particular attention to the number of sample persons in the subclass and the number of PSU's that contain at least one sample person in the subclass. Small sample sizes, or a small number of PSU's used in the variance calculations, may produce unstable estimates of the variances.

A more complete discussion of these issues and possible analytic strategies for examining various hypotheses is presented in Chapter 11 of "Plan and Operation of the Hispanic Health and Nutrition Examination Survey, 1982-84" (Ref. No. 1) and in an earlier NCHS methodology (Series 2) publication (Ref. No. 9).

Some users, however, may not have access to the computer programs for estimating complex sample variances or may want to do their preliminary analyses without using them. In addition, variance estimates calculated from HHANES data through use of the programs described previously are likely to be unstable because there were so few sample areas for each portion of HHANES. This instability is not due to there being too few people in the sample but may be due to the fact that the sample was selected from relatively few areas. Therefore, the following discussion is designed to provide an alternative approach to deal with the unavailability of software and the small number of PSU's. The approach is based on using average design effects (Ref. No. 10).

The design effect, defined as the ratio of the variance of a statistic from a complex sample to the variance of the same statistic from a simple random sample of the same size, that is,

$$\text{DESIGN EFFECT (DEFF)} = \frac{\text{COMPLEX SAMPLE VARIANCE}}{\text{SIMPLE RANDOM SAMPLE VARIANCE}}$$

is often used to show the impact of the complex sample design on variances. If the design effect is near 1, the complex sample design has little effect on the variances and the user could consider assuming simple random sampling for the analysis.

Some illustrative design effects for HHANES data on this tape are given in the following tables. The design effects in the tables are the average for the age groups usually presented in NCHS Series 11 publications. If the average design effect for a subgroup was less than 1.0 (implying an improvement over simple random sampling), it was coded as 1.0.

The following guidelines were used in the calculation of the average design effects:

1. Exclude all persons of non-Hispanic origin,
2. Exclude all estimates for large age ranges, such as all ages combined or 'all adults', and
3. Exclude all estimates where the proportion of the subpopulation with the specific characteristic or condition was zero percent or one hundred percent.

Design effects tend to be larger when age groups are combined, just as they are when the sexes are combined, as shown in the tables. The data in the tables give the user an idea of the range in design effects for selected response variables from this data tape. If a response variable is not one shown in the tables take the range into account; it is possible that a user could have one of the higher, rather than one of the lower, design effects.

Average Design Effects, by Sex, for Selected Assessments--
Mexican-American Portion

Assessment	Mean or Proportion	Tape Postions	Both Sexes	Male	Female
Total serum cholesterol	\bar{x}	457-459	1.0	1.0	1.0
High density lipoprotein cholesterol	\bar{x}	460-462	2.0	1.7	1.7
Serum ferritin	\bar{x}	489-492	1.0	1.0	1.2
Red blood cell folate	\bar{x}	493-496	1.4	1.1	1.0
Serum folate	\bar{x}	497-500	1.4	1.3	1.0
Hematocrit	\bar{x}	407-409	2.3	1.9	2.8
Hemoglobin	\bar{x}	410-412	4.0	2.7	4.1
Red blood cell count	\bar{x}	413-415	3.7	2.8	3.0
White blood cell count	\bar{x}	416-418	1.6	1.2	1.3
Mean corpuscular volume	\bar{x}	419-422	3.3	2.6	1.9
Mean corpuscular hemoglobin	\bar{x}	423-425	1.8	1.7	1.5
Mean corpuscular hemoglobin concentration	\bar{x}	426-428	5.4	3.1	3.5
Serum Iron	\bar{x}	429-431	1.4	1.1	1.3
Total iron binding capacity	\bar{x}	432-434	1.3	1.1	1.2
Transferrin saturation	\bar{x}	435-438	1.4	1.1	1.2
Serum vitamin A	\bar{x}	439-441	2.3	1.6	2.2
Serum vitamin E	\bar{x}	442-445	2.7	1.5	2.2
Erythrocyter protoporphyrin	\bar{x}	446-449	1.1	1.1	1.4
Lead	\bar{x}	450-452	1.5	1.2	1.9
Total serum cholesterol	\bar{x}	457-459	1.0	1.0	1.0
HDL cholesterol	\bar{x}	460-462	2.0	1.7	1.7
Serum ferritin	\bar{x}	489-492	1.0	1.0	1.2
RBC folate	\bar{x}	493-496	1.4	1.1	1.0
Serum folate	\bar{x}	497-500	1.4	1.3	1.0
Sodium	\bar{x}	501-503	7.8	4.0	4.4
Potassium	\bar{x}	504-505	5.7	3.2	3.4
Chloride	\bar{x}	506-508	13.8	6.9	7.6
Total carbon dioxide	\bar{x}	509-510	5.3	2.7	3.4
Calcium	\bar{x}	511-513	3.2	2.0	2.4
Inorganic phosphorus	\bar{x}	514-516	1.9	1.0	2.0
Uric Acid	\bar{x}	517-519	1.7	1.5	1.7
Glucose	\bar{x}	520-522	1.3	1.0	1.4
Bun	\bar{x}	523-525	1.5	1.6	1.0
Total bilirubin	\bar{x}	526-528	2.3	1.6	1.9
Creatinine	\bar{x}	529-531	2.1	1.9	2.1
SGOT	\bar{x}	532-534	2.0	1.3	1.7
SGPT	\bar{x}	535-537	1.7	1.4	1.2
LDH	\bar{x}	538-540	7.0	4.0	4.2
Alkaline phosphatase	\bar{x}	541-543	1.5	1.4	1.3
Total protein	\bar{x}	544-546	2.5	2.1	1.5
Albumin	\bar{x}	547-549	2.5	2.2	2.1

Source: NCHS, HHANES, 1982-84, Tape Number 6511, Version 3

Average Design Effects, by Sex, for Selected Assessments--
Cuban American Portion

Assessment	Mean or Proportion	Tape Postions	Both Sexes	Male	Female
Total serum cholesterol	\bar{x}	457-459	1.2	1.2	1.0
High density lipoprotein cholesterol	\bar{x}	460-462	1.0	1.0	1.0
Serum ferritin	\bar{x}	489-492	1.1	1.3	1.0
Red blood cell folate	\bar{x}	493-496	1.0	1.1	1.0
Serum folate	\bar{x}	497-500	1.0	1.1	1.0
Hematocrit	\bar{x}	407-409	1.2	1.3	1.1
Hemoglobin	\bar{x}	410-412	1.1	1.4	1.0
Red blood cell count	\bar{x}	413-415	1.1	1.2	1.1
White blood cell count	\bar{x}	416-418	1.5	1.3	1.5
Mean corpuscular volume	\bar{x}	419-422	1.1	1.2	1.0
Mean corpuscular hemoglobin	\bar{x}	423-425	1.1	1.3	1.0
Mean corpuscular hemoglobin concentration	\bar{x}	426-428	1.3	1.1	1.2
Serum Iron	\bar{x}	429-431	1.2	1.1	1.0
Total iron binding capacity	\bar{x}	432-434	1.0	1.0	1.0
Transferrin saturation	\bar{x}	435-438	1.1	1.1	1.0
Serum vitamin A	\bar{x}	439-441	1.1	1.0	1.0
Serum vitamin E	\bar{x}	442-445	1.2	1.0	1.3
Erythrocyter protoporphyrin	\bar{x}	446-449	1.0	1.0	1.0
Lead	\bar{x}	450-452	1.0	1.0	1.0
Total serum cholesterol	\bar{x}	457-459	1.2	1.2	1.0
HDL cholesterol	\bar{x}	460-462	1.0	1.0	1.0
Serum ferritin	\bar{x}	489-492	1.1	1.3	1.0
RBC folate	\bar{x}	493-496	1.0	1.1	1.0
Serum folate	\bar{x}	497-500	1.0	1.1	1.0
Sodium	\bar{x}	501-503	1.0	1.0	1.0
Potassium	\bar{x}	504-505	1.0	1.0	1.0
Chloride	\bar{x}	506-508	1.1	1.0	1.4
Total carbon dioxide	\bar{x}	509-510	1.2	1.1	1.2
Calcium	\bar{x}	511-513	1.4	1.1	1.2
Inorganic phosphorus	\bar{x}	514-516	1.0	1.0	1.0
Uric Acid	\bar{x}	517-519	1.2	1.1	1.2
Glucose	\bar{x}	520-522	1.0	1.2	1.0
Bun	\bar{x}	523-525	1.1	1.4	1.0
Total bilirubin	\bar{x}	526-528	1.2	1.0	1.1
Creatinine	\bar{x}	529-531	1.5	1.5	1.2
SGOT	\bar{x}	532-534	1.0	1.0	1.0
SGPT	\bar{x}	535-537	1.0	1.0	1.0
LDH	\bar{x}	538-540	1.4	1.3	1.6
Alkaline phosphatase	\bar{x}	541-543	1.0	1.0	1.0
Total protein	\bar{x}	544-546	1.2	1.2	1.0
Albumin	\bar{x}	547-549	1.4	1.0	1.4

Source: NCHS, HHANES, 1982-84, Tape Number 6511, Version 3

Average Design Effects, by Sex, for Selected Assessments--
Puerto Rican Portion

Assessment	Mean or Proportion	Tape Postions	Both Sexes	Male	Female
Total serum cholesterol	\bar{x}	457-459	1.4	2.0	1.9
High density lipoprotein cholesterol	\bar{x}	460-462	1.6	1.0	1.2
Serum ferritin	\bar{x}	489-492	1.5	1.3	1.4
Red blood cell folate	\bar{x}	493-496	3.5	1.4	2.9
Serum folate	\bar{x}	497-500	2.7	1.5	2.2
Hematocrit	\bar{x}	407-409	1.6	1.2	1.8
Hemoglobin	\bar{x}	410-412	1.5	1.0	1.9
Red blood cell count	\bar{x}	413-415	1.1	1.1	1.2
White blood cell count	\bar{x}	416-418	1.0	1.2	1.0
Mean corpuscular volume	\bar{x}	419-422	1.8	1.6	1.1
Mean corpuscular hemoglobin	\bar{x}	423-425	1.4	1.3	1.0
Mean corpuscular hemoglobin concentration	\bar{x}	426-428	2.0	1.2	1.8
Serum Iron	\bar{x}	429-431	1.2	1.1	1.3
Total iron binding capacity	\bar{x}	432-434	1.2	1.0	1.1
Transferrin saturation	\bar{x}	435-438	1.3	1.2	1.4
Serum vitamin A	\bar{x}	439-441	1.2	1.2	1.0
Serum vitamin E	\bar{x}	442-445	1.5	1.5	1.8
Erythrocyter protoporphyrin Lead	\bar{x}	446-449	1.3	1.2	1.0
Total serum cholesterol	\bar{x}	450-452	1.6	1.4	1.5
HDL cholesterol	\bar{x}	457-459	1.4	2.0	1.9
Serum ferritin	\bar{x}	460-462	1.6	1.0	1.2
RBC folate	\bar{x}	489-492	1.5	1.3	1.4
Serum folate	\bar{x}	493-496	3.5	1.4	2.9
Sodium	\bar{x}	497-500	2.7	1.5	2.2
Potassium	\bar{x}	501-503	1.9	1.5	1.7
Chloride	\bar{x}	504-505	2.9	2.1	1.8
Total carbon dioxide	\bar{x}	506-508	2.0	1.3	2.2
Calcium	\bar{x}	509-510	2.4	1.7	1.6
Inorganic phosphorus	\bar{x}	511-513	2.2	1.3	1.9
Uric Acid	\bar{x}	514-516	1.2	1.0	1.3
Glucose	\bar{x}	517-519	1.6	1.0	1.5
Bun	\bar{x}	520-522	1.0	1.0	1.0
Total bilirubin	\bar{x}	523-525	1.2	1.2	1.0
Creatinine	\bar{x}	526-528	1.1	1.1	1.0
SGOT	\bar{x}	529-531	1.0	1.3	1.0
SGPT	\bar{x}	532-534	1.3	1.0	1.5
LDH	\bar{x}	535-537	1.6	1.1	2.1
Alkaline phosphatase	\bar{x}	538-540	2.3	1.1	2.1
Total protein	\bar{x}	541-543	1.2	1.1	1.0
Albumin	\bar{x}	544-546	2.4	1.6	2.2
		547-549	1.1	1.0	1.3

Source: NCHS, HHANES, 1982-84, Tape Number 6511, Version 3

Suppose, for example, that the average (mean) hemoglobin level for 250 Mexican-American males ages 55-64 years was 13.3 grams per deciliter. Suppose, also, that the simple random sample variance was 1.2.

