

### Nutrition Monitoring and Research in the Department of Health and Human Services

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THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES (DHHS) has responsibility for an array of human nutrition research and monitoring activities, and it works with other Federal Departments to plan, implement, and coordinate those activities. Human nutrition research is defined as the pursuit of new knowledge of nutrition as it relates to human health and disease. It encompasses the three areas of biomedical and behavioral sciences, food sciences, and nutrition education. Nutrition monitoring efforts are those activities designed to assess on a periodic and systematic basis the nutrition status of the American people as well as the factors that may affect that status. Five categories of activity constitute the key components of nutrition monitoring: health status measurements, food consumption measurements, food composition measurements, dietary knowledge and attitudes assessments, and food supply determination (fig. 1).

The foundations of modern nutrition science were laid in the 1920s and 1930s, when most of the essential vitamins and minerals were discovered. The Department's present commitment to nutrition science—nutrition research, for example, was funded at \$144,488,000 in fiscal year 1979 and at \$160,700,000 in FY 1981, with 93 percent of these sums awarded through the National Institutes of Health—has been a significant factor in a number of major health efforts in the last decade that have succeeded in improving public health.

This review of the status of current nutrition research and monitoring activities describes elements of activity and progress that are central to both nutrition monitoring and human nutrition research.

### National Nutrition Monitoring System

Together with the Department of Agriculture (USDA), the Department's Public Health Service (PHS) participates in the National Nutrition Monitoring System (NNMS). The NNMS was proposed in 1978 in response to a Congressional mandate, and it embraces the following goals:

- to provide the scientific foundation for maintaining and improving the nutritional status of the U.S. population and the nutritional quality and healthfulness of its food supply;
- to collect, analyze, and disseminate timely data on the nutritional and dietary status of the U.S. population, the nutritional quality of the food supply, the food consumption patterns, and consumer knowledge and attitudes concerning nutrition;
- to facilitate prompt intervention by identifying high-risk groups and geographic areas, as well as nutrition-related problems and trends;
- to establish national baseline data and develop and improve uniform standards, methods, criteria, policies, and procedures for nutrition monitoring; and

Figure 1. Key components of nutrition monitoring

- Health status measurements
- Food consumption measurements
- Food composition measurements
- Dietary knowledge-attitudes assessment
- Food supply determinations

# Nutrition, food, and health surveys

<i>Survey title</i>	<i>Sponsoring agency</i>	<i>Periodicity</i>	<i>Sample size</i>
National Health and Nutrition Examination Survey (NHANES II)	NCHS	10 years <sup>1</sup>	20,000 persons examined, 27,000 surveyed
Hispanic HANES (HHANES) . . . . .	NCHS	First survey 1982–84	12,000 examined, 16,000 surveyed
Nutritional Status Surveillance System . . . . .	CDC	Monthly <sup>2</sup>	In 1983, a total of 539,000 children screened and 26,000 completed pregnancies; 80 percent of data compiled from WIC and MCH clinics in 34 States and D.C.
Behavior Risk Factor Surveillance System . . . .	CDC	Monthly <sup>3</sup>	Telephone survey of 12,000 persons (600 persons per year in each of 20 States) in 1983
Total Diet Study (TDS) . . . . .	FDA	Annually	1,700 foods representative of 54 food groups found in the U.S. food supply as determined by Neilsen Survey data
Food Label and Package Study (FLAPS) . . . . .	FDA	2 years	Varies
Multi-Purpose Annual Survey of Food Shoppers	FDA	Annually	4,000
Nationwide Food Consumption Survey (NFCS)	USDA	10 years	15,000 households, 30,000 individuals
Continuing Survey of Food Intake of Individuals	USDA	Starts spring 1985	Year 1 sample: 1,200 women ages 19–50 and 500 of their children ages 1–5 years (cross section of the U.S. population) and 1,200 low-income women and 500 of their children ages 1–5 years

<sup>1</sup> First survey 1960–62, last survey 1976–80.

<sup>2</sup> Data gathered monthly and reports issued monthly, quarterly, and annually to the States. Summary of combined State data published annually.

<sup>3</sup> Data reported to participating States quarterly with a summary report prepared annually.

