

Dietary Supplement Databases— Information from NHANES III and Plans for Future NHANES Database

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Abstract

The third National Health and Nutrition Examination Survey (NHANES III), 1988-1994, included household interview and health examination components. NCHS released questionnaire and examination data files in July, 1997; the data included household interview information on vitamin and mineral supplement use and 24-hr dietary recall data from the dietary interview component of the health examination. The NHANES III dietary supplements database will be part of a second NHANES III data release in the Spring of 1998. Information on more than 2,400 prescription and nonprescription dietary supplements is included in the NHANES III database.

All vitamin and mineral supplement use information was collected in the respondents' homes by trained household interviewers. The focus of the data collection was on vitamins and mineral products, but other products including herbal products and botanicals were reported; information on herbal products and botanicals was included in the NHANES III dietary supplements data file. Whenever possible, the actual supplement product containers were observed by the interviewers so that complete and accurate information about the products could be recorded. The product name, manufacturer, usual dosage, frequency of use, and duration of use was recorded for each product. Nutrient/ingredient composition data was not recorded during the actual interview. More than 30% of the NHANES III interviewed sample 2 months of age and older took at least one vitamin-mineral supplement during the month prior to the household interview.

NCHS staff compiled the NHANES III supplements database using information that was provided by manufacturers or researched by checking labels, *The Physician's Desk Reference*, and other resources. NCHS developed criteria for coding all default products; these criteria were used when complete information was not obtained during the interview. The database is comprised of two primary tables; "SUPLIDEN" contains product identifier information--a standardized product name, product type code, numeric product identification code, a source of information code, and a dosage form code. The second table, "SUPLCONC", contains the ingredient and nutrient composition information for each product.

The supplement data, together with information that was collected during the dietary interview is being used to estimate total nutrient intakes from foods and supplement products by the U.S. population 2 months of age and older between 1988 and 1994. The supplement data provide interpretive information for other components of the

survey such as the laboratory component which includes extensive nutritional biochemistry and hematological data. This database will support research aimed at studying the effects of dietary supplements on the health and nutritional status of the U.S. population, and provides important baseline information for future NHANES.

Introduction

Health and Nutrition Examination Surveys (HANES) are periodic surveys that are conducted by the National Center for Health Statistics (NCHS) of the Centers for Disease Control and Prevention. Data are obtained through personal interviews and health examinations. NHANES data are used to estimate the prevalence of selected diseases and health risk factors in the U.S. population including the prevalence of overweight, high blood pressure, and elevated serum lipids. National reference values for nutrition and health parameters including food energy and nutrient intakes from dietary sources, nutritional biochemistry values, and body measurement data are produced from NHANES data. NHANES data are also used to examine secular trends in the prevalences of diseases and health risk factors, and to study the etiology of chronic and infectious diseases in the U.S. population.

Three national HANES (termed "NHANES") were completed between 1971 and 1994: NHANES I (1971-75); NHANES II (1976-80); NHANES III (1988-94). Hispanic HANES, a special survey of three Hispanic subgroups, was conducted from 1982-84 to provide comprehensive health and nutrition data on three major Hispanic subgroups living in the United States: Mexican Americans living in the southwest U.S., Cuban Americans in Dade County, FL, and Puerto Ricans in the New York City metropolitan area. The most recent survey, NHANES III, 1988-94, was conducted in two phases. Each three-year phase, as well as the entire 6 years constituted a national sample.

The NHANES III sample design, interview and examination components, survey methods, and protocols were described in proceedings from the 1989-96 National Nutrient Databank Conferences. NCHS published a survey manual in 1994 entitled, Plan and Operation of the Third National Health and Nutrition Examination Survey, 1988-94 which describes the overall design, methodology, and content of the Survey (1). NCHS released the NHANES III data files in July, 1997; included with the files are provisional household information on vitamin and mineral supplement use from the household interview and 24-hr dietary recall data from the dietary interview component of the health examination (2). The second NHANES III data release scheduled, for April 1998, includes the final data on vitamin and mineral supplement use and the dietary supplements concentration database; the common link between the questionnaire and supplement products and concentration database is the product identification code. The database includes information on more than 2,400 prescription and nonprescription dietary supplements that were reported during NHANES III. An overview of the data collection methodology and coding for supplements follows.

Data Collection Methods

The NHANES surveys are comprised of two components: a household interview and a health examination. Household interviews were conducted in respondents' homes by trained, bilingual (in English and Spanish) interviewers. During the NHANES III household interview, respondents were asked if they had used or taken any prescription or nonprescription vitamin and mineral supplements during the month prior to the interview. (Note: Information was also obtained on the use of other prescription medications, antacids, and nonprescription pain medications.) All supplement information was recorded electronically by means of a computer-assisted personal interview (CAPI) system. Whenever possible, the interviewers observed the actual supplement product containers in order to record complete and accurate information about the products. The product name, manufacturer, usual dosage, frequency of use, and duration of use was recorded for each product. Nutrient or ingredient composition data was not recorded during the interview due to time constraints.

