Sixth National Nutrient Databank Conference

May 18-20, 1981

Omaha, Nebraska

COMMITTEES

The Sixth National Nutrient Data Bank Conference was sponsored by the Department of Biochemistry in cooperation with the Department of Continuing Education, University of Nebraska Medical Center, and by the Swanson Center for Nutrition, Inc., Omaha.

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CONFERENCE SUMMARY

The Sixth National Nutrient Databank Conference was held in Omaha, Nebraska, on May 18, 19 and 20, 1981. The University of Nebraska Medical Center served as the 1981 host institution.

This conference provided an opportunity for individuals who used computerized data bases in analyzing the nutrient contents of food to share research results and new information. Participants represented agencies of the government, industries, universities, hospitals and management science companies involved in nutrient research.

The 1981 conference had two parts: (1) an introductory one-day pre-conference (May 18) designed to help the novice begin use of data bases; and (2) the main conference which consisted of sessions designed for individuals with experience in the field. This program met a variety of individual needs including those of individuals with a computer background who were interested in the manipulation of the data bases; those of individuals involved in the collection of dietary information; and those of individuals simply interested in the results of the overall analysis.

Suggestions for Future Programs

1. Future conferences should concentrate more on data bases and less on application.

2. The pre-conference should have more hands-on sessions using computer terminals.

3. Thirty minutes is not enough to get into the topics. Future conferences should allow 45-60 minutes per presentation.

4. More sessions should be included on the technicalities of computerized data bases.

5. Information should be included on graduate programs using nutrient data banks.

6. Lists of people or organizations having data on specific items, such as ethnic foods, vegetarian foods, etc., should be provided.

7. Future programs might provide separate groups for discussion of specialized data bases.

8. More information should be provided on how a non-computer person can work with a programmer to get desired results.

NUTRIENT DATA BANKS - WHAT THEY ARE AND WHAT THEY CONTAIN

Betty Perloff

A nutrient data bank is a repository for data on the nutrient composition of foods. The U.S. Department of Agriculture's Nutrient Data Bank includes a computer-based system to store and summarize the nutrient data. Its purpose is to facilitate the production of nutrient data bases, both published and computerized, which serve as reference materials on food composition.

Responsibility for the USDA Nutrient Data Bank lies within the Consumer Nutrition Center (CNC) in Hyattsville, Maryland. At the Center, the Nutrient Data Bank is operated by the Nutrient Data Research Group (NDRG), which provides the subject area knowledge, and the Survey Statistics Groups, which provides the computer system and statistical support. The NDRG has staff specialists for different food groups, and also for amino acids and fatty acids.

Part of a food specialist's responsibility is to seek out sources of nutrient composition data. The major sources of data are the food industry, scientific literature, USDA laboratories, and research contracts. Of these major sources of data, research contracts is the only source for which the NDRG can completely control the experimental design or the research methodology. However, funds available for contract research are limited and are used primarily to supplement the data received from other sources, or to study effects of different processing or production variables on the nutrient content of foods.

Because there is little or no control over the production of most of the data collected, data are carefully screened before being accepted for inclusion in the data bank. Several factors considered during the evaluation are: date of analyses, sample selection and handling procedures, sample representativeness of the food supply, analysis methodology, statistical validity and data reliability.

Data passing the evaluation are coded and computerized. Codes for all characteristics of a sample which might affect its nutrient composition are included.

Collection, evaluation, and computerization of data continue until the data base for a food group is large enough to permit development of mean values for the nutrients in various foods. At this point, the data base is analyzed to determine which characteristics of each food item affect the nutrient composition.

After the data base analysis is completed, a data base of mean values, Data Base II, is created to combine data which exist for identical samples. From Base II, data for selected items are combined through a weighting procedure to create weighted means, or overall representative values, Data Base III. For example, different varieties of a food may be weighted according to their relative commercial importance and the nutrient values for each variety combined according to their respective weights.

Several types of user outputs are prepared from the data in USDA's Nutrient Data Bank. These include:

Agriculture Handbook 8. When Base III is completed for a food group, a section of the revision to Handbook 8 is produced.

Provisional tables are released where sufficient data are in the data bank for only some of the foods within a food group. A provisional table on bakery foods and related items was released in May and copies are available from the Consumer Nutrition Center.

Consumer publications. The Sodium Content of Your Food, is the most recent consumer publication to be released. This bulletin contains up-to-date sodium data for 788 food items presented on the basis of common household measures. It may be ordered from the Government Printing Office for $2.00 a copy.

Computerized data bases. Available USDA nutrient data bases are listed below. These data bases are distributed by the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

Data Set 72-1
(Corresponds to Home and Garden Bulletin 72.)

Data Set 456-3, Release 2
(Corresponds to Agriculture Handbook 8, 1963 edition. Updates to iron and B vitamins in flour and bakery products were made in 1977; updates to the foods from the first 5 sections of the revised Agriculture Handbook 8 were made in 1980.)

Data Set 456
(Contains the same data as 456-3 after conversion to weights of household measures.)

Data Set 456-2
(Contains the weights of household measures which appear in Handbook 456, along with a factor representing the percentage of that weight which is the edible portion.)

Revised Handbook 8
(Corresponds to the first five sections of revised Agriculture Handbook 8.)

USDA Nutrient Data Base for Standard References, Release 1
(Includes all data from the first five sections of revised Agriculture Handbook 8 and also data from Data Set 456-3, Release 2. This data base includes the latest and most complete data which are available on tape for each food group.)

USDA Nutrient Data Base for Individual Intake Surveys, Release 1
(Developed to analyze data from the 1977-78 USDA Nationwide Food Consumption Survey of individuals.)

Three things are needed before a nutrient data base can be used.

1. Understanding of possibilities and limitations. A nutrient data base can be used in a number of different applications but it also has limitations. A user needs to fully understand his goals and how a nutrient data base can help accomplish them before deciding to purchase a data base or before preparing computer software to use with a data base.

2. Computer. The type of computer is usually limited to that which is available to the user. Before purchasing a data base, one should make certain that it is compatible with the computer he will use.

3. Program. The program, or computer software, is the set of instructions which directs the computer to make the necessary calculations to perform the desired task. Programs are not included with the USDA nutrient data bases.

Other USDA materials may be of interest to nutrient data base users. These include:

Agriculture Handbook 456. Nutritive Value of American Foods in Common Units presents nutrient data on the basis of common household measures and contains average weights in grams for the various measures.

Agriculture Handbook 102. Food Yields Summarized by Different Stages of Preparation presents weight losses or gains in foods after preparation.

ARS 62-13. Procedures for Calculating Nutritive Values of Home Prepared Foods explains the calculation of nutritive values for home-prepared foods listed in Agriculture Handbook 8, 1963 edition.

Several computerized data banks other than USDA's are in operation. Most of these systems make use of a USDA nutrient data base within a dietary analysis program, although the data base may have been modified to suit the particular installation's needs. The data base may be supplemented with data from other sources to expand a system's coverage of foods or nutrients, or it may be shortened by extracting food items which are seldom needed.

A number of options are available to potential nutrient data base users. These include purchasing a USDA nutrient data base and preparing the software to use with it; purchasing a nutrient data base from another source, either with or without software; or contracting to use an operational nutrient data bank system. Developing one's own nutrient data bank system includes the responsibility to verify the accuracy of all computer programs within the system and all future modifications to the data base. Using an operational system includes the responsibility to evaluate the system for its overall adequacy.

Availability of Data
by Betty P. Perloff

Agriculture Handbook No. 8, Composition of Foods...Raw, Processed, Prepared, is the U.S. Department of Agriculture's standard reference on food composition and was last completely revised in 1963. A current revision, progressing by food group, is underway; as a group is completed, the data are released as a section of the handbook. The following six sections have been released to date:

- 8-1 Dairy and Egg Products
- 8-2 Spices and Herbs
- 8-3 Baby Foods
- 8-4 Fats and Oils
- 8-5 Poultry Products
- 8-6 Soups, Sauces and Gravies
- 8-7 Sausages and Luncheon Meats

Agriculture Handbook No. 456, published in 1975, contains basically the same data that were published in the last complete revision of Handbook No. 8, except that data have been converted to common units. Home and Garden Bulletin No. 72, a small bulletin with data presented in common household measures, was published in 1977 as a consumer service of USDA. Copies of the above publications are available through the Government Printing Office.

Several USDA computerized nutrient data bases are available to the public through the National Technical Information Service. These data bases are described below.

Data Set 456-3, Release 2, contains food items from the 1963 edition of Handbook No. 8 and Handbook No. 456 with data presented on the 100 gram edible portion basis. Data were revised in 1977 to reflect current enrichment practices in the baking industry, and in 1980 the values were updated with data from the first five sections of the revised Handbook No. 8.

Data Set 456-2 contains weights of household measures for most of the food items on Data Set 456-3.

Data Set 456, Release 2, contains the data from 456-3 after conversion to weights of household measures.

Data Set 72-1 contains food items from Home and Garden Bulletin No. 72. Data are presented on the household measures basis.

USDA Nutrient Data Base for Standard Reference, Release 1, consists of the data from the first five sections of revised Handbook No. 8 supplemented by the data from 456-3. The format corresponds to the revised handbook, and data from new sections will be added as they are published. Updated versions of this data base will be released periodically and will be identified by release number and date.

USDA Nutrient Data Base for Individual Intake Surveys, Release 1, is the data base developed to analyze data from the 1977-78 USDA Nationwide Food Consumption Survey of Individuals.

Nutrients included on each file are summarized in Table 1. For details on how to obtain the data bases, call Mr. Brucy Gray (301) 436-8507.

USDA NUTRIENT DATA BASES

Data Base	456-3	456-2	456	72-1	Standard Reference		Individual Survey
Number of Items	3,147	6,943	6,943	730	>3,500		>4,500
					Data From 456	Data from Rev. 8	
Units of Measure	100 gm		Household Measures	Household Measures	100 gm	100 gm and House Meas.	100 gm
Weights of Household Measures		x		x			
Proximate:							
Water.............	x		x	x	x	x	
Energy...........	x		x	x	x	x	x
Protein..........	x		x	x	x	x	x
Total Lipid.......	x		x	x	x	x	x
Carbohydrate......	x		x	x	x	x	x
Crude Fiber.......	x		x		x	x	
Ash..............	x		x		x	x	
Minerals:							
Calcium..........	x		x	x	x	x	x
Iron.............	x		x	x	x	x	x
Magnesium.........						x	x
Phosphorus........	x		x	x	x	x	x
Potassium.........	x		x	x	x	x	
Sodium...........	x		x		x	x	
Zinc.............						x	
Vitamins:							
Ascorbic Acid.....	x		x	x	x	x	x
Thiamin..........	x		x	x	x	x	x
Riboflavin........	x		x	x	x	x	x
Niacin...........	x		x	x	x	x	x
Pantothenic Acid..						x	
Vitamin B-6.......						x	x
Folacin..........						x	
Vitamin B-12......						x	x
Vitamin A.........	x		x	x	x	x	x
Lipids:							
Total Sat. F.A. ..	x		x	x	x	x	
Total Mono. F.A. .						x	
Total Poly. F.A. .						x	
Oleic Acid........	x		x	x	x	x	
Linoleic Acid.....	x		x	x	x	x	
Other Fatty Acids.						x	
Cholesterol.......	x		x		x	x	
Amino Acids........						x	

Table 1

Nutritive Value Data Sets Released By CNC
In A Machine Readable Form

Data Set 456 — Accession Number: PB81 146649

This file contains food compositiion data as published in tables 1 and 2 of Agricultural Handbook No. 456 along with three other composition values (fiber, ash, and cholesterol). Where values were not available for publication in Handbook No. 456, imputed values have been included on the tape. This file also has updated values that have been made available since the handbook was published. The data are provided for the same household units as given in the publication. Food item numbers are assigned sequentially with the food descriptions in alphabetical order. The first four digits and the letter code are identical to those used in the publication for the same food item but a fifth digit has been appended to allow for a finer distinction of the food than was used originally. Where no finer definition is needed, the fifth digit is zero. As an example, item 45 in the publication (cooked artichokes) has now been further specified as 45-1 (cooked artichokes without salt added) and 45-2 (cooked artichokes with salt added). Food descriptions are not included in the file and users will need a copy of the published handbook to determine the food and household measure.

Data Set 456-2 — Accession Number: PB81 146003

This is a companion file to F4563 and contains corresponding quantities for the unit of measure used in Handbook 456 for each food item and the fraction of the total weight that represents the edible portion. By taking the product of the nutritive values per 100 grams contained in F4563 and the corresponding quantities contained in this file comparable to the data contained in tables 1 and 2 of Handbook 456 or one can use the data in this file to have weights of foods in various household units.

Data Set 456-3 — Accession Number: PB81 146011

This file contains food composition data for foods whose quantities are expressed in 100 grams edible portion. Twenty-one composition values are included along with a 20 character description of the food item. The composition values are: percent water, food energy, protein, fat, carbohydrates, fiber, ash, calcium, phosporus, iron, sodium, potassium, vitamin A, thiamin, riboflavin, niacin, ascorbic acid, saturated fatty acid, oleic acid, linoleic acid, and cholesterol. These values are given for 3,147 food items. Except for 105 foods which have item numbers from 2501-2541, 2601-2657, and 2701-2707 food item numbers are assigned sequentially with the food descriptions in alphabetical order. An accompanying booklet gives a full description of the foods.