- to provide data for evaluating changes in agricultural policy related to food production, processing, and distribution that may affect the nutritional quality of the U.S. food supply.

In 1981 the USDA and DHHS submitted to Congress a plan for implementing the NNMS. The categories of activity noted in figure 1 as key components of the NNMS are reflective of these goals. Work by USDA and DHHS in each category is characterized by a spectrum of responsibility, with DHHS bearing primary responsibility for efforts to measure health status, USDA bearing primary responsibility for food supply determinations, and various degrees of shared responsibility for the three other categories of NNMS activity. The four Public Health Services agencies with the largest role in DHHS' part of this monitoring system are the National Center for Health Statistics (NCHS), the Centers for Disease Control (CDC), the Food and Drug Administration (FDA), and the National Institutes of Health (NIH).

**NNMS activities of the National Center for Health Statistics.** The National Nutrition Monitoring System will provide information about the nutrition-related activities just described. Two mechanisms that make such

reporting feasible are the National Health and Nutrition Examination Survey (NHANES), conducted by the National Center for Health Statistics, and the Nationwide Food Consumption Survey (NFCS), conducted by the USDA. Together these surveys form the cornerstone of the Federal Government's nutrition monitoring system (see table).

The NHANES consists of a series of surveys of representative samples of the U.S. population. The surveys include health histories, physical examinations, laboratory measurements, and a dietary interview. Analyses of the resulting data provide assessments of the health and nutritional status of the U.S. population. Two surveys have been completed—NHANES I (1971–74) and NHANES II (1976–80). In NHANES II 21,000 people from 6 months to 74 years of age were examined, using a representative sample of the U.S., civilian noninstitutionalized population. Data from NHANES II will provide the first look at changes in the health and nutrition status of the population over time based on a general medical examination and screening, a complete medical history, body measurements (height, weight, skinfolds), a 24-hour dietary recall, and numerous laboratory tests of blood, serum, and urine. NHANES II also will provide information on kidney disease, heart disease, hyperten-

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sion, certain allergies, disc degeneration, pulmonary function, and hearing and speech problems.

A special survey of the health and nutritional status of Hispanics (called Hispanic HANES) is now in the field, and data collection will be completed by December 1984. The PHS expects to release the first data tapes for analysis on the Mexican-American sample of the survey in December 1984.

To incorporate NHANES and NFCS into a truly operational national nutrition monitoring system, steps have been taken to integrate better the two surveys and to establish a system for evaluating and reporting on the dietary and nutritional status of the U.S. population. Much of the success of the NNMS depends on achieving thorough coordination of the two surveys to make the results of each as comparable as possible and on the development of an analysis system that merge findings from NHANES, NFCS, and other Federal monitoring efforts. Working toward better integration of the surveys, the PHS and USDA have undertaken three joint activities; following are brief highlights of these.

*The NFCS-NHANES data users' conference.* The National Center for Health Statistics and the Human Nutrition Information Service, USDA, requested that the Food and Nutrition Board of the National Academy of Sciences review the dietary portions of NHANES and NFCS. The Academy held a planning workshop in June 1983 and a data users conference in October (a) to obtain information on the data needs of users of NHANES and NFCS survey information and (b) to compile a thorough list of users of the data. The Academy's report, including specific recommendations to improve comparability of the dietary portions of the two surveys, is due later this year.

*The Joint Nutrition Monitoring Evaluation Committee.* This Committee was established to evaluate the findings of the Nationwide Food Consumption Survey, the National Health and Nutrition Examination Survey, and other Federal nutrition monitoring efforts and to report to Congress every 3 years on the nutritional status of the U.S. population. A panel of national experts has been

assembled to review available data and the first composite report will be released in 1985.

*The NFCS-NHANES Coordination Committee.* This interdepartmental Committee is charged with coordinating the content of these national surveys and designing future surveys with compatible designs and definitions. The committee has acted on recommendations made in 1983 by a committee of statisticians to improve comparability between the surveys.

