Appendix B:
Sample design

Appendix B

Sample design and response

1. The free-living sample

The free-living sample was required to be representative of adults aged 65 years and over living in private households in Great Britain and to provide approximately equal numbers in analysis of each sex for the age groups 65 to 74 years, 75 to 84 years and 85 years and over.

The survey involved a sequence of procedures, the interview, the dietary record, the anthropometric measurements and blood and urine collections, for which response levels were likely to vary. It was decided to set a target sample size for the completion of full four-day dietary records.

In determining the overall sample size, account was taken of the relatively low number of men aged 85 years and over and it was agreed that the achieved sample for this group would be lower than for the other groups. Target sample sizes of 100 for men aged 85 years and over and 230 for each of the other groups were set, a total target sample size of 1,250. These targets required considerable over-sampling of the older compared to the younger age groups and of men compared to women.

It was decided that only one eligible adult per household would be included.

1.1 Selection of eligible households

Using the Department of Social Security's (DSS) Pensions Register as the sample frame was considered but it was found to contain insufficient geographic information to permit the clustering required for the survey. Three alternative approaches were then considered:

(i) to obtain a substantially larger DSS file and then cluster the addresses by hand,

(ii) to identify only people aged 85 years and over from the DSS file and identify others by screening addresses from the Postal Address File (PAF), and,

(iii) to identify all the sample by screening addresses from PAF.

As there was some possibility of delay if the DSS file was used, it was decided to use PAF alone as the sample frame, with a sample of addresses being selected and households containing an eligible adult being identified from response to a postal questionnaire or sift form. In opting to use PAF, it was necessary to accept a lower achieved sample size for men aged 85 years and over, since it would be prohibitively expensive to contact the number of addresses that would be required to identify the same number of people in this as in the other groups.

The sample selected for the postal sift took account of the proportion of households which were expected to contain eligible individuals of each sex and age group, as well as those expected to be ineligible because they were not private households, had been demolished, were not yet built or empty. Expected response rates at the postal sift and main stages of the survey were also taken into account. It was estimated that a sample of 30,000 addresses would be required in order to achieve 1,250 dietary records consisting of the target number for each sex and age group.

In selecting addresses, a stratified multi-stage, random probability design was used. The stages in the selection of the sample were as follows:

(i) In order that addresses would be clustered to give areas of an economic size for interviewers to work, postal sectors were selected as primary sampling units. All postal sectors in England, Wales and mainland Scotland were stratified according to region and 1991 Census data for social class. Eighty postal sectors were selected as first stage units, with the chance of selection for each sector being proportional to its size as given by the number of delivery points in the sector.

(ii) Because dietary habits may be seasonally related, fieldwork was designed to cover a 12 month period. For organisational reasons it was decided to conduct the survey in four fieldwork waves of approximately 10 to 12 weeks each. The 80 postal sectors were systematically allocated to one of four waves of fieldwork, ensuring, as far as possible, a similar distribution of all regions in each wave.

Thus, in each wave fieldwork took place in 20 postal sectors throughout Great Britain.

(iii) For each of the 20 postal sectors in each wave, 375 addresses were systematically selected with a random start from the small users' file of PAF.

(iv) Approximately three months before the beginning of each wave of fieldwork, each selected address was sent a sift form which asked for details of the name, age and gender of every person living in the household. It was specified that household residents should include anyone who was temporarily away (for example in hospital or at school) but exclude any family member who lived somewhere else permanently. A reminder postcard was sent two weeks and a further letter four weeks after the original mailing to those who had not responded. Residual non-responding addresses were subsequently called on by an interviewer who attempted to collect the same information. The sift form and letter are reproduced in Appendix B.

In order to avoid response bias, the letter on the front of the form did not mention an interest in any specific age group. This method was adopted following a comparative test in the feasibility study whereby half the sample received an alternative form asking only for details of household members who were aged 60 years and over. Although there was no significant difference between incidence of eligible households from the two versions of the form, the incidence for the alternative form was slightly lower and so it was decided to use the form which requested details for all household members.

Multi-household addresses
Although most addresses listed on the PAF contain only one private household, a small proportion were known to contain more than one address. In these cases an indication of the number of households present was included on the PAF, and this was used in the sample selection to give these addresses an increased chance of selection in proportion to the number of households indicated. In the case of Scotland, where the proportion of addresses with large numbers of households was relatively high (13.9% had four or more households compared with 0.1% in England and Wales), a random selection procedure was adopted so that just one household was screened per address. This

procedure was not followed in England and Wales where all the households at each address were screened. This meant that there was a slight bias towards selecting households from this type of address in England and Wales but on inspection the numbers involved were felt to be too small to justify corrective weighting.

In order to identify concealed multi-household addresses, a question was asked on the sift form to establish whether any part of the address was occupied by someone who was not part of the resident's household. Multi-household addresses identified in this way were visited by an interviewer in order to collect details for each household at the address. Where multi-household addresses were identified by interviewers in the course of their calls on non-responding addresses, details of each household at the address were again recorded.

Ineligible addresses
Non-residential addresses, such as shops, and non-private households, such as residential or nursing homes, were not eligible for the free-living survey. The small users' file of the PAF excludes any delivery point which receives more than 25 items of mail a day and hence excludes most addresses of these types. Small commercial premises with no adults resident and small institutions included in the small users' file were identified at the sift stage and excluded as ineligible.

1.2 Selection of eligible individuals

Households containing eligible adults were identified from the returned sift forms. A sample of individuals was selected using the probabilities required to produce the target sample sizes for each sex and age group, with only one person being sampled per household. For households containing more than one eligible adult, the individual with the highest selection probability was chosen. There was some resulting bias in that some adults of the more common sex and age groups in households with more than one eligible adult had a decreased chance of selection; it was decided that this bias was unlikely to be very great and no adjustment was made.

1.3 Response to the postal sift and interviewer stages

Table H1 shows response to the free-living postal sift and interviewer follow-up. Sift forms were returned by post for 45% of eligible addresses and a further 40% were completed by an interviewer during the follow up of non-responders and multi-households, so the overall response rate was 85%. At 10% of addresses the residents refused to co-operate and for 5% of addresses no resident was contacted. A total of 6,445 households were identified by the sift stage as containing an eligible adult.

(Table H1)

Response rates were very similar by wave. Although the proportion of sift forms returned by post was lower in the last two waves, the shortfall was in each case made up during the interviewer follow up. *(Table H2)*

An adult was selected from 2,235 of the 6,445 households which were found to contain adults of eligible age. Of these, 34 (1.5%) were found to be ineligible due to the information on the sift form being shown to be incorrect or no longer correct. A further 29 (1.3%) of selected adults were found to have died since the screening survey. Therefore, a total of 2,172 adults were considered eligible for the survey (the eligible sample).

2. The institution sample

A representative sample of adults aged 65 years and over who were living in residential or nursing homes was required. Equal numbers of men and women were sought for analysis purposes, so the design was required to over-sample men compared to women. A target sample size of 400 full dietary records was set.

The selected sample frames were the Communal Establishments File for England and Wales (List C), maintained by the then Office of Population Censuses and Surveys (OPCS), and Section F of the General Register for Scotland. Both these sample frames contained the names and addresses of residential and nursing homes for the elderly but no details about the number of residents or their ages. It was therefore not possible to select institutions with probability proportional to the number of residents of eligible age. Therefore, a two stage sampling procedure was required, with an initial selection of institutions being followed by a selection of residents within those institutions, to be carried out by an interviewer.

From the OPCS list of communal establishments, institutions were selected from the following categories:

● Private nursing homes
● Private nursing homes (aged)
● Aged person (LA Pt IV)
● Aged person (Pt III)

From the General Register for Scotland institutions were selected from:

● Eventide homes
● Nursing homes – non NHS, non maternity

It was decided to conduct fieldwork for the institution survey in the same sample points as the free-living survey, making it easier to run the two surveys concurrently. As postal sectors contained too few institutions, the postal districts in which the sectors were located were adopted as first stage units. Thus 80 postal districts were selected, one for each postal sector for the free-living survey, and these were grouped into the same four waves as the free-living sample.

It was decided to select three residents at each institution, including at least one resident of each sex. This was considered to be the optimum number, bearing in mind the time required to gain co-operation at an institution as well as the need to have a broad sample of institutions and to avoid overburdening care staff and based on experience from the feasibility study.

2.1 Selection of eligible institutions

The number of institutions selected per postal district was initially two, with further institutions being selected randomly in the event of the original ones being ineligible or refusing to take part. After the second wave it was realised that this level of sample would be insufficient to produce the target number of dietary records, due to greater than anticipated levels of ineligibility and refusal of institutions to take part. Consequently, more were selected in the last two waves in the areas with the highest number of institutions.

Initial contact with each institution was made by means of an advance letter addressed to 'the manager' at the address, explaining the general purpose of the survey and that an interviewer would be calling shortly. The interviewer then called to make an appointment to speak to the manager in order to introduce the survey and make a selection of residents.

When an institution was found to be ineligible or its manager refused to co-operate with the survey, it was replaced, wherever possible, by another randomly selected from the same postal district.