The complex sample variance is determined by multiplying the simple random sample variance by the design effect (DEFF). In the example above, the complex

$$\begin{aligned} \text{sample variance} &= \text{simple random sample variance} \times \text{DEFF} \\ &= (1.2) \times (2.6) \\ &= 3.12 \end{aligned}$$

In a similar way, the complex sample variance of a percent can be determined. Assuming simple random sampling, the variance for the percent is calculated by converting the percent to a proportion and using the standard formula for the variance of a proportion.

$$V = \frac{pq}{n}$$

This variance (V) multiplied by the design effect (DEFF) provides an estimate of the variance from a complex sample of the same sample size (n).

The user should recognize that this approach does not incorporate the variance covariance matrix. In most cases, this leads to a slight overestimate of the variance because the covariance terms, which are subtracted in the variance of a ratio, in general are positive. Thus, in a borderline case, the null hypothesis would be less likely to be rejected (Ref. No. 11).

Alternative or better approaches may exist or be developed. Users who want to suggest such approaches, or who want the latest information should contact the Scientific and Technical Information Branch (address given in the beginning of this documentation).

SECTION B. DATA COLLECTION AND PROCESSING PROCEDURES

Data presented in Sections E through H and the family relationships data in Section J were collected on the Household Screener and Family Questionnaires. These interview schedules were administered in sample persons' households. Completed interview schedules were reviewed in the Survey's field offices and again at the data processing center of NCHS by clerical editors. The editors checked the forms for completeness, clarity, and compliance with skip patterns, and they coded items such as industry and occupation. At the data processing center the questionnaires were keyed and verified on key-to-disk data entry equipment under the control of programs that checked for valid codes and ranges, compliance with skip patterns, and consistency. After being keyed, data were reedited by analysts for reasonableness and consistency and for compliance with instructions for sampling and questionnaire administration.

Data in Section K were collected as a battery of blood assessments which included hematologic and nutritional biochemistries, and lipids.

The general tape description format is Tape Position X Item X Counts. The item (field) may be a tape descriptor (e.g. Version Number), a sample person descriptor (e.g. Age at Interview), or a question (e.g. Is sample person covered by Medicare?). Where appropriate, data entries are presented by codes. Frequency counts are given for each code. The counts are included to help the user in planning analyses and in verifying that programs account for all data. The data source is given also (e.g., from Family Questionnaire). In some cases, a note is referenced. The notes contain explanations of the item (e.g. how Poverty Index is calculated).

The questionnaire data have undergone many quality control and editing procedures. The responses of sample persons to some questions may appear extreme or illogical. Self-reported data, especially, are subject to a number of sources of variability, including recall and other reporting errors. In the data clean-up process, responses that varied considerably from expected were verified through direct review of the collection form or a copy of it. Such responses may not represent fact, but they are included as recorded in the field. The user must determine if these responses should be included in analyses.

Responses to "other" and "specify" were recoded to existing categories, if possible. For responses that could not be recoded, new code categories were created if the information was deemed analytically useful. Caution should be used in interpreting the data from these new categories because there is no way of knowing which other respondents would have selected one of the new categories if given the option.

The blood determinations like the questionnaire data have undergone numerous quality control and editing procedures in both the data collection and data processing phases of the survey. All unusual values have been checked and verified by the laboratories. A code "8" which is labeled as "blank but applicable" is used to indicate that a sample person should have a data value for a particular blood assessment but for varying reasons that value is unavailable. Blanks were used when a particular assessment was not supposed to be given or was not applicable.

Hematological, biochemical and urinary assessments were included to provide objective evidence of the health and nutritional status of individuals with respect to anemias and other blood disorders, vitamin deficiencies, toxic levels of substances, and the risk of likelihood of disease.

The blood determinations released in this version are a subset of the total battery of determinations done. As additional ones are edited and validated, they will be made available on a subsequent version of this tape. A complete list of laboratory determinations included in the survey, and the laboratories at which they were performed, may be found in appendices V and VI of the plan and operation report of the HHANES (Ref. No. 1). Brief descriptions of the analytic methods used for the determinations are presented in Section M. Detailed descriptions of the procedures and methods used by the various laboratories are available upon request.

Copies of the questionnaires and examination forms, both in English and Spanish can be found in the plan and operation report for HHANES (Ref. No. 1). Detailed information on interviewing and examination procedures is contained in the household interviewer's manual (Ref. No. 12), the mobile examination center interviewer's manual (Ref. No. 13), and the examination staff procedures manual (Ref. No. 14). These manuals are available upon request from:

Division of Health Examination Statistics
National Center for Health Statistics
Presidential Building, Room 900
6525 Belcrest Road
Hyattsville, MD 20782
301-436-7080

SECTION C. REFERENCES

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12. National Center for Health Statistics: Instruction Manual Part 15h, Household Interviewer's Manual for the Hispanic Health and Nutrition Examination Survey, 1982-84. Hyattsville, MD, 1986.
13. National Center for Health Statistics: Instruction Manual Part 15g, Mobile Examination Center Interviewer's Manual for the Hispanic Health and Nutrition Examination Survey, 1982-84. Hyattsville, MD, 1986.
14. National Center for Health Statistics: Instruction Manual Part 15a, Examination Staff Procedures Manual for the Hispanic Health and Nutrition Examination Survey, 1982-84. Hyattsville, MD, 1986.

SECTION D. TAPE POSITION INDEX

TAPE POSITIONS 1-400 contain data categories common to all data tapes: sociodemographic data, family composition, family income, residence and household. Sample weights are also in this set of data.

TAPE POSITIONS 401+ contain data categories unique to this data tape.

SOCIODEMOGRAPHIC DATA - SAMPLE PERSON (SECTION E)

1-5	Sample Person Sequence Number
6-15	Survey and Tape Identifiers
16	Examination Status
17	Language of Interview
18-21	Date of Interview
22-25	Date of Examination
26-29	Date of Birth
30-32	Age at Interview
33-38	Age at Examination
39-43	Family Number
44-45	Relationship to Head of Family
46	Sex
47	Race
48-49	National Origin or Ancestry
50-52	Birth Place
53	National Origin Recode
54-56	Education
57	Marital Status
58	Service in Armed Forces
59-69	Work/Occupation/Employment
70-95	Health Insurance/Health Care Support
96-99	Income Assistance/Public Compensation or Support

SOCIODEMOGRAPHIC DATA - HEAD OF FAMILY (SECTION F)

100	Interview and Examination Status
102-105	Date of Birth
106-108	Age at Interview
109	Sex
110	Race
111-112	National Origin or Ancestry
113-115	Birth Place
116-118	Education
119	Marital Status
120	Service in Armed Forces
121-131	Work/Occupation/Employment

FAMILY COMPOSITION AND INCOME DATA (SECTION G)

132-133	Number of People in Family
134-135	Number of Sample People in Family
136-138	Combined Family Income
139-143	Per Capita Income
144-146	Poverty Index
147-162	Income, Food Stamps

RESIDENCE AND HOUSEHOLD DATA (SECTION H)

163	Size of Place
164	Standard Metropolitan Statistical Area
165-166	Number of People in Household
167-168	Number of Sample People in Household
169-170	Number of Rooms
171	Kitchen Facilities Access
172-183	Heating/Cooling Equipment

SAMPLE WEIGHTS (SECTION I)

184-189	Examination Final Weight
190-195	Interview Final Weight
196-201	GTT/Ultrasound Weight
202-207	Audiometry/Vision Weight
208-213	Pesticide Weight
214-215	Strata Code
216-217	Pseudo PSU Code

FAMILY RELATIONSHIPS (SECTION J)

218-400	Data not yet available
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BLOOD AND URINE ASSESSMENTS (SECTION K)

401-404	Tape number
405	Blood specimen collection
406	Session
407-409	Hematocrit
410-412	Hemoglobin
413-415	Red blood cell count
416-418	White blood cell count
419-422	Mean corpuscular volume
423-425	Mean corpuscular hemoglobin
426-428	Men corpuscular hemoglobin concentration
429-431	Serum iron
432-434	Serum total iron-binding capacity
435-438	Transferrin saturation
439-441	Serum vitamin A
442-445	Serum vitamin E
446-449	Erythrocyte protoporphyrin
450-452	Lead
457-459	Total serum cholesterol
460-462	HDL Cholesterol
463	HDL Cholesterol serum quality
464-467	Serum triglycerides
468-469	Fasting time (hours)
470-471	Fasting time (minutes)
489-492	Serum ferritin

BLOOD AND URINE ASSESSMENTS (SECTION K) (cont.)

493-496	RBC folate
497-500	Serum folate
501-503	S odium
504-505	Potassium
506-508	Chloride
509-510	Total CO ₂
511-513	Calcium
514-516	Inorganic phosphorus
517-519	Uric acid
520-522	Glucose
523-525	BUN
526-528	Total bilirubin
529-531	Creatinine
532-534	AST
535-537	ALT
538-540	LDH
541-543	Alkaline phosphatase
544-546	Total protein
547-549	Albumin
550-551	Clinical Chemistry Profile serum quality - comment 1
552	Clinical Chemistry Profile serum quality - comment 2
553	Clinical Chemistry Profile serum quality - comment 3
554	Clinical Chemistry Profile serum quality - comment 4
555-556	Clinical Chemistry Profile serum quality - comment 5

Position	Item description and code	M	Counts C	P	Source and notes
SECTION E. SOCIODEMOGRAPHIC DATA - SAMPLE PERSON (POS 1-99)					
Source: Family Questionnaire (FQ)					
Household Screener Questionnaire (HSQ)					
1-5	Sample person sequence number				
	00001-09894 Mexican Americans	7462	-	-	
	10002-12238 Cuban Americans	-	1357	-	
	13001-16785 Puerto Ricans	-	-	2834	
6-12	Blank				
13	Portion of survey				
	1 Mexican-American (M)	7462	-	-	
	2 Cuban-American (C)	-	1357	-	
	3 Puerto Rican (P)	-	-	2834	
14	Family Questionnaire missing				
	1 Yes	21	6	10	See Note 1
	2 No	7441	1351	2824	
15	Version number				
	2	7462	1357	2834	
16	Examination status				
	1 Examined	7462	1357	2834	See Note 2
	2 Not examined	0	0	0	
17	Language of interview (Pos. 1-400)				FQ
	1 English	4513	244	1229	
	2 Spanish	2929	1107	1595	
	Blank	20	6	10	
18-19	Date of interview				HSQ 4
	01-12 Month	7462	1357	2834	
20-21	82-84 Year	7462	1357	2834	
22-23	Date of examination				
	From survey control record				
	01-12 Month	7462	1357	2834	
24-25	82-84 Year	7462	1357	2834	
26-27	Date of birth				HSQ 2e
	01-12 Month	7462	1357	2834	
	88 Blank but applicable	0	0	0	
28-29	08-84 Year	7462	1357	2834	
	88 Blank but applicable	0	0	0	
30-31	Age at interview (computed)				
	01-74 (See next column for units)	7462	1357	2834	
32	Age at interview units				HSQ 2f
	1 Years	7342	1349	2796	
	2 Months	120	8	38	

Position	Item description and code	M	Counts C	P	Source and notes
	Age at examination (computed) Positions 33-38 are all 0 for non-examined persons.				
33-34	00-75 Years	7462	1357	2834	
35-36	00-11 Months	7462	1357	2834	
37-38	00-30 Days	7462	1357	2834	
39-43	Family number 00002-03529 04005-04922 07001-08584	7462 - -	- 1357 -	- - 2834	See Note 3
44-45	What is sample person's relationship to head of family? Sample person is: 01 Head of family living alone (1 family with only 1 member) 02 Head of family, with no related persons in household (2+ persons in household) 03 Head of family, with related persons in household 04 Wife of head (husband living at home and not in Armed Forces) 05 Wife of head (husband living at home and is in Armed Forces) 06 Husband of head (wife living at home and not in Armed Forces) 07 Husband of head (wife living at home and is in Armed Forces) 08 Child of head or head's spouse 09 Grandchild of head or head's spouse 10 Parent of head or head's spouse 11 Other relative (includes ex-spouse, daughter-in-law, etc.) 12 Foster child	145 76 1582 1299 5 35 0 3769 217 57 273 4	56 23 369 300 0 12 0 484 32 35 46 0	113 24 678 296 0 37 0 1437 115 33 101 0	HSQ 2b See Note 4
46	Sex 1 Male 2 Female	3516 3946	636 721	1237 1597	FQ B-4
47	Observed race 1 White 2 Black 3 Other 8 Blank but applicable 9 Not observed Blank	7213 76 8 72 72 21	1300 15 3 15 18 6	2462 152 73 59 78 10	FQ B-5 See Note 5
48-49	Sample person's national origin or ancestry. 01 Mexican/Mexicano 02 Mexican-American 03 Chicano 04 Puerto Rican 05 Boricuan 06 Cuban 07 Cuban-American 08 Hispano - specify 09 Other Latin-American or other Spanish - specify 00 Other - specify 10 Spanish-American 11 Spanish (Spain)	1641 5202 102 7 0 4 0 150 37 276 22 21	1 0 0 3 0 1069 222 14 18 30 0 0	1 0 0 2596 36 20 0 26 41 114 0 0	HSQ 2c See Note 6