The USDA has begun planning its Continuing Survey of Food Intakes of Individuals, and preliminary planning has been started for NHANES III. The next cycles of both surveys will be well coordinated. Staff have together reviewed questionnaires for the 24-hour recall common to both surveys to ensure comparability. NHANES and NFCS will use the same food composition data base and food codes and present results consistently to enable easy comparisons of findings. Plans include joint funding of the development and testing of a computer-assisted dietary interview that would be used by NHANES in its mobile examination centers and by NFCS in its telephone followup of respondents in its Continuing Survey of Food Intakes of Individuals (see table).

**NNMS Activities of the Centers for Disease Control.** The Centers for Disease Control contribute to the NNMS through the Nutritional State Surveillance System. The system monitors the nutritional status of high-risk pediatric and pregnant populations through the collection of measurements such as height, weight, and hemoglobin or hematocrit gathered from service delivery programs operated by State and metropolitan health jurisdictions. The information derived from the analysis of these data is communicated to State and local delivery systems for use in planning, managing, and evaluating health programs. Some of CDC's accomplishments in 1984 follow:

*Scientific evidence on infant feeding.* Chaired by the then Director of CDC, the Task Force on the Assessment of the Scientific Evidence Relating to Infant Feeding Practices and Infant Health addressed a number of health issues with implications for the United States as well as developing countries. The report was published as a supplement to the October 1984 issue of Pediatrics.

*Monitoring of low-income populations.* The CDC Nutritional State Surveillance System has been a continuing endeavor with 33 States and the District of Columbia. Between 1981 and 1984 the system was expanded by more than 30 percent. Nutrition surveillance of pregnancy is currently underway in 13 States. The surveillance system to provide information to the Presi-

dent's Task Force on Food Assistance. These data continue to serve as important resources to evaluate progress toward the 1990 Objectives in nutrition.

**Nutrition-related risk factors.** A survey mechanism has been developed and implemented by CDC which will help in determining the prevalence of diet-related risk factors (for example, obesity, hypertension, cholesterol levels, exercise patterns) in the general population.

#### **NNMS Activities of the Food and Drug Administration.**

The Food and Drug Administration has cooperated extensively with NCHS to accelerate the analysis and interpretation of NHANES data. Through a contract with the Federation of American Societies for Experimental Biology, the FDA funded an expert scientific working group to review the NHANES II data on iron, folate, and zinc nutritional status. Final reports in 1984 will aid the FDA in reviewing current food fortification policies. The FDA and NCHS entered into an inter-agency agreement to support analyses of the data collected in NHANES I and NHANES II related to vitamin A status and osteoporosis, and the FDA is funding the determination of ferritin as part of the analysis of Hispanic HANES data.

The FDA also has significant responsibilities for other components of the NNMS:

**Revision of the Total Diet Study.** In April 1982, changes were made in the Total Diet Study to improve efforts to monitor the levels of selected nutrients and toxic substances in representative diets of eight population groups in the United States. The completed work allows for a comparison of data between previous and revised Total Diet Studies. The results indicate that data from the old and new studies can be used together validly to track changes in nutrient intake over prolonged periods of time.

**Special survey of sodium labeling.** In mid-1983, a special interim survey of the Food Label and Package Survey was conducted; it showed an accelerating trend in quantitative sodium declarations on food labels, and a continuing high rate of introductions of new reduced-sodium products. The survey helped to evaluate FDA's voluntary program to encourage provision of more sodium information to consumers and to increase the availability of modified sodium products to those wishing to control their sodium intake.

**Tracking public awareness.** In concert with other efforts, the FDA devoted a major portion of its Annual Consumer Survey to tracking public awareness and knowledge of the sodium-hypertension link as well as

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reported use of reduced sodium products. In late 1983, the FDA and the National Heart, Lung, and Blood Institute also employed the Annual Consumer Survey to gather baseline consumer data as a first step in monitoring public knowledge and concern about reducing fat and cholesterol consumption, one of the PHS's health promotion goals for the next decade. Future surveys are planned on maternal and infant feeding practices and on consumer attitudes and practices relating to dieting for weight loss.

**Improved nutrient bases.** The FDA, as part of its mission, contributes to the quality of information in nutrient data bases by developing and improving analytical methods for nutrients. Through an informal working agreement with the National Bureau of Standards, Department of Commerce, studies are being conducted on the nutrient content of several commonly used reference foods. The FDA is also developing methods to determine the bioavailability of iron compounds used for food fortification and is working with the Association of Official Analytical Chemists to develop and test methods for dietary fiber determinations.