Updated Handbook No. 8 Data Set Accession Number: PB81 158594

This file contains data on the updated data sets of Agriculture Handbook No. 8, "Composition of Foods....raw, processed, prepared." The handbook is being revised in separate sections by food groups. To facilitate future updating, the revision is prepared in loosefeaf form. Each page contains the nutrient profile for a single food item. Data are presented on the 100-gram basis, in two common measures, and in the edible portion of 1 pound as purchased. Values are provided for refuse, energy, proximate composition (water, protein, lipids, carbohydrate, and ash), seven mineral elements (calcium, iron, magnesium, phosphorus, potassium, sodium, and zinc. with the addition of copper in 8-3, 8-5, and 8-6 and manganese in 8-5 and 8-6), nine vitamins (ascorbic acid, thiamin, riboflavin, niacin, pantothenic acid, vitamin B_6, folacin, vitamin B_{12}, and vitamin A, with the addition of total and alphatocopherol in 8-4), individual fatty acids, cholesterol, total phytosterols, and 18 amino acids. In order to provide users of the table with estimates of the variability and reliability of the nutrient data, the standard error of the values on the 100-gram food basis and the number of samples on which the 100-gram are based have been incorporated into the table. Much of the data used in revising Handbook No. 8 was supplied through the cooperation of private industry, Government agencies, and academic institutions. The information presented will be especially useful to research groups who conduct dietary surveys and nutritional status studies, as well as to professional and technical personnel, including those in food industries and health-related professions, who plan or evaluate diets and food supplies.

USDA Nutrient Data Base for Standard Reference Accession Number: PB81 178055

This file is made up of the most complete, most recent data base of food composition data. It's initial data set was the updated version of data set 456-3 formatted to allow for the insertion of additional nutrients. As updates are made to Agricultural Handbook 8, this file is revised to include the changes made to values originally contained in the file as well as the additional composition values and additional foods. To distinguish between the food item numbers used in Agricultural Handbook 8 and the numbers used in the updated Agricultural Handbook 8 codes, all items from the original Handbook 8 have 70000 added to their codes. Our accompanying booklet gives a full description of the foods.

Data Set 72-1 Accession Number: PB81 146748

This file contains food composition data as published in Table 2 of Home and Garden Bulletin No. 72, Nutritive Value of Foods revised 1977. Values for food items are described in terms of household measures for the food and are provided for the weight of the household measure, percent water, food energy, protein, fat, saturated fatty acid, oleic acid, linoleic acid, carbohydrate, calcium, phosphorus, iron, potassium, vitamin A value, thiamin, riboflavin, niacin, and ascorbic acid. There are 730 food items included. A three-digit food code has been sequentially assigned to each food item after the items have been placed into food groups. A 24 character description of the food exist on each of the 87 character records.

Data Set 102-1 — Accession Number: PB81 146730

This file contains data on food yields and losses in food preparation as published in Table 1 of Food Yields...summarized by different stages of preparation. Agriculture Handbook No. 102, revised September 1975. The revised data and additional information in this publication serves as the principal basis for values on refuse in the revisions of Agriculture Handbook No. 8, Composition of Foods...raw, processed, prepared, revised 1963, $3.60. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402). Yields after preparation as well as percent change (by weights) are provided for up to nine variations in preparation for each food item. Each item is identified by an item number which relates directly to the item described in AH 102. No descriptions are contained in this file. This file contains data for 2,894 food items.

Data Set 382-1 — Accession Number: PB80 190192

This file contains composition values as published in Table 1 of Agriculture Information Bulletin No. 382, Nutrition Labeling...tools for its use, issued 1975, with these exceptions: A few foods were added and some were deleted and values for 3 nutrients for all foods have been added. (Agriculture Information Bulletin No. 382 is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402). Twelve composition values for common household measures (expressed in grams) of 885 foods are included. Composition values are for food energy expressed in calories and for protein, carbohydrate and fat expressed in grams (rounded to the nearest whole gram). Also, percentages of the U.S. RDA for protein, vitamin A, vitamin C, thiamin, riboflavin, niacin, calcium and iron are given to the nearest 2 percent (2, 4, 6, etc.) up to 10 percent; to the nearest 5 percent (10, 15, 20, etc.) up to 50 percent; and to the nearest 10 percent (50, 60, 70, etc.) above 50 percent. The data set contains a five-digit food code and an abbreviated description for each food item. An accompanying booklet contains a complete description and the common household measure for each food.

Data Set 382-2 — Accession Number: PB80 190192

This file is a companion file to 382-1 with the following changes in food composition values; food energy is rounded to the nearest whole calorie and protein, carbohydrate and fat are rounded to the nearest tenth of a gram. Values for protein, vitamin A, vitamin C, thiamin, riboflavin, niacin, calcium and iron are rounded to the nearest hundredth of a percentage of the U.S. RDA. The quantitiy of each item, expressed in grams, the five-digit code and the abbreviated description are identical to those in Data Set 382-1. An accompanying booklet contains a complete description and the common household measure for each food.

Data Set 382-3 — Accession Number: PB80 190192

This file is a companion file to 382-1 with food values expressed as follows: food energy as calories; protein, carbohydrate and fat in grams; vitamin A in International Units; vitamin C, thiamin, riboflavin, niacin, calcium and iron in milligrams. Quantities of each item, expressed in grams, the five-digit code and abbreviated descriptions are identical to those in Data Set 382-1. An accompanying booklet contains a complete description and the common household measure for each food.

USDA Nutrient Data Base for Individual Intake Surveys   Accession Number: PB80 197403

A nutrient data base of approximately 4,500 food items developed for the USDA Nationwide Food Consumption Survey 1977-78. Only items reported in the survey are included. Foods reported exclusively in the Puerto Rican phase of the survey are not included but are available on a spplemental tape. Food composition values are for 100-gram edible portions of food, as eaten, for energy (kilocalories), protein (g), fat (g), carbohydrate (g), calcium (mg), iron (mg), magnesium (mg), phosphorus (mg), vitamin A value (I.U.), thiamin (mg), riboflavin (mg), miacin (mg), vitamin B_6 (mg), vitamin B_{12} (mcg), and vitamin C (mg). For milk and milk products, a calcium conversion factor is provided which converts each product to an equivalent weight of whole milk based on it's calcium content relative to whole milk. Food items reported in the survey but not specifically described are assigned nutrient values for a commonly eaten form of the food or for a composite of several forms. Food values for mixtures or recipes are based on popular recipes, commercial products, or composites of several products. A food code manual is provided which includes, for each item, a unique seven-digit food code, description of food, and commonly reported household measures with their weights in grams. The first digit of the code denotes one of nine major food categories. A tenth category of miscellaneous items used in small amounts, assigned a first digit of zero, does not appear on the tape except for soy sauce.

USDA Nutrient Data Base for Household Intake Surveys   Accession Number: PB81

This file contains nutritive values for 3,836 food items reported used by households in the USDA Nationwide Food Consumption Survey 1977-78. Food composition values are for 1 pound of food, as purchased for food energy (calories), protein (g), fat (g), carbohydrate (g), calcium (mg), iron (mg), magnesium (mg), phosphorus (mg), vitamin A (I.V.), thiamin (mg), riboflavin (mg), niacin (mg), vitamin B_6 (mg), vitamin B_{12} (mcg), and ascorbic acid (mg) with cooking losses deducted for the following seven vitamins: vitamin A, thiamin, riboflavin, niacin, vitamin B_6, vitamin B_{12}, and ascorbic acid. Also provided are conversion factors which convert appropriate food items to an equivalent weight based on calcium content or equivalents based on flour, sugar, fresh potatoes, eggs in shell, single strength juice, dry legumes, or shelled nuts. Most of the data on nutrients were derived from Table 2, U.S. Department of Agriculture Handbook No. 8 and its revised supplements. Some values from these sources were updated based on results of new food composition research, on information from industry about new food products, and in accordance with new regulations on the enrichment of food. Foods reported exclusively in the Puerto Rican phase of the survey are not included in this data file but are available on a supplemental tape. A food code manual is provided with this data file which includes a unique 15-digit food code for each food item reported in the survey, a description of the food, and the commonly reported household measures with their weights in pounds for that food.

DATA SETS ON FOOD CONSUMPTION SURVEYS
AVAILABLE AT NTIS

Data Set Name	Accession Number	Cost
Spring Basic Household Consumption Survey, 1977-78	PB80 190176	$175
Summer Basic Household Consumption Survey, 1977-78	PB80 197411	175
Fall Basic Household Consumption Survey, 1977-78	PB80 200215	175
Winter Basic Household Consumption Survey, 1977-78	PB80 202542	175
Low Income Household Consumption Survey, 1977-78	PB81 114399	175
Spring Individual Food Intake Survey, 1977-78	PB80 190218	325
Summer Individual Food Intake Survey, 1977-78	PB80 197429	250
Fall Individual Food Intake Survey, 1977-78	PB80 200223	325
Winter Individual Food Consumption Survey, 1977-78	PB81 118853	325
Low Income Individual Consumption Survey, 1977-78	PB81 118838	400
Spring Individual Food Intake, 1965	PB80 195415	175
Nutritive Values Used in Individual Intake Survey, 1977-78	PB80 197403	100
Data File of Agriculture Information, Bulletin No. 382	PB80 190192	100
Weight of Units of Foods as Used in Agriculture Handbook No. 456 (Data Set 456-2)	PB81 146003	100
Agriculture Handbook No. 456 (Data Set 456-3)	PB81 146011	100
Agriculture Handbook No. 456 (Data Set 456)	PB81 146649	100
Yields and Losses or Gains in Preparation of Foods	PB81 146730	100
Nutritive Value Data as Published in Home and Garden Bulletin No. 72	PB81 146748	100
Hawaii Household Food Consumption Survey, 1977-78	PB81 146755	100

Data Set Name	Accession Number	Cost
Alaska Household Food Consumption Survey, 1977-78	PB81 146763	$100
Hawaii Individual Food Consumption Survey, 1977-78	PB81 146771	100
Composition of Foods Handbook Number 8-1 through 8-5	PB81 158594	100
Alaska Individual Food Consumption Survey, 1977-78	PB81 162539	100
Nutrient Data Base for Standard Reference	PB81 178055	100

How To Order From NTIS

The data made available to the public from the Consumer Nutrition Center is distributed through the National Technical Information Service (NTIS) whose address is: U.S. Department of Commerce, National Technical Information service, 5285 Port Royal Road, Springfield, Virginia 22161. To reduce the probability of getting the wrong data set, requests should make reference to Accession Number whenever possible.

How To Pay
The deposit account, which carries no service charge and enables customers to order rapidly by telephone or telegraph, is the most convenient to use, Thus, the fastest service is provided to customers who charge to their deposit accounts

American Express, VISA, and Master Card credit card transactions are accepted as well as check and money order payments.

As an occasional convenience to customers who have established credit, a Ship and Bill Service is provided at a $5 surcharge on each total order for documents, regardless of documents ordered.

How To Open a Deposit Account
Use the order form on page 2 and send at least $25 to NTIS Deposit Account, 5265 Port Royal Orad, Springfield, VA 22161. Thereafter, keep at least $25 on deposit or enough to cover two months' charges. You may pre-deposit any amount. Some active customers keep several thousand dollars in their accounts to ensure the fastest possible service for large orders since orders will not be processed for overdrawn accounts.

When your account is opened, you will receive preaddressed order forms to speed your orders and simplify accounting and the recording of tax deductible expenses.

Special NTIS Credit for Local Governments and State Universities
No advance funds are necessary for local governments and state universities to obtain credit and immediate shipments of NTIS products and services.

Upon receipt of the special credit account application, NTIS will mail a supply of preaddressed order forms bearing a special account number. These forms also will show a "Ship To" address if one is required. Subsequently, orders from these sources will be processed directly into the NTIS automated system, eliminating several steps in normal order handling and minimizing errors.

Monthly statements will show all charges, credits, deposits, and the balance remaining in the account. The charges may easily be verified from the Record of Shipment Cards included with every shipment. The local government's or the library's signed payment voucher (which we will keep on hand) will be mailed with each statement. Payment is due upon its receipt.

Officials need not be concerned with special funding, delays, and price changes.

The charge for this service is 10 cents a line item.

Ordering
RUSH HANDLING is for customers who must have immediate delivery.

RUSH HANDLING guarantees that a particular order will be filled within 8 working hours of its receipt. These orders receive immediate validation, verification of availability, and individual hand processing through inventory control at the warehouse, priority mailing.

RUSH HANDLING orders for mailing rather than pickup are accepted only from customers having NTIS deposit accounts or American Express Cards. Further, these orders may be placed only by telephone, telegram, telex, telecopier, or customers in person; not by mail.

RUSH HANDLING for delivery to customers by priority mail costs $10, for each item ordered, plus the cost of the document.

RUSH HANDLING for pickup in Springfield or Washington, D.C., costs $6 for each item ordered, plus the cost of the document.

PREMIUM SERVICE is a 24-hour toll-free telephone ordering procedure ensuring priority mail delivery to NTIS deposit account customers within 5 to 12 days.

All deposit account customers will receive PREMIUM SERVICE identification numbers with which they may place telephone orders at any time. PREMIUM SERVICE benefits are toll-free calls with 24-hour availability, no busy signals, simplified ordering techniques (details with the identification number), postage savings, and priority delivery. PREMIUM SERVICE costs $3.50 for each item ordered, plus the cost of the document.

REGULAR SERVICE will continue to operate with improved processing and stocking methods, optional priority mail delivery (slight additional cost), and optional pickup in Springfield or Washington, D.C. Current parcel post deliveries using the U.S. Postal Service are completed within nine to thirty days.

The order processing and sales desk number is 703-487-4650. Call if you have any questions.