2.2 Selection of residents

In order to obtain a random selection of male and female residents, interviewers were instructed to make separate lists of the men and women aged 65 years and over who were resident at the institution. These lists could be prepared in alphabetical or room number order, depending on how this information could most easily be provided. Once these lists were prepared the interviewer was required to make a selection from the lists according to the number of eligible people on them, by reference to a grid of selection numbers and the serial number which had been allocated to that institution. This procedure ensured that in half of

institutions two men and one woman were selected and, in the other half, one man and two women were selected. Wherever the required number of men or women was not present in the institution, the selected number was reduced accordingly; residents of the opposite sex were not substituted. No substitution was made in the event that the selected resident was unwilling to participate or unable to do so, for example due to illness.

It was not practical to control this selection of residents further in order to control the distribution of age groups, as in the free-living sample, so residents were chosen without regard for their ages.

2.3 Co-operation of institutions and selected residents

Table H3 shows details of response for institutions. A total of 240 institutions were selected, of which 178 were selected at the start of the waves and 62 were selected during the waves, as replacements for institutions which refused to participate or were ineligible. Eighty-one percent of selected institutions were found to be eligible and 83% of these agreed to participate in the survey while 17% refused. *(Table H3)*

The number of institutions selected in wave 1 was found to be too few to yield the target number of completed food diaries. Subsequent increases in the numbers of institutions selected and recruited to participate across the four waves are shown on Table H4. *(Table H4)*

From the 162 institutions that agreed to participate, 454 residents were selected to be included in the survey, an average of 2.8 per institution. This is lower than the target number of three residents per institution as some institutions contained female residents only and so the specified number of male residents could not be selected.

Table H1 Response to the free-living sample postal sift and interviewer follow up of non-responders and multi-households

	No.	%
Total sample addresses	30546	
Ineligible addresses	2842	
Eligible addresses	27704	100
Refusals	2661	10
Non-contacts	1471	5
Other unproductive cases	86	*
Returns from postal sift	12349	45
Returns from interviewer follow up	11137	40
Total returns	23486	85
Total households identified from returns as containing an eligible adult	*6445*	

* Denotes a percentage of less than 0.5%

Table H2 Response rates for sift stages by fieldwork wave#

	Wave 1		Wave 2		Wave 3		Wave 4	
	No.	%	No.	%	No.	%	No.	%
Total sample addresses	7478		7493		8021		7554	
Ineligible addresses	660		578		820		784	
Eligible addresses	6818	100	6915	100	7201	100	6770	100
Refusals	665	10	735	11	693	10	568	8
Non-contacts	382	6	386	6	376	5	345	5
Other unproductive cases	16	*	27	*	25	*	18	*
Returns from postal sift	3263	48	3253	47	2829	39	3004	44
Returns from interviewer follow up	2492	37	2532	37	3278	46	2835	42
Total returns	5755	84	5785	84	6107	85	5839	86
Total households identified from returns as containing an eligible adult	*1606*		*1735*		*1520*		*1584*	

* Denotes a percentage of less than 0.5%

Wave 1: October–December 1994; Wave 2: January–March 1995; Wave 3: April–June 1995; Wave 4: July–September 1995.

Table H3   Institution response rates

	No.	%
Originally selected	178	
Selected as substitutes	62	
Total selected	240	100
Ineligible[1]	45	19
Eligible	195	81
Total eligible	195	100
Refused	33	17
Agreed to participate	162	83
Number of eligible individuals selected at participating institutions	**454**	

[1] Ineligible institutions were those which were not residential or nursing homes, had no residents of eligible age or had moved to a different area not covered by the study

Table H4   Numbers of institutions selected and agreeing to participate by fieldwork wave#

	Wave 1	Wave 2	Wave 3	Wave 4
	No.	No.	No.	No.
Originally selected	40	40	47	51
Selected as substitutes	3	19	19	13
Total selected	43	59	66	64
Ineligible	8	8	12	10
Eligible	35	51	54	54
Total eligible	35	51	54	54
Refused	12	13	8	6
Agreed to participate	23	38	46	48
Number of eligible individuals selected at participating institutions	*83*	*108*	*126*	*137*

Wave 1: October - December 1994; Wave 2: January - March 1995; Wave 3: April - June 1995; Wave 4: July - September 1995.

[1] Areas of Scotland excluded from the sample were: the Orkneys, Shetlands, Western Isles and other Scottish Islands. Also excluded from the sampling frame were the Channel Islands, Isle of Man and the Scilly Isles.

Appendix C:
Dietary methodology

Appendix C

Dietary methodology: details of the recording and coding procedures

This appendix provides further information about the recording and coding procedures outlined in Chapter 2.

1. The choice of dietary methodology

The aims of the National Diet and Nutrition Survey of people aged 65 years and over require detailed quantitative information on current food and nutrient intakes. Of the different methods available for assessing food intake, it was decided to use a weighed intake because this method determines accurately the quantities of everything consumed by each survey participant. The weighed intake method is considered to be the most precise method for recording the amounts of foods currently consumed. It has the advantage of reducing the errors that can result from estimating portion sizes and does not have inaccuracies due to recall that can occur with other methods. However, the weighed intake method is time consuming and demanding of participants; it is also expensive relative to other methods. Weighing all food and drinks consumed can interfere with the usual eating habits of the participant and can lead to under-recording.

The feasibility study found that, whilst a weighed intake method could be used for free-living participants, it was not practical for those in institutions. Different dietary recording methods were therefore adopted for free-living and institution participants.

2. Collecting information from the free-living group

Recording in the Home Diary

Free-living participants were provided with two food diaries, the *home diary* in which foods weighed and eaten at home were recorded, and the *eating out diary* for recording foods eaten outside the home. The diaries are reproduced in Appendix B. During the first interviewer visit, the food diaries and the weighing and recording methods were explained to the participant. The interviewer asked about the participant's usual choice of certain commonly eaten foods, such as the type of milk, bread and fat spread used, and entered this information on the page provided at the front of the home diary. This page provided useful information for the interviewer and the survey nutritionists when coding and checking the diary.

At the top of each diary recording page, participants were asked to enter the day and date and to tick a box to indicate how well they were feeling. They were asked to start a new diary page at the beginning of each recording day. A separate line was used to record a full description of each food item, its brand and its weight.

Homemade dishes

Sheets were provided at the back of each home diary for the participant to record details of the types and amounts of ingredients that they used in recipes consumed during the recording period. Details of the cooking method and the amount of liquid added were also included. The sheets were checked by the interviewer to ensure that they had been completed in sufficient detail.

Remarks

The participant was asked to record in the 'Remarks' section at the bottom of the diary page if any of the food and drinks consumed had not come from their own food store but from another source, such as relatives or a takeaway. They were also encouraged use this section to record any changes in routine, details of leftovers and any other information that affected the recording or dietary pattern.

Using the food scales

The food scales used were battery operated Soehnle Quanta digital scales calibrated in one gram units up to 1 kg and two gram units up to a maximum weight of 2.5kg. Foods and drinks were weighed using a cumulative weighing method whereby the scale was set to zero before each new plate or bowl of food was weighed and the weights increased as each food was added to the scale.

The participant was asked to record the time, set the scales to zero and then weigh the container, such as a plate, mug or bowl, in which the food or drink was to be served. Food items were then added to the container and the weights displayed recorded in the diary.

Where foods could be split into their individual components they were weighed and recorded separately, for example, a drink of hot chocolate would be weighed and recorded as chocolate powder and milk; a sandwich as bread, spread and filling(s). The weighing method was demonstrated by the interviewer and a card with an example diary page on one side and weighing instructions on the other, was left with the participant.

Second helpings

Second helpings were treated in the same way as the first serving. The plate and any foods remaining on it were returned to the scales and the weight obtained recorded as a new plate. Additional items were added separately and their weights and descriptions recorded.

Leftovers

After a meal where leftovers occurred, the participant returned the plate to the scales. The total weight of the plate plus the leftovers was recorded in the 'Weight leftover' column, next to the weight of the plate. The participant then placed a tick in the weight leftover column next to the foods which had been left. The participant was also asked to record a description of what had been left in the 'Remarks' section at the bottom of each diary page.

Items too light to weigh

For some foods, such as coffee granules or mustard, the portion served could be too light to register on the scales. In such a case, the participant was asked to give a description of the quantity consumed which was converted into a weight by the survey nutritionists.

Participants were not required to weigh vitamin or mineral supplements, medicines and artificial sweeteners as these items were too light to register on the scales. The participant was asked to record the number of units of these items consumed, ie. the number of tablets, drops or teaspoons.

Tea and Coffee Record

The tea and coffee record was completed by the interviewer together with the participant, typically during their first visit. Using their normal cup or mug, the participant weighed and recorded each component of a typical cup or mug of tea and coffee.

When subsequent cups of tea or coffee were consumed using the same size cup or mug, the survey participants were not required to weigh them, but were asked to enter 'cup of tea/coffee' into the main diary, along with the time it was drunk. If a participant had tea or coffee using a different cup or mug, or did not make it in their standard manner, they were asked to weigh the individual components separately and record them in the diary.

A coding frame was developed so that a single code related specifically to the standard cup or mug of tea drunk by a participant. Two other participant-specific codes were issued for instant and fresh coffee. These codes were entered into the diary by the interviewers.

Food and drink provided from outside sources
Participants were asked to record all meals eaten at home, including those which they had not provided themselves such as meals on wheels. In most cases these meals arrived in a container and the different food items could not be split and weighed separately. The participant was therefore asked to weigh the whole plate of food before eating their meal and to weigh the plate and the leftovers once they had finished. The interviewer then collected descriptive information about the size of the food portions served and the leftovers. Recipe information was collected wherever possible. The interviewer was required to record full details of the meals provided and the name of the organisation or individual who provided the meal. The survey nutritionists apportioned weights to each item using the portion sizes and descriptions provided.