#### **Human Nutrition Research**

The science base for activities of the nutrition monitoring system, in terms of both the assessment of nutritional status and the interpretation of dietary data from the system, is drawn from studies on nutritional status assessment and from epidemiologic investigations. Research on nutritional status includes investigations to develop and evaluate methods for determining the requirements of nutrients throughout the life cycle. It also includes studies carried out in both normal and patient populations to examine biochemical, anthropometric, maturational, and functional indices of nutritional status and methods to measure nutrient concentrations in various tissues and plasma and in food intake.

Methods to refine the assessment of dietary recall of individuals are of interest to many scientists. In June 1984 the National Cancer Institute of the National Institutes of Health held a workshop on the "Core Dietary

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Questionnaire" to establish how the dietary assessment questionnaire to be used in Institute-funded investigations can be improved as an effective and efficient instrument for the appraisal of "usual diet" in cancer studies.

Epidemiologic research in nutrition examines the role of food habits and the socioeconomic factors that influence food selection in health and disease conditions. The five categories of studies in this area are (a) studies to evaluate methods and procedures used in epidemiologic research in nutrition, (b) studies of nutrition's role in physical and psychological development in defined populations, (c) nutrition-related epidemiologic studies on maturation and reproductive functions, (d) surveys of nutrient intake and nutritional status assessment of special population groups, and (e) studies on the relationship of food intake and disease.

Several recent measures important to future directions include the establishment of clinical nutrition research units, the development of a Human Nutrition Research and Information Management System, and the initiation of work on a 5-year plan for federally sponsored human nutrition research.

**Clinical nutrition research units.** Since 1979, the National Institutes of Health has supported a national program in clinical nutrition based in clinical nutrition research units (CNRUs). The establishment of seven CNRUs by NIH was a creative and imaginative response to a long-standing need to bring clinical nutrition into the mainstream of medical research and practice. Each CNRU has these seven components: research with human subjects and populations; laboratory investigations; research training; shared facilities and research services; educational programs for medical students, house staff, practicing physicians, and paramedical personnel; nutritional support services; and public information activities.

The directors of the CNRUs meet annually with NIH staff to facilitate communication, review research findings and problems, and discuss administrative concerns and constraints. In January 1984, the third annual meeting was hosted by the two CNRUs located in New York, the CNRU at the Columbia University College of Physi-

cians and Surgeons' Institute of Human Nutrition and the CNRU at Memorial Sloan-Kettering Cancer Center/New York Hospital-Cornell University Medical Center/Rockefeller University.

The host CNRUs gave indepth presentations of their clinical nutrition research programs as well as tours of their research facilities. The presentations featured discussions on biophysics, metabolism and metals, immunology, mass spectrometry, and lipid laboratories. New clinical investigators presented findings on calcium and bone metabolism in home total parenteral nutrition patients and the effect of beta-adrenergic stimulation on thyroid hormone metabolism and energy expenditure in obesity. Additionally, to provide participants at the meeting with an overview of ongoing clinical nutrition research programs underway at all seven CNRUs, the directors of the CNRUs at the Medical College of Georgia, the Universities of Alabama, Chicago, and Wisconsin, and Vanderbilt University Medical School presented highlights of the research activities of their respective units.

The CNRU program of NIH, now in its fifth year, has been extremely successful in strengthening a multidisciplinary research program in clinical nutrition and in improving the educational programs in nutrition for medical students and other health professionals in each participating institution. In addition, the CNRU program has provided support for the training of new clinical investigators in nutrition and for the development of nutrition education materials for patients and the general public.

By May 1985, renewal applications for all seven CNRUs will have been reviewed before the Councils of their respective funding Institutes. It is expected that a new Request for Applications for additional CNRUs to be funded in FY 1985 will include participation of the National Institute on Aging; National Cancer Institute; and National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases.

