

Continuing Survey of Food Intakes by Individuals and Diet and Health Knowledge Survey

Lori Borrud, USDA-ARS-HNIS

These are exciting times for those of us working on USDA's nationwide food surveys: Fieldwork is successfully under way for our newest surveys--the 1994-96 Continuing Survey of Food Intakes by Individuals (CSFII) and Diet and Health Knowledge Survey (DHKS) and results from CSFII and DHKS 1989-91 are in.

The USDA nationwide food surveys are a major component of the National Nutrition Monitoring and Related Research Program, or NNMRRP, created by legislation in 1990. The purpose of the NNMRRP is to monitor the dietary and nutritional status of the U.S. population and trends in such status.

The USDA has been conducting nationwide food consumption surveys since the 1930's. Earlier surveys were primarily surveys of household food use. An individual intake component was added in 1965. In 1985, USDA initiated the CSFII to provide continuous information on the food and nutrient intakes of the U.S. population. The current, 1994-96, CSFII is the third in the series. The DHKS was initiated in 1989 as a telephone follow-up to the CSFII and is the first national survey designed so that data on individuals' attitudes and knowledge about nutrition can be linked to their food and nutrient intakes.

The two major objectives for the CSFII and DHKS are to

- o measure the kinds and amounts of food eaten by the U.S. population, and
- o measure people's attitudes and knowledge about food and diet.

The first objective addresses the requirements of the 1990 legislation and the NNMRRP for continuous monitoring of the dietary status of the U.S. population, including the low-income population.

For monitoring the dietary status of the population, the CSFII provides detailed benchmark data on foods eaten in order to determine the choices Americans make, to evaluate the nutrient content and nutritional adequacy of their diets, and to signal changes over time. USDA, other Federal agencies, the food and agriculture industries, private organizations, and academia also use the data in analyses supporting public policy, regulation, program planning and evaluation, education, and research. Some uses of the data, including those related to estimating pesticide exposure from foods, are becoming more important.

The DHKS addresses the second objective, which is intended to provide continuing information with which to assess relationships between individuals' knowledge and attitudes about dietary guidance and food safety, their food-choice decisions, and their nutrient intakes. Knowledge of psychosocial factors that influence dietary status is useful to nutrition educators for identifying ways to implement dietary guidance effectively; to food industry analysts for making marketing decisions; and to regulatory agencies in setting policy on food assistance, food labeling, and food safety programs. DHKS information on the use and understanding of food labels should be particularly relevant following passage of the National Labeling and Education Act of 1990 and the food labeling regulations that were an outgrowth of that act.

CSFII and DHKS 1994-96 are being conducted as the "What We Eat in America" survey under contract with Westat, Inc., of Rockville, Maryland. Since the conference last year, the CSFII 1994-96 pilot study has been completed. The study was conducted in 10 sites nationwide in late spring 1993. The pilot study evaluated all survey operations, which was critical since a number of changes were instituted for CSFII and DHKS 1994-96, including the use of on-line food coding through Survey Net and electronic data transmission. We also tested our revised questionnaire and data collection methods as well as the increased survey publicity instituted for this survey.

Pilot study results showed that specified response rates were met; the length of the interviews did not exceed that specified for the pilot study; Survey Net met our high expectations for performance and quality data; and the weekly electronic delivery of survey data was successful. Data collection for the survey began in January of this year.

CSFII/DHKS 1994-96 was designed to provide a multistage stratified area probability sample representative of the 50 States and Washington, DC, with weighted estimates for each survey year and for all three years combined. A subset of the total sample will consist of individuals from low-income households--those at 130 percent of the federal poverty threshold or below. We anticipate that between 15,000 and 16,000 individuals will provide 2 days of intake data over the three years.

HNIS has made several important changes in survey design for CSFII and DHKS 1994-96. For these surveys we implemented changes that we believe will reduce respondent burden, raise response rates, and provide high quality data in a timely manner. We are collecting 2 days of dietary intake data by in-person interviews 3-10 days apart, but not on the same day. Previously we had collected 3 consecutive days of data, 1 day by interview and 2 days by respondent-administered food record. The change in data collection methods reduces the burden on respondents and provides 2 days of independent dietary intake data for use in estimating distributions of usual intake. Days of intake are to be spread across the seven days of the week, over the weeks of the months, and over the months of the year.

For the current CSFII we are no longer interviewing everyone in the household, but are sampling for selected individuals within the household. This not only reduces the burden on the household but allows us to obtain the intake data needed to meet stated precision requirements for each of 20 age-sex groups. With this sample design we will be collecting intake data on larger numbers of children and elderly than in previous surveys. Rather than conducting a separate low-income survey in 1994-96, we are oversampling the low-income population.