Recording in the Eating Out Diary
Foods 'eaten out' included all food purchased and eaten outside the home such as restaurant meals, takeaways eaten out, meals eaten at the homes of relatives or friends and meals eaten at day centres and luncheon clubs.

An eating out diary was provided for the participant to record foods which were eaten outside the home and not weighed. Participants were asked to record a full description of each item of food and drink; together with brand information, where it was purchased, price, portion size and details of any leftovers. Interviewers copied this information from the eating out diary into the home diary on separate pages to distinguish it from food eaten in the home. The survey nutritionists used the descriptions given to assign weights to each item. Composite items were split into their individual components, for example, a sandwich was entered as bread, spread and filling(s).

Free-living participants who could not weigh
The feasibility study[2,3] showed that some free-living participants, particularly those who were frail, were unable or unwilling to use the scales to weigh their foods and drinks. In such cases, they were encouraged to keep a descriptive diary of the foods and drinks they consumed and to record quantities in household measures where possible. The interviewer checked each item recorded to ensure that sufficient information on portion size was provided for the survey nutritionists to convert into a weight. As far as possible, interviewers timed their visits to coincide with the main meal times of the participant so that they could weigh the meals. Weights were also obtained from food packaging.

Obtaining information about foods which had not been weighed
All foods and drinks consumed were required to have a weight. However, it was not always possible for participants to weigh their food and there were some instances when participants forgot to weigh certain items. In such cases the weights were obtained either by weighing a duplicate item or by estimation.

If a participant had forgotten to weigh a biscuit, for example, the interviewer weighed another biscuit from the same packet as those eaten and entered this weight into the home diary. The "Estimate" column in the diary was then ticked by the interviewer to indicate that the weight given had been estimated. An estimated weight was defined as one where the original food item was not weighed, but the weight entered was considered to be reasonably accurate by the interviewer.

Where items had been bought from local shops and cafes and not weighed by the participant, the interviewer was required to purchase and weigh a duplicate. Using information in the eating out diary about the place and price of foods purchased, interviewers returned to the retailer to buy items such as cakes, sandwiches or fish and chips and to ask for further information about the food, for example, the type of fat used to fry chips. This information would then be entered into the home diary with the weight of the duplicate item. Duplicates were not purchased for items from national chains for which portion size information was available.

Participants were given a plastic bag to collect the packets and cartons of foods they consumed as the packaging provided ingredient, weight and nutrition information to ensure appropriate coding. If the participant had forgotten, or was unable, to weigh packaged items, such as a chocolate bar, the weight was copied from the packaging into the home diary by the interviewers who would also tick the "Estimate" column.

The interviewers collected detailed portion size information for all foods and drinks eaten outside the home. The nutritionists used these descriptions and MAFF Food Portion Sizes[4] to estimate weights for foods for which it was not possible either to purchase a duplicate item or to obtain packaging. Any measures not given in grams such as ounces, fluid ounces and tablespoons, were included in the description of the food and converted into grams by the survey nutritionists.

The weights of items ticked as estimated by the participant or the interviewer were checked by the survey nutritionists to ensure that they were consistent with those in Food Portion Sizes[4].

Checks by the Interviewer
After placing the diary, the interviewer arranged a visit on the following day. During this call the interviewer read through the Home and Eating Out diaries to check for difficulties in recording or weighing, to probe for more details of foods that were inadequately described and to check that leftovers had been recorded and weighed. The interviewer would compare the diary entries with the meal pattern given at question 2 of the main questionnaire to identify omissions or changes in routine. The interviewer would enter any missing items and check to see whether medicines and vitamin or mineral supplements had been taken and recorded.

To give the interviewer an idea of typical food weights in grams, a guide weights card was provided. The interviewer used this to check the weights in the diary at the first checking visit.

The number of subsequent checking visits was determined by the needs of the participant. Participants who found weighing or recording difficult were visited more often, with visits timed at mealtimes so that the interviewer could weigh the meals.

3. Collecting information from those living in institutions

A home diary and an eating out diary was provided for each participant living in an institution. Two additional documents, the food record and the food providers' questionnaire, were also used.

In order to ensure that each main meal was weighed at least once, the interviewer was required to weigh one of the participant's main meals, that is either breakfast, the midday meal or the evening meal, on each of the four recording days and to record it in the home diary. For main meals when the interviewer was not present, and for eating occasions between main meals, the participants, or carers acting on their behalf, were asked to use the food record to give descriptions and descriptive quantities of the foods and drinks consumed.

The food providers' questionnaire was designed for self completion by the institution 'food provider', that is the catering manager or cook. Reproduced in Appendix B, it asked for information about the types and brands used of foods such as bread, milk and fat spreads and typical portion sizes of commonly served foods such as custard. This information was used to help with coding the home diary and for assigning weights to those foods which had not been weighed.

Before copying the information on the food record into the home diary, the interviewer was required to ensure that it was sufficiently detailed; specifically by checking that each item had a detailed description and an indication of its portion size and that any leftovers had been noted.

The interviewer was also required to complete a tea and coffee record, ie. to weigh a typical cup or mug of tea and coffee, for each participant.

Weights were assigned to the non-weighed foods and drinks by the survey nutritionists, using information from the food record, the food providers' questionnaire and the foods weighed by the interviewers.

4. Coding the home diary

Interviewers were responsible for food, brand and source coding the home diary. To do this they needed to collect detailed information about the food and drink consumed by the participant, including:

● the form in which the food was bought, for example, whether it was fresh, frozen or canned and, for products such as cheese, fish and meat, whether they were smoked or not;

● whether the product was low fat and whether any fat had been trimmed or skimmed from meat or meat dishes;

● the cooking method, for example whether the food had been boiled, grilled, roasted or fried, and if fried or roasted, the type of fat used;

● whether a coating was used for fish and meat, and whether sauces and gravies were thickened;

● whether foods had been sweetened and, if so, whether sugar or an artificial sweetener had been used;

● full details of the recipe for homemade items;

Interviewers collected the completed diary pages for coding each time they visited the participant. This allowed them to check for missing entries or incomplete descriptions and to ask the participant for more information on their next visit.

Interviewers were provided with a food code list and check lists which provided additional information needed to code fat spreads, cooking fats and oils and soft drinks. The food code list contained over 3000 food codes. A page from the food code list is reproduced in Appendix D.

Brand information
Brand information was recorded for all pre-packaged foods. For some food items, for example, confectionery, biscuits and some breakfast cereals, the brand name was needed in order to code the food item correctly. Artificial sweeteners, soft drinks, fruit juices and mineral waters were the only food items to be brand coded. This was necessary to provide intake information on non-nutrient components of the diet, such as sweeteners, for risk assessment.

Source information
Participants were asked to record in the diary the 'source' of food eaten, i.e. where it came from. In most cases the source of food was the participant's home stocks. Other sources included food eaten outside the home, e.g. at restaurants or at relatives' homes, and food brought into the home such as meals on wheels

or takeaways. The source of such foods was coded by the interviewer.

Data processing and data editing
MAFF compiled the nutrient databank, details of which are given in Appendix E. New food products and recipe items, and their nutrient data, were added to the databank as required throughout the survey.

Every food diary was checked for incorrect and missing codes and weights by the survey nutritionists prior to keying. The types and proportions of ingredients used in recipes were compared with those of standard recipes. If the ingredients differed from the standard recipe in a way which was nutritionally significant the existing food code was not used and a new food code was allocated. The appropriate nutrients for the new recipe code were calculated by MAFF and added to the nutrient databank. The nutritionists also noted any information which they felt might be useful when editing the data, such as the health of the participant or changes in eating habits.

Two CADI (Computer Assisted Data Input) programs were developed (using 'BLAISE'); one for food coding and one for diary data entry. The coding program enabled the survey nutritionists to check or find codes by entering either a food name or a food code prompt.

The diary data entry system was set up to include acceptable weight ranges for every food consumed so that incorrect keying of weights or weighing errors could be identified as the diary was keyed. The diary entry system revealed the description attached to each food code so that each code could be verified as it was keyed. To identify omissions, the program highlighted days where fewer than eight plates of food had been consumed or where a time period of more than six hours was found between subsequent plates. The program also prompted for brand codes, where applicable, and source codes. The weight of the food and drinks consumed was calculated from the cumulative weights entered.

Once entered and verified, the data was processed (using 'QUANTUM') to distribute any leftover weights proportionately amongst all the foods entered as leftover on a plate. Data from the tea and coffee record (that is the description and weight of each component) were copied through the diary whenever tea or coffee had been recorded. The MAFF nutrient databank was then used to calculate nutrient intakes from food consumption, using the food codes and actual food weights consumed.

A program was developed which highlighted participants with nutrient intakes outside expected daily nutrient intake ranges so that diaries could be checked for data entry and other errors. It also enabled the nutritionists to cross reference these data with all the other data collected so that nutrient intakes outside the expected range could be examined in the context of other information, such as Body Mass Index or health status.

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4 Ministry of Agriculture, Fisheries and Food. *Food Portion Sizes.* 2nd Edition. HMSO (London, 1994).

Appendix D:
Main and subsidiary food groups and examples of food in groups

Appendix D

Food types, main and subsidiary food groups[1]

Food types consist of one or more food groups.
Food groups are expressed as integers.
Food sub-groups are integers with an alphabetical suffix.

