Chapter 4: Questionnaire Development and Data Collection Procedures
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This chapter describes the questionnaire development process and the data collection procedures for the CSFII/DHKS 1994–96. Table 10 summarizes the questionnaires and data collection procedures. For each questionnaire, the table identifies the type of data collected, the respondent, the mode of administration, the average administration time, and the number of contact attempts required (Westat 1995). Copies of the questionnaires are provided in appendix C. This chapter also describes the Food Instruction Booklet the interviewers used to collect the descriptions and amounts of foods the respondents consumed and the measurement guides the respondents used to estimate the amounts of food eaten (see appendix B).

Questionnaire Development

The questionnaires used in the CSFII 1989–91 and DHKS 1991 were the starting point for the development of the questionnaires for the 1994–96 surveys. The questionnaires were developed by staff working groups. As described in chapter 2, Federal users expressed their needs in specific content areas through the Continuing Survey Users' Group (CSUG). Draft questionnaires were tested several ways to prepare the versions used in the pilot study, and the questionnaires were further refined after the pilot study.

Continuing Survey of Food Intakes by Individuals

In the CSFII 1989–91, interviewers collected 24-hour dietary recalls from respondents and trained the respondents to keep 2-day dietary intake records. A structured grid format was used for the recall and the recordkeeping forms. The interviewers completed debriefing questionnaires and participated in focus groups periodically so that USDA staff could gain some insight into how data collection could be improved. The interviewers believed that the recordkeeping was too burdensome and difficult for respondents. Interviewers often had to collect information missing from the records when they were retrieved. USDA staff also found the level of detail on the self-administered records less than desirable for coding purposes.

In addition to respondent burden, another issue addressed in the development process was underreporting. While much of the research on underreporting focused on the food diary method (Mertz et al. 1991), underreporting has also been a concern in 24-hour recalls (Briefel et al. 1995). To address these issues, the

dietary data collection method chosen for the CSFII 1994–96 was two interviewer-administered 24-hour recalls, using a multiple-pass approach, collected 3 to 10 days apart. The 3-day minimum separation ensured that nutrient intakes on the 2 days would be statistically uncorrelated and 10 days was chosen as the maximum limit of endurance for interviewer-respondent rapport (An and Carriquiry 1991). The exclusive use of 24-hour recalls eliminated the burden of recordkeeping for the respondent, and the multiple-pass approach was expected to reduce underreporting.

Cognitive research. USDA commissioned the Bureau of the Census to find ways to improve the 24-hour recall procedures and other questions asked of respondents. In 1992, the Census Bureau's Center for Survey Methods Research (CSMR), reviewed, revised, and tested the 24-hour dietary recall protocol used in the 1989–91 CSFII and made recommendations for improving the quality and completeness of the data collected during the individual intake interviews. After reviewing the procedures for the 1989–91 CSFII and those used for the dietary component of the Third National Health and Nutrition Examination Survey, CSMR recognized that the 24-hour dietary recall task was a difficult one for respondents compared to the task typically required of survey respondents (U.S. Department of Health and Human Services–Public Health Service 1994). The 1989–91 CSFII dietary recall procedures focused respondents' attention on time and eating occasions as cues for recalling foods eaten. However, chronological order is not necessarily the best recall strategy for everyone (Means et al. 1991) and respondents do not always think in terms of "eating occasions." Also, the 1989–91 CSFII questionnaire asked the respondent to perform a fairly complex task only once; however, research has shown that questioning respondents multiple times, using different forms of the question, can generate more recall (Means et al. 1989; Fisher and Quigley 1991; Fries et al. 1995).

CSMR used concurrent think-aloud interviews to learn about the cognitive processes and recall strategies subjects used to answer questions and to identify misperceptions about questions (DeMaio et al. 1993). Subjects were instructed to verbalize their thoughts while they answered the survey questions presented by the interviewer. This procedure was used in 17 interviews conducted at the CSMR cognitive laboratory in Maryland over 2 phases of research, which allowed revisions to be tested.

CSMR found that subjects used a variety of strategies to recall foods, such as activities, meals, and time. The indepth probing for details about the foods reported was also found to be successful in prompting the recall of additional foods. The proposed procedure allowed respondents to use their own recall

strategy in reporting foods consumed and to think about the same general question in different ways to elicit greater recall. CSMR called the revised procedure a multiple-pass approach to the 24-hour dietary recall.