DHKS data are collected through a follow-up telephone interview 2-3 weeks after the dietary interviews. For the 1994-96 survey, DHKS data will be collected from a selected CSFII respondent in each household who is 20 years of age or older. Previously, DHKS data were collected from the main meal planner/preparer only. Survey operations also include the administration of a household questionnaire.

The current CSFII and DHKS feature many improvements in survey monitoring and data management to improve the timely release of quality data. The process starts with HNIS carefully monitoring the timeliness of the data collection efforts by reviewing weekly status reports of field work produced by the contractor's automated field management system. Monitoring continues with a review of weekly status reports from an automated forms tracking system detailing the number of questionnaires received, processed, and transmitted to HNIS by the contractor. In order to monitor the quality of the data and provide timely intervention, HNIS requires the contractor to transmit the survey data electronically each week.

Many of the changes implemented have been in the area of improved communication and information exchange. Examples are publicizing the survey to potential respondents, receiving survey data as well as status reports weekly, and increasing both the level and frequency of communication between HNIS and contractor staff. Through these types of changes, we can identify problems early and take corrective action.

HNIS has put forth a concerted effort to publicize the new survey and to provide the interviewers with the materials they need to convince people to participate in the survey. For example, we have developed a survey brochure that has been very well received. The brochure is mailed out with an advance letter to each household that will be screened prior to the interviewer's visit. The brochure includes an 800 number that potential respondents are encouraged to call if they have questions. We also have worked with our public affairs office and contractor to develop and mail out press notices on the survey to about 250 local newspapers nationwide and have been pleasantly surprised with the number of articles that have been printed.

Survey Net, our automated food coding and nutrient analysis program, has become an integral part of the communications network for the survey. Using Survey Net, HNIS can monitor the data received from the contractor, update the data base files accordingly when new foods are reported, and send the updated data base files electronically to the contractor. In other words, there is a continuous flow of information between HNIS and the contractor which we believe will speed the release of high-quality data.

As a data base management system, Survey Net allows other forms of communication in addition to that which takes place between HNIS and the contractor. Survey Net links coded food intake data from the CSFII to the National Nutrient Data Bank through the Survey Nutrient Data Base. It provides information on new foods and frequently reported foods. Finally, Survey Net generates and then uses the Survey Nutrient Data Base for nutritional analysis of the food intake data. Analysis of recipes reported in the survey is part of this process.

Survey Net is being further developed to operate with the new Nutrient Data Base for Trend Analysis. This data base will identify changes to the data base resulting from actual changes to foods or as improvements to the data. The trends analysis data base will allow us to revise consumption data from previous surveys to account for improvements in the nutrient values, thus increasing comparability in nutrient intake data from one time period to another.

Another important link is that between Survey Net and the Food Grouping System, another data base management system. Information on food is collected the way people eat it--as separate items such as a piece of chicken or as mixtures such as pizza. HNIS' Food Grouping System allows us to translate information on consumption to the specific ingredients or even to the level of raw agricultural commodities. This system is presently being used in limited applications to meet data requirements for USDA and other Federal agencies. We are working at this time to fully automate Food Grouping System operations. We are excited about the possibilities offered by Survey Net and the Food Grouping System as data base management system components.

I'd like to update you now on CSFII and DHKS 1989-91. Data tapes for all three survey years are available from the National Technical Information System. At this time, we are preparing a number of reports. These include the CSFII 1989-91 1-day and 3-day reports and the 1989-91 DHKS report. We also are working and are looking forward to providing these data on CD-ROM.

Plans for conducting the household food consumption survey in 1996 as reported last year have been postponed. While we are continuing to plan for the next household survey, at this time I cannot tell you definitely when that survey will be conducted.

I'd like to spend a few minutes telling you what we think are some of the most important trends from CSFII 1989-91. CSFII 1989-91 included the collection of 3 consecutive days of dietary intake data. The results presented here are, for the most part, from the first day of data collection from the 3 combined years--1989, 1990, and 1991.

One of the first things people want to know from survey data is how well our diets meet the Dietary Guidelines for Americans. Have changes in what we eat moved us closer to dietary recommendations made by science and health groups? The answer, of course, is yes and no.

The first Dietary Guideline is EAT A VARIETY OF FOODS. In 1989-91, Americans ate a wide variety of foods: For four of the five major food groups--grain products, vegetables, milk, and meat--the percentage of individuals eating at least one item from the group was 80 percent or more. For the grain products group, more than 96 percent of individuals ate at least one grain item. The fifth group, fruit, is a different story.