1 Pasta, rice and other miscellaneous cereals

1A	Pasta	all types – dried, fresh and canned; including egg noodles, macaroni cheese, ravioli, canned spaghetti bolognaise
1B	Rice	fried and boiled, savoury rice, egg fried rice, rice flakes, rice flour. (Not rice pudding)
1C	Pizza	all types – thin & crispy, deep pan, French bread
1R	Other cereals	includes flour, bran, oats, semolina, papadums, dumplings, Yorkshire pudding

2 White bread

2R	White bread	sliced, unsliced, toast, fried; includes French stick, milk loaf, slimmers, pitta bread, rolls, chappatis, soda bread

3 Wholemeal bread

3R	Wholemeal bread	sliced, unsliced, toast, fried; includes chappatis, pitta bread, rolls, hi-bran bread, wholemeal soda bread

4 Other breads

4A	Softgrain bread	sliced, unsliced, toast, fried, rolls; e.g. Mighty White, Champion, own brands; fortified and not fortified
4R	Other breads	sliced, unsliced, toast, fried; includes brown, granary, high fibre white, rye bread, gluten free, garlic bread, continental breads e.g. ciabatta, oatmeal bread, Vitbe, Hovis, crumpets, English muffins (white & wholemeal), pikelets, brown and granary rolls, bagels, brioche, naan, paratha

5 Wholegrain and high fibre breakfast cereals

5R	Wholegrain and high fibre breakfast cereals	all with non starch polysaccharide (Englyst fibre) of 4g/100g or more. e.g. All Bran, muesli, Shredded Wheat. Includes porridge & Ready Brek

6 Other breakfast cereals

6R	Other breakfast cereals	all with non starch polysaccharide (Englyst fibre) of less than 4g/100g. e.g. cornflakes, Coco Pops, Sugar Puffs. includes Pop Tarts

7 Biscuits

7R	Biscuits	All types, sweet and savoury; includes cream crackers, flapjacks, breadsticks, crispbread, cereal crunchy bars, ice-cream cornet

8 Buns, cakes, pastries and fruit pies

8A	Fruit pies	All types, one and two crusts; includes apple strudel, individual fruit pies from takeaways
8R	Buns, cakes and pastries	Includes danish pastries, currant bun, doughnuts, eccles cakes, Bakewell tarts, jam tarts. scones (sweet and savoury), sponge cakes, fruit cakes, eclairs, currant bread, malt loaf, gateaux, pastry. mince pies, sponge fingers, scotch pancakes. croissants, custard tart, lemon meringue pie

9 Puddings

9A	Cereal-based milk puddings	rice pudding (including canned), custard (not egg custard), Angel Delight, blancmange, confectioners custard, sweet white sauce
9B	Sponge puddings	steamed, canned, suet pudding, jam roly poly, sponge flan, upside down pudding
9R	Other puddings	Includes trifle, fruit fritters, pancakes, crumble, bread pudding, cheesecakes, tiramisu, rum baba, Christmas pudding

Food type: **Cereals and cereal products (1-9)**

10 Whole milk

10R	Whole milk	all types of cow's milk including pasteurised, UHT, sterilised, Channel Island

11 Semi-skimmed milk

11R	Semi-skimmed milk	all types of cow's milk including pasteurised, UHT, sterilised, canned, milk with added vitamins

12 Skimmed milk

12R Skimmed milk   all types of cow's milk including pasteurised, UHT, sterilised, canned, milk with added vitamins, Vital, Calcia

13 Other milk and cream

13B Cream   all types, including imitation cream, aerosol, dream topping, Tip Top, creme fraiche

13R Other milk   includes soya milk, goats, sheeps, evaporated, condensed, dried milk, milk shake, milk with added fibre, coffee whitener, buttermilk, flavoured milk drink

14 Cheese

14A Cottage cheese   includes diet and flavoured

14R Other cheese   all types, including hard, soft, cream cheese, processed, reduced fat cheeses, vegetarian cheese, cheese spread. (Not fromage frais or Quark)

15 Yoghurt, fromage frais and other dairy desserts

15A Fromage frais   includes fromage frais mousse, Quark

15B Yoghurt   all types including soya, goats, sheeps, yoghurt mousse, yoghurt drink, frozen yoghurt, custard style yoghurt, Greek yoghurt

15R Other dairy desserts   includes chocolate and fruit cream desserts, mousse, milk jelly, junket, egg custard, buttermilk desserts, fruit fools, creme caramel

53 Ice-cream

53R Ice-cream   all types, including non dairy, choc ices, ice-cream desserts, ice-cream containing lollies, milk ice lollies, low fat/ low calorie ice-cream

Food type: Milk and milk products (10–15 & 53)

16 Eggs and egg dishes

16A Eggs   includes boiled, fried, scrambled, poached, dried, omelettes (sweet and savoury)

16B Egg dishes   includes quiches, flans, souffles, scotch eggs, eggy bread, sorbet, apple snow, meringue, pavlova, curried eggs

Food type: Eggs and Egg dishes (16)

17 Butter

17R Butter   salted and unsalted, butter ghee, spreadable butter

18 Polyunsaturated margarine and oils

18A Polyunsaturated margarine   margarine claiming to be high in polyunsaturated fatty acids

18B Polyunsaturated oils[2]   includes corn oil, sunflower oil, solid sunflower oil

19 Low fat spread

19A Low fat spread polyunsaturated   spreads containing 40% or less fat, claiming to be high in polyunsaturated fatty acids

19R Low fat spread, not polyunsaturated   spreads containing 40% or less fat, not claiming to be high in polyunsaturated fatty acids

20 Margarine and other cooking fats and oils NOT polyunsaturated

20A Block margarine   all hard margarine

20B Soft margarine   tub margarine not claiming to be high in polyunsaturated fatty acids

20C Other cooking fats and oils, not polyunsaturated[2]   includes blended vegetable oil, suet, lard, compound cooking fat, dripping, olive oil, rapeseed oil

21 Reduced fat spread

21A Reduced fat spread, polyunsaturated   spreads containing more than 40% and less than 80 % fat, claiming to be high in polyunsaturated fatty acids

21B Reduced fat spread, not polyunsaturated   spreads containing more than 40% and less than 80% fat, not claiming to be high in polyunsaturated fatty acids; includes spreads made with olive oil or rapeseed oil

Food type: Fat spreads[2] (17-21)

22 Bacon and ham

22R Bacon and ham   including bacon and gammon joints, steaks, chops and rashers; all types of ham, pork shoulder, bacon and cheese grills

23 Beef, veal and dishes

23R Beef, veal and dishes   includes beef and veal joints, steaks, minced beef, stewing steak, beef stews, casseroles, meat balls, lasagne, chilli con carne, beef curry, bolognaise sauce, shepherds pie, canned beef

24 Lamb and dishes

24R Lamb and dishes   includes lamb joints, chops, cutlets, fillets, lamb curries, Irish stew, lamb casseroles and stews

25 Pork and dishes

25R Pork and dishes   includes joints, chops, steaks, belly rashers, pork stews and casseroles, sweet and sour pork, spare ribs, roast roll

26 Coated chicken and turkey

26R Coated chicken and turkey   chicken and turkey pieces coated in egg and crumb; drumsticks, nuggetts, fingers, burgers etc. Includes Kentucky fried chicken, chicken kiev

27 Chicken and turkey dishes

| 27R | Chicken and turkey dishes | includes roast chicken and turkey, barbecued, fried (no coating), curries, stews, casseroles, chow mein, tandoori, in sauce, spread, chicken/turkey roll |

28 Liver, liver products and dishes

| 28R | Liver, liver products and dishes | includes all types of liver - fried, stewed, braised, grilled; liver casserole, liver sausage, liver pate |

29 Burgers and kebabs

| 29R | Burgers and kebabs | includes beefburgers, hamburgers, cheeseburgers, (with or without roll) doner/shish/kofte kebabs (with or without pitta bread and salad), grillsteaks, steaklets |

30 Sausages

| 30R | Sausages | includes beef, pork, turkey sausages, polony, sausage in batter, saveloy, frankfurters, sausage dishes |

31 Meat pies and pastries

| 31R | Meat pies and pastries | any type of meat; includes chicken/turkey pies, vol-au-vents, beef pies, steak and kidney pudding, pork pies, veal and ham pie, pasties, sausage roll, meat samosas, pancake rolls |

32 Other meat and meat products

| 32R | Other meat and meat products | includes game (e.g. venison, grouse, rabbit, pheasant), duck, goose, all offal (except liver), faggots, black pudding, haggis, haslet, meat paste, tongue, luncheon meats, corned beef, salami, pepperami, meat loaf |

Food type: Meat and meat products (22-32)

33 White fish coated or fried

| 33R | White fish coated or fried | cod, haddock, plaice, etc. fried without coating, or coated in egg and crumb, batter or flour and fried, grilled or baked. includes fish fingers and fish cakes – fried and grilled, fried cartilaginous scampi, fillet-o-fish, cod roe, fried fish, prawn balls, fish feasts, fish pancakes |

34 Other white fish, shellfish and fish dishes

| 34A | Other white fish and fish dishes | cod, haddock, plaice etc. poached, steamed, baked, grilled, smoked, dried; includes curried fish, fish in sauce, fish pie, kedgeree |
| 34B | Shellfish | all types including mussels, prawns, crabs, shellfish dishes |

35 Oily fish

| 35R | Oily fish | includes herrings, kippers, mackerel, sprats, eels, herrings roe (baked, fried, grilled), salmon, tuna, sardines, trout, taramasalata, mackerel pate, fish paste |