The passes prompted respondents to perform different cognitive tasks, a process useful in eliciting greater recall of foods. First, the respondent was instructed to tell the interviewer everything he or she had to eat or drink yesterday, from midnight to midnight ("Tell me everything you ate or drank yesterday, from midnight to midnight. Include everything eaten at home or away--even snacks, coffee breaks, or alcoholic beverages.").[1] The first pass made respondents focus on reporting what they ate and drank, which was the main intent of the dietary intake questionnaire. It also instructed respondents to report on foods easily forgotten, such as snacks and food eaten away from home. Most important, the first pass gave the respondents the flexibility to use their own cognitive strategies in an uninterrupted recall.

After the first listing of foods, questions on the time a food was eaten and the name of the eating occasion were asked. The main purpose of the next pass was to develop a more complete listing of individual foods. Questions included: (1) "Did you have anything else on your (food item)?", or, if more appropriate, "Did you have anything else in your (food item)?" and (2) "Did you have anything else with your (grouping of foods)?" This set of questions targeted items that CSMR found to be frequently not mentioned during the first listing (for example, milk on cereal and butter on bread). Then, respondents were asked to review the previous day's intake at another time. However, its focus was on unreported eating occasions or on anything else consumed yesterday: "Did you nibble or sip on anything while preparing a meal or while waiting to eat that you haven't already told me about?" and "Did you have anything else to eat or drink yesterday?" The final pass gathered the detailed descriptions, amounts, and sources of the foods.

Pilot study. In 1993, Westat conducted a pilot study (see chapter 2). While the research conducted by CSMR provided an understanding of the respondent's interpretation of the questions asked under laboratory conditions, the pilot study offered USDA the opportunity to look at the data collection procedures and questionnaires from the interviewer's point of view under survey conditions. In preparation for the pilot study, USDA staff evaluated the CSMR recommendations.

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1. The National Health and Nutrition Examination Survey III interview also started with a general listing of foods and beverages consumed, but respondents reported by time of eating and in chronological order.

A multiple-pass approach was incorporated into the dietary intake questionnaires, although the passes were revised. The initial listing of foods was not changed. However, the questions recommended for the detailed list were modified. Rather than ask several questions about what was eaten in, on, or with foods reported at a specific occasion, the second pass asked the detailed questions about the reported foods. The detailed list was obtained through use of the Food Instruction Booklet. The probes developed by CSMR were integrated back into the Food Instruction Booklet, mainly by probing for "additions"—items added to foods by respondents.

After the pilot study, the last pass was developed into a more extensive series of questions that asked whether the respondent reported all food and beverage intake before the first reported eating occasion (but after midnight of the previous day), between the following eating occasions, and then after the last eating occasion (but before midnight). The final review questions focused on time periods between reported eating occasions to pick up foods that may have been forgotten earlier. (See the section on the day-1 individual intake interview below for a description of the final recall procedure.)

In addition to the changes proposed for the 24-hour recall, CSMR proposed revisions to other questions in the food intake questionnaires. Question wording and response options were revised so that reporting errors resulting from the respondents' misinterpretation of questions could be minimized. Major improvements were made in the structure and content of questions about the sources of foods. Response options to this question were revised to capture information about home-grown vegetables and about fish that were not commercially purchased to address the particular needs of the Environmental Protection Agency. Handcards listing response options were revised to help respondents understand the level of detail required when reporting their responses (see appendix C). Lastly, terms used in questions were clarified; for example, "water" was changed to "plain drinking water."

Other changes were made to the content and administration of the dietary intake questionnaires prior to the pilot study. These included revising interviewer instructions to clarify the administration of the instruments, as well as the procedures for administering the 24-hour recall to children when assisted by another household member. USDA and Westat staff worked collaboratively to further develop data collection procedures, questionnaires, handcards, and portion-size measurement aids. Westat staff developed questionnaire formats that improved the ease of questionnaire administration.

USDA staff reviewed and revised the 1989–91 Food Instruction Booklet, which contained probes the interviewers used to elicit detailed descriptions of foods and amounts reported by respondents. The probes were designed to capture the information needed to assign appropriate food codes (see chapter 7) and varied with the type of food. For example, milk had a probe for fat content and bread had a probe for type of grain. CSMR staff also reviewed the Food Instruction Booklet. They recommended that the format be more standardized and that the booklet be changed from landscape to portrait style. Both suggestions were adopted.

To evaluate the multiple-pass approach to the 24-hour recall during the pilot study, USDA and Westat staff observed interviews in respondents' homes. A mailed interviewer debriefing questionnaire, a review of interviewers' logs, and an interviewer debriefing in a focus group at the end of the study provided additional insight. Interviewers and Westat and USDA staff observers concluded that the food intake questions did not overburden respondents or interviewers. The level of detail collected was judged by USDA to be sufficient for food coding and subsequent nutrient intake calculation.