Position	Item description and code	Counts			Source and notes
		M	C	P	
50-52	In what state or foreign country was sample person born?				FQ B-6 See Note 7
	001-118 State/country code	7403	1345	2771	
	888 Blank but applicable	38	6	53	
	Blank	21	6	10	
53	National origin recode "Hispanic" = Mexican-American in Southwest, Cuban-American in Florida and Puerto Rican in New York City area.				See Note 8
	1 "Hispanic"	7197	1291	2645	
	2 Not "Hispanic"	265	66	189	
54-55	What is the highest grade or year of regular school sample person has ever attended?				FQ B-7
	00 Never attended or kindergarten only	1476	116	446	
	01-08 Elementary grade	3118	556	1090	
	09-12 High school grade	2119	400	1011	
	13-16 College	581	243	225	
	17 Graduate school	70	30	14	
	88 Blank but applicable	77	6	38	
	Blank	21	6	10	
56	Did sample person finish that grade/year?				FQ B-8
	1 Yes	3938	853	1436	
	2 No	1934	368	861	
	8 Blank but applicable	93	14	81	
	Blank	1497	122	456	
57	Is sample person now married, widowed, divorced, separated or has he or she never been married?				FQ B-9
	0 Under 14 years of age	2953	297	1000	
	1 Married - spouse in household	2600	632	660	
	2 Married - spouse not in household	70	17	54	
	3 Widowed	161	50	66	
	4 Divorced	214	92	155	
	5 Separated	159	21	149	
	6 Never married	1265	241	730	
	8 Blank but applicable	19	1	10	
	Blank	21	6	10	
58	Did sample person ever serve in the Armed Forces of the United States?				FQ B-11
	1 Yes	416	27	145	
	2 No	3557	952	1409	
	8 Blank but applicable	7	3	14	
	Blank	3482	375	1266	
59	During the past 2 weeks, did sample person work at any time at a job or business, not counting work around the house?				FQ B-12
	1 Yes	2210	622	613	
	2 No	1751	349	930	
	8 Blank but applicable	19	11	25	
	Blank	3482	375	1266	

Position	Item description and code	M	Counts C	P	Source and notes
60	Even though sample person did not work during those 2 weeks, did he or she have a job or business?				FQ B-13
	1 Yes	46	13	23	
	2 No	1704	334	902	
	8 Blank but applicable	20	13	30	
	Blank	5692	997	1879	
61	Was sample person looking for work or on layoff from a job?				FQ B-14
	1 Yes	217	43	60	
	2 No	1533	304	865	
	8 Blank but applicable	20	13	30	
	Blank	5692	997	1879	
62	Which, looking for work or on layoff from a job or both?				FQ B-15
	1 Looking	146	34	44	
	2 Layoff	46	6	8	
	3 Both	23	2	7	
	8 Blank but applicable	22	14	31	
	Blank	7225	1301	2744	
63-65	What kind of business or industry does sample person work for?				FQ B-19 See Note 9
	010-932 Industry code	2429	665	681	
	990 Blank but applicable	49	18	37	
	Blank	4984	674	2116	
66-68	What kind of work was sample person doing?				FQ B-20 See Note 9
	003-889 Occupation code	2432	666	681	
	999 Blank but applicable	46	17	37	
	Blank	4984	674	2116	
69	Class of worker				FQ B-22
	1 An employee of a private company, business or individual for wages, salary, or commission	1912	543	551	
	2 A Federal government employee	74	6	21	
	3 A State government employee	124	19	17	
	4 A Local government employee	169	17	56	
	5 Self-employed in own incorporated business or professional practice	17	12	7	
	6 Self-employed in own unincorporated business, professional practice, or farm	131	67	27	
	7 Working without pay in family business or farm	3	0	0	
	8 Blank but applicable	46	18	38	
	0 Never worked or never worked at a full-time civilian job lasting 2 weeks or more	2	1	1	
	Blank	4984	674	2116	
70	Is sample person now covered by Medicare?				FQ C-2
	1 Covered	303	107	139	
	2 Not covered	7129	1237	2674	
	8 Blank but applicable	6	6	11	
	9 Don't know	3	1	0	
	Blank	21	6	10	

Position	Item description and code	M	Counts C	P	Source and notes
71	Is sample person now covered by the part of Social Security Medicare which pays for hospital bills?				FQ C-3
	1 Yes	270	100	124	
	2 No	18	4	5	
	8 Blank but applicable	15	6	20	
	9 Don't know	6	3	1	
	Blank	7153	1244	2684	
72	Is sample person now covered by that part of Medicare which pays for doctor's bills? This is the Medicare plan for which he or she or some agency must pay a certain amount each month.				FQ C-4
	1 Yes	269	100	111	
	2 No	17	5	17	
	8 Blank but applicable	15	6	20	
	9 Don't know	8	2	2	
	Blank	7153	1244	2684	
73	Type of Medicare coverage As shown on Medicare card				FQ C-5
	1 Hospital	0	0	0	
	2 Medical	2	0	0	
	3 Card not available	3	0	2	
	4 Hospital and medical	5	3	0	
	8 Blank but applicable	15	6	20	
	Blank	7437	1348	2812	
	<u>HEALTH INSURANCE</u>				See Note 10
74	Is sample person covered by any health insurance plan which pays any part of a hospital, doctor's, or surgeon's bill?				FQ C-11
	1 Yes	4094	818	1011	
	2 No	3326	526	1796	
	8 Blank but applicable	13	7	16	
	9 Don't know	8	0	1	
	Blank	21	6	10	
75	Is sample person covered by a plan that pays any part of hospital expenses?				FQ C-9
	1 Yes	4039	806	955	
	2 No	6	7	9	
	8 Blank but applicable	54	12	55	
	9 Don't know	8	0	8	
	Blank	3355	532	1807	
76	Is sample person covered by a plan that pays any part of a doctor's or surgeon's bills for operations?				FQ C-10
	1 Yes	4034	804	945	
	2 No	22	11	28	
	8 Blank but applicable	36	10	35	
	9 Don't know	15	0	19	
	Blank	3355	532	1807	

Position	Item description and code	M	Counts C	P	Source and notes
	Many people do not carry health insurance for various reasons. Which of these statements describes why sample person is not covered by any health insurance (or Medicare)? (Positions 77-80)				FQ C-13/15 See Note 10
77-78	Main reason				
	01 Care received through Medicaid or welfare	267	31	854	
	02 Unemployed, or reasons related to unemployment	350	40	114	
	03 Can't obtain insurance because of poor health, illness, or age	24	2	15	
	04 Too expensive, can't afford health insurance	1767	280	506	
	05 Dissatisfied with previous insurance	50	3	3	
	06 Don't believe in insurance	31	4	8	
	07 Have been healthy, not much sickness in the family, haven't needed health insurance	206	23	31	
	08 Military dependent, (CHAMPUS), Veteran's benefits	45	1	15	
	09 Some other reason - not specified	2	0	7	
	10 Some other reason - specified	255	35	58	
	88 Blank but applicable	118	34	77	
	Blank	4347	904	1146	
79-80	Second reason				
	00 No second reason reported	2573	339	1374	
	01 Care received through Medicaid or welfare	70	17	58	
	02 Unemployed, or reasons related to unemployment	109	30	30	
	03 Can't obtain insurance because of poor health, illness, or age	4	2	3	
	04 Too expensive, can't afford health insurance	168	20	132	
	05 Dissatisfied with previous insurance	15	1	2	
	06 Don't believe in insurance	18	3	3	
	07 Have been healthy, not much sickness in the family, haven't needed health insurance	47	4	8	
	08 Military dependent, (CHAMPUS), Veteran's benefits	0	0	2	
	09 Some other reason - not specified	0	0	0	
	10 Some other reason - specified	25	8	7	
	88 Blank but applicable	86	29	69	
	Blank	4347	904	1146	
81-87	Blank				
88	During the last 12 months, has sample person received health care which has been or will be paid for by Medicaid?				FQ D-6
	1 Yes	537	101	1076	
	2 No	6859	1242	1708	
	8 Blank but applicable	45	7	40	
	9 Don't know	0	1	0	
	Blank	21	6	10	

Position	Item description and code	Counts			Source and notes
		M	C	P	
89	Does sample person have a Medicaid card?				FQ D-8
	1 Yes	530	104	1144	
	2 No	6872	1232	1647	
	8 Blank but applicable	39	15	33	
	9 Don't know	0	0	0	
	Blank	21	6	10	
90	Status of sample person's Medicaid card?				FQ D-9
	1 Medicaid card seen - current	382	84	832	
	2 Medicaid card seen - expired	7	0	12	
	3 No card seen	128	17	274	
	4 Other card seen	0	0	0	
	5 Other card seen (specify)	5	0	2	
	8 Blank but applicable	47	18	57	
	Blank	6893	1238	1657	
91	Is sample person now covered by any other public assistance program that pays for health care?				FQ D-11
	1 Yes	54	2	29	
	2 No	7376	1348	2780	
	8 Blank but applicable	11	1	15	
	9 Don't know	0	0	0	
	Blank	21	6	10	
92	Does sample person now receive military retirement payments from any branch of the Armed Forces or a pension from the Veteran's Administration? Do not include VA disability compensation.				FQ D-13
	1 Yes	56	4	9	
	2 No	7373	1346	2806	
	8 Blank but applicable	12	1	9	
	9 Don't know	0	0	0	
	Blank	21	6	10	
93	Which does sample person receive; the Armed Forces retirement, the VA pension, or both?				FQ D-14
	1 Armed Forces	16	0	2	
	2 Veteran's Administration	30	0	5	
	3 Both	4	4	1	
	8 Blank but applicable	18	1	10	
	Blank	7394	1352	2816	
94	Is sample person now covered by CHAMP-VA, which is medical insurance for dependents or survivors of disabled veterans?				FQ D-16
	1 Yes	45	4	10	
	2 No	7388	1346	2808	
	8 Blank but applicable	8	1	6	
	9 Don't know	0	0	0	
	Blank	21	6	10	
95	Is sample person now covered by any other program that provides health care for military dependents or survivors of military persons?				FQ D-18
	1 Yes	41	4	8	
	2 No	7387	1346	2804	
	8 Blank but applicable	13	1	12	
	9 Don't know	0	0	0	
	Blank	21	6	10	

Position	Item description and code	M	Counts C	P	Source and notes
96	Is sample person included in the AFDC, "Aid to Families with Dependent Children", assistance payment?				FQ D-2
	1 Yes	394	39	650	
	2 No	7020	1304	2134	
	8 Blank but applicable	27	6	39	
	9 Don't know	0	2	1	
	Blank	21	6	10	
97	Does sample person now receive the "Supplemental Security Income" or "SSI" gold-colored check?				FQ D-4
	1 Yes	131	44	135	
	2 No	7285	1295	2659	
	8 Blank but applicable	25	12	30	
	9 Don't know	0	0	0	
	Blank	21	6	10	
98	Does sample person have a disability related to his or her service in the Armed Forces of the United States?				FQ D-20
	1 Yes	48	2	14	
	2 No	346	20	108	
	8 Blank but applicable	29	8	37	
	Blank	7039	1327	2675	
99	Does sample person now receive compensation for this disability from the Veteran's Administration?				FQ D-21
	1 Yes	31	1	9	
	2 No	17	1	4	
	8 Blank but applicable	29	8	38	
	Blank	7385	1347	2783	

Position	Item description and code	M	Counts C	P	Source and notes
SECTION F. SOCIODEMOGRAPHIC DATA - HEAD OF FAMILY (POS 100-131)					
Source: Family Questionnaire (FQ) Household Screener Questionnaire (HSQ)					
100	Interview and examination status of head of family				See Note 4
	1 Selected as sample person, interviewed on Adult Sample Person Questionnaire, and examined	5523	1076	2098	
	2 Selected as sample person, interviewed on Adult Sample Person Questionnaire, but not examined	338	62	79	
	3 Selected as sample person, not interviewed, and not examined	218	34	23	
	4 Not selected as sample person	1362	179	624	
	Blank	21	6	10	
101	Blank				
	Date of birth				HSQ 2e
102-103	01-12 Month	7413	1348	2830	
	88 Blank but applicable	49	9	4	
104-105	00-86, 89-99 Year	7440	1353	2832	
	88 Blank but applicable	22	4	2	
106-107	Age at interview 17-95 Years	7462	1357	2834	
108	Blank				
109	Sex				FQ B-4
	1 Male	5982	1069	1331	
	2 Female	1460	282	1493	
	Blank	20	6	10	
110	Observed race				FQ B-5 See Note 5
	1 White	7138	1282	2511	
	2 Black	75	27	165	
	3 Other	6	3	58	
	8 Blank but applicable	106	31	59	
	9 Not observed	117	8	31	
	Blank	20	6	10	
111-112	Head of family's national origin or ancestry.				HSQ 2c See Note 6
	01 Mexican/Mexicano	2068	0	3	
	02 Mexican-American	4523	0	0	
	03 Chicano	97	0	0	
	04 Puerto Rican	19	7	2503	
	05 Boricuan	0	0	29	
	06 Cuban	6	1197	46	
	07 Cuban-American	0	85	2	
	08 Hispano - specify	147	20	37	
	09 Other Latin-American or other Spanish - specify	54	17	39	
	00 Other - specify	513	31	175	
	10 Spanish-American	17	0	0	
	11 Spanish (Spain)	18	0	0	