NTIS
Deposit Account Application

Initial Deposit________

Date Mailed________

Date Acceptance Received________

Keep This Brochure For Your Records

Mail To:

NTIS
U.S. Department of Commerce
National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

DEPOSIT ACCOUNT SERVICE APPLICATION

Please open a deposit account in my name

Here is my check for $_______ payable to NTIS
($25 minimum initial deposit).

Name________
Title________
Organization________
Street________
City________ State________ Zip________
Date________ Signature________

Nutrient Data Bases

	456-3	456-2	456	72-1	Standard Reference		Individual Survey
Number of Items	3,147	6,943	6,943	730	>3,500		>4,500
					Data from 456	Data from Rev. 8	
Units of Measure	100 gm		Household Measures	Household Measures	100 gm	100 gm and House. Meas.	100 gm
Weights of Household Measures		X		X			
Proximate: Water	X		X	X	X	X	
Energy	X		X	X	X	X	X
Protein	X		X	X	X	X	X
Total lipid	X		X	X	X	X	X
Carbohydrate	X		X	X	X	X	X
Crude fiber	X		X		X	X	
Ash	X		X		X	X	
Minerals: Calcium	X		X	X	X	X	X
Iron	X		X	X	X	X	X
Magnesium						X	X
Phosphorus	X		X	X	X	X	X
Potassium	X		X	X	X	X	
Sodium	X		X		X	X	
Zinc						X	
Vitamins: Ascorbic acid	X		X	X	X	X	X
Thiamin	X		X	X	X	X	X
Riboflavin	X		X	X	X	X	X
Niacin	X		X	X	X	X	X
Pantothenic acid						X	
Vitamin B-6						X	X
Folacin						X	
Vitamin B-12						X	X
Vitamin A	X		X	X	X	X	X
Lipids: Total Sat. F.A.	X		X	X	X	X	
Total Monounsat. F.A.						X	
Total Polyunsat. F.A.						X	
Oleic acid	X		X	X	X	X	
Linoleic acid	X		X	X	X	X	
Other fatty acids						X	
Cholesterol	X		X		X	X	
Amino acids						X	

CFEI, HN, SEA, USDA, Hyattsville, MD 20782

NUTRIENT DATA BANK AVAILABILITY
Donna L. Hay

The second session of the Pre-Conference addressed a review of the different nutrient data banks currently available for sale or rent. Information used in this presentation was volunteered by respondents to a nutrient data bank questionnaire. Twenty-eight data banks were compared across their major characteristics, including:

- Price (cost to buy or rent)
- Quantity basis of volume measurement (household units, 100 grams, as well as conversion capabilities)
- Number of food items (distinct items for which nutritional information is available) and their coding procedure
- Number of nutrients coded for each food item
- Sources of the nutritional food item profiles
- Documentation of source information, inadequate/incomplete data

A nutritional profile comparison summary was provided on both the total number of nutrient components and the major nutritional groupings of general, carbohydrates, protein, fat, vitamins and minerals.

This directory of specific information of the twenty-eight data banks was provided to all conference attendees. The accuracy or adequacy of any particular data bank is not guaranteed, rather the directory is meant to serve as an aid to potential data bank users in acquainting the user with options available in a readily accessible and easy-to-use form.

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I.D. NUMBER	CONTACT	COMPUTER FACILITY	SALE/RENT PRICE	QUANTITY BASIS	SUMMARY	NUTRIENT SOURCES	UPDATE FREQUENCY FLAGS	MISCELLANEOUS
			. . . . .NUTRIENT DATA BANK DESCRIPTION.					
NUMBER	NAME TITLE ORGANIZATION ADDRESS-STREET ADDRESS-CITY, STATE PHONE NUMBER	IN-HOUSE TIMESHARE ON-LINE LANGUAGE LANGUAGE	SALE-PRICE RENT-PRICE ANALYSIS	HH UNITS 100 GRAMS OTHER CONVERT	(NO. OF) ITEMS NUTRS	HNDBK 8 (63) HNDBK 8 (72) HNDBK 456 (77) PERIODIC LIT. FOOD MFGR. LAB ANALYSIS	FREQUENCY ID SOURCE-ITEM ID SOURCE-NUTR. ID ACCURACY-NUTR. FLAG QUEST NUTR.	FOOD GROUP CODES FLAG ALLERGIES FOOD-DRUG INTRACT NUTR-NUTR INTRACT LAB ASSAY NUTRIENTS
000001	JEAN THOMPSON NUTRITIONIST ACTION BC 1600 W. 6TH AVE. VANCOUVER BC CANADA V6J1R3 604 734-2706	IN-HOUSE TIMESHARE ON-LINE BASIC FORTRAN 4	SALE-$5000 YES	HH UNITS NO	250 18	HNDBK 8 (72) NUTRITION CAN- ADA (UPDATE)	(NO) ID SOURCE-ITEM ID SOURCE-NUTR. ID ACCURACY-NUTR.	FOOD GROUP CODES NO NO
000002	MARY E. KILBY, R.D. OWNER CALCULATED DIETARY ANALYSIS 5 CHESTNUT STREET CLINTON, NEW YORK 13323 315 853-8834	IN-HOUSE MACHINE	SALE-$180 PER PROGRAM YES	HH UNITS NO	1331 14	PERIODIC LIT. HNDBK 456 HOME + GARDEN- BULLETIN (72)	AS NEEDED ID SOURCE-ITEM	NO NO
000003	HAROLD B. HOUSER M.D. PROFESSOR + CHAIRMAN DEPT OF BIOMETRY CASE WESTERN RESERVE UNIV CLEVELAND, OH 44106 216 444-3491	IN-HOUSE TIMESHARE ON-LINE FORTRAN C	SALE-$5750 YES	100 GRAM YES	2400 71	HNDBK 8 (63) HNDBK 456 (77) PERIODIC LIT. FOOD MFGR. OTHERS	CONTINUING ID SOURCE-ITEM ID SOURCE-NUTR.	FOOD GROUP CODES FLAG ALLERGIES NO NO
000004	ANN LEONARD NUTRITIONIST CLINICAL NUTRITION 2701 FRONTIER AVE. ALBUQ, NM 87131 505 277-1040	IN-HOUSE TIMESHARE ON-LINE FORTRAN	RENT-UNDET. YES	HH UNITS 100 GRAM OTHER YES	2000 71	(FROM CASE WESTERN)	YEARLY ID SOURCE-ITEM FLAG QUEST NUTR.	FOOD GROUP CODES FLAG ALLERGIES NO NO
000005	MARK GREEN, PHD PRESIDENT DIET DESIGN, INC. 1701 N FORT MEYER DR., 610 ARLINGTON, VA 22209 703 243-7300/524-5183	TIMESHARE FORTRAN	RENT-UNDET. YES	HH UNITS 100 GRAM YES	297 49	HNDBK 8 (72) PERIODIC LIT. FOOD MFGR.	YEARLY	FOOD GROUP CODES NO NO
000006	BOB OR JANET FIALA OWNERS GEMINI NATURAL NUTRIT. 5362 YALE WESTMINISTER, CA 82633 714 894-6376	IN-HOUSE TIMESHARE ON-LINE C BASIC	SALE/RENT-NO YES	HH UNITS 100 GRAM YES	1200 28	(FROM OHIO STATE)	(NO)	NO NO

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			. . . . .NUTRIENT DATA BANK DESCRIPTION.					
NUMBER	NAME TITLE ORGANIZATION ADDRESS-STREET ADDRESS-CITY, STATE PHONE NUMBER	IN-HOUSE TIMESHARE ON-LINE LANGUAGE LANGUAGE	SALE-PRICE RENT-PRICE ANALYSIS	HH UNITS 100 GRAMS OTHER CONVERT	(NO. OF) ITEMS NUTRS	HNDBK 8 (63) HNDBK 8 (72) HNDBK 456 (77) PERIODIC LIT. FOOD MFGR. LAB ANALYSIS	FREQUENCY ID SOURCE-ITEM ID SOURCE-NUTR. ID ACCURACY-NUTR. FLAG QUEST NUTR.	FOOD GROUP CODES FLAG ALLERGIES FOOD-DRUG INTRACT NUTR-NUTR INTRACT LAB ASSAY NUTRIENTS
000007	MICHAEL J. COX DIRECTOR, APPLICATIONS GOLDEN WEST COLLEGE 15744 GOLDEN WEST ST. HUNTINGTON BEACH, CA 92647 714 892-7711 EXT 645	IN-HOUSE TIMESHARE ON-LINE APL	SALE-$300+ MAYBE- CALL	HH UNITS OTHER YES	3500+ 19	HNDBK 8 (63) HNDBK 456 (77) PERIODIC LIT. FOOD MFGR. OTHER	3 TIMES PER YEAR ID SOURCE-ITEM ID SOURCE-NUTR. FLAG QUEST NUTR	NO NO
000008	JAMES J. DOYLE SOFTWARE APPLICATIONS HONEYWELL DATANETWORK HONEYWELL PLAZA 12-1124 MINNEAPOLIS, MN 55408 612 870-6350	TIMESHARE ON-LINE FORTRAN	RENT-$3 PER RECIPE YES	HH UNITS NO	2500+ 20+	HNDBK 456 (77) FOOD MFGR.	WHEN AVAILABLE ID SOURCE-ITEM	NO NO
000009	MARGARET C. MOORE V.P.-SCIENTIFIC AFFAIRS INT. DIETARY INF FOUND. 924 ROYAL STREET NEW ORLEANS, LA 70116 504 522-8973	ON-LINE ASSEMBLER, FORTRAN, COBOL, SAS	SALE/RENT-NO YES	100 GRAM NO	3500 112	HNDBK 8 (63) HNDBK 8 (72) HNDBK 456 (77) PERIODIC LIT. FOOD MFGR. LAB ANALYSIS	WHEN AVAILABLE ID SOURCE-ITEM ID SOURCE-NUTR.	FOOD GROUP CODES NO NO
000010	COL JOHN D MARSHALL MS COMMANDER LETTERMAN ARMY INST RES PRESIDIO OF SAN FRANCISCO CA 94129	IN-HOUSE TIMESHARE ON-LINE FORTRAN	SALE-(YES) YES	HH UNITS 100 GRAM YES	1400 120	HNDBK 8 (72) HNDBK 456 (77) PERIODIC LIT. FOOD MFGR. LAB ANALYSIS OTHER	CONTINUOUSLY ID SOURCE-ITEM ID SOURCE-NUTR.	FOOD GROUP CODES YES YES (MANY)
000011	MR RICHARD S CATES MGR. FOOD MGT SYSTEMS MEDICUS SYSTEMS CORP. 1175 PEACHTREE ST. NE ATLANTA, GA 30361 404 892-9815	IN-HOUSE FORTRAN ASSEMBLER	SALE-$3500 YES	100 GRAM NO	2800 16	HNDBK 8 (72)	(YES) ID SOURCE-ITEM	FOOD GROUP CODES NO NO
000012	NANCY E. JOHNSON PRESIDENT NARS, LTD. P.O. BOX 5323 MADISON, WI 53705 608 233-8038	FORTRAN	SALE-NO YES	HH UNITS 100 GRAM VARIES NO	12-20	HNDBK 456 (77) PERIODIC LIT.	(NO) FLAG QUEST NUTR.	NO NO

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			SALE/RENT PRICE	QUANTITY BASIS	SUMMARY	NUTRIENT SOURCES	UPDATE FREQUENCY FLAGS	MISCELLANEOUS
	NAME	IN-HOUSE	SALE-PRICE	HH UNITS	(NO. OF)	HNDBK 8 (63)	FREQUENCY	FOOD GROUP CODES
	TITLE	TIMESHARE	RENT-PRICE	100 GRAMS	ITEMS	HNDBK 8 (72)		FLAG ALLERGIES
NUMBER	ORGANIZATION	ON-LINE		OTHER		HNDBK 456 (77)	ID SOURCE-ITEM	FOOD-DRUG INTRACT
	ADDRESS-STREET				NUTRS	PERIODIC LIT.	ID SOURCE-NUTR.	NUTR-NUTR INTRACT
	ADDRESS-CITY, STATE	LANGUAGE	ANALYSIS	CONVERT		FOOD MFGR.	ID ACCURACY-NUTR.	LAB
	PHONE NUMBER	LANGUAGE				LAB ANALYSIS	FLAG QUEST NUTR.	ASSAY NUTRIENTS
	DAN JOHNSON	TIMESHARE	SALE-(YES)	HH UNITS		HNDBK 8 (72)	MONTHLY	FOOD GROUP CODES
	DIRECTOR			100 GRAM	2500			
000013	NUTRANALYSIS						ID SOURCE-ITEM	
	924 ANACAPA 4H				33		ID SOURCE-NUTR.	
	SANTA BARBARA, CA 93101	SAS	YES	YES				NO
	805 962-4072/962-0500	FORTRAN						NO
	ALFRED C. MEYER	IN-HOUSE	SALE/RENT-	100 GRAM		HNDBK 8 (72)	WITH NEW DATA	FOOD GROUP CODES
	DIRECTOR	TIMESHARE	NEGOTIABLE		200	PERIODIC LIT.		FLAG ALLERGIES
000014	THE NUTRITION CLINIC	ON-LINE				FOOD MFGR.	ID SOURCE-ITEM	FOOD-DRUG INTRACT
	P.O. BOX 190				30	BOWES + CHURCH	ID SOURCE-NUTR.	
	MADISON, WI 53701	MIIS	YES	YES		PAUL + SOUTHGATE	ID ACCURACY-NUTR.	NO
	608 255-0444	FORTRAN					FLAG QUEST NUTR.	NO
	ROBIN S. WILLARD, R.D.	IN-HOUSE	SALE-NEGOT.	HH UNITS		HNDBK 8 (63)	CONTINUOUSLY	FOOD GROUP CODES
	SYSTEMS DIETITIAN	TIMESHARE		100 GRAM	6100	HNDBK 8 (72)		FLAG ALLERGIES
000015	OHIO STATE UNIV HOSP.	ON-LINE				HNDBK 456 (77)	ID SOURCE-ITEM	
	RM 149, 410 W 10TH AVE				63	PERIODIC LIT.	ID SOURCE-NUTR.	
	COLUMBUS, OH 43210	ASSEMBLER	YES	YES		FOOD MFGR.		NO
	614 422-7680/422-4314	COBOL				LAB ANALYSIS		NO
	ANTHONY COPPING	IN-HOUSE	SALE-$5000	HH UNITS		HNDBK 8 (72)	CONTINUOUSLY	FOOD GROUP CODES
	PRESIDENT	ON-LINE		100 GRAM	350	HNDBK 456 (77)		
000016	QUILCHENA CONSULTING LTD.					FOOD MFGR.		
	305 VIADUCT AVE.				46	FAO		
	VICTORIA BC CAN V8X3X1	FORTRAN 4	YES	YES		HNDBK 8-3		NO
	604 479-6596							NO
	WEI WU	TIMESHARE	SALE-NO	HH UNITS		FOOD MFGR.	AS NEEDED	FOOD GROUP CODES
	SYSTEMS DIETITIAN	ON-LINE		100 GRAM	6000	OHIO STATE		FLAG ALLERGIES
000017	ST. LUKES HOSPITAL					USDA 8-1, 8-2,	ID SOURCE-ITEM	
	P.O. BOX 20269				63	8-3...	ID SOURCE-NUTR.	
	HOUSTON, TX 77025			NO		ST. LUKE RECI-		YES
	713 791-2009					PES		YES-NA AND K ONLY
	SARAH H. SHORT	IN-HOUSE	SALE/RENT-NO	HH UNITS		HNDBK 456 (77)	SIX MONTHS	
	PROFESSOR	ON-LINE		100 GRAMS	2500	PERIODIC LT.		
000018	SYRACUSE UNIVERSITY					FOOD MFGR.	ID SOURCE-ITEM	
	200 SLOCUM MALL				28		ID SOURCE-NUTR.	
	SYRACUSE, N.Y. 13066	APL	MAYBE	YES				NO
	315 423-2396							NO