Food type: Fish and fish dishes (33–35)

36 Salad and other raw vegetables

36A	Carrots raw	
36B	Salad and other vegetables (raw)	all types of raw vegetables, including coleslaw, fresh herbs. Not salads made with cooked vegetables or potato salad
36C	Tomatoes (raw)	

37 Vegetables (not raw)

37A	Peas (not raw)	includes canned, dried, mushy, frozen, mange tout, pease pudding canned
37B	Green beans (not raw)	includes French, runner, green beans, canned, frozen
37C	Baked beans	canned baked beans in sauce. includes baked beans with additions e.g. sausages, burgers, pasta
37D	Leafy green vegetables (not raw)	includes broccoli, spinach, cabbage (all types), brussels sprouts; fresh and frozen
37E	Carrots (not raw)	includes boiled, frozen, canned
37F	Tomatoes (not raw)	includes fried, grilled, canned, sundried tomatoes
37G	Vegetable dishes (not raw)	includes curries, pulse dishes, casseroles and stews, pies, vegetable lasagne, cauliflower cheese, vegieburgers, bubble and squeak, vegetable samosas, pancake rolls, ratatouille, vegetable fingers etc.
37R	Other vegetables (not raw)	includes lentils, dried beans and pulses, mushrooms, onion, aubergine, parsnips, sweetcorn, peppers, leeks, courgettes, cauliflower, mixed vegetables, TVP/soya mince, quorn, tofu

38 Chips, fried and roast potatoes and potato products

38A	Chips	fresh and frozen, including oven and microwave, French Fries
38B	Fried or roast potatoes and potato products	roast potato, fried sliced potato with or without batter, fried waffles, fried croquettes, crunchies, alphabites, fritters, hash browns,
38R	Potato products not fried	croquettes, waffles, fritters, hash browns, alphabites, ketchips, grilled or oven baked

39 Other potatoes, potato salads and dishes

| 39R | Other potatoes, potato salads and dishes | includes boiled, mashed, baked (with or without fat), canned, potato salad, instant potato, potato based curries, cheese and potato pie |

42 Crisps and savoury snacks

42R	Crisps and	includes all potato and cereal based savoury snacks, popcorn (not sweet), twiglets

Food type: Total vegetables (36–39 & 42)

40 Fruit

40A	Apples and pears not canned	includes raw, baked, stewed (with or without sugar), dried, apple sauce
40B	Citrus fruit not canned	includes oranges, grapefruit, limes, tangerines, ortaniques etc.
40C	Bananas	includes baked bananas, banana chips
40D	Canned fruit in juice	includes canned in water
40E	Canned fruit in syrup	
40R	Other fruit, not canned	includes plums, grapes, apricots (raw and stewed) etc. fruit pie fillings, dried fruit, fruit salad

56 Nuts and seeds

56R	Nuts and seeds	includes fruit and nut mixes, salted peanuts, peanut butter, tahini, bombay mix

Food type: Fruit and nuts (40 & 56)

41 Sugar, preserves and sweet spreads

41A	Sugar	all types, including golden syrup, fructose
41B	Preserves	includes jam, fruit spreads, marmalade, honey, lemon curd
41R	Sweet spreads, fillings, icings	includes ice-cream topping sauce, chocolate spread, mincemeat, glace cherries, mixed peel, icing, brandy/ rum butter, marzipan

43 Sugar confectionery

43R	Sugar confectionery	includes. boiled sweets, gums, pastilles, fudge, chews, mints, rock, liquorice, toffees, chewing gum, sweet popcorn, ice lollies (without ice-cream)

44 Chocolate confectionery

44R	Chocolate	includes chocolate bars, filled bars, assortments

Food type: Sugar, preserves and confectionery (41, 43 & 44)

45 Fruit juice

45R	Fruit juice	includes 100% single or mixed fruit juices, canned, bottled, cartons, carbonated, still, freshly squeezed, vegetable juice

46 Soft drinks

46A	Soft drinks, not diet/low calorie	carbonates, concentrated squashes and cordials, ready to drink fruit drinks, tonic water
46B	Diet / low calorie soft drinks	carbonates, concentrated squashes and cordials, ready to drink fruit drinks, slimline tonic water. includes sugar free / no added sugar products

47 Spirits and liqueurs

47A	Liqueurs	includes cream liqueurs, Pernod, Southern Comfort, Tia Maria, Cherry Brandy
47B	Spirits	70 % proof spirits – brandy, gin, rum, vodka, whisky

48 Wine

48A	Wine	white, red, sparkling, rose
48B	Fortified wine	port, sherry, champagne, vermouth
48C	Low alcohol and alcohol free wine	includes fruit juice and wine drinks

49 Beer, lager, cider and perry

49A	Beers and lagers	premium and non premium, stout, strong ale (bottled, draft and canned)
49B	Low alcohol and alcohol fre lager and beer	includes shandy
49C	Cider and perry	includes Babycham
49D	Low alcohol alcohol free cider and perry	

51 Tea, coffee and water

51A	Coffee (made up)	includes instant and leaf bean, decaffeinated, vending machine with whitener, coffee essence
51B	Tea (made up)	infusion, instant, decaffeinated, vending machine with whitener
51C	Herbal tea (made up)	
51D	Bottled water	includes carbonated and still, herbal tonics, (not sweetened drinks or tonic water)
51R	Tap water	

Food type: Total drinks (45-49 & 51)[3]

50 Miscellaneous

50A	Beverages[4] (dry weight)	includes drinking chocolate, cocoa, Ovaltine, Horlicks, malted drinks etc.
50B	Soups	includes homemade, dried, condensed, canned

558

50R	Savoury sauces, pickles, gravies, condiments	includes white sauces, cook in sauces, sauce mixes, tomato ketchup, pickles, chutney, stuffing, gravy, mayonnaise, salad cream, dried herbs, spices

55 Artificial sweeteners

55R	Artificial sweeteners	includes granulated table top sweeteners, tablet, liquid or mini cube sweeteners

Food type: Miscellaneous (50 & 55)

54 Dietary supplements

54A	Tablets and capsules	vitamin and mineral tablets and capsules; includes cod liver oil and other oil based capsules
54B	Oils and syrups	includes cod liver oil etc (not capsules), malt extract, multivitamin syrups, iron syrups and tonics
54C	Drops and powders	includes cold relief powders with vitamin C, laxative powders, multivitamin drops
54R	Nutritionally complete supplements	liquid or powdered supplement drinks containing protein / fat / carbohydrate plus vitamins / minerals. Includes Complan, Build Up, Fortisip, Ensure, Provide, Fresubin

References and notes

1 There have been some changes to the structure of the food groups since the last NDNS of children aged 1½–4½ years. The major changes are as follows:

- New food groups have been created for ice cream (53R) and nuts and seeds (56R);

- New sub-groups have been created for other dairy desserts (15R); vegetable dishes (37G); egg dishes (16B); low alcohol wine (48C); low alcohol lager (49B); low alcohol cider and perry (49D); beverages (dry weight) (50A); soups (50B)

- Groups 20 (margarine and other cooking fats and oils, not polyunsaturated) and 21 (reduced fat spread) have been redefined.

- Bottled water has been moved from soft drinks (46) to tea coffee and water (51)

- Dietary supplements (54) has been redefined.

2 Fats and oils used in cooking are reported with the food they are cooked with

3 Food Type 'Total drinks' does not include powdered beverages (group 50A).

4 Group 50A covers only the dry weight of the powdered beverage. The water or milk used to make up the beverage is reported elsewhere.

Appendix E:
Protocols for making anthropometric measurements

Appendix E

Protocols for making the anthropometric, blood pressure and hand grip strength measurements

1. Height

Height was measured with a portable, digital, telescopic stadiometer. The measurement was taken to the nearest millimetre.

The participant was asked to remove shoes. If the participant was wearing a temporary hairstyle that was above the top of the head and which would make the reading inaccurate, such as a bun, the nurse asked if it was possible to alter it.

The stadiometer was placed on a flat, hard surface, switched on and extended to allow sufficient room for the participant to stand underneath the headplate. The participant was asked to stand facing forward with feet flat on the base-plate, heels against the rod, back as straight as possible and arms hanging at the sides. The headplate was lowered to just above the participant's head which was then carefully positioned so that the Frankfort Plane was horizontal, in order to extend the participant to maximum height. To achieve this, the head was tilted forward until the top of the external ear canal and the top of the lower bone of the eye socket were on a plane parallel to the floor. *(Figure G1)*

Once in this position the participant was instructed to focus on a point straight ahead and to breathe in and stretch to their fullest height whilst maintaining the head in the Frankfort position. Where necessary, the nurse repeated the positioning procedure before lowering the headplate until it rested gently on the participant's head. The nurse asked the participant to indicate when the headplate was touching the top of the head if it was difficult to observe. The 'hold' key on the stadiometer was pressed to freeze the reading obtained. This allowed the headplate to be raised, and the person to move away whilst the measurement was recorded.
(Figure G2)

The measurement was performed once. The nurse was required to assess and record on the questionnaire if the measurement was unreliable for any reason, for instance if the respondent had a bent back or could not stand without wobbling a little. If no measurement was attempted, for example if the participant was unable to stand, the reason was recorded on the questionnaire.

2. Weight

Weight was measured using Soehnle Quantratronic digital personal scales to the nearest 100 grams. The scales were checked for accuracy at regular intervals during fieldwork and recalibrated as necessary.