Following the pilot study, Westat and USDA staff met to revise the questionnaires, the Food Instruction Booklet, and other aids for the main survey. The 24-hour recall procedure used is described below in the section on the day-1 individual intake interview. The format of the questionnaires was improved to reduce interviewer error. For the household questionnaire, the income and head-of-household questions were redesigned to reduce interviewer and respondent confusion. Employment status questions were revised to correspond to the questions used in the Current Population Survey.

The Food Instruction Booklet was also revised after the pilot study. Probes were standardized by writing the questions exactly as they were to be read when collecting the detailed food descriptions. Earlier 24-hour recall procedures required the interviewers to frame the questions needed to collect the information called for in the Food Instruction Booklet. Changes in the marketplace and interviewer suggestions resulted in additional changes.

Further refinements were made to the Food Instruction Booklet in the middle of the first year of data collection and at the beginning of the second and third years of data collection. Revisions were made to keep up with changes in the marketplace and to improve the interface with the Food Coding Database (see chapter 7). Changes included increasing the number and specificity of food categories and adding more examples of quantity measures.

Measurement guides. In 1989–91, the measurement guides used by respondents to estimate the amounts of foods eaten included a set of stainless steel measuring cups and spoons, a 6-inch ruler, and a picture of concentric circles for estimating diameters. In 1994, a 12-inch ruler replaced the 6-inch ruler. In addition, a pint measuring cup was added for use in measuring volumes of household cups, glasses, and bowls, and the thickness sticks used in the National Health and Nutrition Examination Survey III dietary intake component were added because of the known difficulty in estimating the height or thickness of foods. The full set of measurement guides used in CSFII 1994–96 is described below in the section on the day-1 individual intake interview.

Diet and Health Knowledge Survey

The DHKS questionnaire used in the 1991 survey served as the starting point for development of the questionnaire for the DHKS 1994–96. The questionnaires were developed by an inhouse working group.

USDA staff reviewed the 1991 DHKS questionnaire and proposed changes for DHKS 1994–96. Two primary criteria drove decisions about questionnaire content. First, questions were to focus on respondents' knowledge or beliefs about the *Dietary Guidelines for Americans* and their ability to put the guidelines into practice (USDA and DHHS 1990). The guidelines were a focus because they are the basis for the Federal Government's nutrition policy and education activities. Second, questions had to benefit from the unique feature of the DHKS that allows linking people's knowledge, attitudes, and behavior with their dietary intakes. In addition to these two primary criteria, content decisions were driven by research needs identified in the Ten-Year Comprehensive Plan for the Nutrition Monitoring and Related Research Program (U.S. Department of Health and Human Services and USDA 1993). The plan identified the need for research on consumer use and understanding of the nutrition information on food labels and on the predictive capabilities of knowledge, attitude, and behavior questions for assessing intakes of nutrients of public health interest. The plan also called for the development of questions framed in the context of theories of behavior change.

With these criteria in mind, proposed changes were presented to Federal users for discussion at a Continuing Survey Users' Group meeting in 1992. Written comments were requested, and the comments were considered in subsequent revisions of the questionnaire by the inhouse working group.

A number of food safety questions were proposed for deletion so the questionnaire could address new issues. Most of the food safety questions on the DHKS 1991 did not meet the criteria established for the DHKS 1994–96. Nonetheless, to

ensure that deletion of questions would not leave policy or monitoring needs unmet, agencies conducting food safety initiatives, notably the Food Safety and Inspection Service (FSIS), Environmental Protection Agency, and Food and Drug Administration, were consulted. As a result, modified forms of questions about washing and peeling vegetables and fruits prior to consumption were retained, but other food safety questions were dropped.

While the DHKS 1994–96 was being developed, the Nutrition Labeling and Education Act of 1990 was generating major changes in food labeling regulations, which were at various stages in the legislative process. The new food label was viewed as an important tool for helping consumers put the dietary guidelines into practice, and the DHKS 1994–96 provided a vehicle for collecting data to assess relationships between food label use and dietary intakes. Therefore, an interagency working group was formed by USDA to consider food labeling issues for the DHKS. This working group included staff from FDA and FSIS, the agencies responsible for food labeling regulations, as well as USDA staff involved in questionnaire development. The purpose of the working group was to identify appropriate content areas, formulate draft questions, ensure consistency with food labeling regulations, avoid unnecessary duplication in data collection, and promote comparability with other Federal nutrition surveys.