Diets in 1989-91 differed considerably from those reported in our 1977-78 nationwide food consumption survey. In 1989-91, we ate more of some types of grain products, especially cereals and pastas and grain mixtures such as pizza; we drank less whole milk and more lowfat and skim milk than a decade earlier; we ate more mixtures that were mainly meat, poultry, or fish (such as hamburgers and stews) and fewer separate cuts of beef and pork (such as steaks and roasts); we ate fewer eggs; and we drank more carbonated soft drinks, especially low-calorie ones. But overall fruit and vegetable consumption changed very little--despite dietary advice to eat more.

One of the more interesting trends, and one that affects the variety of foods eaten, is the increase in consumption of both grain mixtures and meat mixtures. HNIS has always collected food as individuals eat it. For reporting purposes, mixtures, such as pizza or stew, are assigned to the group of the main ingredient.

From the Food Grouping System, we now know that about 57 percent of grain mixtures are pasta-based, such as spaghetti with sauce, macaroni and cheese, or pasta soups; 32 percent are bread-based, such as pizza, enchiladas, burritos, and tacos; and 11 percent are rice mixtures. When these mixtures are broken down into their component parts, only about one-third of the weight of grain mixtures is a grain product, about one-fourth is vegetables, and about one-sixth is water. Milk products; meat, poultry, or fish; and other ingredients account for the rest.

Of mixtures that were mainly meat, poultry, or fish, about 67 percent are red meat, 15 percent are poultry, and 9 percent are fish. Meat or poultry soups account for the other 9 percent. Of the meat, poultry, and fish mixtures, about one-third of the weight is a meat, poultry, or fish item, about one-fourth is vegetables, and about one-sixth is grain. Water, milk products, and other ingredients account for the rest.

Another way to assess the variety of foods we eat is to look at how individuals fare with respect to their nutrient intakes. The wide array of foods consumed in 1989-91 provided the Recommended Dietary Allowance (RDA) for many nutrients but not for others. In general, average intakes for most population groups exceeded the RDA for protein, vitamin A, vitamin C, thiamin, riboflavin, niacin, folate, vitamin B-12, phosphorus, and iron. For other nutrients--vitamins B-6 and E, calcium, magnesium, and zinc--intakes

were below the RDA for many sex-age groups. While the mean intake of iron is about the RDA, intakes by some sex-age groups (mostly women) were not. Although vitamin E and zinc were not examined in 1977-78, vitamin B-6, calcium, iron, and magnesium were also below the RDA a decade earlier.

The second guideline is **MAINTAIN A HEALTHY WEIGHT**. Obesity is a major health problem in the United States. It is linked with high blood pressure, heart disease, stroke, adult-onset diabetes, and certain cancers. The proportion of the population classified as overweight (based on self-reported height and weight) increased since 1977-78 by about 55 percent for adult males and about 27 percent for adult females. About 3 percent of the overweight men and 11 percent of the overweight women reported that they were on a low-calorie or weight-loss diet.

Another guideline is **CHOOSE A DIET LOW IN FAT, SATURATED FAT, AND CHOLESTEROL**. Americans appear to be doing a better job of this. Over the past decade there has been a shift to a lower fat, higher carbohydrate diet. In 1989-91, individuals obtained 34 percent of their calories from fat, down from 40 percent in 1977-78. However, the amount of fat in the average diet is still higher than the 30 percent or less of calories recommended by the Dietary Guidelines for Americans. Neither saturated fat nor cholesterol were examined in 1977-78, but in 1989-91, saturated fat accounted for about 12 percent of calories, above the recommended level of less than 10 percent.

Many health authorities recommend a daily cholesterol intake of less than 300 mg. The average intake of cholesterol in 1989-91 was 270 mg--345 mg for men and 231 mg for women. Black males 20 years and over had higher cholesterol intakes (382 mg) than did white males 20 years and over (340 mg).

More lower fat products, leaner meat, and changes in food choices have probably contributed to the reduced percentage of energy from fat. For example, our intake of whole fluid fell by nearly a third--down 35 percent over the last decade while our intakes of lowfat/skim milk rose 111 percent.

CHOOSE A DIET WITH PLENTY OF VEGETABLES, FRUITS, AND GRAINS is the fourth Guideline. The average intake of grain products increased by 27 percent, intakes of cereals and pastas by 49 percent, and intakes of grain mixtures by 71 percent compared with 1977-78. Pizza is an item that illustrates the increased consumption of grain mixtures. The amount of pizza consumed tripled over the last decade. Children ages 6 to 11 are the biggest consumers, although all groups have increased their consumption.