Position	Item description and code	Counts			Source and notes
		M	C	P	
113-115	In what state or foreign country was head of family born?				FQ B-6 See Note 7
	001-118 State/country code	7362	1331	2762	
	888 Blank but applicable	80	20	62	
	Blank	20	6	10	
116-117	What is the highest grade or year of regular school head of family has ever attended?				FQ B-7
	00 Never attended or kindergarten only	250	7	35	
	01-08 Elementary grade	2959	511	889	
	09-12 High school grade	2896	411	1445	
	13-16 College	1002	336	363	
	17 Graduate school	170	57	41	
	88 Blank but applicable	165	29	51	
	Blank	20	6	10	
118	Did head of family finish that grade/year?				FQ B-8
	1 Yes	5710	1171	2210	
	2 No	1316	137	492	
	8 Blank but applicable	166	36	87	
	Blank	270	13	45	
119	Is the head of family now married, widowed, divorced, separated or has he or she never been married?				FQ B-9
	0 Under 14	0	0	0	
	1 Married - spouse in household	5706	1059	1295	
	2 Married - spouse not in household	129	9	129	
	3 Widowed	333	48	133	
	4 Divorced	492	136	376	
	5 Separated	388	28	452	
	6 Never married	320	56	418	
	8 Blank but applicable	74	15	21	
	Blank	20	6	10	
120	Did head of family ever serve in the Armed Forces of the United States?				FQ B-11
	1 Yes	1478	64	383	
	2 No	5883	1265	2400	
	8 Blank but applicable	81	22	41	
	Blank	20	6	10	
121	During the past 2 weeks, did head of family work at any time at a job or business, not counting work around the house?				FQ B-12
	1 Yes	5443	1019	1283	
	2 No	1923	305	1504	
	8 Blank but applicable	76	27	37	
	Blank	20	6	10	
122	Even though head of family did not work during those 2 weeks, did he or she have a job or business?				FQ B-13
	1 Yes	101	19	28	
	2 No	1822	286	1476	
	8 Blank but applicable	76	27	37	
	Blank	5463	1025	1293	

Position	Item description and code	M	Counts C	P	Source and notes
123	Was head of family looking for work or on layoff from a job?				FQ B-14
	1 Yes	510	61	118	
	2 No	1413	244	1384	
	8 Blank but applicable	76	27	39	
	Blank	5463	1025	1293	
124	Which, looking for work or on layoff from a job or both?				FQ B-15
	1 Looking	270	43	69	
	2 Layoff	151	12	26	
	3 Both	85	3	17	
	8 Blank but applicable	80	30	45	
	Blank	6876	1269	2677	
125-127	What kind of business or industry does head of family work for?				FQ B-19 See Note 9
	010-932 Industry code	5980	1080	1395	
	990 Blank but applicable	118	28	62	
	Blank	1364	249	1377	
128-130	What kind of work was head of family doing?				FQ B-20 See Note 9
	003-889 Occupation code	5988	1080	1391	
	999 Blank but applicable	110	28	66	
	Blank	1364	249	1377	
131	Class of worker				FQ B-22
	1 Employee of a private company, business or individual for wages, salary, or commission	4702	842	1058	
	2 A Federal government employee	219	4	45	
	3 A State government employee	246	12	54	
	4 A Local government employee	359	22	169	
	5 Self-employed in own incorporated business or professional practice	49	25	14	
	6 Self-employed in own unincorporated business, professional practice, or farm	420	171	56	
	7 Working without pay in family business or farm	0	0	0	
	8 Blank but applicable	99	32	60	
	0 Never worked or never worked at a full-time civilian job lasting 2 weeks or more	4	0	1	
	Blank	1364	249	1377	

Position	Item description and code	Counts			Source and notes
		M	C	P	
SECTION G. FAMILY COMPOSITION AND INCOME DATA (POS 132-162)					
Source: Family Questionnaire (FQ)					
132-133	Number of persons in family (computed) 01-18 Persons	7462	1357	2834	
134-135	Number of sample persons in family (computed) 01-13 Persons	7462	1357	2834	
136	Was the total combined family income during the past 12 months more or less than \$20,000? Include money from jobs, Social Security, retirement income, unemployment payments, public assistance, and so forth. Also include income net from interest, dividends, income from business, farm or rent, and any other money income received.				FQ E-10
	1 \$20,000 or more	2353	536	578	
	2 Less than \$20,000	4856	795	2193	
	7 Refused information	31	1	7	
	8 Blank but applicable	202	19	46	
	Blank	20	6	10	
137-138	Of those income groups, which best represents the total combined family income during the past 12 months? Include wages, salaries, and other items we just talked about. (in dollars)				FQ E-11
	01 Less than 1,000	40	8	7	
	02 1,000 - 1,999	107	10	33	
	03 2,000 - 2,999	143	25	68	
	04 3,000 - 3,999	182	28	132	
	05 4,000 - 4,999	184	34	250	
	06 5,000 - 5,999	234	45	202	
	07 6,000 - 6,999	312	35	213	
	08 7,000 - 7,999	314	46	169	
	09 8,000 - 8,999	284	42	106	
	10 9,000 - 9,999	263	52	125	
	11 10,000 - 10,999	282	72	139	
	12 11,000 - 11,999	250	47	75	
	13 12,000 - 12,999	296	54	100	
	14 13,000 - 13,999	186	32	64	
	15 14,000 - 14,999	254	25	66	
	16 15,000 - 15,999	208	36	77	
	17 16,000 - 16,999	209	34	51	
	18 17,000 - 17,999	231	37	66	
	19 18,000 - 18,999	333	28	82	
	20 19,000 - 19,999	240	55	79	
	21 20,000 - 24,999	694	148	152	
	22 25,000 - 29,999	585	83	124	
	23 30,000 - 34,999	358	78	92	
	24 35,000 - 39,999	257	64	43	
	25 40,000 - 44,999	192	48	36	
	26 45,000 - 49,999	84	43	30	
	27 50,000 and over	107	55	54	
	77 Refused information	76	10	43	
	88 Blank but applicable	537	77	146	
	Blank	20	6	10	

Position	Item description and code	Counts			Source and notes
		M	C	P	
139-143	Per capita income (computed)				See Note 11
	00083-50000 Dollars	6829	1264	2636	
	88888 Blank but applicable	613	87	189	
	Blank	20	6	9	
144-146	Poverty index (computed)				See Note 12
	Decimal not shown on tape. 0.04-9.78	6829	1264	2636	
	999 Blank but applicable	613	87	189	
	Blank	20	6	9	
147	Did any member of this family receive any Government food stamps in any of the past 12 months?				FQ E-12
	1 Yes	1651	234	1344	
	2 No	5783	1115	1474	
	8 Blank but applicable	8	2	6	
	Blank	20	6	10	
148-149	In how many months of the past 12 months did any member of this family receive food stamps?				FQ E-13
	01-12 Months	1631	234	1335	
	88 Blank but applicable	28	2	15	
	Blank	5803	1121	1484	
150	Did this family receive any government food stamps last month?				FQ E-14
	1 Yes	1345	187	1290	
	2 No	303	47	50	
	8 Blank but applicable	11	2	10	
	Blank	5803	1121	1484	
151-152	In which month did any member of this family last receive food stamps?				FQ E-15
	01-12 Month	298	47	50	
	88 Blank but applicable	16	2	10	
	Blank	7148	1308	2774	
153-154	For how many persons were those food stamps authorized?				FQ E-16
	01-13 Persons	1641	234	1337	
	88 Blank but applicable	18	2	13	
	Blank	5803	1121	1484	
155-157	What was the total face value of those food stamps received by this family in that month?				FQ E-17
	010-520 Dollars	1567	230	1325	
	888 Blank but applicable	92	6	25	
	Blank	5803	1121	1484	
158	Did this family spend more for food in that month than the value of your food stamps?				FQ E-18
	1 Yes	1405	194	1279	
	2 No	231	40	64	
	8 Blank but applicable	23	2	7	
	Blank	5803	1121	1484	

Position	Item description and code	M	Counts C	P	Source and notes
159-161	How much more?				FQ E-19
	003-880 Dollars	1314	182	1258	
	888 Blank but applicable	114	14	28	
	Blank	6034	1161	1548	
162	Is your family receiving food stamps at the present time?				FQ E-20
	1 Yes	1273	175	1269	
	2 No	6153	1171	1542	
	8 Blank but applicable	16	5	13	
	Blank	20	6	10	

Position	Item description and code	Counts			Source and notes
		M	C	P	
SECTION H. RESIDENCE AND HOUSEHOLD DATA (POS 163-183)					
Source: Family Questionnaire (FQ)					
Household Screener Questionnaire (HSQ)					
163	Size of place				See Note 13
	1 1 million or more	1049	0	2070	
	2 500,000 - 999,999	844	0	0	
	3 250,000 - 499,999	884	467	0	
	4 100,000 - 249,999	203	364	368	
	5 50,000 - 99,999	1277	70	76	
	6 25,000 - 49,999	785	205	216	
	7 10,000 - 24,999	746	120	79	
	8 200 - 9,999	1003	88	24	
	9 Not in a place	671	43	1	
164	Standard Metropolitan Statistical Area				See Note 13
	1 In SMSA, in central city	3707	467	2465	
	2 In SMSA, not in central city	2854	890	369	
	4 Not in SMSA	901	0	0	
165-166	Number of persons in household				HSQ 1a
	01-18 Persons	7462	1357	2834	
167-168	Number of sample persons in household				
	(computed)				
	01-13 Persons	7462	1357	2834	
169-170	How many rooms are in this home? Count				FQ E-1
	the kitchen, but not the bathroom.				
	01-14 Rooms	7433	1350	2816	
	88 Blank but applicable	9	1	8	
	Blank	20	6	10	
171	Do you have access to complete kitchen				FQ E-2
	facilities in this home; that is, a kitchen				
	sink with piped water, a refrigerator and				
	a range or cookstove?				
	1 Yes	7136	1315	2548	
	2 No	83	10	18	
	8 Blank but applicable	223	26	258	
	Blank	20	6	10	
172-173	What is the main fuel used for heating				FQ E-3
	this home?				See Note 14
	00 No fuel used	538	231	16	
	01 Oil	4	0	1988	
	02 Natural gas	5955	78	718	
	03 Electricity	604	1027	37	
	04 Bottled gas (propane)	174	2	0	
	05 Kerosene	13	3	0	
	06 Wood	98	3	0	
	07 Coal	0	0	14	
	08 Other, not specified	0	0	2	
	09 Other, specified	11	0	8	
	88 Blank but applicable	45	7	41	
	Blank	20	6	10	

Position	Item description and code	Counts			Source and notes
		M	C	P	
174-175	What is the main heating equipment for this home?				FQ E-4 See Note 14
	00 No heating equipment used	538	231	20	
	01 Steam or hot water with radiators or convectors	44	5	1450	
	02 Central warm air furnace with ducts to individual rooms, or central heat pump	2677	542	180	
	03 Built-in electric units (permanently installed in wall, ceiling, or baseboard)	474	323	63	
	04 Floor, wall or pipeless furnace	1598	46	21	
	05 Room heaters <u>with</u> flue or vent, burning oil, gas, or kerosene	805	17	596	
	06 Room heaters <u>without</u> flue or vent, burning oil, gas, or kerosene	847	6	425	
	07 Heating stove burning wood, coal or coke	88	0	9	
	08 Fireplace(s)	91	4	0	
	09 Portable electric heater(s)	139	137	4	
	10 Other, not specified	0	0	0	
	11 Other, specified	114	35	16	
	88 Blank but applicable	1	5	23	
	99 Don't know	26	0	17	
	Blank	20	6	10	
176-177	Are any other types of equipment used for heating this home?				FQ E-5 See Note 14
	00 No other heating equipment used	6057	1073	2350	
	01 Steam or hot water with radiators or convectors	0	0	13	
	02 Central warm air furnace with ducts to individual rooms, or central heat pump	11	15	7	
	03 Built-in electric units (permanently installed in wall, ceiling, or baseboard)	24	0	2	
	04 Floor, wall or pipeless furnace	11	0	0	
	05 Room heaters <u>with</u> flue or vent, burning oil, gas, or kerosene	22	0	3	
	06 Room heaters <u>without</u> flue or vent, burning oil, gas, or kerosene	22	1	29	
	07 Heating stove burning wood, coal or coke	70	0	8	
	08 Fireplace(s)	449	8	9	
	09 Portable electric heater(s)	186	18	351	
	10 Other, not specified	4	2	3	
	11 Other, specified	18	2	4	
	88 Blank but applicable	30	1	25	
	Blank	558	237	30	
178-179	What is the main fuel used by this additional equipment?				FQ E-6 See Note 14
	00 No fuel used	2	0	2	
	01 Oil	0	0	20	
	02 Natural gas	96	2	27	
	03 Electricity	214	35	345	
	04 Bottled gas (propane)	9	0	1	
	05 Kerosene	2	0	25	
	06 Wood	471	8	11	
	07 Coal	2	0	0	
	08 Other, not specified	0	0	0	
	09 Other, specified	7	0	0	
	88 Blank but applicable	44	2	23	
	Blank	6615	1310	2380	