One section of the DHKS 1994–96 included questions that measure the frequency with which people use various sections of the food label, seek information on various dietary components, and use food labels to choose various types of foods. Additional questions measured respondents' level of confidence and knowledge about terms used on food labels and their attitudes toward label use. The attitude questions were framed in the context of a theory called "diffusion of innovations" (Rogers 1983). The attitudinal stage of this theory consists of five perceived attributes of innovations: (1) "relative advantage" over earlier ideas, (2) "compatibility" with existing values and needs, (3) "complexity" of use, (4) "trialability," [sic] and (5) "observability" by others. In formulating DHKS questions, the new food label was viewed as an innovation, and questions were designed to tap each of these attributes. The questions were reviewed independently by members of the inhouse working group and revised until a consensus was reached regarding the attribute measured by each question and its wording.

Another DHKS section, new in 1994, included a series of questions about dietary behaviors likely to influence fat intake. These questions were added to provide an opportunity to evaluate their predictive validity. They focused on fat intake because it is associated with major health problems in the United States, including coronary heart disease, obesity, and cancer. One of the dietary guidelines is

devoted to fat, and it has been highlighted as a current public health issue in nutrition monitoring reports (FASEB 1989, 1995; U.S. Department of Health and Human Services and USDA 1986). These questions also assess acceptance of basic food guidance concepts that have been promoted in advice on how to put the dietary guidelines into practice.

Many of the questions on fat intake were derived from research by Kristal on dimensions of behavior that correlate with fat intake (Kristal et al. 1990 a,b,c 1992). The dimensions he identified are (1) avoiding fat as a flavoring, (2) avoiding meat, (3) substituting specially manufactured low-fat foods for higher fat foods, (4) modifying commonly used foods so they are lower in fat, and (5) changing the overall cuisine. Content ideas were also derived from research assessing relationships between food intakes and fat intake (Block et al. 1985; Gorder et al. 1986; Gorbach et al. 1990; Schectman et al. 1990; Georgiou and Arquitt 1992; Krebs-Smith et al. 1992; Thompson et al. 1992).

The DHKS questionnaire was pretested by USDA staff in collaboration with survey design experts at the Census Bureau's Demographic Surveys Division to prepare the version used in the pilot study. The objectives of the pretests were to evaluate the questionnaire in actual interview situations and to revise it to improve comprehension of the questions by respondents and interviewers, resolve context issues, correct skip patterns, improve ease of administration, and meet time constraints on the length of the interview.

Four pretests were conducted. Trained interviewers administered draft questionnaires by telephone, and researchers monitored the interviews. In three of the pretests, random digit dialing was used to select sample persons (SP's), and in the fourth pretest, Census Bureau employees volunteered to be interviewed. All SP's were 20 years of age or older. The testing was conducted as an iterative process whereby weaknesses in the questionnaire were identified, corrected, and then retested. No more than six interviews were conducted using any single version of the questionnaire. This process allowed rapid recognition and revision of problems onsite by the researchers. A total of 17 interviews was conducted, 11 with women and 6 with men. In this manner, DHKS questionnaire flow, skip patterns, and question wording were refined before the pilot study.

Additional changes were made to the DHKS questionnaire based on interviewer experiences during the pilot study. The introduction was revised to improve its flow and tone. Minor wording changes were made to a few questions. Interviewer instructions were added as needed to standardize responses to frequently asked questions. A shorter alternative set of questions on attitudes about food label use was developed for people who do not use labels. A postcard listing the major sets

of response categories used in the DHKS was developed to streamline the interview by decreasing the need for interviewers to repeat response categories. The postcard, which was mailed to SP's prior to the DHKS interview, also served as a DHKS appointment reminder.

Data Collection Procedures

During the data collection process, interviewers conducted the following steps:

- Mailed introductory letters and brochures to sample addresses.
- Used maps and other information to locate sampled addresses and verify, by visual inspection, that they met the definition of a "dwelling unit."
- Checked the area around sampled addresses for dwelling units that may have been missed during the listing process (see chapter 3).
- Conducted a screening interview at each sampled dwelling unit to determine if any household members were eligible to participate.
- Administered the household questionnaire.
- Conducted two food-intake interviews with each person selected for the CSFII.
- Conducted the DHKS interview with selected persons.
- Completed a noninterview report form for each missing screener, household questionnaire, individual intake questionnaire, and DHKS questionnaire (see chapter 5).