The scales were placed on a hard level surface where possible, such as a tiled floor. The participant was asked to remove shoes, heavy outer garments, heavy jewellery and loose change and keys. The scales were turned on, and when a zero displayed, the participant was asked to step onto the scales. The nurse then asked the participant to stand facing forwards in the centre of the scales with heels against the back edge, and arms hanging at the sides. Posture was adjusted so that the participant stood as straight as possible, looking directly ahead to ensure that weight was evenly distributed. Once the display reading stabilised, the measurement was recorded on the questionnaire and the participant was asked to step off the scales.

The measurement was made once. The nurse was asked to assess the reliability of the measurement and to indicate whether the scales had been placed on a surface which was likely to affect the reading obtained, such as an uneven floor. The items of clothing worn by the respondent whilst being weighed were also recorded on the questionnaire. If no weight measurement was attempted, the reason for this was noted.

The procedures were revised during the survey to allow participants from institutions which possessed equipment for weighing a person while seated, to be weighed using this equipment if they were unable to stand. Measurements taken in this way were noted on the questionnaire. *(Figure G3)*

3. Demi-Span

The measure was made using a retractable demi-span tape with a hook attached to one end. Measurements were taken to the nearest even millimetre.

The right arm was used unless it could not be fully extended by the participant, in which case the left arm was used. Participants were asked to remove items of clothing which might distort the measurement, such as jackets, ties, jumpers or thick jewellery. Standing with back adjacent to the wall, the participant was asked to stretch the arm horizontally. The wrist was kept in neutral rotation and neutral inflexion. The nurse then supported the participant's arm in this position with her left wrist, located the centre of the sternal notch, and marked this point of the participant's skin using a dermatological pen. Where clothing made it impossible to mark the skin, the point was marked with adhesive tape.

Using the hook, one end of the demi-span tape was secured between the participant's middle and ring finger. The arm was then outstretched in the manner described above and the tape extended along the arm to the sternal notch. Before taking the reading, the nurse encouraged the participant to stretch the arm fully, without flexing the wrist or leaning to one side. The measurement was taken and recorded on the questionnaire. *(Figure G4)*

The measurement was repeated, and the second reading recorded. The nurse recorded any special circumstances which may have made the measurement unreliable, such as the participant being unable to stand parallel to a wall. In cases where the participant was chairbound or unsteady, the measurement could be taken with the person sitting or lying down. If the measurement had to be taken on the left arm, this was noted on the questionnaire.

4. Waist and Hip Circumferences

Waist and hip circumferences were measured twice using a tape with an insertion buckle at one end. Measurements were taken to the nearest even millimetre. No measurements were taken if the participant had a colostomy or ileostomy or was chairbound.

Participants were asked to remove any layers of outer clothing, such as cardigans, belts, high heeled shoes, and the contents of pockets, which might distort the measurements. The measurements were taken with the participant standing straight, with arms hanging at the sides. Where possible nurses took the measurements whilst sitting or kneeling at the person's side, at eye-level with the tape, so that it was possible to judge when it was horizontal. Any factor that was considered to have affected a measurement significantly was noted on the questionnaire.

To measure the waist, the tape was passed around the respondent and the plain end threaded through the buckle. The nurse located the point midway between the iliac crest and the costal margin (lower rib) using the fingers of the right hand. The participant was asked to breathe out gently, looking straight ahead. The circumference was measured at the end of normal expiration and recorded on the questionnaire. *(Figure G5)*

The same procedure was followed for measuring hip circumference. If the participant happened to be very large, the nurse asked him/her to pass the tape around themselves. The nurse located the widest circumference over the buttocks and below the iliac crest. To ensure this was accurate, several circumferences were measured until the widest was found. Care was taken to keep the tape horizontal, and not to pull it tightly enough to compress tissue, giving a distorted measurement. The measurement was recorded on the questionnaire. *(Figure G6)*

5. Mid-upper arm circumference

Measurements were made, using the same tape as for the waist and hip measurements, on the left arm wherever possible. The participant was asked to stand, with the arm bare, held with the elbow at 90 degrees and the lower arm across the body. The acromion process (top of left shoulder) and the olecranon process of the ulna (tip of the elbow) were marked with a dermatological marker pen. The distance between the two markings was then measured and the mid-point marked with the pen.

The participant was then asked to allow the arm to hang loosely at the side. The circumference of the arm was measured at the marked mid-point, ensuring the tape was horizontal, in contact with the arm around the entire circumference, and not pulled tightly enough to compress the tissue. The measurement was recorded on the questionnaire.

The measurement was repeated and recorded. The nurse assessed the reliability of the readings and recorded this on the questionnaire. *(Figure G7)*

6. Blood Pressure

This was measured using a Dinamap 8100 automated blood pressure monitor which was run on a rechargeable battery. Three readings were taken at one minute intervals for systolic, diastolic and mean arterial pressure (mmHg) and heart rate (beats per minute).

Measurements were taken on the right arm. The nurse measured the circumference of the upper right arm in order to select the correct sized cuff for the participant. Three different sizes were available - small (17-25cm), standard (23-33 cm), and large (31-40 cm). Where the circumference fell in the overlap between two sizes, the standard cuff was used. The cuff was connected via a pneumatic hose to the Dinamap, ensuring that the screw connectors were properly connected to avoid any air leak.

The measurements were timed so that wherever possible, the participant had not eaten, smoked or drunk alcohol in the preceding 30 minutes. If this was not possible, the nurse recorded details of the participant's food and alcohol consumption or smoking in the previous 30 minutes. The participant was asked to remove any outer garments (such as jackets) or roll up sleeves so that the arm was exposed and unconstricted. The participant was asked

to sit on a chair with the right arm supported on a surface so that the elbow was at approximately heart level and legs uncrossed. The nurse located the brachial pulse medial to the biceps tendon and positioned the cuff so that the arrow marked on the cuff rested over the brachial artery. The cuff was secured so that two fingers could be inserted between it and the participant's arm.

Before taking the measurement the nurse explained that it was necessary for the participant to sit and rest for five minutes without talking. After this interval, the monitor was switched on, and the cuff inflated. After the first reading was displayed, the Dinamap took two further readings at one minute intervals. *(Figure G8)*

Each reading was recorded on the questionnaire as it was taken. The Dinamap has a memory facility allowing the nurse to retrieve the previous set of readings if these needed to be checked. The nurse also recorded details of any difficulties which might have affected the measurements, including if the measurements had to be taken on the left arm.

The nurse commented on the blood pressure readings according to which of three bands they fell into. If all three readings were classified as severely raised or severely low (defined in chapter 2) the nurse was instructed to say to the participant: 'your blood pressure is a bit high/bit low today, I think we should let your GP know.' The GP and survey doctor were then contacted.

7. Grip Strength

Each hand was measured separately using a Handgrip Dynamometer, designed and built by the Department of Medical Physics at the Queen's Medical Centre, Nottingham. Grip strength was measured in kilograms to the nearest 100 grammes.

The dynamometer was connected to the mains electricity supply and switched on five minutes before taking the measurement, to allow time for it to stabilise. The 'Hold' control was selected to record the maximum grip strength obtained on each attempt.

The participant was seated with the forearm resting on a table, upper arm adducted against the body, and the elbow at 90 degrees. The wrist was held in neutral rotation, and slightly extended. The nurse adjusted the hand-set width to the correct size for the participant. This was achieved by varying the thickness of the hand-set attachments so that when held, the middle joint of the index finger formed a right angle. The participant was asked to remove any heavy rings which could cause discomfort or inhibit maximal effort.

The nurse explained the technique and demonstrated how the LED lights on the dynamometer illuminated with increased effort. The participant was asked to squeeze the handgrip for one submaximal practice, which was not recorded. Following this, the participant made two maximal attempts with each hand, beginning with the right hand, with two minutes rest between each attempt. The control was reset and switched back to 'Hold' after each attempt. The participant gripped the handpiece for three seconds whilst being given strong verbal encouragement from the nurse in order to produce reliable maximum effort.

Each measurement was recorded on the questionnaire. The degree of reliability of the readings for each hand was recorded. *(Figure G9)*
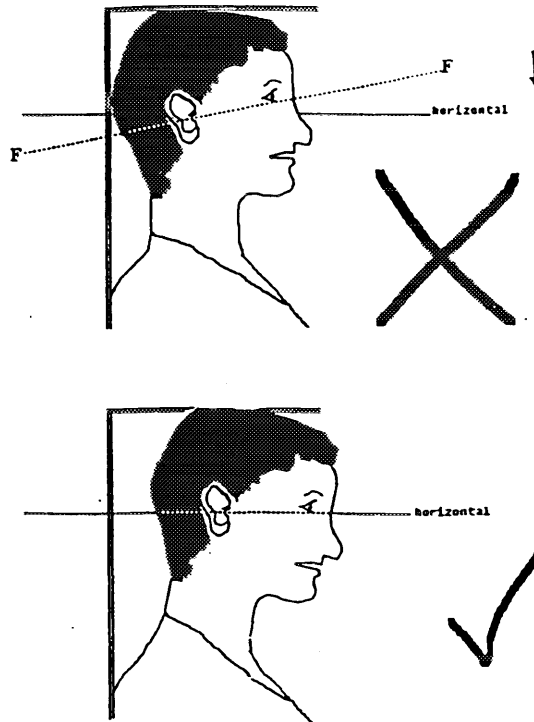
Figure G1   The Frankfort position of the head for measurement of height

