NATIONAL FOOD AND NUTRIENT ANALYSIS PROGRAM

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Abstract

The National Food and Nutrient Analysis Program (NFNAP) is a research program that is designed to achieve long-sought improvements to the National Nutrient Data Bank through a comprehensive revision of scientific concept and technical approach. The project was begun in FY97 with the support of the National Heart, Lung, and Blood Institute, NIH and various other agencies and oversight by the Nutrient Data Laboratory, Agricultural Research Service, USDA. Research activities comprise four linked components, or Specific Aims:

1) Evaluate existing data for scientific quality;
2) Identify Key Foods and Nutrients for sampling and analysis plans;
3) Devise and implement a probability-based sampling survey of U.S. foods; and
4) Analyze sampled foods under USDA-supervised laboratory contracts.

The outcome of the program will be a body of nutrient data with unprecedented analytical quality for 1000 Key Foods and ingredients. The plan will yield unbiased estimates for the mean and variability of nutrient content in high priority foods, and the data will be statistically representative of both the national food supply and national food consumption patterns. It thus will be possible to use the NFNAP data with a high level of confidence that can be expected to benefit essentially every activity touching on human nutrition research, education, and policy.
Each Specific Aim (SA) comprises a major activity within an integrated research program that takes advantage of the results of national food consumption surveys; recent advances in sampling statistics, data evaluation methodology, and analytical chemistry; and information on product alterations in the national food supply. The data yielded by each phase of the program will become an inherent part of the new USDA National Nutrient Databank System. Better estimates of the mean nutrient content of foods will allow individuals to be more accurately classified according to nutrient intake. This will improve our ability to detect etiologic relationships; delineate biologic mechanisms; assess time trends in nutrient intake; and define populations at nutritional risk. Better estimates of the variability in nutrient content will allow foods to be more rationally classified and grouped. This will improve our ability to monitor the nutritional adequacy of the food supply; develop intake methodology based on categorization of foods; design dietary guidance for the healthy; and plan therapeutic diets for the sick.

I. Summary

The National Food and Nutrient Analysis Program (NFNAP) is a research program that will achieve long-sought improvements to the National Nutrient Data Base through a comprehensive revision of scientific concept and technical approach. The project is directed by the Nutrient Data Laboratory, Agricultural Research Service, USDA.

Research activities comprise four linked components, or Specific Aims:

1) Evaluate existing data for scientific quality;
2) Identify Key Foods and Nutrients for sampling and analysis plans;
3) Devise and implement a probability-based sampling survey of U.S. foods; and
4) Analyze sampled foods under USDA-supervised laboratory contracts.

The outcome of the program will be a body of nutrient data with unprecedented analytical quality. The data will be statistically representative of the national food supply and of national food consumption patterns, and will provide unbiased estimates for the mean and variance of nutrient content in high priority foods. It thus will be possible to use the NFNAP data with a high level of confidence that can be expected to benefit essentially every activity touching on human nutrition research, education, and policy.

Better estimates of the mean nutrient content of foods will allow individuals to be more accurately classified according to nutrient intake. This will improve the ability to detect etiologic relationships; delineate biologic mechanisms; assess time trends in nutrient intake; and define populations at nutritional risk. Better estimates of the variance in nutrient content will allow foods to be more rationally classified and grouped, This will improve the development of dietary intake methods that depend on categorization of foods; the monitoring of the nutritional adequacy of the food supply; the design of dietary guidance for the healthy; and the planning of
therapeutic diets for the sick.

II. Specific Aims

Each Specific Aim (SA) plays a role in an integrated research program that takes advantage of the results of national food consumption surveys; recent advances in sampling statistics, data evaluation methodology, and analytical chemistry; and information on product alterations in the national food supply. The data yielded by each phase of the program will become an inherent part of the new USDA National Nutrient Databank System.

SA 1: Evaluation of existing data for scientific quality
Newly developed algorithms will be used to review essentially all of the existing data in the NNDB. This process will allow the data to be classified into three groups: a) data of fully satisfactory analytical quality; b) marginally satisfactory data needing upgrading; and c) unsatisfactory data needing replacement. This Specific Aim will identify areas with the highest need for improved data and data gaps where no prior information is available.

SA 2: Identify Key Foods and Critical Nutrients for sampling and analysis
National data on public health and research priorities and on food consumption and production patterns will be used to rank major contributors to nutrient intake. This information will combined with the results of Specific Aim 1 to identify those foods and nutrients most needing new sampling and analysis. The U.S. food supply is enormously

varied, but preliminary data indicate that 1000 foods will account for approximately 85% of the intake of most nutrients.

SA 3: Devise and implement a nationally-based sampling survey of U.S. foods
The NFNAP will have a probability-based design in order to reduce bias, minimize unpredictable accrual of data, and ensure that the data are truly representative of the national food supply. This will be achieved through a 5-stage sampling survey: a) identifying population units (foods) of interest; b) characterizing the foods for sources of variance and other stratifying factors; c) defining sample size for each stratum; d) locating and collecting the food samples; and e) preparing samples for analysis.