Extensive efforts were used to gain participation in the CSFII/DHKS 1994–96. Community-level efforts included press releases and radio spot announcements. Newspaper articles related to current and past surveys were put in notebooks for the interviewers to refer to, if necessary, to gain SP cooperation. The interviewers also had photo-identification badges and a tote bag with the survey logo on it to help establish their legitimacy. In all materials prepared for SP's, the surveys were referred to as the "What We Eat in America Survey," rather than by the official name, to make it easier for SP's to remember.

Spanish questionnaires

Spanish-language questionnaires were first used in the CSFII and the DHKS in 1994. All questionnaires were translated into Spanish, as were the introductory letter, the survey brochure, the flyers, the questionnaires (but not the Food Instruction Booklet), the handcards, and the DHKS postcard.

Materials were translated by a native, Spanish-speaking Westat employee and back-translated by a subcontractor whose first language was Spanish and who had professional experience as a translator for Federal Government agencies. To check the accuracy and utility of the translation, the back-translator received a copy of the materials translated into Spanish and translated them into English without having seen the original English version. The translator checked the original English against the back-translated English for changes in meaning. When questions arose, the translator and the back-translator consulted on the most accurate translation.

Spanish questionnaires were used in 2.7 percent of CSFII 1994 interviews and 2.4 percent of the DHKS interviews. If an SP spoke neither English nor Spanish, a family member or neighbor 16 years of age or older served as an interpreter.

Introductory letter

Interviewers mailed the introductory letter and brochure (see appendix A) describing the survey to each dwelling unit (DU) 1 week before they intended to contact the household. The introductory letter included a Westat toll-free telephone number to call for more information. A total of 130 calls was received during the CSFII/DHKS 1994. Of these, 11 percent requested additional information about the survey; 15 percent wanted to verify the legitimacy of the survey; 17 percent wanted to set an appointment, reschedule an appointment, or contact a particular interviewer; and 57 percent were calling for other reasons but generally expressed an unwillingness to participate in the survey. Information about each call was recorded and passed along to the regional supervisor and the interviewer assigned to the case.

Incentives

Incentives were also used to gain SP participation. The interviewer told the screener respondent that each participating household would receive a gift. A set of high-quality measuring cups and spoons was given to the screener respondent after the screener was completed and the household was found to contain any SP's. An insulated nylon sack, bearing the survey logo, was given to each SP before the day-1 interview, and at the conclusion of the day-2 interview each responding SP

received a travel-type beverage mug, also bearing the survey logo, as a thank-you gift for participating. The gift provided at the end of day 2 also served as an incentive to complete the DHKS. The measuring cups and spoons and the nylon sacks were offered before the respondents completed their tasks to establish a social contract and help ensure participation. The incentives were not intended to be payment for cooperation.

Contact procedures

At each sample address, the interviewer determined if the structure was an occupied DU and carried out the missed DU procedure if instructed to do so (see chapter 3). Then, the interviewer attempted a screening interview to determine if any members of the household were eligible to participate in the survey. In cases where no household member could be contacted after four visits, interviewers were instructed to ask two neighbors about the number of people living in the household, the sex and age of each, and the time household members were most likely to be home.

Based on the information provided by the neighbors, the interviewer followed the SP selection instructions in the screening questionnaire. If SP's were selected, the interviewer continued his or her efforts to contact the sampled household to complete the screening questionnaire (screener) and necessary interviews.

Screening interview

Any household member 18 years of age or older was an acceptable respondent for the screener. However, it was recommended that interviewers attempt to conduct this portion of the survey with either the main meal planner/preparer or a person knowledgeable about household characteristics because they were the preferred respondents for the household questionnaire, which typically followed the screener (see table 10). It was not necessary for the respondent completing the screener or household questionnaire to be an SP.

At the beginning of the screening interview, the interviewer reminded the respondent about the letter and brochure that had been sent and provided new ones if the respondent did not remember the originals. During the interview, information was collected on the number of persons living in the household; the first name of the person or one of the persons who owned or rented the home (reference person); the first name of the reference person's spouse, if any; and the first name, race, ethnicity (Hispanic or non-Hispanic), date of birth, age, sex, and relationship to the reference person of any other people living in the household,

including friends, relatives, roomers, boarders, employees, and household members who were away from home at the time of the interview but who usually lived there.

Some screening respondents were asked whether the total income of all household members from all sources during 1993 was more or less than an amount specific to the household's size. The screener income question was part of the strategy used for oversampling the low-income population to meet the precision goals discussed in chapter 3, and was asked only when the household included individuals in sex and age groups specified on a computer-generated label that varied among DU's. This label and a similar label guided the interviewer to select persons to complete the individual food intake questionnaires.