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			.NUTRIENT DATA BANK DESCRIPTION.					
NUMBER	NAME TITLE ORGANIZATION ADDRESS-STREET ADDRESS-CITY, STATE PHONE NUMBER	IN-HOUSE TIMESHARE ON-LINE LANGUAGE LANGUAGE	SALE-PRICE RENT-PRICE ANALYSIS	HH UNITS 100 GRAMS OTHER CONVERT	(NO. OF) ITEMS NUTRS	HNDBK 8 (63) HNDBK 8 (72) HNDBK 456 (77) PERIODIC LIT. FOOD MFGR. LAB ANALYSIS	FREQUENCY ID SOURCE-ITEM ID SOURCE-NUTR. ID ACCURACY-NUTR. FLAG QUEST NUTR.	FOOD GROUP CODES FLAG ALLERGIES FOOD-DRUG INTRACT NUTR-NUTR INTRACT LAB ASSAY NUTRIENTS
000019	DR. GEORGE R. YOUNG PROFESSOR UMKE SCHOOL OF DENTISTRY 650 E. 25TH STREET KANSAS CITY, MO 64108 816 221-3500	IN-HOUSE FORTRAN 4 ASSEMBLER	FREE YES	HH UNITS NO	915 15	HNDBK 8 (72) FOOD MFGR.	YEARLY	FOOD GROUP CODES NO NO
000020	STEPHEN J FREELAND, PHD ANALYTICAL CHEMIST UNIVERISITY OF COLORADO 4200 E. NINTH AVE. C233 DENVER, CO 80206 303 394-7037	IN-HOUSE FORTRAN	SALE-TO-BE DETERMINED YES	HH UNITS 100 GRAM OTHER YES	1000 93	HNDBK 456 (77) PERIODIC LIT. FOOD MFGR. LAB ANALYSIS	AS NEEDED ID SOURCE-ITEM ID SOURCE-NUTR.	 YES ZINC + TRACE ELMT
000021	LORETTA W HOOVER, PHD ASSOCIATE PROFESSOR UNIV OF MO-COLUMBIA W128 MEDICAL CENTER COLUMBIA, MO 65212 314 882-6158	IN-HOUSE PL/1	SALE/RENT-NO NO	HH UNITS NO	3196 21	HNDBK 8 (72) PERIODIC LIT. FOOD MFGR OTHER	NO	 NO NO
000022	DR TOM CHILTON ASSOCIATE PROFESSOR UNIV OF SOUTH ALABAMA DEPT. HPE, ROOM 1002 MOBILE, AL 36688 205 460-7131	IN-HOUSE TIMESHARE ON-LINE FORTRAN PASEUL	RENT-YES YES	100 GRAM NO	2655 21	HNDBK 8 (63)	(NO) ID SOURCE-ITEM	 NO NO
000023	JOAN M KARKECK ASSISTANT PROFESSOR DL-10 U OF WASHINGTON SCHOOL OF NUTR. SCIENCE SEATTLE, WA 98195 206 543-1730	IN-HOUSE TIMESHARE ON-LINE PILOT SAIL	RENT-VARIED YES	HH UNITS 100 GRAM OTHER YES	5800 90	HNDBK 8 (63) HNDBK 8 (72) PERIODIC LIT. FOOD MFGR. ALASKAN FOODS- P.H. LABS	(YES) ID SOURCE-ITEM ID SOURCE-NUTR. FLAG QUEST NUTR	FOOD GROUP CODES NO NO
000024	JOEL WORRA APPLICATIONS PROGRAMMER UNIV. OF WIS.-LACROSSE COMPUTER CENTER LACROSSE, WI 54601 608 785-8030	IN-HOUSE TIMESHARE ON-LINE BASIC	SALE-$250 RENT-NEGTBL YES	100 GRAM YES	3100 45	HNDBK 456 (77) FOOD MFGR WAISMAN CENTER DATA BASE	(NO) FLAG QUEST NUTR	 NO NO

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			. . . . NUTRIENT DATA BANK DESCRIPTION					
NUMBER	NAME TITLE ORGANIZATION ADDRESS-STREET ADDRESS-CITY, STATE PHONE NUMBER	IN-HOUSE TIMESHARE ON-LINE LANGUAGE LANGUAGE	SALE-PRICE RENT-PRICE ANALYSIS	HH UNITS 100 GRAMS OTHER CONVERT	(NO. OF) ITEMS NUTRS	HNDBK 8 (63) HNDBK 8 (72) HNDBK 456 (77) PERIODIC LIT. FOOD MFGR. LAB ANALYSIS	FREQUENCY ID SOURCE-ITEM ID SOURCE-NUTR. ID ACCURACY-NUTR. FLAG QUEST NUTR.	FOOD GROUP CODES FLAG ALLERGIES FOOD-DRUG INTRACT NUTR-NUTR INTRACT LAB ASSAY NUTRIENTS
000025	BRUCY GRAY STATISTICIAN CONSUMER-FOOD ECON INST 6505 BELCREST ROAD HYATTSVILLE, MD 20782 301 436-8507	DATA SET - 456-3 FOR SALE THRU PRIVATE VENDOR	NO	100 GRAM NO	3147 21	PERIODIC LIT. FOOD MFGR. LAB ANALYSIS		NO NO
000026	BRUCY GRAY (SAME AS ABOVE)	DATA SET - 456 FOR SALE THRU PRIVATE VENDOR	NO	HH UNITS NO	6943 21	PERIODIC LIT. FOOD MFGR. LAB ANALYSIS	(NO)	NO NO
000027	BRUCY GRAY (SAME AS ABOVE)	DATA SET - 72-1 FOR SALE THRU PRIVATE VENDOR	NO	HH UNITS NO	6493 21	HNDBK 456 (77) FOOD MFGR LAB ANALYSIS	(NO)	NO NO
000028	BRUCY GRAY (SAME AS ABOVE)	USDA NUTRIENT DATA BASE FOR INDIVIDUAL INTAKE SURVEYS FOR SALE THRU PRIVATE VENDOR	NO	100 GRAM NO	4500+ 15	PERIODIC LIT. FOOD MFGR. LAB ANALYSIS	(NO)	NO NO

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			SALE/RENT PRICE	QUANTITY BASIS	SUMMARY	NUTRIENT SOURCES	UPDATE FREQUENCY FLAGS	MISCELLANEOUS
NUMBER	NAME TITLE ORGANIZATION ADDRESS-STREET ADDRESS-CITY, STATE PHONE NUMBER	IN-HOUSE TIMESHARE ON-LINE LANGUAGE LANGUAGE	SALE-PRICE RENT-PRICE ANALYSIS	HH UNITS 100 GRAMS OTHER CONVERT	(NO. OF) ITEMS NUTRS	HNDBK 8 (63) HNDBK 8 (72) HNDBK 456 (77) PERIODIC LIT. FOOD MFGR. LAB ANALYSIS	FREQUENCY ID SOURCE-ITEM ID SOURCE-NUTR. ID ACCURACY-NUTR. FLAG QUEST NUTR.	FOOD GROUP CODES FLAG ALLERGIES FOOD-DRUG INTRACT NUTR-NUTR INTRACT LAB ASSAY NUTRIENTS
	DR RUTH E. CAROL PRESIDENT AND DIRECTOR COMP NUT+STAT. SERVICE 15 LINDEN STREET GREAT NECK, NY 11021 516 466-8162	IN-HOUSE TIMESHARE ON-LINE FORTRAN 4 BINARY	SALE-VARIES RENT-VARIES YES	HH UNITS 100 GRAM OTHER YES	VARIES ACC. TO CUSTOM- IZED SPECS.	HNDBK 8 (72) HNDBK 456 (77) PERIODIC LIT. FOOD MFGR.	AS NECESSARY ID SOURCE-ITEM ID SOURCE-NUTR. ACCURACY-NUTR.	FOOD GROUP CODES FOOD-DRUG INTRACT NUTR- NUTR INRACT NO NO
	DONNA HAY ACCOUNT MANAGER MRKT SCIENCE ASSOCIATES 1011 E. TOUHY AVENUE CHICAGO, IL 60018 312 298-5093	IN-HOUSE TIMESHARE ON-LINE FORTRAN	RENT-VARIES YES	CUSTOMIZE PROCESSING AND ANALYSIS SERVICES AVAILABLE ON ALL DATA BASES				
	DON HENDERSON PRINCIPAL STAFF ORI, INC. 7910 WOODMONT RM 1405 BETHESDA, MD 20014 301 656-3276	IN-HOUSE TIMESHARE COBOL, SAS FORTRAN	YES	WILL CONSTRUCT DATA BASES. STATISTICAL ANALYSIS OF NUTRIENT DATA. DIET GENERATION AND DIET HISTORY PROGRAMMING				

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PART NO. 2
NUTRIENTS STORED ON EACH DATA BANK

GENERAL

I.D. NUMBER (REFER TO PART NO. 1)	WATER	CALORIES	ASH	REFUSE	CAFFEINE	OTHER
000001		X				
000002		X				
000003	X	X	X		X	
000004	X	X	X		X	
000005		X				
000006		X				
000007		X				
000008	X	X				
000009	X	X	X	X	X	X
000010	X	X	X			
000011	X	X				
000012		X				
000013	X	X	X			
000014	X	X	X	X	X	
000015	X	X	X		X	
000016		X				
000017	X	X	X		X	

CARBOHYDRATE COMPONENTS

I.D. NUMBER	TOTAL	CRUDE FIBER	DIET. FIBER	ALCOHOL	TOTAL SUGAR	STARCH	PECTIC SUB.	SORBIIOL	ORGAN. ACID	REDUC SUGAR	SUCROSE	NAI. SUCROS	ADD. SUCROS	GLUCOSE	FRUCTOSE	LACTOSE	MALTOSE	DEXTRINS	HEMICELLUL.	PENTOSANS	OTHER
000001	X	X		X																	
000002	X																				
000003	X	X		X						X	X			X	X	X	X				X
000004	X	X	X	X						X	X			X	X	X	X				X
000005	X	X									X										
000006	X	X																			
000007	X	X																			
000008	X																				
000009	X	X		X	X	X	X			X	X	X	X	X	X	X	X				
000010	X	X	X	X	X						X										
000011																					
000012	X																				
000013	X	X																			
000014	X	X	X	X							X										
000015	X	X		X						X	X			X	X	X	X				
000016	X		X	X	X																
000017	X	X		X						X	X			X	X	X	X				

PROTEIN COMPONENTS

I.D. NUMBER	TOTAL	ANIMAL	PLANT	MIXED	UNKNOWN	ALANINE	ARGININE	ASPART. ACID	CYSTEINE	CYSTINE	GLUTAM. ACID	GLYCINE	HISTIDINE	HYDROXYPROL	ISOLEUCINE	LEUCINE	LYSINE	METHIONINE	PHENYLALANIN	PROLINE	SERINE	THREONINE	TRYPTOPHAN	TYROSINE	VALINE	OTHER AMINO	NITROGEN	NITRATES	NITRITES	AMMONIA	GLUTEN	NIACIN EQUV	OTHER
000001	X																																
000002	X																																
000003	X	X	X						X	X			X		X	X	X	X	X			X	X	X	X						X		
000004	X	X	X						X	X			X		X	X	X	X	X			X	X	X	X								
000005	X									X					X	X	X	X	X			X	X	X	X								
000006	X																																
000007	X																																
000008	X																																
000009	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X							X	
000010	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
000011	X																																
000012	X																															X	
000013															X	X	X	X	X			X	X	X	X								
000014	X																																
000015	X								X	X			X		X	X	X	X	X			X	X	X	X								
000016	X									X			X		X	X	X	X	X			X	X		X								
000017	X								X	X			X		X	X	X	X	X			X	X	X	X								