Position	Item description and code	M	Counts C	P	Source and notes
180-181	What is the main fuel used for cooking in this home?				FQ E-7
	00 No fuel used	21	4	4	
	01 Oil	14	0	31	
	02 Natural gas	5899	253	2603	
	03 Electricity	1295	1083	148	
	04 Bottled gas (propane)	182	8	12	
	05 Kerosene	0	0	3	
	06 Wood	0	0	0	
	07 Coal	0	0	0	
	08 Other, not specified	0	0	0	
	09 Other, specified	14	1	0	
	88 Blank but applicable	17	2	23	
	Blank	20	6	10	
182	Do you have air-conditioning - either individual room units, a central system or evaporative cooling?				FQ E-8
	1 Yes	3583	1254	653	
	2 No	3845	96	2153	
	8 Blank but applicable	14	1	18	
	Blank	20	6	10	
183	Which do you have?				FQ E-9
	1 Individual room unit	1625	583	613	
	2 Central air-conditioning	1233	660	22	
	3 Evaporative cooling	719	6	10	
	8 Blank but applicable	20	6	26	
	Blank	3865	102	2163	

Position	Item description and code	M	Counts C	P	Source and notes
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SECTION I. SAMPLE WEIGHTS (POS 184-217)

184-189	Examined final weight				
	000439-002711	7462	-	-	
	000223-000891	-	1357	-	
	000177-002000	-	-	2834	

190-195	Interview final weight				
	000447-002096	7462	-	-	
	000176-000604	-	1357	-	
	000175-001220	-	-	2834	

GTT/ULTRASOUND, AUDIOMETRY/VISION, PESTICIDE WEIGHTS

By design, only some of the persons in the sample were included in the GTT/ultrasound, audiometry/vision, and pesticide components of the survey. Tape positions for those persons not part of these subsamples are BLANK.

196-201	GTT/ultrasound weight				
	000843-005302	1777	-	-	
	000469-001685	-	449	-	
	000349-003110	-	-	667	
	Blank	5685	908	2167	

202-207	Audiometry/vision weight				
	000507-006283	4431	-	-	
	000223-001600	-	804	-	
	000264-003123	-	-	1759	
	Blank	3031	553	1075	

208-213	Pesticide weight				
	000872-005584	2465	-	-	
	000441-001600	-	568	-	
	000343-003117	-	-	1012	
	Blank	4997	789	1822	

214-215	Strata code				
	01-08	7462	1357	2834	

216-217	Pseudo PSU code				
	01-02	7462	1357	2834	

Position	Item description and code	M	Counts C	P	Source and notes
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SECTION J. FAMILY RELATIONSHIPS (POS 218-400)

Source: Adult Sample Person Questionnaire
Family Questionnaire

218-400 **Blank**
Data not yet available.

Position	Item description and code	M	Counts C	P	Source and notes
SECTION K. BLOOD AND URINE ASSESSMENTS (POS 401-460)					
401-404	Tape number 6511	7462	1357	2834	
405	Blood specimen collection				
	<u>Collected</u>				
	1 Venipuncture	6277	1202	2285	
	2 Capillary	651	53	201	
	<u>Not collected</u>				
	3 Refused	448	96	282	
	4 Unsuccessful venipuncture	83	6	49	
	5 Other	3	0	17	
406	Session				
	1 Morning	3562	642	1247	
	2 Afternoon	1653	294	793	
	3 Evening	1713	319	446	
	Blank	534	102	348	
	Hematology (Positions 407-428; ages 6 months-74 years)				
407-409	Hematocrit				
	Decimal not shown on tape				
	23.5-58.0 Percent	6914	1255	2481	
	888 Blank, but applicable	14	0	5	
	Blank	534	102	348	
410-412	Hemoglobin				
	Decimal not shown on tape				
	06.4-19.9 Grams per deciliter (g/dL)	6844	1254	2475	
	888 Blank, but applicable	84	1	11	
	Blank	534	102	348	
413-415	Red blood cell count				
	Decimal not shown on tape				
	2.23-6.77 X 10 ¹² /liter	6797	1251	2412	
	888 Blank, but applicable	131	4	74	
	Blank	534	102	348	
416-418	White blood cell count				
	Decimal not shown on tape				
	02.6-26.9 X 10 ⁹ /liter	6834	1250	2414	
	888 Blank, but applicable	94	5	72	
	Blank	534	102	348	
419-422	Mean corpuscular volume				
	Decimal not shown on tape				
	055.2-121.1 Femtoliters (fL)	6795	1251	2409	
	8888 Blank, but applicable	133	4	77	
	Blank	534	102	348	
423-425	Mean corpuscular hemoglobin				
	Decimal not shown on tape				
	15.3-44.4 Picograms (pg)	6789	1251	2411	
	888 Blank, but applicable	139	4	75	
	Blank	534	102	348	

Position	Item description and code	M	Counts C	P	Source and notes
426-428	Mean corpuscular hemoglobin concentration Decimal not shown on tape 24.6-47.2 Grams per deciliter (g/dL)	6843	1254	2472	
	888 Blank, but applicable	85	1	14	
	Blank	534	102	348	
	ATTENTION: Blood assessments in Positions 429-456 were done on persons ages 4-74 years unless otherwise noted.				
429-431	Serum iron 016-380 Micrograms per deciliter (ug/dL)	6040	1190	2240	
	888 Blank, but applicable	234	11	38	
	Blank	1188	156	556	
432-434	Serum total iron-binding capacity 183-719 Micrograms per deciliter (ug/dL)	5828	1184	2220	
	888 Blank, but applicable	446	17	58	
	Blank	1188	156	556	
435-438	Transferrin saturation (computed) Decimal not shown on tape 002.8-097.5 Percent	5826	1184	2219	
	8888 Blank, but applicable	448	17	59	
	Blank	1188	156	556	
439-441	Serum vitamin A 006-165 Micrograms per deciliter (ug/dL)	5933	1178	2232	
	888 Blank, but applicable	341	23	46	
	Blank	1188	156	556	
442-445	Serum vitamin E 0106-6948 Micrograms per deciliter (ug/dL)	5931	1178	2232	
	8888 Blank, but applicable	343	23	46	
	Blank	1188	156	556	
446-449	Erythrocyte protoporphyrin (Ages 6 months-74 years) 0017-1580 Micrograms per deciliter red blood cell (ug/dL RBC)	6754	1227	2461	
	8888 Blank, but applicable	174	28	25	
	Blank	534	102	348	
450-452	Lead (Ages 6 months-74 years) 001-125 Micrograms per deciliter (ug/dL)	6266	1243	2344	
	888 Blank, but applicable	662	12	142	
	Blank	534	102	348	
453-456	Blank				

Position	Item description and code	M	Counts C	P	Source and notes
ATTENTION: Blood assessments in positions 457-471 and 501-549 were done on adults ages 20-74 years.					
457-459	Total serum cholesterol				
	076-630 Milligrams per deciliter (mg/dl)	3427	865	1258	
	888 Blank but applicable	58	21	27	
	Blank	3977	471	1549	
460-462	High density lipoprotein cholesterol				See Note 16
	010-138 Milligrams per deciliter (mg/dl)	3375	852	1248	
	888 Blank but applicable	110	34	37	
	Blank	3977	471	1549	
463	HDL Cholesterol serum quality				See Note 17
	1 Frozen	3367	843	1248	
	2 Refrozen	8	9	0	
	8 Blank but applicable	110	34	37	
	Blank	3977	471	1549	
464-467	Serum triglycerides				
	0022-3540 Milligrams per deciliter (mg/dl)	3146	817	1191	
	8888 Blank but applicable	339	69	94	
	Blank	3977	471	1549	
468-469	Fasting time				
	00-23 Hours	1254	275	401	
	88 Blank but applicable	489	159	243	
	Blank	5719	923	2190	
470-471	Fasting time				
	00-59 Minutes	1254	275	401	
	88 Blank but applicable	489	159	243	
	Blank	5719	923	2190	
472-488	Blank				
489-492	Serum Ferritin (ages 4-74 years)				See Note 18
	0001-1668 Nanograms per milliliter (ng/ml)	5303	1102	2148	
	8888 Blank but applicable	971	99	130	
	Blank	1188	156	556	
493-496	RBC Folate (Females ages 18-44 years)				See Note 19
	0013-2539 Nanomoles per liter (nmol/L)	1786	348	777	
	8888 Blank but applicable	405	38	49	
	Blank	5271	971	2008	
497-500	Serum Folate (Females ages 18-44 years)				See Note 19
	Decimal not shown on tape				
	000.5-070.8 Nanomoles per liter (nmol/L)	1860	362	764	
	8888 Blank but applicable	331	24	62	
	Blank	5271	971	2008	

Position	Item description and code	M	Counts C	P	Source and notes
Clinical Chemistry Profile Assessments					
501-503	Sodium 096-150 Milliequivalents per liter (mEq/L)	3211	858	1136	See Note 20
	888 Blank but applicable	274	28	149	
	Blank	3977	471	1549	
504-505	Potassium Decimal not shown on tape 2.6-5.8 Milliequivalents per liter (mEq/L)	3211	858	1136	See Note 20
	88 Blank but applicable	274	28	149	
	Blank	3977	471	1549	
506-508	Chloride 079-129 Milliequivalents per liter (mEq/L)	3211	858	1136	See Note 20
	888 Blank but applicable	274	28	149	
	Blank	3977	471	1549	
509-510	Total CO2 16-43 Milliequivalents per liter (mEq/L)	3211	858	1136	
	88 Blank but applicable	274	28	149	
	Blank	3977	471	1549	
511-513	Calcium Decimal not shown on tape 06.5-14-1 Milligrams per deciliter (mg/dl)	3211	858	1136	
	888 Blank but applicable	274	28	149	
	Blank	3977	471	1549	
514-516	Inorganic Phosphorus Decimal not shown on tape 01.0-08.0 Milligrams per deciliter (mg/dl)	3211	858	1136	
	888 Blank but applicable	274	28	149	
	Blank	3977	471	1549	
517-519	Uric Acid Decimal not shown on tape 00.2-12.9 Milligrams per deciliter (mg/dl)	3211	858	1136	
	888 Blank but applicable	274	28	149	
	Blank	3977	471	1549	
520-522	Glucose 050-621 Milligrams per deciliter (mg/dl)	3211	858	1136	
	888 Blank but applicable	274	28	149	
	Blank	3977	471	1549	
523-525	Blood Urea Nitrogen 004-058 Milligrams per deciliter (mg/dl)	3211	858	1136	
	888 Blank but applicable	274	28	149	
	Blank	3977	471	1549	

Position	Item description and code	M	Counts C	P	Source and notes
526-528	Total Bilirubin Decimal not shown on tape 00.1-03.2 Milligrams per deciliter (mg/dl)	3211	858	1136	
	888 Blank but applicable	274	28	149	
	Blank	3977	471	1549	
529-531	Creatinine Decimal not shown on tape 00.1-10.5 Milligrams per deciliter (mg/dl)	3211	858	1136	
	888 Blank but applicable	274	28	149	
	Blank	3977	471	1549	
532-534	AST 002-530 International Units per liter (IU/L)	3211	858	1136	See Note 21
	888 Blank but applicable	274	28	149	
	Blank	3977	471	1549	
535-537	ALT 002-290 International Units per liter (IU/L)	3211	858	1136	See Note 21
	888 Blank but applicable	274	28	149	
	Blank	3977	471	1549	
538-540	LDH 019-437 International Units per liter (IU/L)	3211	858	1136	See Note 21
	888 Blank but applicable	274	28	149	
	Blank	3977	471	1549	
541-543	Alkaline Phosphatase 003-321 International Units per liter (IU/L)	3211	858	1135	See Note 21
	888 Blank, but applicable	274	28	149	
	Blank	3977	471	1549	
544-546	Total Protein Decimal not shown on tape 04.1-10.2 Grams per deciliter (g/dl)	3211	858	1136	
	888 Blank but applicable	274	28	149	
	Blank	3977	471	1549	
547-549	Albumin Decimal not shown on tape 02.3-06.0 Grams per deciliter (g/dl)	3211	858	1136	
	888 Blank but applicable	274	28	149	
	Blank	3977	471	1549	

Position	Item description and code	M	Counts C	P	Source and notes
Comments regarding quality of serum for Clinical Chemistry Profile tests:					
550-551	Comment 1 16 Specimen thawed and possibly leaked in shipping	228	0	199	See Note 20
	Blank	7234	1357	2635	
552	Comment 2 1 Lipemia 1+ 2 Lipemia 2+ 3 Lipemia 3+ 4 Lipemia 4+ Blank	427 170 68 21 6776	91 28 7 1 1230	137 54 24 3 2616	See Note 22
553	Comment 3 1 Hemolysis 1+ 2 Hemolysis 2+ 3 Hemolysis 3+ 4 Hemolysis 4+ Blank	32 7 5 2 7416	5 1 0 0 1351	10 2 0 0 2822	See Note 22
554	Comment 4 1 Icteric 1+ 2 Icteric 2+ Blank	45 9 7408	8 8 1341	17 3 2814	
555-556	Comment 5 19 Quality unknown due to prolonged shipping	0	0	116	See Note 21
	Blank	7462	1357	2718	

SECTION L. NOTES

1. Family Questionnaire Missing

A Family Questionnaire was to be completed for each eligible family in a household with sample persons. However, a few Family Questionnaires are missing. Data records for sample persons in families with missing questionnaires are flagged with a code = 1, and all family data are blank. Data records for sample persons in families with a Family Questionnaire are flagged with a code = 2.