Household interview

At households where at least one SP was selected, the interviewer administered the household questionnaire in person. It included a series of questions about the educational and employment status of household members 15 years and older, household income, food assistance program participation, food expenditures, and other food-related practices.

The respondent to the household questionnaire did not have to be an SP. The preferred respondent was the main meal preparer/planner for the household. When that person was unavailable, another household member who was knowledgeable about the household was asked to respond.

The interviewers had discretion, however, to complete the intake interviews before administering the household questionnaire. Interviewers might exercise this option, for example, if no qualified household questionnaire respondent was available or if an SP would have to leave the home before the household questionnaire could be completed.

Day-1 individual intake interview

Interviewers' visits were scheduled to ensure that at least 10 percent of day-1 food intake interviews took place on each day of the week. A label attached to the survey materials for each household specified 3 days of the week that would be acceptable for collecting day-1 food intake information from SP's in that household. Repeated in-person visits were made, as necessary, to attempt to complete day-1 intakes with SP's on one of the scheduled days of the week. In some cases, when repeated visits were made on different scheduled days and at different times, interviewers were permitted to change the day of the week in order to obtain an interview. In 1994, 10 percent of all intake interviews were conducted

on Sunday, 17 percent on Monday, 18 percent on Tuesday, 16 percent on Wednesday, 13 percent on Thursday, 12 percent on Friday, and 14 percent on Saturday. Day of the week was a factor in the weighting—the sums of the weights for each day of the week were set equal to each other (see chapter 8).

A three-phase approach was used for nonresponse conversion. First, interviewers made at least three visits, and often more, to attempt to complete all necessary interviews. For nonresponse cases, supervisors instructed the interviewer to either approach the SP, offering advice on how to approach nonresponse cases, or to complete a noninterview report form, which listed the reason for the nonresponse and was returned to the supervisor for further review. Second, supervisors reviewed the noninterview report forms. Additional attempts to contact these SP's were made by reassigning them to the original interviewer, to another local interviewer, or to an interviewer from an adjacent area. Finally, the supervisor considered the response rates and the noninterview report forms to determine the likely benefit of additional attempts by a senior interviewer or another experienced interviewer.

Interviewers were permitted to make an appointment only for the first time an intake interview was to be administered to any household member. Multiple interviews could be administered on the appointed day, but if the interviewer needed to return to interview any sample person who was not available on that day, no further appointment could be made. It was believed that people's eating behavior might be influenced if they knew that on the following day they would be asked to report what they had eaten. The same reasoning applied to the day-2 intake interviews, so no appointments were allowed for these interviews.

Day-1 intake questionnaires were administered in person. Before conducting this interview, the interviewer told the SP that his or her participation would involve two in-person interviews (and possibly, for one SP in the household, the DHKS interview by telephone). At the conclusion of the day-1 interview, the interviewer notified the SP that he or she would be returning in a few days to conduct another interview. Whenever possible, the interviewers conducted the first day-1 intake interview with the SP who was also the main meal preparer/planner because this person could possibly provide more details about food preparation than other household members.

Proxy interviews were conducted routinely for SP's under 6 years of age and any others (including adults) who could not report for themselves due to physical or mental limitations. Proxy interviews were not permitted for any other reason. They were not considered to be an acceptable substitute for an in-person interview

with adult SP's who were difficult to reach or refused to be interviewed. Children 6 to 11 years of age were asked to describe their own food intake assisted by an adult household member (referred to as the assistant). The preferred proxy or assistant was the person responsible for preparing the SP's meals.

Interviewers often used school menus, which they obtained from newspapers, school personnel, or household members, during interviews with children to help them identify what they had eaten at school. If the SP, proxy, or assistant could not provide enough descriptive or quantitative information about the foods eaten, it was sometimes necessary to seek that information from other caregivers, such as babysitters, daycare personnel, or school cafeteria personnel. In 1994, 2 percent of the interviews required the use of the data retrieval procedures that had been developed for such instances.

The day-1 individual intake questionnaire began with a 24-hour food recall, using the multiple-pass approach. The first pass began with the respondent being asked to report everything he or she ate or drank the previous day between midnight and midnight. The interviewer did not interrupt the respondent during this initial listing of the day's intake. The respondent was invited to add any other items he or she remembered as the interview progressed.