Figure G2   Measurement of height

Figure G3   Measurement of weight

Figure G4   Measurement of demi-span

Figure G5   Measurement of waist circumference
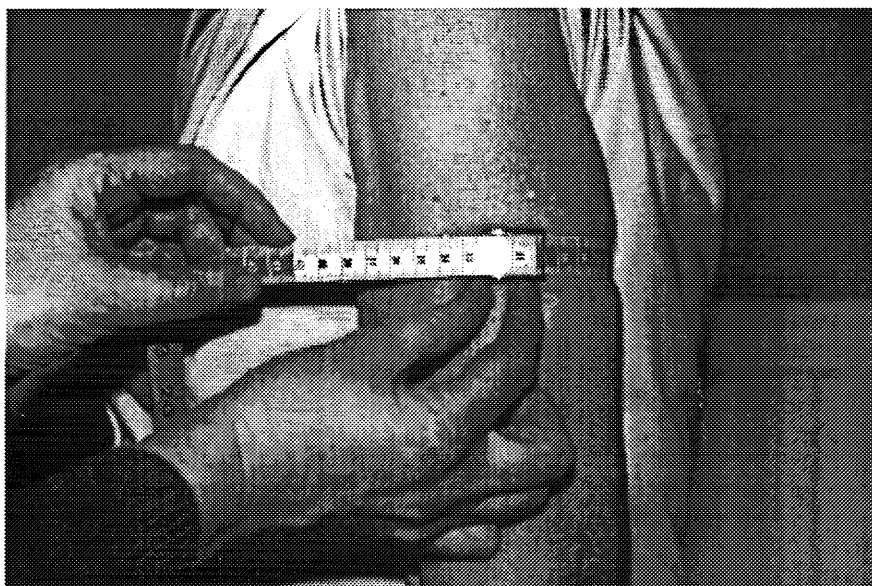

Figure G6   Measurement of hip circumference
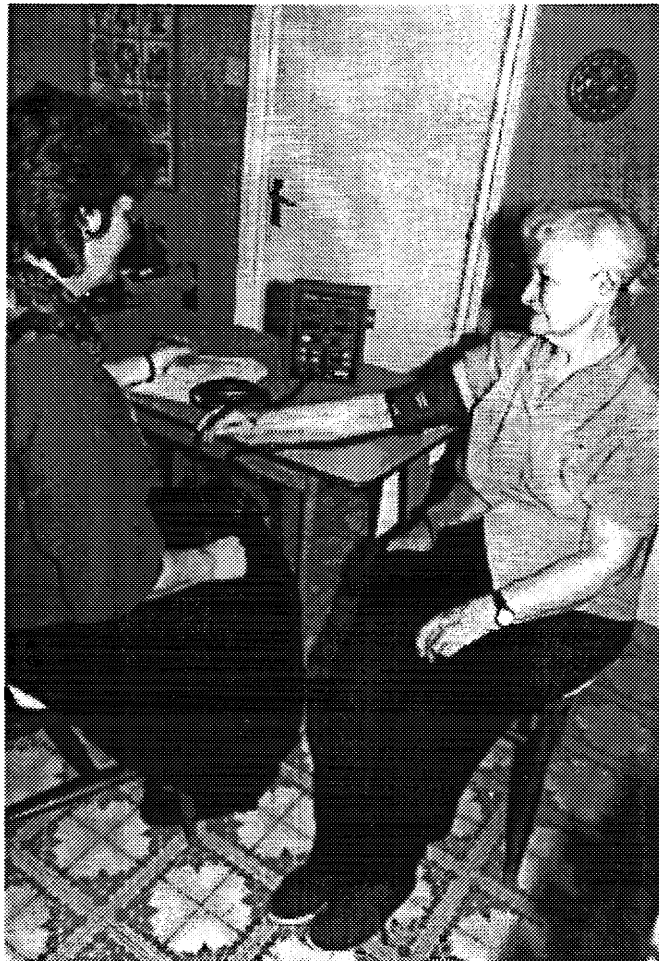