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PART NO. 2
NUTRIENTS STORED ON EACH DATA BANK

FAT COMPONENTS

NUMBER I.D. NUMBER (REFER TO PART NO. 1) I.D. NUMBER	TOTAL FAT	SFA	USFA	POLYUNS. FA	ANIMAL	FISH	PLANT	HYDROGENATE	CHOLESTEROL	ARACHIDIC	ARACHIDONIC	BUTYRIC	CAPRIC	CAPROIC	CAPRYLIC	DECOSAHEXAN	LAURIC	LINOLEIC	LINOLENIC	MYRISTIC	OLEIC	PALMITIC	STEARIC	OTHER SFA	TRANS FA	GLYCERIDES	PHOSPHOLIPIDS	GLYCOLIPIDS	OTHER FAT
000001	X																												
000002	X									X																			
000003	X	X		X	X			X		X									X			X							
000004	X	X	X		X			X		X									X			X							
000005	X	X		X						X									X			X							
000006	X	X	X																										
000007	X	X								X									X			X							
000008	X	X	X							X																			
000009	X	X	X	X	X	X		X		X		X							X	X	X	X	X	X	X				
000010	X	X	X	X	X	X		X		X		X				X	X	X	X	X	X	X	X	X					
000011	X	X								X										X		X							
000012	X	X		X						X																			
000013		X		X						X																			
000014	X									X																			
000015	X	X	X							X										X		X							
000016	X		X							X																			
000017	X	X		X						X									X			X							

VITAMINS

I.D. NUMBER	A	PREFORMED A	A PRECURSOR	ALPHA-CAROT	BETA-CAROTE	GAMMA-CAROT	THIAMINE	RIBOFLAVIN	NIACIN	C	REDUCED C	DEHYDRO C	B6	PYRIDOXAL	PYRIDOXINE	PYRIDOXAMIN	PANTO. ACID	B12	D	TOTAL TOCOP	ALPHA TOCOP	OTHER TOCOP	E	FOLATE	BIOTIN	CHOLINE	K	INOSITOL	OTHER
000001	X						X	X	X	X			X				X	X						X					
000002	X						X	X	X	X																			
000003	X	X			X		X	X	X	X			X				X	X	X	X	X	X		X	X	X			
000004	X	X			X		X	X	X	X			X				X	X	X	X	X	X		X	X	X			
000005	X						X	X	X	X			X				X	X	X				X	X	X	X	X	X	
000006	X						X	X	X	X			X				X	X	X	X				X	X	X			
000007	X						X	X	X	X																			
000008	X						X	X	X	X																			
000009	X				X		X	X	X	X			X				X	X	X		X			X	X				
000010	X			X	X	X	X	X	X	X			X		X		X		X	X	X								
000011	X						X	X	X	X																			
000012	X						X	X	X	X			X				X	X						X					
000013	X						X	X	X	X			X				X	X	X				X		X				
000014	X						X	X	X	X			X				X	X					X						
000015	X						X	X	X	X				X			X	X	X	X	X	X			X	X			
000016	X						X	X	X	X			X				X	X	X				X	X	X		X		
000017		X					X	X	X	X			X				X	X	X	X	X	X		X	X	X			

NUTRIENT DATA BANKS FOR SALE OR RENT
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PART NO. 2
NUTRIENTS STORED ON EACH DATA BANK

NUMBER	MINERALS																		DATA BANK SUMMARY							
																				...NUMBER OF NUTRIENT COMPONENTS...						
I.D. NUMBER (REFER TO PART NO. 1)	CALCIUM	PHOSPHORUS	IRON	SODIUM	POTASSIUM	MAGNESIUM	ZINC	COPPER	CHLORINE	IODINE	CHROMIUM	COBALT	MANGANESE	MOLYBDENUM	SELENIUM	SULFUR	FLUORINE	OTHER	NUMBER OF FOOD ITEMS	TOTAL	GENERAL	CARBS.	PROTEIN	FAT	VITAMINS	MINERALS
000001	X	X	X	X															250	18	1	3	1	1	9	4
000002	X	X	X	X	X														1331	14	1	1	1	2	5	5
000003	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			2400	71	4	11	16	8	17	16
000004	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			2000	71	4	12	15	8	17	16
000005	X	X	X	X	X	X	X	X		X	X		X		X			X	297	49	1	3	11	6	15	13
000006	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X		1200	28	1	2	1	3	13	15
000007	X	X	X	X	X														3750	19	1	2	1	5	5	5
000008	X	X	X	X	X														2500	20	2	1	1	4	5	5
000009	X	X	X	X	X	X	X	X		X	X	X	X	X	X		X		3500	112	6	14	24	16	13	15
000010	X	X	X	X	X	X	X	X		X									1400	120	3	6	24	18	14	9
000011	X		X	X	X														2800	16	2	0	1	5	5	4
000012	X	X	X	X		X	X												VARIES	12-20	1	1	2	4	9	6
000013	X	X	X	X	X	X	X	X		X			X						2500	33	3	2	9	3	11	10
000014	X	X	X	X	X	X	X										X		200	30	5	5	1	2	9	8
000015	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			6100	63	4	9	13	6	14	16
000016	X	X	X	X	X	X	X	X		X	X		X	X	X		X		350	46	1	4	11	3	13	14
000017	X	X	X	X	X	X	X	X	X	·	X	X	X	X	X	X			6000	63	4	9	13	6	15	16

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PART NO. 2
NUTRIENTS STORED ON EACH DATA BANK

NUMBER	GENERAL						CARBOHYDRATE COMPONENTS																				
I.D. NUMBER (REFER TO PART NO.1)	WATER	CALORIES	ASH	REFUSE	CAFFEINE	OTHER	TOTAL	CRUDE FIBER	DIET. FIBER	ALCOHOL	TOTAL SUGAR	STARCH	PECTIC SUB.	SORBITOL	ORGAN. ACID	REDUC SUGAR	SUCROSE	NAT. SUCROS	ADD. SUCROS	GLUCOSE	FRUCTOSE	LACTOSE	MALTOSE	DEXTRINS	HEMICELLUL.	PENTOSANS	OTHER
000018		X	X					X																			
000019		X					X			X																	
000020	X	X					X		X								X			X	X	X	X				
000021	X	X	X				X	X																			
000022	X	X	X				X	X																			
000023	X	X	X				X	X	X	X	X						X			X	X	X	X				
000024		X					X	X		X																	
000025	X	X	X				X	X																			
000026	X	X	X				X	X																			
000027	X	X					X																				
000028		X					X																				

I.D. NUMBER	PROTEIN COMPONENTS																															
	TOTAL	ANIMAL	PLANT	MIXED	UNKNOWN	ALANINE	ARGININE	ASPART. ACID	CYSTEINE	CYSTINE	GLUTAM. ACID	GLYCINE	HISTIDINE	HYDROXYPROL	ISOLEUCINE	LEUCINE	LYSINE	METHIONINE	PHENYLALANIN	PROLINE	SERINE	THREONINE	TRYPTOPHAN	TYROSINE	VALINE	OTHER AMINO	NITROGEN	NITRATES	NITRITES	AMMONIA	GLUTEN	NIACIN EQUIV	OTHER
000018	X																														X	
000019	X																															
000020	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X					X	
000021	X																															
000022	X																															
000023	X					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
000024	X									X			X		X	X	X	X	X			X	X	X	X							
000025	X																															
000026	X																															
000027	X																															
000028	X																															

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PART NO. 2
NUTRIENTS STORED ON EACH DATA BANK

FAT COMPONENTS

NUMBER I.D. NUMBER (REFER TO PART NO. 1) I.D. NUMBER	TOTAL FAT	SFA	USFA	POLYUNS. FA	ANIMAL	FISH	PLANT	HYDROGENATE	CHOLESTEROL	ARACHIDIC	ARACHIDONIC	BUTYRIC	CAPRIC	CAPROIC	CAPRYLIC	DECOSAHEXAN	LAURIC	LINOLEIC	LINOLENIC	MYRISTIC	OLEIC	PALMITIC	STEARIC	OTHER SFA	TRANS FA	GLYCERIDES	PHOSPHOLIPIDS	GLYCOLIPIDS	OTHER FAT
000018	X	X		X					X												X								
000019	X			X																									
000020	X	X		X					X		X		X		X		X	X	X	X	X	X	X						
000021	X	X	X	X					X																				
000022	X	X	X						X									X			X								
000023	X	X	X	X					X	X	X	X	X	X	X			X	X	X	X	X	X						
000024	X	X							X									X			X								
000025	X	X							X									X			X								
000026	X	X							X									X			X								
000027	X	X																X			X								
000028	X																												

VITAMINS

I.D. NUMBER	A	PREFORMED A	A PRECURSOR	ALPHA-CAROT	BETA-CAROTE	GAMMA-CAROT	THIAMINE	RIBOFLAVIN	NIACIN	C	REDUCED C	DEHYDRO C	B6	PYRIDOXAL	PYRIDOXINE	PYRIDOXAMIN	PANTO. ACID	B12	D	TOTAL TOCOP	ALPHA TOCOP	OTHER TOCOP	E	FOLATE	BIOTIN	CHOLINE	K	INOSITOL	OTHER
000018	X						X	X	X	X			X					X	X	X				X					
000019	X						X	X	X	X																			
000020	X						X	X	X	X			X				X	X	X				X	X					
000021	X						X	X	X	X																			
000022	X						X	X	X	X																			
000023	X						X	X	X	X			X				X	X	X		X			X	X	X	X	X	
000024	X						X	X	X	X			X				X	X	X				X				X		X
000025	X						X	X	X	X																			
000026	X						X	X	X	X																			
000027	X						X	X	X	X																			
000028	X						X	X	X	X			X					X											

NUTRIENT DATA BANKS FOR SALE OR RENT
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PART NO. 2
NUTRIENTS STORED ON EACH DATA BANK

NUMBER: I.D. NUMBER (REFER TO PART NO. 1)	MINERALS: CALCIUM	PHOSPHORUS	IRON	SODIUM	POTASSIUM	MAGNESIUM	ZINC	COPPER	CHLORINE	IODINE	CHROMIUM	COBALT	MANGANESE	MOLYBDENUM	SELENIUM	SULFUR	FLUORINE	OTHER	DATA BANK SUMMARY: NUMBER OF FOOD ITEMS	NUMBER OF NUTRIENT COMPONENTS: TOTAL	GENERAL	CARBS.	PROTEIN	FAT	VITAMINS	MINERALS
000018	X	X	X	X	X	X	X			X									2500	28	2	1	2	5	10	8
000019	X	X	X	X	X	X													915	15	1	2	1	2	5	6
000020	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		1000	93	2	7	25	14	11	16
000021	X	X	X	X	X														3196	21	3	2	1	5	5	5
000022	X	X	X	X	X														2655	21	3	2	1	6	5	5
000023	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		5800	90	3	10	21	17	15	16
000024	X	X	X	X	X	X	X	X		X	X		X					X	3100	45	1	3	12	5	12	12
000025	X	X	X	X	X														3147	21	3	2	1	5	5	5
000026	X	X	X	X	X														6943	21	3	2	1	5	5	5
000027	X	X	X		X														730	18	2	1	1	4	5	4
000028	X	X	X			X													4500	15	1	1	1	1	7	4

DATA BANKS AND THEIR APPLICATIONS
Robin S. Willard

The computer is a relatively new tool in the field of dietetics, but it has already made a substantial impact. Dietitians are typically computer novists who now must make intelligent decisions regarding possible automation for their operation. Therefore, the dietitian must seek the skills or counsel of a computer specialist. This combined expertise in dietetics and data processing will secure full utilization of the strengths of a computer, speed and memory, for execution of the necessary "clerical" tasks, while relieving the professional in dietetics to pursue a higher level of administrative planning and performance.

Each of you must analyze your own situation to determine if automation is the path to travel or whether streamlining your present manual method of operation would prove sufficient. Obviously each of you are here, however, because you are seriously considering automation -specifically automated nutrient analysis of individuals' foods, food records, menus and recipes.

A systems analysis should answer the following questions:

- -what kind of information?
- -what are the capabilities of the primary user of the system? the sophistication of the user must match that of the system.
- -what will the full cost be, including installation, training and redesigning of work space?
- -will there be interfacing with other departments (nursing and pharmacy)?
- -will there be necessary restaffing or reorganization? Who will use it, who will manage it, how will security of the system be insured?
- -will there be sufficient data processing support for developing or buying a system?
- -is the system really needed in the first place? - the least asked question.

As you consider the acquisition of a compiled source of nutrient data, or data base, plus the software for manipulating the data, referred to as application programs, you should weigh four options:

1) develop both the data base and application programs
2) purchase both the data base and application programs
3) purchase the data base and develop the application programs
4) although less common, purchase the application programs and develop the data base

Common features of a nutrient data base include:

- -nutrient composition of foods (brand name, USDAO)
- -food group classification
- -common allergy classifications (gluten, lactose)
- -common portion unit assignment (volume unit with associated gram weight)
- -source of data documentation

Common features of application programs include:

- -calculation of total or averages of nutrients from the food records entered
- -comparison of totals to the NRC-RDA
- -calculation of the percentage of carbohydrate, protein, fat and alcohol contributing to the total calories
- -formats of input and output forms will vary greatly

There are responsibilities that are assumed when acquiring a nutrient data base system. The coordinator of a nutrient data base is primarily responsible for maintaining the integrity of the data base. The user of the nutrient data base is ultimately responsible for the end results of manipulating the data and the priorities established in utilizing these results.