During the Mexican-American portion of the HHANES survey, a Family Questionnaire continuation booklet containing sample person information was lost for one sample person. Therefore, the sociodemographic data for this sample person are missing. The reference person, family composition, income, residence, and household data for this person were obtained from another person in the household.

2. Examination Status

Not all sample persons consented to come to a Mobile Examination Center to participate in the examination phase of the survey. In certain rare instances (less than 0.1%), sample persons who came to the Mobile Examination Centers did not participate in sufficient components of the examination to be considered as "examined." This data field contains code = 1 for those persons who participated fully in the examination phase, and code = 2 for those who did not come to the examination center or who did not satisfactorily complete the examination.

3. Family Number

In HHANES, all household members who were related by blood, marriage, or adoption were considered to be one "family." All sample persons in the same family unit have the same computer-generated family unit code.

4. Head of Family

Relationship of Sample Person to Head of Family (Pos. 44-45)

Each family containing sample persons has a designated "head of family," and the relationship of each sample person to the head of his or her family is coded in tape positions 44-45. The first three categories of this variable describe the "head" of three different kinds of families.

- o Code '01' identifies sample persons who lived alone (i.e., "head" of one-person families, no unrelated individuals living in the household).
- o Code '02' identifies sample persons who lived only with unrelated persons.
- o Code '03' identifies sample persons who were "heads" of families containing at least one other person (whether or not the household included additional families unrelated to the sample person).

Sociodemographic Data (Pos. 100-131)

This data tape includes some sociodemographic data about the head of each sample person's family (Section F). Because there can only be one "head" per family, the data in this section (positions 100-131) are the same for all sample persons in the same family (i.e. with the same family number codes in positions 39-43). If the sample person is the head of his or her family, the data in positions 100-131 are the same as in the corresponding positions in Section E.

5. Observed Race

"Race" was observed by the interviewer for all sample persons actually seen. Rules for classification of observed race were consistent with those used in the NHANES II and the National Health Interview Survey at that time. The categories were coded as follows:

White Includes Spanish origin persons unless they are definitely Black, Indian or other nonwhite.
Black Black or Negro.
Other Race other than White or Black, including Japanese, Chinese, American Indian, Korean, Eskimo.

6. National Origin or Ancestry

The value for national origin or ancestry is based on Item 2c in the Household Screener Questionnaire and was reported by the household respondent for all household members. In the Mexican-American portion of the survey, if "other Latin-American or other Spanish" (code 9) or "Other" (code 0) was recorded and the specified origin was "Spanish-American" or "Spanish (Spain)", a code of 10 or 11, respectively, was assigned. In all three portions of the survey, if more than one category was reported, the first appropriate "Hispanic" code, if any, was assigned (codes 1, 2, 3, 8, 10, or 11 in the Mexican-American portion; codes 6 or 7 in the Cuban-American portion; codes 4 or 5 in the Puerto Rican portion). If none of these codes was recorded, the first category entered was coded.

7. Codes for States and Foreign Countries

Code	State or Foreign Country
001	Alabama
002	Alaska
004	Arizona
005	Arkansas
006	California
008	Colorado
009	Connecticut
010	Delaware
011	District of Columbia
012	Florida
013	Georgia
015	Hawaii
016	Idaho
017	Illinois
018	Indiana
019	Iowa
020	Kansas
021	Kentucky
022	Louisiana
023	Maine
024	Maryland

Codes for States and Foreign Countries (continued)

Code	State or Foreign Country
025	Massachusetts
026	Michigan
027	Minnesota
028	Mississippi
029	Missouri
030	Montana
031	Nebraska
032	Nevada
033	New Hampshire
034	New Jersey
035	New Mexico
036	New York
037	North Carolina
038	North Dakota
039	Ohio
040	Oklahoma
041	Oregon
042	Pennsylvania
044	Rhode Island
045	South Carolina
046	South Dakota
047	Tennessee
048	Texas
049	Utah
050	Vermont
051	Virginia
053	Washington
054	West Virginia
055	Wisconsin
056	Wyoming
060	American Samoa
093	Canada
061	Canal Zone
062	Canton and Enderbury Islands
091	Central America
095	Costa Rica
063	Cuba
064	Dominican Republic
065	El Salvador
062	Enderbury Islands
087	Germany
066	Guam
068	Guatemala
069	Haiti
088	Honduras
070	Jamaica
090	Japan
067	Johnston Atoll
080	Mexico
071	Midway Islands
081	Nicaragua
096	Palestine
097	Austria
098	Lebanon
099	Chile
100	Philippines

Codes for States and Foreign Countries (continued)

Code	State or Foreign Country
101	Brazil
102	Holland
103	Colombia
082	Panama
072	Puerto Rico
092	Saudi Arabia
083	Spain
094	Taiwan
089	Turkey
084	Uruguay
085	Venezuela
073	Ryukyu Islands, Southern
074	Swan Islands
075	Trust Territories of the Pacific Islands (includes Caroline, Mariana and Marshall Island groups)
076	U. S. miscellaneous Caribbean Islands (includes Navassa Islands, Quito Sueno Bank, Roncador Cay, Serrana Bank and Serranilla Bank)
077	U. S. miscellaneous Pacific Islands (includes Kingman Reef, Howland, Baker & Jarvis Islands, and Palmyra Atoll)
086	United States
078	Virgin Islands
079	Wake Island
104	Azores
105	Peru
106	England
107	Vietnam
108	Italy
109	Ecuador
110	North America
111	Surinam
112	Argentina
113	Portugal
114	Trinidad
115	Egypt
116	Sudan
117	British Honduras
118	China
888	Blank but applicable

8. National origin recode

In the HHANES, if any household member was identified as "Hispanic" (as defined below), all household members, regardless of origin, were eligible to be selected as sample persons. The national origin recode specifies whether a sample person is considered to be "Hispanic" or "not Hispanic" for purposes of analysis. "Hispanic" is defined as:

Mexican-American, residing in selected counties of Texas, Colorado, New Mexico, Arizona, and California;
 Cuban-American, residing in Dade County (Miami), Florida; or
 Puerto Rican, residing in the New York City area, including parts of New Jersey and Connecticut

The recode was assigned as follows:

A. Southwest portion

- 1) If the original national origin or ancestry code on the Household Screener Questionnaire was 1, 2, 3, 8, 10, or 11, then National origin recode = 1;
- 2) If national origin or ancestry was 4, 5, 6, 7, 9, or 0 but the person specified Mexican/Mexicano, Chicano, or Mexican-American self-identification on the Adult Sample Person Questionnaire (question M10), or the person was the biological child of a household member with Recode equal to 1 (as determined by questions A-1/A-11 on the Family Questionnaire), then National origin recode = 1;
- 3) In all other cases, National origin recode = 2.

B. Dade County, Florida portion

- 1) If the original national origin or ancestry code was 6 or 7, then National origin recode = 1;
- 2) In all other cases, National origin recode = 2;

C. New York City area portion

- 1) If the original national origin or ancestry code was 4 or 5, then National origin recode = 1;
- 2) If national origin or ancestry was 1, 2, 3, 6, 7, 8, 9, or 0 but the person specified Boricuan or Puerto Rican self-identification on the Adult Sample Person Questionnaire (question M10), or the person was the biological child of a household member with Recode equal to 1 (as determined by questions A-1/A-11 on the Family Questionnaire), then National origin recode = 1;
- 3) In all other cases, National origin recode = 2;

The national origin recode may be used in analysis in one of two ways:

- a. Selecting on Recode = 1 will restrict analysis to "Hispanics" only. In this case, in the Southwest portion of the survey, the weighted estimates by age and sex will approximately equal U.S. Bureau of Census population estimates of the number of Mexican Americans and a small proportion of other Hispanics assumed to be Hispano in the five Southwest States (Arizona, California, Colorado, New Mexico, and Texas) at the midpoint of the Mexican-American portion of HHANES - March 1983. The weighted estimates of Cuban Americans represents an independent estimate of the number of Cuban Americans in Dade County at the midpoint, February 1984. The weighted estimates of Puerto Ricans represents an independent estimate of the number of Puerto Ricans in the sample counties in New York, New Jersey, and Connecticut at the midpoint of the Puerto Rican portion - September 1984.

- b. Using Recode greater than 0, that is, all sample persons, will include "Hispanic" and "not Hispanic" persons and the Southwest weighted estimates by age and sex will overestimate the U.S. Bureau of the Census population estimates of Mexican Americans and other Hispanics by about 4.5 percent. In Dade County, using recode greater than 0 will increase the weighted estimates by about 5.3 percent over that for Cuban Americans only, using recode greater than 0 for the New York area will increase the weighted estimates by about 9.2 percent over that for Puerto Ricans only.

9. Industry and Occupation Code

Family Questionnaire questions B-12 through B-15 (see page 117 or 139 of Ref. No. 1 in Section C) identified sample persons 17 years old or older who were in the labor force working for pay at a job or business or who worked without pay in a family business or farm operated by a related member of the household without receiving wages or salary for work performed.

Questions B-17 through B-22 provided a full description of sample persons' current or most recent job or business. The detail asked for in these questions was necessary to properly and accurately code each occupation and industry. Interviewers were trained to define a job as a definite arrangement for regular work for pay every week or every month. This included arrangements for either regular part-time or regular full-time work. If a sample person was absent from his or her regular job, worked at more than one job, was on layoff from a job or was looking for work during the two week reference period, interviewers were trained to use the following criteria to determine the job described:

- a. If a sample person worked at more than one job during the two week reference period or operated a farm or business and also worked for someone else, the job at which he or she worked the most hours was described. If the sample person worked the same number of hours at all jobs, the job at which he or she had been employed the longest was entered. If the sample person was employed at all jobs the same length of time, the job the sample person considered the main job was entered.
- b. If a sample person was absent from his or her regular job all of the two week reference period, but worked temporarily at another job, the job at which the sample person actually worked was described, not the job from which he or she was absent.
- c. If a sample person had a job but did not work at all during the two week reference period, the job he or she held was described.
- d. If a sample person was on layoff during the two week reference period, the job from which he or she was laid off, regardless of whether a full-time or part-time job, was described.
- e. If a sample person was looking for work or waiting to begin a new job within 30 days of the interview, the last full-time civilian job which lasted two consecutive weeks or more was described.

The 1980 census of population Alphabetical Index of Industries and Occupations was used in the coding of both industry and occupation. This book has Library of Congress Number 80-18360, and is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 for \$3.00. Its Stock Number is 003024049-2.

10. Health Insurance

- a. In the Health Insurance section of the Family Questionnaire, up to three separate health insurance plans could be reported for a family. Each sample person could have been covered by any combination of the three, or by none at all. In order to simplify the health insurance coverage data, the information on all reported plans was combined to a single variable for each sample person, i.e., whether or not the person is covered by any plan (position 74). For all persons covered by at least one plan, information on the type of coverage is then indicated: position 75 specifies whether any of the sample person's plans pays hospital expenses and position 76 specifies whether any of the sample person's plans pays doctor's or surgeon's bills.
- b. For all sample persons who were not covered by Medicare or any health insurance plan, the reasons for not being covered were ascertained. Positions 77-78 contain the main or only reason reported. For persons with one or more additional reasons, the first (lowest) code entered on the questionnaire was coded in positions 79-80.

11. Per Capita Income

Per capita income was computed by dividing the total combined family income by the number of people in the family.