During the second pass, for each food and drink that had been listed, the interviewer asked for the name of the eating occasion and the time it began, and for detailed food descriptions and amounts consumed. The interviewers were trained to read the questions verbatim from the questionnaire and to read the food probes verbatim from the Food Instruction Booklet. When appropriate, questions were asked about the use of salt and fat in food preparation and about additions to reported foods like coffee and bread. The interviewer was directed to ask for ingredients in some categories (for example, sandwiches; salads; mixed dishes, casseroles, and stews; soups; and tacos, burritos, enchiladas, and fajitas). Interviewers were required to use the Food Instruction Booklet to obtain details of every food item recalled by the respondent, including additions remembered as a result of questions asked in describing another food. The booklet also specified the types of measures (weight, volume, or size) appropriate for recording the amount of food consumed.

Measuring guides were used to help respondents estimate the amount of foods and beverages consumed. They included a set of four stainless steel measuring cups (1/4 cup, 1/3 cup, ½ cup, 1 cup) and four measuring spoons (1/4 teaspoon, ½ teaspoon, 1 teaspoon, 1 tablespoon); eight 1/8-inch-thick rectangular sticks for estimating the thickness of meat, poultry, and cheese; an easy-to-read 12-inch ruler for reporting dimensions in inches; and a pint measuring cup. A laminated card

with illustrations of a fish fillet and chicken parts was used to ensure adequate description of pieces. A set of concentric circles on the card helped the respondents quantify the diameter of some foods, such as pancakes.

The measuring cup was used when the respondent referred to a bowl or cup in his or her home. The respondent could then fill the bowl or cup with water to represent the amount he or she ate or drank, and the interviewer could measure the volume of water by pouring it into the 2-cup measure.

After each item on the initial list of the day's intake was described and quantified, the interviewer reviewed for the respondent all the foods listed for each eating occasion and probed for additional foods eaten before the first eating occasion listed, in between listed occasions, and after the last occasion listed. This review was the respondent's third pass through the day. Then, for each food or drink reported, the interviewer asked where it had been obtained and whether it had been eaten at home or not.

Additional questions asked on day 1 and day 2 were whether the respondent's intake on the previous day had been usual or unusual and why; how much plain drinking water the respondent drank on the previous day and whether it came from his or her home or another source; and, how many hours of television or videos the respondent watched the previous day. Additional questions on the day-1 questionnaire included the type of salt usually used by the respondent and frequency of use at the table; whether the respondent was on a diet and, if so, the type and source of the diet; whether the respondent considered himself or herself to be a vegetarian; frequency of vitamin or mineral supplement use and type of supplement; use of fish oil and fiber supplements; whether the respondent ever had his or her blood cholesterol checked; self-reported height and weight (without shoes); self-assessed health status; food allergies; physician-diagnosed medical conditions; frequency of vigorous exercise; cigarette smoking status and number of cigarettes smoked per day; and consumption (ever or never) of alcoholic beverages during the past 12 months. The day-2 interview contained an additional question on the consumption (ever or never) of 28 specific foods during the past 12 months.

Interviewers were trained to review and edit the intake questionnaires as soon as they left the respondents' homes. Legibility, accuracy, and completeness were checked using a standard list. Explanations were added, if necessary.

Day-2 individual intake interview

The day-2 interview was conducted 3 to 10 days after the day-1 interview, but not the same day of the week. Less than 1 percent of day-2 interviews were conducted sooner than 3 days after the day-1 interview, 2 percent were conducted the same day of the week, and 24 percent were conducted more than 10 days after the day-1 interview.

Supervisory permission was given to conduct the interview by telephone when interviewers were unable to complete the questionnaire in person. Three percent of day-2 interviews were conducted by telephone in 1994. Respondents interviewed by telephone were asked to refer to the measuring cups and spoons given to the household when reporting food quantities on day 1.

Diet and Health Knowledge interview

When all SP's in a household either had completed a day-1 intake or been judged to be day-1 nonrespondents, the DHKS sample person was randomly selected by a computerized process from among eligible CSFII sample persons 20 years of age and over who had completed a day-1 intake interview. An SP was not eligible if the intake interview was completed by proxy, nor were any proxies allowed to complete the DHKS. Therefore, not all households had a DHKS respondent.

Telephone contact to conduct the DHKS interview was initiated 2 to 3 weeks after the DHKS respondent completed the day-2 intake interview or was determined to be a day-2 nonrespondent. The purpose of the time delay was to minimize any influence that reporting food intake might have on responses to attitude questions. Interviewers attempted to schedule an appointment for the DHKS interview at the completion of the day-2 intake interview or as soon as the individual was judged to be a day-2 nonrespondent. For households without telephones or with unlisted numbers not previously provided to interviewers, interviews were conducted in person. Typically, the interviewer who administered the CSFII also administered the DHKS.