Only you can decide whether you should develop your own system or purchase one of the many systems - or components of a system available. There are definitely situations when developing a tailor-made system is in order, but such added convenience should be weighed against the extra time and cost. Finally, remember to 1)know your business well so as to plan and weigh options 2)do not hold false hopes - there will be missing values for some nutrients 3)sustain the system once you have acquired it and 4)embrace the future because your patience in planning for the system will be rewarded!

DIETARY STANDARDS -- USES AND LIMITATIONS

A. E. Harper

The Recommended Dietary Allowances, defined as the levels of intake of essential nutrients considered in the judgment of the Food and Nutrition Board, on the basis of available scientific knowledge, to be adequate to meet the needs of practically all healthy persons, are the generally accepted dietary standards in the United States.

The original purpose of the RDA was to serve as standards for planning and procuring food supplies for population groups. The RDA were, therefore, set high enough to cover the nutritional needs of individuals with the highest requirements. The general approach in establishing the RDA, although it cannot be used for all nutrients because the amount of information available about requirements for some is limited, is: one, to select the best estimate of the average requirement; two, to increase the average by twice the coefficient of variation to take into account individual variability; and then, three, allow additionally for low biological availability or inefficiency of utilization of the nutrient in the food supply. RDA are established for different age-sex groups to take into consideration the changes in requirements during periods of growth. The standards established in this way should achieve the original purpose of the RDA, i.e. anyone who consumes a diet that provides nutrients in amounts equivalent to the RDA is unlikely to suffer a nutritional deficit.

The other major use of the RDA is as standards for evaluating, from knowledge of food consumption and food composition, the adequacy of nutrient intake of either population groups or individuals. RDA were not designed specifically for this purpose and a question arises immediately as to whether they are the most appropriate standards for it. The main problem is that neither the RDA nor, for that matter, any other dietary standards, provide a guideline for establishing the point at which nutrient intakes become inadequate. Nutrient requirements of individuals vary, to the best of our present knowledge, over about a two-fold range, and there is no way of distinguishing a person whose requirements may be 50% below the average from one whose requirements may be 50% above the average. The problem is thus a statistical one. It is not possible to establish a standard that applies to individuals. The problem will, therefore, require a statistical solution. Before that can be achieved, however, there is another confounding factor that must be dealt with.

The above discussion about RDA is based on the assumption that all of the individual allowances have been established with equal consistency and reliability and that the proportion of people whose requirement is, say, 25% below the average requirement will be roughly the same for each nutrient. This is not so. For ascorbic acid, for example, if the procedure outlined above for establishing the RDA applies, one would assume that the average requirement is 40 mg/day for adults with a range of requirements from 20 to 60 mg/day, and that most people would develop deficiency signs if intake fell below 20 mg/day. In actual fact, we know that few, if any, adults would be at risk if they consumed 20 mg of ascorbic acid daily. On the other hand, with the RDA for thiamin set at 0.5 mg/1000 kcal/day the anticipated range of requirements would be from 0.17 to 0.5

mg/1000 kcal/day. Evidence from both epidemiologic and experimental studies indicates that subjects with intakes at the lower end of this range develop signs of thiamin inadequacy and that, among groups with diets providing only this amount, beri-beri will develop. Thus, for a solution to the problem of establishing a standard for evaluating the adequacy of nutrient intakes, an important first step is to develop a more consistent standard than the RDA.

Lörstad (FAO Nutr. Newsletter 9: 18, 1971) and Beaton (Proc. West. Hemis. Nutr. Congr. III, PP. 356-363, 1972) have pointed out that if the average requirement for a nutrient and the range of requirements for a population have been established with reasonable accuracy, and the average intake and range of intakes are known, it then becomes possible to calculate, for a particular level of intake of that nutrient, the percent of people expected to be at risk of deficiency. This still does not permit identification of those at risk but it does permit quantification of the degree of risk within a population. Ideally, effects of interactions among nutrients and of other factors that influence efficiency of utilization on nutrient needs should also be taken into account in such quantification.

If one reviews the dietary standards of the various countries and international agencies, it is evident that there are discrepancies among them. The standards used for assessing the adequacy of intake of nutrients in food consumption surveys differ from one another and from the various national standards. With increasing emphasis on the importance of dietary surveys as a means of monitoring the nutritional adequacy of the food supply, it would seem important to work toward development of more consistent dietary standards and toward development of techniques, such a those proposed by Lörstad and Beaton, for quantification of risk of nutritional inadequacy.

COMMONALITIES OF EATING PATTERNS IN HANES AND NFCS DATA

Jack Smith & Ken Warwick

Due to recent advances in computer hardware and programming expertise, it is now possible to examine the large amount of nutritional data collected by the HANES I and National Food Consumption Surveys. The purpose of this study is to determine what relationships exist between the food and eating patterns of individuals from both surveys, the presence or absence of nutritional abnormalities and their nutritional adequacy.

The first step in developing the commonality of eating patterns in the HANES and NFCS data involved the selection of a sub-sample from the total HANES I population. Individuals between the ages of ten and forty-four were assigned to one of two groups, depending on whether they did or did not meet certain health criteria. Obesity, abnormal values on certain nutritional biochemical indices and the presence of selected clinical symptoms resulted in assignment to that group not meeting the health criteria. All others were classified as having met the criteria. The eating patterns of these two groups will be compared.

In order to facilitate comparisons between HANES I and NFCS, individual foods from HANES I were aggregated into groups. The individual food items from NFCS will be grouped in a similar manner.

The dietary intake of those HANES I individuals not meeting the health criteria and those who do meet the criteria will be examined for frequency of mention, total calories, total grams and nutrient density. From these data, the eating patterns of the two groups will be ascertained. It is hypothesized that the two eating patterns will be different and a multiple regression analysis will be done to examine those factors which best discriminate between the two groups and to generate a predictive equation. The transition to NFCS data will be accomplished by applying the equation to divide the sample into two groups comparable to those in HANES I according to the eating patterns developed from the HANES I intake data.

A STATUS REPORT ON METHODS FOR NUTRIENT ANALYSIS IN 1981

Kent K. Stewart

The quality of the data in any nutrient data bank can be no better than the quality of the methods used to obtain the nutrient data. Contrary to popular opinion, we do not know everything there is to know about the nutrient analysis of foods. Recent work in the Nutrient Composition Laboratory has resulted in the classification of the methods for the analyses of foods. This classification is shown in Table 1. We believe that if a qualified analyst used the methods classified as sufficient, substantial, or tentatively acceptable with the appropriate quality control, then the nutrient composition data, thus obtained, will be acceptable. Unfortunately, the same cannot be said for the determination of the other nutrient in foods. Application of the new techniques of analytical chemistry should permit the development of adequate methodologies for all the nutrients.

State of Development of Methodology for the Analysis of Nutrients in Foods as of 1981

Sufficient	Substantial	Tentatively Acceptable	Conflicting	Fragmentary	Little to None
Calcium	Amino Acids (Most)	Amino Acids (Some)	Arsenic	Biotin	Cobalt
Copper	Cholesterol	Chromium*	Calories	Choline	Silicon
Magnesium	Fatty Acids	Fat (Total)	Fiber	Heme-Iron	Tin
Nitrogen (Total)	Individual Sugars	Manganese	Fluorine	Molybdenum	Vanadium
Phosphorus	Iron (Total)	Trans-Fatty Acids	Folacin	Non Heme-Iron	
Potassium	Niacin		Iodine	Vitamin K	
Sodium	Riboflavin		Pantothenic Acid		
Zinc	Selenium		Protein (Total)		
	Thiamin		Starch		
	Vitamin C		Sterols (Others)		
			Vitamins		
			A		
			B_6*		
			B_{12}*		
			D		
			E*		

* New methods look very promising

MODEL FOR EVALUATION OF A NUTRIENT DATA BASE

Loretta W. Hoover, Ph.D.

Food composition tables have been utilized since the 1890's to estimate the dietary intake of individuals. Initially, data were limited to a few nutritional components in a few foods. As analyses of more nutrients in more foods have been performed, extensive tables of food composition have been compiled. During the past two decades, computer technology has been used to access computer-stored nutrient data bases to estimate the nutritional content of food intake. However, the nutritional values computed by different computerized systems for the same dietary record may vary substantially. Thus, the need to improve the comparability of analyses from various systems has been recognized.

Development of a review model for nutrient analysis systems has been undertaken cooperatively by the University of Missouri-Columbia and the U.S. Department of Agriculture. Several types of errors which might exist in nutrient analysis systems and nutrient data bases were identified. For each type of error, computer processing tasks were developed to diagnose logic and data entry problems. This review model was tested by seven developers of nutrient data base systems.

The review model contains two segments: a questionnaire and five computing tasks accompanied by an interpretation guide. The computing tasks are: 1) update a data base, 2) calculate nutrients for a recipe, 3) report baseline data for 100 gram portions, 4) report nutrients for various portion sizes, and 5) perform dietary record computations. The interpretation guide includes reference data from several USDA data sets. The review model will be published and made available for data base developers wishing to utilize the methodology with their systems.

REPLICATION OF EATING PATTERNS

John L. Stanton

The use of eating patterns as a way of describing the dietary habits of the American population is becoming more ubiquitous. However, to best utilize the concept of eating patterns in the context of large scale dietary surveys like NFCS, a number of critical issues must be addressed by the researchers. The resolution of these issues is significant since different decisions can lead to very different eating patterns being identified.

The three issues, addressed in this paper are the unit of measurement of dietary intake, level of aggregation of food groups and the statistical methods used to cluster individual diets into discrete patterns. Before one tries to resolve the above issues it should be pointed out that the primary source for the answer lies within a well defined statement as to what the researcher means by eating patterns. Many of the decisions one must make with respect to analytic alternatives are influenced by the end objective of the researcher. Therefore although the discussion from this point addresses analytic consideration one should not demean the significance of a well defined initial concept of eating patterns.

With respect to the unit of analysis three variables are most often considered. Food frequency, gram intake and caloric intake. By food frequency one means the binomial response of "ate" or "didn't eat" a food item. If a person had soup once in a day then a 1 would be his/her response for the soup item, or if a person had milk three times during the day the binomial response can be aggregated to a 3. The primary instance for using food frequency is when the researcher is interested in whether foods appear together (covary) in a day (or whatever unit of time) rather than the amount of intake. A difficulty with using frequency is that rather different dietary habits can be recorded as similar. For example if one takes milk and sugar in coffee each day and another puts milk and sugar on cereal each day, the frequency record for those two individuals would be identical even though the cereal consumer would have ingested much more milk and sugar than the other. Using grams or calories overcomes the above problem by indicating how much of each item is ingested as well as whether an item is ingested.

Also using grams or calories other than frequency permits the use of more powerful statistical methods like Pearson product moment correlations which should not be applied to ordinal or nominal data.

The second issue to be addressed is what level of food aggregation to use. It is almost impossible to treat each food item as a separate food for determining eating patterns. Not only is it impractical but it also may give very misleading results through loss of information due to over-disaggregation. By aggregation one means creating a larger defined food group, and aggregating all grams, calories or frequency together for any items consumed with that food group. Therefore if a person ate 100 grams of milk and 50 grams of cheese, a dairy group would have 150 grams, or if frequency was used the value for dairy would be 2. A number of different aggregations have been used and presented in the literature. Most commonly used are the 15 groups in Ten State Nutrition Survey, 18 groups used in the

Health and Nutritional Examination Survey, and the 48 groups for the Nationwide Food Consumption Survey using the first two digits of the food item codes. The actual choice of aggregates does have an impact on final patterns exacted. Smaller food aggregates often yield patterns which look more like meal components, like bread and butter/margarine, or soup and crackers. These are specific but may not give much of a picture of a daily pattern. Larger aggregates give a more descriptive picture of a daily pattern; e.g., meat, vegetables/fruits and desserts but little insight into what was specifically eaten. The decision again rests on the researchers' requirements.

The next issue to address is how will the foods be grouped in patterns, e.g., what statistical models will be used? There are at least two common methods applied to data of this sort. One method would be hierarchial clustering analysis. There are a number of these clustering programs available at most well equipped computer centers. Examples would be H-group in Veldman and PIM through P3m in BMDP. These models in general presume each case or variable is a single group and combine the groups into larger groups based on some amalgamation rule. At each step the two most similar clusters are joined to form a new cluster until a single cluster is obtained that includes all cases. However a shortcoming is the large time and space requirements. Therefore the size of the problem is often limited when using large government studies. For example, an estimate would be if you used 20 food groups in the analysis, space limitations in most computer systems prevent the handling over 370 cases. This is an obvious shortcoming when most studies have thousands of cases. An example where the analysis has been used in food and nutrition is "Determinants of Food Usage Behavior: A Market Segmentation Approach," published by the Marketing Science Institute, where 700 respondents and 10 variables were clustered using this algorithm.

The second method, which is more frequently used, is factor analysis. The factor analytic technique enables one to see whether some underlying pattern of relationships exists such that the data may be "rearranged" or reduced to a smaller set of factors or components. These may be taken as the source variables accounting for the observed interrelations in the data. Specifically related to food and nutrition, the source variables are the patterns of consumption which drive or motivate the choice process in the selection of foods. That is, even through a person may choose a wide variety of items on any day, the commonality of the items can be extracted and identified from the data. Therefore a person who eats milk with cereals and fruit juice each morning may be part of a "breakfast eating pattern." The juices and cereals may vary but if the person eats disproportionately more of these common items than the population, one might extract this breakfast group.