The focus of the NHANES III supplement questions was vitamins and mineral products, but respondents reported other products including herbal products and botanicals. Information on herbal products and botanicals was included in the NHANES III dietary supplements file, but since they were not part of the standard interview question, these data should not be considered to be nationally representative. The NHANES III data revealed that supplement use is widespread in the U.S.; supplement products were taken by more than 30% of the NHANES III interviewed sample 2 months of age and older. The task of reviewing, researching, and coding these products required the development of coding guidelines and data editing specifications.

At the time the data were reviewed and coded, there were no current, comprehensive databases available on dietary supplements products that would meet NCHS's needs. NCHS compiled information from manufacturers and product distributors, product labels, and references including The Physician's Desk Reference. Complete information was not available for all products that were reported; NCHS developed default coding criteria for several categories of supplement products. NCHS staff compiled the information for the individual product records and database files.

The NHANES III Supplements Database

The NHANES III database consists of two look-up files that are linked to the questionnaire information on each product reported; the common link between the questionnaire and the supplements database is the product code. A look-up file called "SUPLIDEN" contains descriptive information about each product, including the standardized product name, product type code, product identification code, a source of information code, and a form code indicating the dosage on which the nutrient or ingredient values are expressed in the database. The standardized dietary supplement

name was coded based on the name and other information recorded during the interview, or a default product name as assigned when the information did not permit NCHS to match the product to an actual brand name or private label product. Approximately 12 percent of the supplements in the database are default products. Default product names are identified in the file. The 6-digit product identification code is the common link between the questionnaire data, the product description table (SUPLIDEN), and the nutrients and ingredients table (SUPLCONC). The product identification codes are product-specific and manufacturer/distributor-specific. The first three digits represent the manufacturer or distributor, and the last three digits represent a specific product produced by the manufacturer or distributor. In general, default products begin with three 8's since the manufacturer or distributor is unknown.

The second look-up file, "SUPLCONC", contains the ingredient and nutrient composition information for each product. The nutrient names include vitamins and minerals such as niacin and iron as well as more unusual ingredients such as dong quai and kelp. NCHS ranked the sources of information that were used to assign nutrient or ingredient values according to their perceived validity and currency of the values. The preferred source of information, if it was available, was the manufacturer or distributor. When this was not available, either product labels or packages, catalogs, or published references were used. Some nutrient data were estimated or inferred from product names. Estimation was used to assign nutrient or ingredient values to brand name products and for most default products; the estimated values were based on information that was compiled for similar products. Inference was used for single ingredient products where the concentration was implied in the name.

Uses of Supplement Data

The supplement database and questionnaire information have important monitoring and research applications. The intake estimates for vitamins and minerals, together with information that was collected during the 24-hour dietary recall interview, are useful to estimate total nutrient intakes from foods and supplement products by the U.S. population 2 months of age and older between 1988 and 1994. This information is not available from previous NHANES or other national food consumption surveys. Total nutrient intakes are needed to assess the contribution of "diet" to nutritional status. Second, the supplement data provide interpretive information for the laboratory and clinical components of the survey including the nutritional biochemistry, hematological data, and possibly other components such as bone densitometry and blood pressure levels. For example, it is necessary to identify supplement users when interpreting hemoglobin and ferritin data to estimate the prevalence of iron deficiency anemia. Similarly, information about supplement use practices is useful when reviewing serum folate and red blood cell folate data in assessments of folate nutritional status.

Finally, many potential health effects of dietary supplements are unclear due to a lack of qualitative and quantitative data on supplement use. The Third Report on Nutrition Monitoring in the United States noted that the lack of product-specific information on vitamin and mineral supplement products limited efforts to assess excessive nutrient intakes from all sources (3). Further, The Report of the Commission on Dietary Supplement Labels (4) cited the need for research to explore the health effects of supplement use; such research should include vitamin and mineral supplements as well as botanicals and other products that are used as dietary supplements. The NHANES III database is useful for this type of research and provides baseline information to track dietary supplement use in future NHANES.

NCHS will build on information that was obtained on dietary supplements during NHANES III. Final preparations are underway for NHANES to become a continuous, annual survey program beginning in early 1999. NCHS solicited input and received many recommendations for the dietary supplement component of the survey. A 1-day workshop, sponsored by NCHS, was held in August, 1997 to identify the uses of dietary supplement information and potential sources of information for future dietary supplement databases, including the databases by the NHANES program. The attendees included Federal agency and dietary supplement trade association representatives. Since the workshop, NCHS has pursued plans to expand the scope of the NHANES dietary supplement component to include all dietary supplements, including herbal products and botanicals. NCHS anticipates that many of the products that were reported during NHANES III are likely to be reported again; the NHANES III database content will be reviewed and updated as needed. Household interviewers will have online lists of dietary supplements and medications available at the time of the interview to make data collection more efficient. The plans for future NHANES include enhanced product research capabilities, and timely interview data review, coding, and reporting.

References

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