Three to 5 days before the scheduled interview date, the interviewer mailed a colorful DHKS reminder card. This card contained the appointment date and time and sets of response categories used in the DHKS questionnaire. During the interview, the respondent was directed to look at the set of response categories applicable to the particular question being asked in order to reduce the need for repetitious reciting of response options. Therefore, the card served to improve the flow of the interview.

The first telephone contact was attempted on the scheduled day and time. If this attempt was unsuccessful, additional calls were made, as needed, at various times of the day and on various days of the week to reach respondents. At least six telephone attempts were required for each telephone number, followed by four in-person visits to obtain the interview. In a number of difficult cases, contact attempts exceeded the required level of effort to complete the interview.

Eighty-four percent of 1994 DHKS interviews were completed by telephone. Interviewers were required to get supervisor approval before conducting an interview in person. The primary reason for in-person interviews was that the household did not have a telephone. Other major reasons included physical limitations, such as a hearing difficulty and language barriers.

In 1994, 73 percent of DHKS interviews were completed between 2 and 3 weeks after the last CSFII interview as contractually specified. Interviews completed earlier than 2 weeks or later than 3 weeks were considered mistimed. About 5 percent of interviews were completed earlier than 2 weeks for reasons such as prior knowledge of extended periods of absence (for example, hospitalization or travel). For 23 percent, more than 3 weeks had elapsed. These mistimings were often caused by broken appointments when respondents were, for example, too busy or not at home at the scheduled time. Refusal conversion efforts also contributed to mistimings by lenghtening the time between the day-2 intake interview and the DHKS interview.

The interview began with a request to speak to the person with whom the appointment had been made. The interviewer identified himself or herself and reminded the respondent that during the CSFII, he or she had been told about later contact to answer a few more questions about food and nutrition issues. The DHKS respondent's name and age were verified to make sure the correct person was being interviewed.

The DHKS questionnaire covered knowledge, behavior, and attitudes about diet and health issues. Topics included (1) knowledge of the recommended number of servings from five major food groups, (2) self-assessment of one's own diet (overall and for specific dietary components), (3) perceived importance of dietary guidance concepts, (4) awareness of relationships between diet and health, (5) knowledge about food sources of fat, (6) food intake behaviors, (7) knowledge and attitudes about food label use, (8) behaviors related to food label use, and (9) food-handling practices.

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Table 10. —Summary of questionnaires and data collection procedures for the 1994–96 CSFII/DHKS*

Questionnaire	Type of data collected	Respondent	Mode of administration	Average administration time (minutes)	Contact attempts required (number)
Screener	List of household members and each one's age, race, and ethnicity	Household member 18 yr. or older	In person	8	Two visits to sampled dwelling unit, then two more with neighbor
Household	Educational and employment status of household members 15 yr. and older, household income, food assistance program participation, food expenditures, and other food-related practices	Main food preparer/meal planner for the household or any adult knowledgeable about household characteristics, especially income. Did not have to be a sample person	In person	20	Three visits after screening
Day-1 intake	24-hr. dietary recall, time and name of eating occasions, source of foods, water intake, vegetarianism, supplement use, height and weight, allergies, smoking, exercise frequency, type of diet, health status, and consumption of alcoholic beverages	Sample person. Adult proxy for children under 6 yr. and persons mentally or physically incapable of self-report; adult assistance required for children 6-11 yr.	In person	33	Three visits; additional visits with supervisor approval
Day-2 intake	24-hr. dietary recall and a food list question that asked whether specific foods were consumed in the past year	Sample person or adult proxy	In person, telephone only if approved by supervisor in advance (3% in 1994)	30	Three visits, then telephone with supervisor approval

Table 10. —Summary of questionnaires and data collection procedures for the 1994–96 CSFII/DHKS*—Continued

Questionnaire	Type of data collected	Respondent	Mode of administration	Average administration time (minutes)	Contact attempts required (number)
Diet and Health Knowledge Survey	Dietary knowledge, behavior, and attitudes such as perceived adequacy of food and nutrient intake, perceived importance of dietary guidance food intake behaviors, awareness of diet-health relationships, and use and understanding of food labels	Sample person 20 yr. or older who completed day-1 interview; selected by an automated, randomized procedure	Telephone, in person only if approved by supervisor in advance (16% in 1994)	Telephone interview, 30; in-person interview, 35; overall, 31	Six telephone, then, four in-person visits with supervisor approval

* Adapted from Westat, Inc. (1993).