Survey data showed that the average intake of vegetables declined by about 11 percent. However, vegetable intakes are underestimated because vegetables are frequently eaten as part of mixtures, such as carrots or potatoes in stews and tomatoes in sandwiches, casseroles, and pizza. We estimated that about one-fourth of the weight of both meat mixtures and grain mixtures are vegetables. Since the intake of mixtures has increased substantially over the last decade, we may assume that intakes of vegetables may not have declined as much as the data indicate. Use of the Food Grouping System will help us to determine this. However, there is no evidence to indicate that vegetable consumption is reaching the Food Guide recommendation of 3 to 5 servings daily.

Fruit consumption increased slightly over the decade. However, on the first day of the survey, almost half (47 percent) of the population ate no fruit and drank no fruit juices. The Food Guide advises individuals to consume 2 to 4 servings of fruit daily. For some groups, especially teens and young adults, the percentage eating no fruit is even higher. This is clearly one major area where Americans are not meeting the Guidelines. Vegetables and fruits are major sources of vitamins A and C in the diet. Although average

intakes by all sex and age groups for both vitamins are above the RDA, the averages conceal variations. Research we did last year with 2 years of CSFII data showed that women who ate no fruit had intakes of vitamin C that were below the RDA and that were much lower than the average vitamin C intakes of women in general.

Average intake of fiber in 1989-91 was 14 grams. Men consumed more fiber (17 grams) than women (12 grams). Although the Dietary Guidelines make no recommendation on the amount of fiber that should be consumed, these levels fall well below the 20 to 30 grams recommended by the National Cancer Institute.

The next guideline is **USE SUGARS ONLY IN MODERATION**. Intakes of total sugars in the diet cannot be estimated from the CSFII at this time because the current survey nutrient data base does not include total sugar. The addition of total sugars to the data base is under review. Food supply data, however, suggest that sugar consumption is on the rise.

We do know that much of the sugar we eat is an ingredient in other foods, such as cookies or cakes, sweetened beverages, and other processed foods. This makes it difficult for people to know how much sugar they are actually consuming or to realize that their consumption of sugar is increasing.

In 1977-78 consumption of soft drinks was about two-thirds of the consumption of either milk or coffee. In 1989-91, however, average milk and coffee consumption was about the same or slightly less than a decade earlier, but soft drink consumption had increased by 72 percent.

The last two guidelines are **USE SALT AND SODIUM ONLY IN MODERATION** and **IF YOU DRINK ALCOHOLIC BEVERAGES, DO SO IN MODERATION**.

The Food and Nutrition Board of the National Academy of Sciences has recommended that daily intakes of salt (sodium chloride) be limited to 6 grams. This translates into a daily sodium intake of 2,400 milligrams. The average intake of sodium in 1989-91 was 3,074 mg--3,891 mg for men and 2,489 mg for women. These amounts are underestimated because they do not include salt added at the table. About 36 percent of individuals report "never" adding salt to food at the table, while 11 percent indicate that they use ordinary salt very often." Men are more likely than women to salt "very often."

Consumption of alcoholic beverages was 70 grams in 1989-91, up from 52 grams in 1977-78 (about a 35 percent increase). In 1989-91 about 11 percent of the population reported consuming alcoholic beverages, up from 9 percent in 1977-78.

About 80 percent of the alcoholic beverages consumed was for "beer and ale." In CSFII 1989-91, whites consumed more alcoholic beverages than blacks and high-income individuals more than low-income individuals.

I want to close by giving you just a brief picture of the results from the Diet and Health Knowledge Survey. This survey was designed to link with the CSFII so that we could look at how individual attitudes and knowledge about healthy eating affect food choices and dietary status. Results indicate that about seven out of 10 main meal planners/preparers were aware of health problems related to consumption of fat, six out of 10 were aware of health problems related to saturated fat, and eight out of 10 were aware of problems related to cholesterol. Yet the diets of most did not meet the saturated fat. Only one-fourth of both men and women met the recommendations for fat and saturated fat, while about half of the men and three-quarters of the women met the recommendation for cholesterol.

Main meal planners/preparers were asked if they thought their diets should be lower, higher, or were just about right in selected dietary components. Results indicate that people's perceptions do not always match reality. When asked to compare the levels of fat, saturated fat, and cholesterol in their own diet with "what is most healthful," both men and women meal planners tended to underestimate the amount of fat and saturated fat in their diets but overestimate the amount of cholesterol.