**Human Nutrition Research and Information Management System.** The Human Nutrition Research and Information Management (HNRIM) System mandated by the Congress in December 1982 was completed in April 1984 and is now fully operational. The system, which the USDA PHS Task Force on the HNRIM and the Division of Computer Research and Technology of NIH developed, operates out of the NIH Nutrition Coordinating Committee Office. The USDA-PHS Task Force on the HNRIM completed its interim progress report on the system in August 1983.

This progress report detailed the development of the online data support capability for the HNRIM system. The system consists of a data base that presently contains

information on more than 3,800 federally-supported human nutrition research projects. The agencies that have contributed data to the system are PHS (NIH; the Alcohol, Drug, Abuse, and Mental Health Administration; FDA; and the Health Resources and Services Administration), USDA, Veterans Administration, Agency for International Development, Department of Defense, and Department of Commerce. Data in the system include the name, organization, and address of the principal investigator, title of the research, information on the sponsoring agency and the funding mechanism, a narrative description of the research, and 34 classification codes that permit identification of the principal areas of research addressed by the investigator.

An interactive, online inquiry computer program has been designed to query the data base and prepare online as well as printed reports in varying detail. This inquiry program has also been designed to be "user friendly." The USDA-PHS Task Force will monitor the use of the HNRIM system so that the system can be modified as necessary to meet user needs.

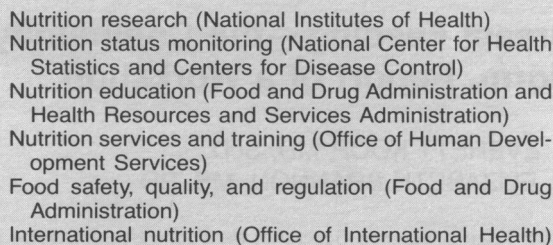
**Federal human nutrition research plan.** PHS and USDA have worked together to establish an Interagency Committee on Human Nutrition Research, co-chaired by Dr. Orville Bentley, USDA's Assistant Secretary for Science and Education, and the first author. Its purpose is to increase the overall coordination and productivity of research efforts in nutrition and to establish an agenda of research priorities. The Committee, which meets quarterly, has member representatives from eight other agencies: Agency for International Development, Department of Commerce, Department of Defense, Federal Trade Commission, National Aeronautics and Space Administration, National Science Foundation, Veterans Administration, and Office of Science and Technology Policy.

Progress to date includes initiation of the process to develop a 5-year research plan for Federal involvement in human nutrition research. The process has included identifying priorities of human nutrition research, and each of the eight representative agencies will be involved in developing the priority listing. A composite inventory of all activities has already been completed, and the 5-year plans and priorities are expected to be completed for release early in 1985. In addition, the PHS is sponsoring a conference of federally supported nutrition research centers, with the directors of all Federal human nutrition research centers likely to be in attendance.

## Nutrition Policy Board

To facilitate and oversee the work of the DHHS agencies in nutrition, a departmental Nutrition Policy Board has been established; it is composed of senior officials

Figure 2. Policy foci of the DHHS Nutrition Policy Board



- Nutrition research (National Institutes of Health)
- Nutrition status monitoring (National Center for Health Statistics and Centers for Disease Control)
- Nutrition education (Food and Drug Administration and Health Resources and Services Administration)
- Nutrition services and training (Office of Human Development Services)
- Food safety, quality, and regulation (Food and Drug Administration)
- International nutrition (Office of International Health)

from the agencies with nutrition interests. The policy foci of the Board include nutrition research; nutrition status monitoring; nutrition education; nutrition services and training; food safety, quality, and regulation; and international nutrition. These foci represent the major nutrition interests of the various agencies, and lead responsibility for each area has been assigned to the agencies listed in figure 2.

The Policy Board meets approximately quarterly to review progress and issues in departmental nutrition activities and to stimulate new initiatives where appropriate. Examples of such initiatives relevant to nutrition monitoring and research include work to develop the first Surgeon General's Report on Nutrition and Health (to be released in 1986) and the establishment of a working group on monitoring the nutritional status of low-income populations.

In summary, significant progress has been made in providing renewed focus on DHHS nutrition efforts, particularly in the implementation of the National Nutrition Monitoring System and the development of human nutrition research plans. Furthermore, cooperation is at an all-time high, creating a promising outlook for the achievement of critical goals in human nutrition monitoring and research activities for the 1980s.