

10. Gortmaker S, Dietz W, Sobol M, *et al*: Increasing pediatric obesity in the United States. *Am J Dis Child* 1987; 141:535-540.
11. Harlan W, Landis J, Flegal K, *et al*: Secular trends in body mass in the United States, 1960-1980. *Am J Epidemiol* 1988; 128:1065-1074.

CLIFFORD L. JOHNSON, MSPH
CATHERINE E. WOTEKI, PhD

Address reprint requests to Clifford L. Johnson, MSPH, Chief, Nutrition Statistics Branch, Division of Health Examination Statistics, National Center for Health Statistics, Rm 900, 6525 Belcrest Road, Hyattsville, MD; or call: (301) 436-7072. Dr. Woteki, former Deputy Director, DHES, NCHS, is currently Director, Food and Nutrition Board, National Academy of Sciences, Institute of Medicine, Rm 312, 2137 Wisconsin Avenue, NW, Washington, DC 20007.

At Last—A View of Hispanic Health and Nutritional Status

The Hispanic population is the second largest minority group in the United States and the fastest growing. Yet little has been known about their general health and nutritional status. Hispanic researchers over the years have reported on some major physical and mental health and health care-related issues. However, generalizing their findings to other geographic areas and to other Hispanics was limited because the studies were in selected communities or of select groups of persons. The papers focusing on Hispanic health, health care, and related topics in the supplement to this issue of the *Journal*¹ were based on analyses of a unique study, the Hispanic Health and Nutrition Examination Survey (HHANES) conducted during the years 1982-84 by the National Center for Health Statistics (NCHS), one of the Centers for Disease Control.

HHANES was the product of an evolutionary process that took 20 years to develop in an organization that primarily focuses its data collection efforts on national information for the general population. The original National Health Examination Surveys conducted in the 1960s basically provided detailed information for the total civilian noninstitutionalized population 6-79 years of age and for the White population.²⁻⁴ No oversampling was done to increase the number of minorities in the studies. Consequently, information for the Black population could only be presented for very broad groups and no estimates could be made for Hispanic groups. Providing nationally representative, standardized objective measures of health over the years of the studies and across many sample locations consumed most of the time and all resources available. In the National Health and Nutrition Examination Surveys (NHANES) of the 1970s, the study objectives gave more emphasis to nutrition and focused on developing information for which the poor and minority groups were hypothesized to be groups at greatest risk and of greatest analytic interest.⁵⁻⁷ Oversampling techniques increased the number of Black non-Hispanics and Hispanics in the studies as well as persons with low income, young children, and persons over 60 years of age. Although information for Hispanics was recognized as important, the survey designers viewed the national mission as the primary goal with the resources available. Hence, the NHANES studies provided detailed estimates of health and nutritional status for non-Hispanic Whites and the total population with sufficient levels of precision. Estimates for non-Hispanic Blacks were also provided, but for broader population groups. Important contributions were made toward better understanding of Black non-Hispanic health and health risk factor issues. Still, too few Hispanics were in the studies to provide reliable estimates for most age/sex groups of analytic interest.

In 1977, to help clarify and define the role NHANES should play in national nutrition monitoring activities after a decade of experience, NCHS requested an evaluation of the NHANES nutrition component, its objectives and its ability

to provide information needed to answer major public policy questions. The National Academy of Public Administration formed an expert panel to examine the issues. The panel's final report⁸ included a number of recommendations, among them the recommendation that a special study of Hispanics be undertaken. This was consistent with the point of view that the nation needs reliable information about the health and nutritional status both of the entire population and of its major subgroups. NCHS pursued the recommendation but resource constraints dictated early on that the study could not provide national estimates for all Hispanic subgroups nor even the largest ones. The final design for HHANES focused on Mexican Americans in 5 Southwestern States, Puerto Ricans in the New City and surrounding areas, and Cuban Americans in Dade County, Florida.

The HHANES data base is one of the largest, most comprehensive studies of the health and nutritional status of Hispanics ever undertaken in the United States. Hispanic researchers participated in planning, designing and conducting the study to help assure that results would be most relevant for the Hispanic community and for a broad range of uses by health data consumers. This cross-cultural study posed new challenges that were critical to the success of the undertaking. Some of these were: development of special outreach relationships to national and local Hispanic organizations and activities within communities to encourage participation in the study and to establish its credibility; translation and back translation of questionnaires into idiomatic Spanish to develop acceptable Spanish and English questionnaires with conceptual equivalence across study groups; and recruitment of bi-lingual, bi-cultural field staff who could properly administer interviews and give instructions for the health and nutrition examination procedures in the language of the participant's choice. The survey content in the area of health services utilization and barriers to health care was expanded beyond the coverage in previous studies. Questions were asked about the birthplace of the sample persons and their parents, ethnic identification and language usage and a brief Mexican American acculturation index was adapted for analytic purposes. A published descriptive report details these efforts and the study content.⁹

The papers in the *Journal* supplement examine issues related to health care utilization, health risk behaviors, perinatal health, and dental health.¹ Other published results of HHANES have supported some of the previous research in areas such as the prevalence of diabetes and gallstones. In addition, new insights have been documented in these areas and in the areas of lead exposure, blood pressure control, cholesterol levels, prevalence of anemia, low vitamin A levels and overweight. References to these reports are in the supplement. HHANES will provide material for many more analyses of policy and research interest. Since most of the data base is available on public use data files and the remainder will be in the next six months, analysts of the

HHANES and previous Health and Nutrition Examination Survey data will find the paper in the supplement on HHANES Methodological Considerations by Delgado, Johnson, *et al*, a valuable reference. It provides some statistical guidelines for analyses and presentation of data as used by many in NCHS. Thoughtful analysts have always taken the data bases to the limits and sometimes beyond; the guidelines attempt to delineate where the limits may be.