12. Poverty Index

The poverty index is a ratio of two components. The numerator is the midpoint of the income bracket reported for each family in the Family Questionnaire (E-11). Respondents were asked to report total combined family income during the 12 months preceding the interview. The denominator is a poverty threshold which varied with the number of persons in the family, the adult/child composition of the family, the age of the reference person, and the month and the year in which the family was interviewed.

(Note 12 continues on next page)

Poverty thresholds published in Bureau of the Census reports* are based on calendar years and were adjusted to reflect differences caused by inflation between calendar years and 12 month income reference periods to which question E-11 referred. Average Consumer Price Indexes for all Urban consumers (CPI-U) for the calendar year for which the poverty thresholds were published (see table below) and for the 12 months representing the income reference period for the respondent were calculated. The percentage difference between these two numbers represents the inflation between these two periods and was applied to the poverty threshold appropriate for the family (based on the characteristics listed above). For example, for a family interviewed in November, 1983, the 1982 poverty threshold was updated to reflect inflation by multiplying by the percent change in the average CPI-U for the 12 month reference period, which would have been November, 1982 through October, 1983, over the calendar year January through December, 1982, in this example. To compute poverty indexes, the midpoint of the total combined family income bracket was divided by the updated poverty threshold.

Average Consumer Price Index, all Urban consumers (CPI-U),
U. S. city average, 1981-84

Month	Year			
	1981	1982	1983	1984
January	260.5	282.5	293.1	305.2
February	263.2	283.4	293.2	306.6
March	265.1	283.1	293.4	307.3
April	266.8	284.3	295.5	308.8
May	269.0	287.1	297.1	309.7
June	271.3	290.6	298.1	310.7
July	274.4	292.2	299.3	311.7
August	276.5	292.8	300.3	313.0
September	279.3	293.3	301.8	
October	279.9	294.1	302.6	
November	280.7	293.6	303.1	
December	281.5	292.4	303.5	
Average	272.4	289.1	298.4	

Source: U.S. Department of Labor, Bureau of Labor
Statistics

* U.S. Bureau of the Census, Current Population Reports, Series P-60, No. 138, "Characteristics of the Population Below the Poverty Level: 1981", U.S. Government Printing Office, Washington, D.C., March 1983.

U.S. Bureau of the Census, Current Population Reports, Series P-60, No. 144, "Characteristics of the Population Below the Poverty Level: 1982", U.S. Government Printing Office, Washington, D.C., March 1984.

Members of families with incomes equal to or greater than poverty thresholds have poverty indexes equal to or greater than 1.0 and can be described as "at or above poverty"; those with incomes less than the poverty threshold have indexes less than 1.0 and can be described as "below poverty".

Poverty thresholds used were computed on a national basis only. No attempt was made to adjust these thresholds for regional, State, or other variations in the cost of living. None of the noncash public welfare benefits such as food stamp bonuses were included in the income of the low income families receiving these benefits.

13. Size of Place and SMSA

Codes for size of place and SMSA were obtained from Bureau of Census summary tape files (STF1B).

A place is a concentration of population. Most places are incorporated as cities, towns, villages or boroughs, but others are defined by the Bureau of the Census around definite residential nuclei with dense, city-type street patterns, with, ideally, at least 1,000 persons per square mile. The boundaries of Census defined places may not coincide with civil divisions.

A Standard Metropolitan Statistical Area (SMSA) is a large population nucleus and nearby communities which have a high degree of economic and social integration with that nucleus. Generally, an SMSA includes one or more central cities, all urbanized areas around the city or cities, and the remainder of the county or counties in which the urbanized areas are located. SMSAs are designated by the Office of Management and Budget.

The same place size and SMSA codes were assigned to all persons in the same segment (for the definition of segments see Ref. No. 1 in Section C). In a few cases segments were divided by place boundaries. In these cases codes were assigned after inspecting segment maps. If the segment was predominantly in one place, then the place code for that place was used. If the segment was approximately evenly divided, the code for the larger place was used.

14. Home Heating

Questions E-3 through E-6, pertaining to the main fuel and equipment used for heating the home, appear to have codes which are inconsistent. It has been verified that these are the codes that were recorded on the original document; that is, codes that appear inconsistent were not incorrectly keyed.

15. Blood specimen collection

The blood specimen collection code indicates whether the blood was drawn by venipuncture or fingerstick, and gives the reason why the blood was not drawn (i.e., refusal, unsuccessful venipuncture, etc.). Users should be aware that in HHANES blood was drawn by fingerstick for children under age four for hematology, protoporphyirin, and lead. The literature indicates that estimates of hematological indices and blood lead levels differ depending on method of drawing blood. Users should keep this in mind when collapsing or combining age groups for presentation of the hematology, protoporphyirin, and lead data.

16. HDL

There is one Mexican American woman on the tape with an HDL-C:TC ratio of 0.9. Such a value is possible (since it could occur in a beta patient) but unlikely. Including this individual does not introduce any serious biases in the published estimates of TC or HDL-C. It is left up to the user whether or not to include this individual in the analyses.

17. HDL Quality

A few serum specimens arrived cold but thawed to the laboratory. As far as the laboratory was concerned, this should not affect the measured values of HDL.

18. Serum ferritin values

An expert panel recently evaluated serum ferritin (SF) data from HHANES, and found that serum ferritin values were higher for Hispanic persons from HHANES than for either non-Hispanic white or Hispanic persons from the second National Health and Nutrition Examination survey (NHANES II), especially among males (I). Because the study had to be retrospective in nature, the potential reasons for the SF difference between NHANES II and HHANES could only be indirectly assessed. Interpretation of the difference in SF values between NHANES II and HHANES is complicated for several reasons: 1) the ethnic composition of the populations sampled in the two surveys was different, so the SF difference could reflect a difference in iron stores or in confounding factors such as liver or inflammatory disease between the ethnic groups; 2) the SF assays differed between surveys, although both were based on the two-site immunoradiometric assay (IRMA) developed by Miles et al (II); and 3) the surveys were conducted at two time points, so secular trends in the overall U. S. population could have occurred. Because no conclusive reason could be identified retrospectively for the SF difference between NHANES II and HHANES, the expert panel concluded that the comparisons of SF data from NHANES II with data from HHANES may not be valid. For further details, see reference I.

- I. Looker AC, Gunter EW, Cook JD, et al. Comparing serum ferritin values from different population surveys. National Center for Health Statistics. Vital Health Stat 2(111). 1991.
- II. Miles LEM, Lipschitz, DA, Bieber CP, Cook JD. Measurement of serum ferritin by a 2-site immunoradiometric assay. Anal Biochem 61:209-224, 1974.

19. Folate and Differential Count Subsamples

In HHANES, folate (serum and red cell) and differential count assessments were done on a special subsample of persons ages 4-74 years from the total examined sample. This sample, referred to as the "special hematological subsample," consisted of all women ages 18-44 years, the 10 percent of the HHANES sample with identification numbers that ended in 8, and those who had a predetermined "high" or "low" value for one or more of the following hematological indices: white cell count, red cell count, hemoglobin, hematocrit, or mean corpuscular volume. See reference 1 on page 10 (Plan and Operation of HHANES) for the cutoff values used to define "high" or "low" for each indicator).

This data tape contains serum folate and red blood cell folate data for women ages 18-44 years only. The "examined final sample weight," located in tape positions 184-189, should be used with these data for all weighted analyses. The serum and red cell folate data for the rest of the hematological subsample has not been released because there is no appropriate sample weight available for the remainder of the special hematological subsample. These individuals have been coded as 8888, Blank but applicable, on this data tape. (Note that the Blank but applicable category also contains 18-44 year old women for whom folate data was missing). Folate data for the remainder of the hematological subsample are available on special request from the Division of Health Examination Statistics.

After careful review, it was decided not to release any differential count data due to large numbers of missing values (for numerous reasons) and lack of an appropriate sample weight for these data.

20. Sodium, Potassium Chloride

Specimens which may have leaked in shipping may also have been contaminated during shipping. Of particular concern are the measured values for sodium, potassium, and chloride. Analysts interested in these tests should compare their results by:

1. Excluding all specimens with COMMENT 1 = 16,
2. Excluding some specimens with COMMENT 1 = 16 (e.g. those with extreme values for sodium, potassium or chloride); and
3. Including all specimens with COMMENT 1 = 16.

21. AST, ALT, LDH, Alkaline Phosphatase

Specimens for which the quality was unknown due to prolonged shipping (COMMENT 5 = 19) may be of poor quality. Prolonged shipping would particularly affect levels of AST, ALT, LDH, and alkaline phosphatase. Analysts interested in these tests should compare their results by:

1. Excluding all specimens with COMMENT 5 = 19,
2. Excluding some specimens with COMMENT 5 = 19 (e.g. those with extreme high values for AST, ALT, LDH or alkaline phosphatase); and
3. Including all specimens with COMMENT 5 = 19.

22. Lipemia and Hemolysis

Measured values have been changed to 8's for those specimens with Lipemia 4+ or Hemolysis 3-4+.

SECTION M. ANALYTIC METHODS

I. Hematology

The hemoglobin determinations were performed on a Coulter hemoglobinometer. Hematocrit determinations were performed by the spun microhematocrit method.

Cell counts were performed on a Coulter Model FN. The hematologic indexes (MCV, MCH, MCHC) on this tape were computer-generated, and the MCV and MCHC were calculated using the spun microhematocrit value. The MCV values, derived automatically by electronic counter (Coulter), are likely to give somewhat different results from those that are computer generated using the spun microhematocrit value.

The MCV is expressed in femtoliters and is calculated using the sample person's hematocrit and red blood cell count (RBC) values as follows:

$$\text{MCV} = \frac{\text{hematocrit (in percent)}}{\text{RBC per liter} \times 100}$$

Mean corpuscular hemoglobin (MCH) is the average amount of hemoglobin by weight in the red blood cells; the MCH is expressed in picograms and is calculated using the sample persons hemoglobin and RBC values as follows:

$$\text{MCH} = \frac{\text{hemoglobin (in g/dL)} \times 10}{\text{RBC per liter}}$$

Mean corpuscular hemoglobin concentration (MCHC) is the average concentration of hemoglobin (weight/volume) in the red blood cells; the MCHC is expressed in grams per deciliter and is calculated using the sample person's hemoglobin and hematocrit values as follows:

$$\text{MCHC} = \frac{\text{hemoglobin (in g/dL)} \times 100}{\text{hematocrit (in percent)}}$$

More detailed descriptions of these methods have been published (Refs. a,b).

II. Nutritional BiochemistryA. Erythrocyte Protoporphyrin^a1. Principle

Free erythrocyte protoporphyrin (FEP) is measured by a modification of the method of Sassa et al. (Ref. c). Protoporphyrin is extracted from EDTA-whole blood into a 2:1 (v/v) mixture of ethyl acetate-acetic acid, then back-extracted into diluted hydrochloric acid. The protoporphyrin in the aqueous phase is measured fluorometrically at excitation and emission wavelengths of 404 and 655 nm, respectively. Calculations are based on a processed protoporphyrin IX (free acid) standard curve. The final concentration of protoporphyrin in a specimen is expressed as micrograms per deciliter of packed red blood cells (ug/dL RBC). A correction for the individual hematocrit is made.

2. CDC Modifications

The following modifications of the original methods are based on CDC optimization experiments: (a) sample size increased from 2 μ L to 10 μ L; (b) ethyl acetate-acetic acid and 0.43 mol/L HCL volumes increased from 0.3 mL to 1.0 mL; (c) processed protoporphyrin IX standards used; (d) hydrolysis time for the dimethyl ester decreased from 48 h to 3 h, on the basis of the work of Culbreth et al. (Ref. No. d); and (e) 0.43 mol/L HCL was chosen as a diluent for maximum fluorescent intensity and stability of the extracted protoporphyrin IX.

B. Serum Iron and Total Iron-binding Capacity^a

1. Principle

Serum iron and total iron-binding capacity (TIBC) are measured by a modification of the automated Technicon AAII-25 method, which is based on the procedures of Giovanniello et al, (Ref. e) and of Ramsey (Ref. d). Iron is quantitated by measuring the intensity of the violet complex formed in the reaction between ferrozine and Fe(II) in pH 4.7 acetate buffer at 562 nm. In TIBC tests, serum is mixed with a 400 μ g/dL iron solution to saturate the iron-binding sites of the serum transferrin molecules. Magnesium carbonate is used to remove excess iron. Centrifugation is used to precipitate the magnesium carbonate, and the supernatant is then analyzed for iron.

2. CDC Modifications

The following modifications to the Technicon AAII-25 method are noted: (a) the reagent concentrations used and their ratios are based on procedures developed at CDC, (b) two standard Technicon AutoAnalyzer I, type C, dialysis plate assemblies are connected in series to increase the efficiency of dialysis, (c) ferrozine is incorporated into the acetate buffer, and (d) a 50-mm flowcell is used in the colorimeter to maximize sensitivity.