Factor analysis is based on the hypothesis that the observed relationships between variables (food and/or nutrients) are the results of some underlying regularity in the data, (eating pattern) rather than a stochastic choice model.

The advantage of factor analysis is that the basic data unit is the correlation matrix and therefore is not restricted by the number of cases. It does, however, in general, have a restriction on the number of variables.

For reasonably large computer systems you may have a maximum of about one hundred variables. Therefore if one used the 2 digit NFCS food codes (48) it would be no problem on most systems.

A disadvantage with factor analysis is that it is not a unitary concept and it subsumes a fairly large variety of procedures. One can not in this paper discuss all the issues in factor analysis but clearly a working knowledge of the key issues is necessary to choose among the variety of factor procedures.

The above discussion points out three critical issues in the analysis of eating patterns. It is by no means an exhaustive list of issues. The researcher must rely on the basic conceptual framework which drives the analysis to answer these three as well as the other critical issues in eating pattern analysis.

INTERFACE PROBLEMS USING DATA BANKS FOR MODELS OF HUMAN DIETS

Joseph L. Balintfy

Planning human diets in terms of food nutrient data is not a well defined problem unless food preferences and food cost are also considered. Mathematical optimization techniques are available to solve such problems now on computers and this possibility raises the question of interfacing models with data banks. One result of this prospect is the realization that network representation and data base management concepts are necessary for uniformly correct dietary decision support systems. Another requirement is the screening of the set of nutritiously controllable foods for missing data. In general a tightening of procedures for identification, yields, portion size, recipes and computational tasks will be necessary before the large scale utilization of data banks becomes possible in human diet models.

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INTERNATIONAL FOOD INFORMATION SYSTEMS
PART 1: PROCEDURES FOR NAMING FOODS AND RECORDING DATA

Lorin E. Harris

It is proposed to develop An International Food Information System similar to the International Network of Feed Information Centers (INFIC) Feed System. INFIC now has Centers in 16 countries. These centers use the same International Feed Names, input forms and codes. This makes it possible to exchange information through a computer. The proposed food system is described below.

The International Food Information System is divided into two parts; the international name file and the data file. Most systems do not have a clear distinction between the names of the foods and the parameters that describe the data. The system proposed keeps these two items on separate tapes or disks. These are linked together by a 5-digit international food number. In making up reports or feed composition tables, the food group number is put in front of the 5-digit international food number. The food group can be composed of the usual five food groups with the USDA food groups or the FAO food groups as subgroups. The system is flexible, however, and will accommodate several food group systems.

The International Food Name File

The International Food Name File is composed of five facets, elements and descriptors (Table 1). Each of the elements has a tag i.e., 025, 030, etc. This makes it possible to sort the food name descriptors by these tags. The descriptors make up the International Food Names (tags 025 to 327). These descriptors are used as alphabetical codes, therefore, they are flexible and open-ended. By sorting on the element tag and the descriptors, it is possible to make up a list of food names in any order using the five facets (origin, part, process, maturity or grade). Before data are entered into the system, a food name must be in the name file. The system overcomes many difficulties because coding is open-ended and the name can be printed out for reports or food composition tables in many different ways.

The country name in this example is from France. In the system, there are also codes for language and country so the names may be translated to other languages. When names are retrieved from the name file, any name or combination of names could be selected.

Parameters to Describe the Data

Parameters to describe the data include such items as project number, sample number, laboratory number, country, region, state, county, season, brand of food, kind of package, fertilizer, amount of fertilizer applied and so on.

TABLE 1. Facets, Elements, and Descriptors which Portray the International Food Names, and Country Names

Facet No.		Element Tag		Descriptors[a]
International Food Name				
1	Original material (origin)	025	Genus (first)	*PHASEOLUS*
		030	Species (first)	*VULGARIS*
		155	Generic (common) name	BEAN
		185	Breed or kind	KIDNEY
2	Part	215		PODS
3	Process	245		RAW
4	Maturity	275		IMMATURE
5	Grade	325		—
Country Food Name				
		425	Country Food Name	Haricot nain

[a] Facets and descriptors pertain only to the International Food Name (elements 025 to 325).

Analytical and Biological Parameters

The system utilizes an attribute deck as described in Table 2. There are attributes for proximate analysis; minerals; digestion coefficients and many other items. The first column of Table 2 consists of a series of numbers which lines up the data to print out information according to a format similar to that of the recent USDA publications. Column two contains a 3-digit code for attributes. Column three contains codes for animal kind.

For example, man, swine and rats are used in human nutrition. Column four gives the description of the attribute. Column five gives the unit, and column six gives the number of decimal points to carry each attribute.

TABLE 2. List of Attributes and Codes

Printing Sequence No.	Attribute No.	Animal No.	Unit No.	Attribute	Unit	Number Decimal Points for Data
0095	101	000	01	DRY MATTER	%	1
0340	109	000	01	PROTEIN	%	1
0370	109D	490	02	MAN	DIG COEF %	0
0385	109D	700	02	RATS	DIG COEF %	0
0460	111	840	03	SWINE	DIG PROT %	1
2295	530	000	01	CALCIUM	%	2
2375	534	000	01	PHOSPHORUS	%	2
2705	763	000	01	ALANINE	%	2

Conversion Codes

Conversion codes have been developed to convert measures in the English system to the metric system, such as ounces to g/100g. Conversion codes have also been developed to convert the metric system to servings such as cups, teaspoons, and so on.

Input of Information

Two types of forms are used for input. One is a source form which is distributed to laboratories who wish to contribute to a central center such as the 20 countries working with FAO and the World Health Organization on the Food Contaminant Project. Laboratories fill out the source form without codes. It is then sent to a central center where it is coded and processed.

The second input forms are called input formats which will handle 40 samples per form. The formats are used for filling in informtion as well as for coding. This input form is used at a central center to take unpublished information from laboratories or from the literature.

The third type of input does not use a format. The International Food Number may be inserted, usually on the left hand side of a published table

Insert after Part I

International Food Information Systems

Ann Sorenson

Part 2: Procedures for Coding and Processing Data

The unique features of the proposed International Food Information System allows the retrieval and organization of food composition data on many different levels of complexity, depending on the specific needs of the user. In addition to the specificity of data one may obtain, the alpha numeric organization of foodstuffs by a standardized name which is linked to descriptive parameters makes any data base generated by this system introconvertible to any other derived from this system via an appropriate transformation. Thus, the International Food Information System has the versatility to meet individual user needs while retaining the attributes of standardization. This paper describes the protocol for retrieving food composition data using this system.

Selection of Foods and Parameters

The initial step in producing a computerized data base from the master Food Information System is deciding what foods or food categories are to be included. These choices may be specific, such as, baked, top grade Idaho Russet potatoes; or a general classification, such as, potatoes. Once the food choices have been established, attributes or descriptions of these foods are selected, completing the matrix of the data base. The user then enters the components for the required data base using two tapes. The first is the name file tape containing the International Food Names and their International Food Numbers, as described by Dr. Harris in Part I. The specificity of the foods desired is controlled by using the proper number of name facets. The most detailed food would use all the facets whereas the general categories would collapse the data by using only one or two facets, such as "Origin" and "Part". Each food, whether general or complex has its own 5-digit code number. This code number links the first tape file to the second which contains the information or attributes about foods. The attributes are classed as parameters, such as, source of sample, kind of package, brand name, data source, etc. and as food composition data including analytical values for dry matter, macronutrients, vitamins, minerals, trace elements, additives, contaminants and toxins, among others.

Sorting the Data

The data is retrieved from the Food Information System by sorting on the desired parameters of the foods selected for inclusion in the data base to be created. Foods may be sorted on any number or combination of attributes and food composition data which are linked to the food name by the International Food Code Number.

Summarizing the Data

Unless the entire Food Information System is to be used, some sort of summary of individual foods and the data from their individual source forms will be made to yield the desired data set. Summaries are automatically made on all data for food names which contain one or more detailed foods names in the same category. For example, a summary for "rice cereals" would be comprised of an average of all individual rice cereals and their attributes contained in the master food system data base. A user can also decide which attributes will be used and how they will be averaged. For example, the value for the amount of a specific nutrient, such as Vitamin B_6, in a summarized food may be given as the mean values and standard error of single assays of all samples of foods that qualify for the food summary. The mean may represent the mean value of 2 or more samples of the same food or the mean value of a nutrient from different sub foods. The type of summary would depend on the requirements and discretion of the user. Summaries can include all analytical assays and sources of data or specific methods and/or investigations may be chosen. Sources are printed out as one of the attributes, if desired.

Data on food composition can be retrieved as amount per humdred grams or converted to other amounts that are part of the Food Information Software System previously described.

Printout of Data

The data is printed out according to the choices of foods and their parameters described above. Each user receives the information in the format which corresponds to the specifications which were programmed to yield the required data. As seen in Figures 1 and 2, two different users required data on rice in different forms. The first (Figure 1) wanted data on cooked and raw rice as a grain. The first 5 columns represent the 5 facets of the International Food Name, followed by the Food Code for that specific food. The last 7 columns are attributes selected by the user. The attribute columns are determined by the requirements of the data base. In Figure 2, the user wished a summary of the attributes of all rice cereals. The process column is represented by the combined control cards on cereal processing that grouped all the appropriate cereal breakfast foods into the summary. Note that no specific source of data or brand of cereal was designated. Therefore, all sources and brands of rice cereal were included in the composite food required by user 2.

Future Development

The International Food Information System provides a method for users to retrieve and generate food composition data according to their own needs. This process does require time and expertise and only a limited number of data base users would be willing to spend the time to research the foods and attributes best suited to their needs. Furthermore, some universal decisions should appropriately be made by an expert panel which would standardize and set policy for use of the International System. Some obvious situations are: naming of complex foods, methods of updating the data base and ways of dealing with missing or questionable data.

Since many users will have similar requirements which can be served by similar data sets, standard data bases can be constructed and used in the same way standardized software programs have been developed for statistical analysis. Thus, the International Food Data System could be accessed by any user on a level consistent with his objectives and expertise.

and the attribute codes are inserted across the top of the table. Information can then be punched and inserted into the system without putting it on a source form or a card format.

Another type of input is to code printouts from industry or from a laboratory. This information can be inserted into the system without putting it on a source form by following the same procedures as outlined under the third type described above.

Information for the User

The data are stored in the databank on a dry basis and preferred unit (metric system with all the parameter codes). If the user wishes to have information by states, for example, the raw data are sorted by state and then summarized. It would then be given to the user in this form. Of course, the data could also be sorted and summarized by any parameter or combination of parameters and summarized before giving it to the user.

On the other hand, many users of the data do not worry about all the parameters. In this case, the data could be summarized by country and put on-line or a tape of the information could be given to the user. If the data are on-line, the user could access it from a remote terminal. A conversion program may be needed to convert the data to serving portions or it could be put on-line in this form. The data could then be used to calculate diets for hospital patients or to calculate nutrient contents of a recipe.

It is proposed that an International System for making up a databank be implemented. Since the system described is flexible and open-ended, it could be readily adapted to the wishes of an International Group.

Insert Part 2 (see attached)

FOOD SAFETY DATA BASES

D. Jesse Wagstaff

People express ideas about which foods are good or bad for them virtually throughout their lives. National concern in the United States was formalized in 1906 by passage of the sister acts regulating safety of 1) meats and 2) other foods and drugs.

The Food and Drugs Act of 1906 has been amended a number of times and has become the Food, Drug, and Cosmetic Act. The Food and Drug Administration (FDA) implements its provision. Prevention of food contamination by organisms or chemicals capable of causing disease was thought of to benefit public health. Although it is widely believed that our society actually has received some of the expected health benefits, it is difficult to provide strong scientific evidence that food safety regulatory activities in fact have led to improved public health. Acquisition of such evidence required 3 types of information: 1) the count and characterization of the population, 2) exposure, which in this case is food analyses and food intake, and 3) health outcomes.

If substances in food affect health, then disease rates in population groups in the U.S. should be related to food intake. In a classic application of such methods, Dr. John Snow helped control a 19th century cholera epidemic in London by comparing the geographic distributions of cholera cases with drinking water source.

The U. S. population is large, is exposed to a large number of potentially harmful agents, and is afflicted by many types of disease. Information is collected from the public for different purposes which have expanded beyond the historic objectives of governing, taxing, and raising armies as exemplified by the Domesday Book. As data collection has expanded and purposes for those data have diversified, so also have file formats become dissimilar. The population, exposure, and health outcome data needed to evaluate human food safety are collected by a variety of agencies for a variety of purposes. Those data are then tabulated in different ways and released in various massive dissimilar published tables and computer file structures. In the U.S. government alone there are an estimated 250,000 data files. No master catalog or inventory listing these files or describing their contents has ever been compiled.

The logistical problems of using large, complex national files have generally restricted evaluations of human food safety data to small or local studies or to use of summarizations of national data. Although automated data processing methods and equipment such as computers were originally developed to process population data, scientific evaluators, outside of a few organizations, have not had adequate access to automatic data processing. Also computers until recently lacked the speed and storage capacity to support any large number of studies using national files. With few exceptions the problems of massive files, file dissimilarity, and inadequate computer access have prevented optimum use of national files. The earliest year for which machine readable national files are available for all of the three areas of population, food intake, and health outcome is 1965.

The magnitude of the problem of evaluating data on human food safety at the national level dictated that the approach had to be extensive but systematic. To this end the FDA has launched an Epidemiology Information System (EIS) to enable us to acquire, store, analyze, and display the needed information. Such an effort required the cooperation of many individuals, agencies, and organizations.