Some of the strengths and limitations of HHANES are important to point out. The strengths include the probability sampling of the populations which permits estimation of population parameters and the calculation of confidence intervals around these estimates; objective measures or indicators of health and nutritional status or physical state; the availability of quality control and validity assessments; the data to assess aspects of non-response bias for virtually all major analyses; and a basis to examine co-morbidity in addition to the individual condition, status or risk factor issues. Documentation of procedures and efforts to standardize the collection process are also generally available.

Because of its size and uniqueness in population coverage, there may be a tendency to overlook some important limitations of HHANES. The sample sizes for Puerto Ricans (3,369 interviewed and 2,834 examined) and Cuban Americans (1,766 interviewed and 1,357 examined) are small. Persons doing or using detailed analyses for any of the population groups must be particularly aware of how many people form the basis for estimates. Evaluation of the data for potential measurement errors is also important and possible for those using the public use files. For example, one technician or physician could cause observations to be systematically biased by not following the protocol exactly. This can be an important problem because HHANES had a relatively small number of persons doing the data collection over the course of the study. Users should carefully evaluate the potential non-response and non-coverage biases so that the results can be put in proper perspective. For most analyses these biases are felt to be small. NCHS staff have examined these issues in their tape documentation and published reports, but it is not possible to thoroughly evaluate every data field and combinations of them before releasing public use files. HHANES users should be familiar with the sample design and selection procedures to identify sample persons⁹ and the relevant characteristics of respondents versus nonrespondents before interpreting the results of analyses.

Lastly, as in all studies using objective measures, consumers of the data should recognize the limitations of the measures themselves as applied in the HHANES environment. The sensitivity, specificity, and validity of the measure(s) with respect to the concept or condition being measured clearly need to be considered, but the HHANES environment adds another dimension that can affect inter-

pretation. For example, to use serum iron as the indicator for iron status, one would have to analyze how diurnal variation in serum iron levels would affect the interpretation of the HHANES results. Participants were examined morning, afternoon, and evening. Many such examples could be given.

HHANES results have documented important differences among the three largest Hispanic groups with respect to a number of health, nutritional, risk factor and behavior measures. Many more analyses of HHANES data are planned by NCHS staff and other researchers. Clearly, HHANES will provide important insights into the health and nutritional status of Mexican Americans, Puerto Ricans, and Cuban Americans. The information will aid health and nutritional service providers, researchers, and policymakers to focus on some of the most important issues in Hispanic communities, to set goals and target prevention activities, and to feed information back to medical and nutrition educators to improve services to this community. With these applications in mind, NHANES III, currently in progress, has been designed to provide detailed information for non-Hispanic Blacks, Mexican Americans, and all others. Information from the first part NHANES III will be available in 1993 and will be completed in 1994.

REFERENCES

1. Trevino FM (ed): Hispanic Health and Nutrition Examination Survey, 1982-84: Findings on Health Status and Health Care Needs. *Am J Public Health* 1990;80(suppl) 72 pp.
2. National Center for Health Statistics: Plan and initial program of the Health Examination Survey. US Public Health Service. *Vital Health Stat* 1965; 1(4).
3. National Center for Health Statistics: Plan, operation, and response results of a program of children's examinations. US Public Health Service. *Vital Health Stat* 1967; 1(5).
4. National Center for Health Statistics: Plan and operation of a health examination survey of US youths 12-17 years of age. US Public Health Service. *Vital Health Stat* 1969; 1(8).
5. Miller HW: Plan and operation of the Health and Nutrition Examination Survey: United States 1971-1973. National Center for Health Statistics. *Vital Health Stat* 1973; 1(10a).
6. Engel A, Murphy RS, Maurer K, Collins E: Plan and operation of the HANES I Augmentation Survey of Adults 25-74 years: United States, 1974-1975. National Center for Health Statistics. *Vital Health Stat* 1978; 1(14).
7. McDowell A, Engel A, Massey JT, Maurer K: Plan and operation of the second National Health and Nutrition Examination Survey, 1976-1980. National Center for Health Statistics. *Vital Health Stat* 1981; 1(15).
8. National Academy of Public Administration: Improving the Health and Nutritional Examination Survey, an evaluation by a panel of the National Academy of Public Administration. Hyattsville, Maryland: US Public Health Service, 1981.
9. National Center for Health Statistics: Plan and operation of the Hispanic Health and Nutrition Examination Survey, 1982-1984. National Center for Health Statistics. *Vital Health Stat* 1985; 1(19).

ROBERT S. MURPHY, MSPH

Address reprint requests to Robert S. Murphy, MSPH, Director, Division of Health Examination Surveys, National Center for Health Statistics, Room 900, 6525 Belcrest Road, Hyattsville, MD 20782.

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