SA 4: Analyze sampled foods under USDA-supervised laboratory contracts.
Data on the composition of foods will be obtained through direct assay with up-to-date analytical methodology. Rigorous quality control programs based on use of standard reference materials and thorough documentation will maximize reliability and accuracy of analytical data. Edible yield and nutrient retention factors will be updated by analyzing foods prepared according to the methods most commonly used at present.

III. Budgetary considerations

A. Description

Accomplishing the NFNAP Specific Aims will require a substantial fiscal commitment. These commitments will be needed in several categories: l)funds that can be used for contracts and procurements; 2) USDA staff effort; and 3) in-kind support from other Federal agencies. Apart from the necessary USDA staff effort, total basic contract and procurement costs for the research plan are estimated to be approximately $15 million, distributed over 5 years. Costs will be relatively lower in Year 01 (FY 1997) while the statistical design, laboratory prequalification, and data evaluation phases take place, and higher thereafter in Years 02-05 (FY 1998-2001). Once the protocol has been developed, sampling and analysis of foods will be conducted in proportion to available funds. Costs in Years 02-05 would be proportional to the number of foods analyzed (approximately 250 foods/year). Resources above this level would permit yet more thorough sampling approaches and analysis of specialty components.

SA 1 and SA 2 will have costs for expert consultation, laboratory quality control programs, and standardization activities. SA 3 will have costs associated with statistical design activities and the collection and preparation of food samples. SA 4 costs for chemical analysis will use the majority of the contract funds, because the laboratory assays for generating new food composition data are expensive. Each Specific Aim also requires USDA staff effort and infrastructure support.

B. Status of Interagency Funding for the NFNAP

Full implementation of the NFNAP research plan requires the support of many cooperating parties. The program was initiated in FY97 with funds from the USDA, the National Heart, Lung and Blood Institute (NHLBI), the National Eye Institute (NEI), the National Institute of Child Health and Human Development (NICHD), the National Center for Health Statistics, the Health Resources and Services Administration, and the Indian Health Service. Authorizations for FY98 and later years have been received from USDA, NHLBI, NEI, NICHD, the National Cancer Institute (NCI), the National Institute for Deafness and Other Communication Disorders (NIDCD), and the National Institute of Dental Research (NIDR). As of this date, more funds are needed. Other Federal agencies with programmatic responsibilities in human nutrition have been asked to provide complementary co-funding so that the planned workscope may be carried out in full. Private sector parties also can help to support the NFNAP through in-kind participation as well as donations to the appropriate agency gift funds.

C. Program management

The NFNAP is an interagency program conducted under the aegis of the USDA Nutrient Data Laboratory. NHLBI is available to serve as the coordinating unit for Interagency Agreement contracts between participating agencies and the USDA. Project Officers for the NFNAP are:

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V. Schedule of Activities

An overview of the five-year plan for the NFNAP is shown below. It is anticipated that a Monitoring and Surveillance phase would be instituted after this intensive data collection phase is complete. The time line is based on information available as of September 1997. Modular budgeting and activity units will accommodate the likelihood that financial commitments would be phased in over the course of one or more fiscal years. Adherence to the schedule and completion of the workscope is contingent upon authorization of funds.

Dates	Activities and Related Specific Aims (SA)
FY1997 (Year 01)	Planning and setup. Protocol development initiated, including sampling and analysis plans. Specific Cooperative Agreements, Research Support Agreements, and contracts awarded for contract laboratories and collection contractors. Analytical laboratories prequalified Pilot studies for analytical laboratories initiated. Laboratory quality control (QC) program developed; QC oversight lab identified. Data evaluation phase initiated (SA 1). Key/Other Foods and Critical/Other Nutrients lists - development initiated (SA 2). Sampling plan - development initiated (variance sources) (SA 3).
FY1998 (Year 02)	Data evaluation phase (SA I) continues. Key/Other Foods and Critical/Other Nutrients lists: development completed (SA 2). Sampling plan - development completed (SA 3). Standard Reference Materials developed. Protocol completed and peer-reviewed by NIH-convened expert panel. Sampling and analysis of foods (SR 3, SA 4): Priority I: Critical Nutrients in Key Foods. Database updated.
FY 1999 (Year 03)	Data evaluation phase completed (SA 1). Sampling and analysis of foods (SA 3 and SA 4): Priority I: Critical Nutrients in Key Foods Priority 2a: Critical Nutrients in Other Foods Priority 2b: Other Nutrients in Key Foods Database updated.
FY 2000 (Year 04)	Sampling and analysis of foods (SA 3 and SA 4): Priority 1: Critical Nutrients in Key Foods Priority 2a: Critical Nutrients in Other Foods Priority 2b: Other Nutrients in Key Foods Priority 3: Other Nutrients in Other Foods Database updated.
FY 2001 (Year 05)	Sampling and analysis of foods (SA 3 and SA 4): Priority 2a: Critical Nutrients in Other Foods Priority 2b: Other Nutrients in Key Foods Priority 3: Other Nutrients in Other Foods Database updated.
(FY 2002-) (Year 06-)	Monitoring and surveillance phases begin.