Emphasis in the first phase of the development of the EIS was on bibliographic indexing. Through an interagency agreement between the FDA and the National Library of Medicine (NLM) an index to the more important reprints, books, and other documents of the Epidemiology Unit is being created by the Toxicology Information Response Center at Oak Ridge National Laboratory. There are two main issues in creating collections of documents and indexing them. The first is the number of documents to collect and the criteria of selecting those documents. The second issue is selection of a nomenclature or coding scheme for indexing the selected documents. Resolutions of these problems were not obvious at the outset but have evolved as our experience has grown. Financial and space limitations dictated that only a moderately small number of documents could be housed and indexed. Criteria for selection of documents to index and include in the collection has been a matter as much of determining things outside our scope as determining things within our scope. Animal toxicity tests generally are outside while human epidemiology is in. Drugs are out but foods and cosmetics are in. Infectious agents are out but environmental chemicals which are food contaminants are in. The subject areas selected include epidemiologic studies and reviews on human safety of foods and cosmetics. Memoranda, letters, and preliminary reports are generally not indexed. Documents are selected for indexing by system users. Meetings are held periodically to review the selection process and to discuss operation of the system.

With the possible exception of chemical compounds we have not been able to find universally accepted standard nomenclatures or codes. We chose to work with the biomedical nomenclature used by the NLM for MEDLINE. It is called Medical Subject Headings (MeSH). Using this controlled vocabulary all documents dealing with a particular subject are indexed under a single keyterm regardless of the different synonyms that may have been used in the document itself. For example, articles regarding vitamin C are indexed under ascorbic acid. System documentation aids the user in determining correct keyterms. Most documents are indexed under several keyterms. The searcher can retrieve references using almost any combination of authors and keyterms connected with Boolean connectors such as "and" and "or." For example, a person could readily find all documents in the system indexed under both ascorbic acid <u>and</u> colonic neoplasms.

Each document selected for indexing in the EIS is microfiched and is assigned a unique identification number which designates its location in the files. Because of extensive crossindexing there is no need to file multiple copies of a document dealing with several subjects. In a manner similar to MEDLINE the user can select references using authors and keyterms. The computer system is RECON, operated by the Department of Energy. Subscriptions to RECON are available to the public.

Another bibliographic index on food safety available from the Bureau of Foods but not in the EIS is the Natural Toxicants Database. This computer-indexed collection of documents was originally limited to mycotoxins but has since been expanded to cover other areas. The index is accessible by subscription to the Parklawn Computer Center, FDA, Rockville, Md.

The need to obtain information on research in progress in epidemiology was recognized by the Epidemiology Work Group of the Interagency Regulatory Liaison Group of which FDA is a member. Through a contract with the Smithsonian Science Information Exchange, an Epidemiology Research Projects Directory has been published and may be purchased from the National Technical Information Service, Springfield, VA. This hard copy of the annual Epidemiology Research Projects Directory supplements the creation by the Epidemiology Work Group of the RPROJ subfile of the NLM's TOXLINE, containing monthly updates of epidemiology and toxicology research. TOXLINE represents a database which has a totally uncontrolled vocabulary. Instead, the computer is directed to match words in the request with character strings in the title and abstract. The user has to be concerned about synonyms and even misspelled words.

The remainder of this presentation will emphasize files of numeric data, particularly those files related to food safety. These files come from different sources. Population data originates in the Bureau of Census, national food intake surveys are conducted by such organizations as the U.S. Department of Agriculture (USDA) and mortality data are compiled by the National Center for Health Statistics. Even a simple comparison of disease-specific death rates for two population groups of differing dietary intakes required bringing together or integrating data from a number of sources. Computer systems called Integrated Database Systems (IDBs) have been developed to enable researchers and reviewers to efficiently and easily perform operations of this type.

Because of the long development time and the high costs required, most agencies including FDA share use of existing IDBs rather than develop their own. At the national level there are four major IDBs in the areas of health and environment. These are SEEDIS, GEOECOLOGY, DIDS and UPGRADE.

SEEDIS, the Socio-Economic Environmental Demographic Information System, developed by Lawrence Berkeley Laboratory, is used for applications in human health, air pollution, employment, unemployment, energy planning, environmental impact analysis, and land use analysis. SEEDIS supports 50 different geographic levels from nations down to minor civil divisions. SEEDIS has the ability to automatically aggregate or disaggregate data from one geographic level to another. Presently, 12,000 different data elements are archived in 31 files.

Geoecology Data Base is an integrated data base of diverse environmental resource information developed by the Oak Ridge National Laboratory. Data on terrain and soils, water resources, forestry, vegetation, agriculture, land use, wildlife, air quality, climate, natural areas, endangered species, and human population are stored in Systeme Internationale units at the county level for the coterminous United States with some data available at the subcounty level in a few cases.

DIDS, the Decision Information Display System, is an interactive color mapping system developed in the Executive Office of the President to display statistical data. DIDS provides very rapid retrieval, display, and manipulation of thematic map images using avant garde but expensive color television types of computer techniques.

UPGRADE is an acronym for the User Prompted Graphics Data Evaluation system developed by the Council on Environmental Quality (CEQ) to enable noncomputer-oriented scientists to analyze environmental data by graphing, statistical analyses, data manipulations, and mapping. UPGRADE was first used for the 1976 Annual Environmental Quality report. Users can key in their own data, or can use data on the system. UPGRADE presently is the only one of the major IDBs which is available nationally and internationally through computer time sharing. Subscriptions at competitive commercial or government rates can be obtained from Sigma Data Corporation, Washington, DC. Any standard printing terminal can provide access for retrieval and analysis but graphic displays require a Tektronix type of terminal or appropriate plotter. Devices to adapt microcomputers to emulate Tektronix have been advertised but to my knowledge have not been tested with UPGRADE.

A high level of cooperation and exchange of information exists among producers and users of these IDBs, as was seen at the First Integrated County Level Data User's Workshop held last fall in Reston, VA. A second workship is being planned for this October, again to be held in the Washington, DC area. People interested in integrating data from different subject areas are invited to attend.

The IDB used by the EIS is UPGRADE. it was originally developed by the CEQ, but has since also been supported by a number of cooperating agencies including the Geologic Survey, Environmental Protection Agency, USDA, National Cancer Institute, and as a cooperative venture of the EIS of FDA. Prior to involvement of FDA, emphasis in UPGRADE was on environmental datasets; population and health datasets were available only in summarized form.

After the log-on, the entire UPGRADE session is conducted in English. The user is asked yes or no questions or presented with menus for selection of tasks to be performed. Detailed explanations can be requested at any time in the session by entering "help." Steps can be repeated by entering "back." "Exit" terminates a session. In the first section of an UPGRADE session called the setup section, the user is prompted for terminal type and line speed. Also the user may select full or abbreviated prompting by selecting verbose or terse mode. In the next section called the data selection section, the user selects data from one or more datasets. One field or a number of fields may be selected from each dataset. The selected fields from the various datasets are integrated into a user dataset which may be used immediately or saved for use in future sessions. UPGRADE does not actually search millions of records at the time of the request; rather it searches indexes to enable it to quickly retrieve data which previously had been selected, pruned, and sorted. In the FDA UPGRADE project, which is one of the functions of the EIS, the goal is to prepare food safety data sets for English language response to about 90% of the most commonly expected types of requests. Preparation for unusual requests which may never be made would not be an efficient use of resources. In the last section, called the graphic and statistical analysis section, the user directs the processing and display of the data selected in the data selection section. The UPGRADE user is presented several choices for display of data either before or after analyses. The user can print statistical results in rows and columns, construct a table of the data, plot data points, connect the points, draw a regression line through the points, or draw a bar graph. With the advent of SASGRAPHICS, it should be possible to use enhancements of all of these display procedures and to have new ones.

Of course it is possible to make nonsensical comparisons or perform illogical or incorrect analyses. Responsibility for quality is in three parts. First, the organization which generated a dataset is responsible for faithful execution of the requests entered at the keyboard to retrieve, analyze, or display data. And third, responsibility for interpretation of results rests with the user. USDA cannot expect to pass responsibility for accuracy of its food survey data on to an IDB or user. Nor should English-language capability in an IDB be expected to make every user an expert statistician. Some users will only use simple descriptive statistical procedures or displays while others more expert in statistics may wish to use the fullest capabilities of available statistical packages.

One of the most interesting display techniques in UPGRADE is mapping. Any data that can be referenced to geographic areas can be mapped. The user selects the data, the intervals into which the range of data are to be divided, the shading and color patterns considering the capabilities of the terminal or plotter, the geographic area, and the heading and labeling. Presently UPGRADE can map by county and by state. In addition some natural bounded areas, such as river drainage areas can be mapped. Maps can be created for point data but it is difficult to relate point data to area data.

In the FDA UPGRADE project detailed health datasets are being added to UPGRADE in the three areas of population, exposure, and health outcomes. Census data or estimates for each year from 1965 to 1976 are being added for each U. S. county by age, race, and sex. Some religious groups such as Mormons and Jews follow unique dietary practices and thus are of value in food safety studies. The Bureau of Census used to collect data on church membership but now that information must be sought from private sources. Several files of food intake and related exposure data have been acquired by UPGRADE including food intake surveys conducted by USDA in 1965 and 1977-78; food intake interview data from the first Health and Nutrition Examination Survey (HANES I) a fish intake survey obtained from the National Marine Fisheries Service; food analyses done by FDA for pesticides, metals, and other contaminants; occupational data in the County Business Patterns files; and the 1974 Census of Agriculture. Detailed health outcome files recently made available to UPGRADE are U. S. detailed mortality in the years from 1965 to 1976, except for 1972 for which a complete file is not available, and medical interviews and physical examination results from HANES I.

Some of the things which have been done during the enhancement of UPGRADE with these new files are as follows. Population census or estimates have been printed for different geographic areas by age, race, and sex. Fish intake in the Great Lakes area has been tabulated by species to aid in the human food safety evaluation of dioxin contamination of fish in the Great Lakes. Beef intake statistics from the USDA 1977-78 food intake survey have been analyzed to assist in evaluating safety of drugs and feed additives given to cattle.

Effort in the EIS has been concentrated on system development but some general comments about food intake and its relationship to health can be made. Types and amounts of foods consumed change during normal lifespans. For example, milk is the only food of the newborn and is the major beverage during childhood. But as adulthood is reached other drinks including coffee and tea are substituted for milk, the substitution being greater for women than for men. In old age food intake patterns tend to return to those of childhood. In this country we are fortunate to have an abundant food supply. In fact we eat more than is necessary to maintain normal function. On average we accumulate adipose tissue as we age.

However, we are living longer than our ancestors. Also the causes of death have changed since the last century. Then, most people died of infectious disease and often at an early age. Now most fatal disease is chronic and strikes the elderly age group. Half the present day deaths are due to cardiovascular diseases. The next largest group of fatal diseases are neoplasms. Trauma is the third category. Respiratory diseases, although not generally highly publicized, still account for about 4% of deaths, while all other diseases, including those of the digestive system, infancy and congenital anomalies and miscellaneous causes, account for less than 20%.

In a typical recent year, 1975, only 0.22% of deaths were due to nutritional problems other than alcohol. In many of these cases the people literally ate themselves to death as evidenced by a listing of obesity on the death certificate as the primary cause of death. Others of these deaths were probably due more to malabsorption or other physiologic impairment than to dietary deficiency. The total number of nutritional deaths is less than the number of deaths due to septicemia or pneumococcal pneumonia or chronic nephritis or cardiac congenital anomalies and is not far different from the number of deaths from paralysis agitans or hyaline membrane disease or amyotrophic lateral sclerosis. Six times more people drink themselves to death, nine times more people kill themselves with guns or other means, seven times more people are murdered, and fourteen times more people are killed in traffic accidents than die from nutritional problems.

Why then the great continuing national debate about diet and food safety? Probably the answer is that scientists and laymen alike feel that health and food are more closely related than the above statistics indicate. Perhaps diet is involved in the etiology of the great killers of our time, cardiovascular disease and cancer. Decisions about food safety, whether made by individuals or by regulatory agencies, should be based on the best scientific evidence available at the time. The strength of the evidence underlying the decision may be overwhelmingly strong, as in the case of measures to avoid botulinum toxin or the evidence may be controversial, as in the case of nitrites. Improvement of scientific evidence to support better food safety decisions can only be obtained through considerable effort.

In conclusion, there are large amounts of information available on human food safety but difficulties exist in organizing and accessing it. FDA is addressing the issue through development of the EIS to index research in progress and published reports and to integrate data on population, exposure, and health outcomes. Financial support is becoming critical for producers and users of IDBs. Development of these systems may slow. But as critical as the issue of financial support is, an even more important issue is demonstrating that creation of databanks on foods and related subjects is of sufficient benefit to society to justify continued use of public funds. This will require increased cooperation of individuals and organizations. The EIS expresses eagerness to cooperate in efficient use of food safety information.

CANADIAN APPLICATION OF NUTRIENT DATA BANK
FOCUS ON FOOD AND NUTRIENT INTAKE BY CHILDREN

Dewey Peterson

A nutrient data bank containing the food composition of over 2,000 food and drink items was used in conjunction with a detailed 7-day food intake record to determine the nutrient intake of 343 Ontario schoolchildren.

Twelve nutrients were used as indicators to determine the adequacy of diet for 3 age groups of children for both males and females. A model of statistical probability was used to predict the percentage of the population that would be judged to be deficient. The results of this data was compared with biochemical evidence from another study.

It is concluded that the use of a nutrient data bank in conjunction with accurate food intake records could be used to screen population groups for possible nutrient deficiency before undertaking an extensive biochemical testing program.