C. Transferrin Saturation

The transferrin saturation values were computer generated using the examinee's serum iron and total iron-binding capacity (TIBC) values as follows:

$$\text{Transferrin Saturation (in percent)} = \frac{\text{Serum Iron}}{\text{TIBC}} \times 100$$

D. Serum Vitamins A and E^a

1. Principle

Vitamins A (retinol) and E (alpha-tocopherol) are measured in serum by an isocratic modification (Ref. g) of Bierl's high-performance liquid chromatography method (Ref. h) Serum is added to the internal standard solution, which contains retinyl acetate in ethanol. The ethanolic solution is extracted with hexane and the extract is dried with nitrogen and redissolved in ethanol. An aliquot is injected onto a C₁₈ reverse-phase radial-pack column and eluted with 95 percent methanol: 5 percent

water at 2.0 ml/min flow rate. Absorbance at 280 nm is recorded. Vitamins A and E are measured by comparing the height of the retinol or tocopherol peak to the height of the retinyl acetate internal standard peak. (Peak-area quantitation may also be used.)

E. Whole Blood Lead^a

1. Principle

Lead is measured in whole blood by atomic absorption spectroscopy by using a modification (Ref. i) of the Delves method (Ref. j). Quantitation is based on the measurement of light absorbed at 283.3 nm by ground state atoms of lead from a lead hollow-cathode lamp source. Whole blood samples, bovine whole blood quality controls, and standards (bovine whole blood spiked with aqueous lead standards) are diluted with nitric acid as the oxidizing agent, dried, and ashed, and lead content is determined by using a Perkin-Elmer Model 360 or Model 2380 atomic absorption spectrophotometer with deuterium background correction. All materials used for collecting and processing specimens are screened for possible lead contamination and all processing work, except ashing, is performed under laminar-flow hoods.

2. CDC Modifications

The following modifications to the original method are noted: (a) nitric acid is used rather than hydrogen peroxide as the oxidizing agent, (b) drying and ashing constitute two steps rather than one, (c) a deuterium background corrector is used to compensate for refractory blood components such as sodium chloride, which can give a small, nonspecific absorption signal when blood is being analyzed at the 283 nm lead wave length; and (d) experientially, it has been found that the Delves sample cups should be reused no more than ten times to minimize imprecision errors and that alignment of all parts of the Delves assembly is critical for maximum sensitivity in analysis.

F. Serum Ferritin^a

1. Principle

Serum ferritin is measured by using the Bio-Rad Laboratories "Quantimune Ferritin IRMA" kit (Ref. k), which is a single-incubation two-site immunoradiometric assay (IRMA) based on the general principles of assays as described by Addison et al. (Ref. l) and Miles (Ref. m) and modified by Jeong et al. (Jeong H, Blackmore J, Lewin N. U.S. Patent No. 4,244,940). In this IRMA, which measures the mostly basic isoform of ferritin found in serum, highly purified¹²⁵I-labeled antibody to ferritin is the tracer, and the ferritin antibodies are immobilized on polyacrylamide beads as the solid phase. Serum or ferritin standards (made from human liver) are mixed with the combined tracer/solid-phase antibody reagent, and the mixture is incubated. During incubation, both the immobilized and the ¹²⁵I-labeled antibodies bind to the ferritin antigen in the serum or standards, thus creating a "sandwich."

After incubation, the beads are diluted with saline, centrifuged, and decanted. The level of ¹²⁵I-labeled ferritin in the pellets is measured by using a gamma counter. There is a direct (rather than inverse, as in most RIA) relationship between the radioactive levels of the pellets and the amount of endogenous ferritin in the serum of standards.

^aThe methodology described in this section is excerpted from the Manual, Laboratory Procedures Used by the Clinical Chemistry Division, Center for Environmental Health, Centers for Disease Control, for the Hispanic Health and Nutrition Examination Survey (HHANES, 1982-1984) (Ref. s). Reference numbers were changed to match the list in this documentation.

2. CDC Modifications

No CDC modifications were made to the standard protocol except to include the maximum binding tubes to permit automated data reduction with the logit-log function (as suggested by Bio-Rad Laboratories).

This kit was selected after an extensive evaluation of commercially available products. The accuracy of the kit was confirmed using materials kindly supplied by Dr. James Cook at the University of Kansas Medical School, Kansas City, KA, as well as the human liver ferritin international reference material supplied by the National Institute for Biological Standards and Controls, London, UK. Dr. Cook's laboratory also performed several comparison studies on our samples with IRMA and enzyme-linked immunoassay (ELISA) methods, and produced results very comparable to those from the HANES laboratory.

G. Serum and Red Cell Folate^a

1. Principle

Serum and red cell folic acid are measured by using the Bio-Rad Laboratories' "Quanta-Count Folate" radioassay kit (Ref. n), which is based on assays described by Dunn and Foster (Ref. o) and Waxman and Schreiber (Ref. p). Serum (or whole blood diluted 1:5 with 1.0 g/dl ascorbic acid) is mixed with a pH 9.4 borate-dithiothreitol buffer and radioactively labeled folate (¹²⁵I-pteroylglutamic acid) derivative. After the serum is heated, folate-binding protein is inactivated while the folate is stabilized by the buffer. A binding material, folate-binding milk protein (lactal-bumin), is added to the mixture of ¹²⁵I-labeled and -unlabeled (serum) folate in a quantity sufficient to bind some, but not all, of the folate present. During incubation, the labeled and unlabeled folates compete for the binding sites available on the folate-binding protein on the basis of their concentrations. The higher the folate concentration in the serum, the more unlabeled folate it contains, and therefore less ¹²⁵I-labeled folate will bind to the binding protein. The bound and free (unbound) folate is separated after incubation by using dextran-coated charcoal. The level of ¹²⁵I-labeled folate is measured by using an LKB Rackgamma 11 gamma counter. The higher the level of radioactivity, the more ¹²⁵I-folate has been bound and the less unlabeled folate originally present in the serum (or whole blood).

2. CDC Modifications

The following modifications are noted to the Bio-Rad Instruction Manual: (a) because the HANES specimens are collected in the field and shipped frozen, the 1:22 whole blood dilution is prepared from a 1:5 hemolysate rather than directly, (b) 1.0 g/dl ascorbic acid rather than 0.4 g/dL is used as the diluent, and (c) whole blood with diluent is not incubated, since a freeze-thaw cycle accomplishes maximum red cell conjugase-activating effect, as described by Mortensen (Ref. q) and Netteland and Bakke (Ref. r).

III. Lipids

A. Serum Lipid Determinations

Blood samples were obtained by venipuncture from both fasting and nonfasting adult subjects. The blood was allowed to clot for 30-40 minutes at room temperature, and the samples were then centrifuged. An aliquot of serum was transferred to a plastic screw-capped vial, then placed in a -20°C freezer within three hours after collection. At approximately two-week intervals, serum specimens collected over the preceding period were placed in a styrofoam shipping container containing dry ice and shipped to the Johns Hopkins Lipid Research Clinic Laboratory for analysis of TC, triglyceride, and HDL-C.

Samples received in the laboratory were placed in a freezer at -20°C until they were analyzed, usually within two weeks of receipt. Specimens were allowed to thaw at room temperature and then mixed thoroughly on a blood rotator for thirty minutes before the sample vials were opened. All measurements were performed according to the protocol described for the Lipid Research Clinic program (Ref. t).

Total Serum Cholesterol and Serum Triglycerides

Analyses were performed in zeolite-treated isopropanol extracts of serum using an Auto-Analyzer II (AII-Technicon Instruments, Tarrytown, NY) using the Liberman-Burchard reaction for cholesterol measurement and the fluorimetric method of Kessler and Lederer (Ref. t,u) for triglyceride measurement. Isopropanol solutions of purified cholesterol and triolein standards were provided by the Clinical Chemistry Standardization Section of CDC. A serum calibrator was also provided by CDC and was used to correct the cholesterol measurement to reference values (Ref. v).

Day-to day quality control was maintained using two serum control pools, one with normal and one with elevated concentrations of cholesterol and triglycerides. These pools were provided by CDC and analyzed in quadruplicate with each analytical run (Ref. t).

High Density Lipoprotein Cholesterol

HDL-C was measured following the precipitation of apo B-containing lipoprotein, with heparin and manganese chloride final concentrations of 1.3 mg/dl and 0.046 M, respectively (t). The precipitate was sedimented by centrifugation for thirty minutes at 1,500xg. An aliquot of the clear supernatant was extracted with isopropanol; the extract was treated with a zeolite-containing mixture to remove interfering substances, and cholesterol measured as described above.

IV. Clinical Chemistry Profile

The following tests were performed on a Union Carbide Centrifichem 500 analyzer:

1. Albumin was performed on the Centrifichem using the Bromcresol Green Method (Ref. w,x,y).
2. Total protein by the Biuret Method (Ref. z,aa,bb).
3. Alkaline phosphatase by the Modified Bessey-Lowry-Brock Technique (Ref. cc,dd,ee).
4. LDH by the Lactate-Pyruvate Techniquer (Ref. ff,gg,hh).
5. AST by the NADH Oxidation (Ref. ii,jj,kk).
6. Inorganic phosphorus by the Daly and Ertingshausen Technique (Ref. ll,mm,nn).
7. Uric acid by the Uricase Method (Ref. oo,pp,qq).
8. Total bilirubin by the Diazo Method (Ref. rr,ss,tt).
9. Glucose by the Hexokinase Method (Ref. uu,vv,ww).
10. Calcium by the Alizarin Sulfonate Method (Ref. xx,yy).
11. Blood urea nitrogen by the Urease Method (Ref. zz,aaa,bbb).
12. Creatinine by the Jaffe' Reaction (Ref. ccc,ddd,eee).
13. Total CO² by the Phosphoenol Pyruvate Carboxyease Method (Ref. fff,ggg,hhh).
14. Chloride by the Mercuric Thiocyanate Method (Ref. iii,jjj,kkk).
15. ALT by the NADH Oxidation Method (Ref. lll,mmm,nnn).
16. Sodium and potassium tests performed on a IL343 Flame Photometer (Ref. ooo).

V. Clinical Chemistry Profile Quality Control

All samples with values which fell outside of normal ranges (Manufacturers Recommended Ranges are given in Table A) were repeated immediately and quality control values were verified on the instrument. If the repeated value was still outside the normal range, a note was placed in the comment field of the datatape.

In addition to comparing the values with the manufacturer's recommended ranges, the laboratory participated in both the CDC Proficiency Testing Program and in a computerized quality control program developed by Fisher Scientific. Additional quality control was added to the enzyme runs: AST, ALT, LDH and Alkaline Phosphatase were monitored using the Hyland Omega Critical Value Assayed Control Sera. In addition to these quality control parameters, the concentration factors on each run on the Centrifichem 500 were monitored and compared.

Inter- and intra-laboratory comparison of techniques and methodologies was accomplished through use of the Fisher Scientific Quality Control Program. This included examining Youden Plots, monthly and comprehensive means, standard deviation ranges and coefficients of variation. Day to day monitoring was achieved through the use of Levy-Jenning histograms.

The Fisher SeraChem Quality Control Program was used through December 1983. Normal and abnormal controls with known values were analyzed with each batch of samples. Bath runs were accepted if (1) one level of control was within 2-SD of the known value, or (2) one level of control was within 2-SD and the other level was within 3-SD of the known range. Runs were rejected if (1) both levels were outside the 2-SD range, or (2) if any level was outside the 3-SD range. Rejected runs were repeated and accepted if they met the above criteria. If the runs again failed acceptance criteria, a complete system check was performed and the test was validated using Ortho assayed controls. After validation of the test, the batch would again be analyzed.

From January 1984, the Beckman Triad Span Program (administered by the College of American Pathologists) was used. The Beckman program provided three levels of controls to provide coverage of a normal, abnormal and mid-range. Batch runs were accepted if (1) all three controls read within 2-SD of their known range, or if (2) two of the three controls were within their 2-SD ranges and the third level was within 3-SD of its known range. The batch was rejected and repeated if (1) two or more controls were outside the 2-SD range, or if (2) any level of control fell outside the 3-SD range, or if (3) any level of control was outside the 2-SD range on two successive runs. If the repeat run was also rejected, a complete system maintenance check was performed and the test was validated with assayed controls before the batch was rerun.

Table A. Manufacturers recommended ranges

<u>Tests</u>	<u>Mfg. Normal Range</u>
Sodium	133-143 mEq/L
Potassium	3.5-5.6 mEq/L
Chloride	96-106-mEq/L
Total CO ₂	25-32 mEq/L
Calcium	9-11.5 mg%
Phosphorus	2.5-4.5 mg%
Uric Acid	2.5-8.0 mg%
Glucose	57-110 mg%
BUN	8-22 mg%
Total Bilirubin	0.1-1.3 mg%
Creatinine	0.5-1.3 mg%
AST	6-22 IU/L
ALT	0-21 IU/L
LDH	0-110 IU/L
Alkaline Phosphatase	25-80 IU/L
Total Protein	6.0-8.0 gm%
Albumin	3.4-4.0 gm%

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