Figure G7   Measurement of mid-upper arm circumference

Figure G8   Measurement of blood pressure

Figure G9   Measurement of grip strength

```
APPENDIX F

Quantum code used to compute derived variables.

Code of the form:

fcode=c(5227,5230)

Sets the integer variable fcode (food code number) to the number in
columns 27-30 on record type 52. Record type 52 means records with
52 in columns 6-7. See section 4.2.2.

-----------------------------------------------------------------------
Quantum levels file to define the structure of the data:

ser=1,5
crd=6,7
max=59
person
cards=1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,21,22,23,24,27,28,29,30,31
,32,33,34,36,37,38,39,40,41,43,44,45,46,49,50,51,52,53,54,55,56,57,58,59
day cards=50 < person
plate cards=51 < day
food cards=52,53,54,55,56,57,58,59 < plate

-----------------------------------------------------------------------
The Quantum edit section:
/* lines beginning /* are comments
int serial 1
real gwt 107s
real adjwater 1
real fluid 1
real afluid 1
real gwtx 1
real dowwt 1
real prewt 1
real an 61s
int agefd 1
int agep 1
int age 1
int agen 1
int agefv 1
int agem 1
int ageb 1
real bmrn 1
real mjbmr 1
int m1a 1
int outc 1
int outcn 1
int phact 5s
int cereal 1
int dsupps 1
int ddays 1
int dayno 1
int ddate 1
int mdate 1
int pldayno 1
```

```
int plno 1
int pltime 1
real wtwater 1
int hour24 1
int teacof 1
int tcsug 1
int lastplat 1
real plwt 1
real plleft 1
int fdayno 1
int fplno 1
int fno 1
int ftime 1
int fcode 1
int presnut 1
int fhour 1
real foodwt 1
real totfwt 1
int fwtserv 1
int fbrandn 1
int dilut 1
int baseu 1
int map1 1
int pulse1 1
int syst1 1
int dias1 1
int map2 1
int pulse2 1
int syst2 1
int dias2 1
int map3 1
int pulse3 1
int syst3 1
int dias3 1
int bldvol 1
int med 99s
int medtot 1
int medcode 1
int q23n 1
int q25d 8s
int q25e 1
int q45n 1
real weight 1
real height 1
real demisp1 1
real demisp2 1
real demisp 1
real mindex 1
real demiq 1
real htodemi 1
real waist 3s
real hip 3s
real arm 2s
real muac 1
real rgrip 3s
real lgrip 3s
real grip   1
```

```
int blddate 1
int bldtime 1
int weedate 1
int weetime 1
int pblddate 1
int pbldtime 1
int pweedate 1
int pweetime 1
real GACr1 1
real GACl1 1
real GACr2 1
real GACl2 1
real GACr3 1
real GACl3 1
real GACr4 1
real GACl4 1
int country1 1
int country2 1
int country3 1
int country4 1
int resptime 1
int realtime 1
int respyob 1
int noxs 1
int Q103b_1 1
int Q103b_2 1
int Q103b_3 1
int Q103b_4 1
int Q103b_5 1
int Q111d 1
int Q130f 1
int Q5c_1a 1
int Q5c_1b 1
int Q5c_2a 1
int Q5c_2b 1
int Q5c_3a 1
int Q5c_3b 1
int Q5c_4a 1
int Q5c_4b 1
int Q5c_5a 1
int Q5c_5b 1
int age04 1
int age0515 1
int age1619 1
int age2029 1
int age3049 1
int age5064 1
int age6574 1
int age7584 1
int age85 1
int alcn 1
int alcna 1
int alone 1
int benefits 12
int pets 6
int dofint 1
int drink 6
```

```
int food4c 1599
int food6c 1599
int difchew 65s
int difdent 65s
int easchew 65s
int easdent 65s
int fv4_1b 1
int fv4_1c 1
int fv4_2b 1
int fv4_2c 1
int fv4_3b 1
int fv4_3c 1
int fv4_4b 1
int fv4_4c 1
int fv4_5b 1
int fv4_5c 1
int fvend 1
int fvlen 1
int fvtime 1
int gnut 1
int hhclas 1
int meninhh 1
int wominhh 1
int totinhh 1
int medtyp 17s
int hypoag 1
int diuretn 1
int mendtime 1
int mtime 1
int noadults 1
int oftfood3 65
int others 1
int partner 1
int pensions 10
int point 1
int region 1
int supps 7s
int supptot 1
int tofint 1
int unwell 3
int whatfood 65
int whtfood2 65
int whtfood3 65
int why 15
int why2 15
int q28_ 7s
real alcunit 1
int fgroup 1
int alcons 1
int fsgroup 1
real fooden 1
real anutp 63s
real anutpv 63s
real anutpm 63s
int folsup 1
int trim 63s
real kcsoup 5s
```

```
real kjsoup 5s
real kjoutp 2s
int kjear 1
real bmi 1
real metre 1
real nut 63s
real nutdv 63s
real nutg 56s
real nutgs 107s
real pctfe 63s
real pctte 63s
real permce 63s
real q27wt 1
real bp 3s
real whratio 1
real xtemp 1
int q31c 1
int q32 1
int q33 1
int q35 1
int q36c 1
int q53a 1
int q53c 1
int q55 1
int q61a 1
int q61b 1
int q63c 1
int q64 1
int dobf 1
int dobi 1
int typeill 15s
int qcodes  99s
int depress 1
real bowelm 1
real bowelmd 1
int cer 1
real pctsup  63s
real pctrni  63s
real pctrniv 63s

/* Computations done at person level
ed person
serial = c(101,105)
/* batchn=c(308,309)
/* filedef test.rep report
/* reportn test.rep $Serial=$,serial
outc=c(120,121)
outcn=c(215,216)
prewt=cx(381,386)
agep=c(188,190)
age=c(314,316)
agen=-1
if (c(3612,3614)u$   $) agen=c(3612,3614)
t13 = c(1314,1315)
t14 = c(1310,1311)
dobf = 100*t13 + t14
t13 = c(1342,1343)
```

```
t14 = c(1338,1339)
dobi = 100*t13 + t14
dofint = 10000*c(321,322) + 100*c(319,320) + c(317,318)
tofint = c(323,326)
ageb=c(2309,2311)
agefv=c(2709,2711)
agem=c(2409,2411)
ddays=0
dayno=0

/* set tobacco numerics
q31c=-1
if (c(946,947)u$  $) q31c=c(946,947)
q32=-1
if (c(948,949)u$  $) q32=c(948,949)
q33=-1
if (c(950,951)u$  $) q33=c(950,951)
q35=-1
if (c(966,967)u$  $) q35=c(966,967)
q36c=-1
if (c(970,971)u$  $) q36c=c(970,971)


/*
/*     Set numerics for visits to clinic
/*

if (c1708n'1') go to 1708
      if (c(1711,1712)u$  $) Q103b_1 = c(1711,1712); else; Q103b_1 = -1
      if (c(1715,1716)u$  $) Q103b_2 = c(1715,1716); else; Q103b_2 = -1
      if (c(1719,1720)u$  $) Q103b_3 = c(1719,1720); else; Q103b_3 = -1
      if (c(1723,1724)u$  $) Q103b_4 = c(1  723,1724); else; Q103b_4 = -1
      if (c(1727,1728)u$  $) Q103b_5 = c(1727,1728); else; Q103b_5 = -1
1708  continue

if (c1823n'1') go to 1823
      if (c(1832,1833)u$  $) Q111d = c(1832,1833); else; Q111d = -1
1823 continue

if (c1955n'1') go to 1955
      if (c(1956,1957)u$  $) Q130f = c(1956,1957); else; Q130f = -1
1955  continue

/*
/*     Set numerics for types of food no longer eaten (Q5c)
/*

if (c(412,413).gt.0) Q5c_1a = c(412,413); else; Q5c_1a = -1
if (c(414,415).gt.0) Q5c_1b = c(414,415); else; Q5c_1b = -1
if (c(417,418).gt.0) Q5c_2a = c(417,418); else; Q5c_2a = -1
if (c(419,420).gt.0) Q5c_2b = c(419,420); else; Q5c_2b = -1
if (c(422,423).gt.0) Q5c_3a = c(422,423); else; Q5c_3a = -1
if (c(424,425).gt.0) Q5c_3b = c(424,425); else; Q5c_3b = -1
if (c(427,428).gt.0) Q5c_4a = c(427,428); else; Q5c_4a = -1
if (c(429,430).gt.0) Q5c_4b = c(429,430); else; Q5c_4b = -1
if (c(432,433).gt.0) Q5c_5a = c(432,433); else; Q5c_5a = -1
if (c(434,435).gt.0) Q5c_5b = c(434,435); else; Q5c_5b = -1
```

```
/*
/*    Set point and region
/*
point = 0
region = 0

point = c(108,109)
if (point.in.(4,6,8,13,31,32,35,58,60)) region=1
if (point.in.(5,9,10,11,33,34,56,57,59)) region=2
if (point.in.(7,12,30)) region=3
if (point.in.(14,15,16,36,37,61,62)) region=4
if (point.in.(17,18,38,39,40,63)) region=5
if (point.in.(21,22,45,48,50)) region=6
if (point.in.(43,46,47,52,70,73,74,77)) region=7
if (point.in.(19,20,23:25,42,44,49,51,64,65,66,69,71,72,75,76,78,79)) region=8
if (point.in.(41,67,68)) region=9
if (point.in.(26,27,53,80)) region=10
if (point.in.(1,2,3,28,29,54,55)) region=11

/* record amounts drunk of each type
do 923 t1=911,923,2
t2=(t1-909)/2
q28_(t2)=-1
if (c(t1,t1+1)u$  $) q28_(t2)=c(t1,t1+1)
923 continue

/*
/*    Calculate units of alcohol
/*      alcna set if amount drink unknown for any drink
/*
alcunit = 0
alcna = 0
do 843 t1=843,847
/* set up weight factor to convert to weekly estimate
q27wt=0
if (c(t1)'12') q27wt=6.5
if (c(t1)'3') q27wt=3.5
if (c(t1)'4') q27wt=1.5
if (c(t1)'5') q27wt=0.375
if (c(t1)'6') q27wt=0.058
if (c(t1)'7') q27wt=0.029

/* set up t2 = 911,913,919,921,923
t2 = 911 + 2*(t1-843)
if (t1.gt.844) t2=t2+4

alcn=0
if (c(t2,t2+1).in.(1:50)) alcn=c(t2,t2+1)
/* select correct beer,lager etc fields
if (t1.eq.844.and.c(915,916).in.(1:50)) alcn=2*c(915,916)
if (t1.eq.844.and.c(917,918).in.(1:50)) alcn=c(917,918)

/* reportn test.rep $t1=$,t1,$q27wt=$,q27wt,$ alcn=$,alcn,$ alcunit=$,alcunit
alcunit=alcunit + q27wt*alcn
if (c(t2,t2+1).eq.99) alcna=1

843 continue
```

```
/* deal with any other codes
do 849 t1=851,857,3
/* set up weight factor to convert to weekly estimate
q27wt=0
if (c(t1)'12') q27wt=6.5
if (c(t1)'3') q27wt=3.5
if (c(t1)'4') q27wt=1.5
if (c(t1)'5') q27wt=0.375
if (c(t1)'6') q27wt=0.058
if (c(t1)'7') q27wt=0.029
/* set up t2 = 927,932,937
if (t1.eq.851) t2=927
if (t1.eq.854) t2=932
if (t1.eq.857) t2=937
alcn=0
if (c(t2,t2+1).in.(1:50)) alcn=c(t2,t2+1)
alcunit=alcunit + q27wt*alcn
/* if (c(t2,t2+1).eq.99) alcna=1
849 continue

if (alcna.eq.1) alcunit=-1
/* reportn test.rep $alcunit=$,alcunit,$ alcna=$,alcna

drink(1) = 0
drink(2) = 0
drink(3) = 0
drink(4) = 0
drink(5) = 0
drink(6) = 0

if (alcunit.gt.0.and.alcunit.lt.0.5) drink(1) = 1
if (alcunit.ge.0.5.and.alcunit.lt.10.5.and.c313'1')  drink(2) = 1
if (alcunit.ge.10.5.and.alcunit.lt.21.5.and.c313'1') drink(3) = 1
if (alcunit.ge.21.5.and.alcunit.lt.35.5.and.c313'1') drink(4) = 1
if (alcunit.ge.35.5.and.alcunit.lt.50.5.and.c313'1') drink(5) = 1
if (alcunit.ge.50.5.and.c313'1') drink(6) = 1
if (alcunit.ge.0.5.and.alcunit.lt.7.5.and.c313'2')   drink(2) = 1
if (alcunit.ge.7.5.and.alcunit.lt.14.5.and.c313'2')  drink(3) = 1
if (alcunit.ge.14.5.and.alcunit.lt.25.5.and.c313'2') drink(4) = 1
if (alcunit.ge.25.5.and.alcunit.lt.35.5.and.c313'2') drink(5) = 1
if (alcunit.ge.35.5.and.c313'2') drink(6) = 1

/*
q53c=-1
if (c(1211,1212)u$  $) q53c=c(1211,1212)

/*
/*    Whether unwell during diary period
/*
unwell(1)=0
unwell(2)=0
unwell(3)=0

t5 = 0
if (c(2758).eq.1) t5 = 1
if (c(2759).eq.1) t5 = 1
```

```
if (c(2761).eq.1) t5 = 1
if (c(2763).eq.1) t5 = 1
if (c(2765).eq.1) t5 = 1

t6 = 0
if (c(2760).eq.1) t6 = 1
if (c(2762).eq.1) t6 = 1
if (c(2763).eq.1) t6 = 1
if (c(2765).eq.1) t6 = 1

if (t5.eq.1.and.t6.eq.1) unwell(1) = 1
if (t5.eq.1.and.t6.eq.0) unwell(2) = 1
if (t5.eq.0) unwell(3) = 1

q55=-1
t13 = c(1314,1315)
t14 = c(1310,1311)
if (c(1314,1315)u$  $) q55 = 100*t13 + t14
q61a=-1
if (c(1333,1335)u$   $) q61a=c(1333,1335)
q61b=-1
t13 = c(1342,1343)
t14 = c(1338,1339)
if (c(1342,1343)u$  $) q61b = 100*t13 + t14
q63c=-1
if (c(1347,1348)u$  $) q63c=c(1347,1348)
q64=-1
if (c(1349,1350)u$  $) q64=c(1349,1350)

/*
/*     Pensions recieved
/*
pensions(1)=0
pensions(2)=0
pensions(3)=0
pensions(4)=0
pensions(5)=0
pensions(6)=0
pensions(7)=0
pensions(8)=0
pensions(9)=0
pensions(10)=0

do 1926 t1 = 1917,1925,2
      t2 = c(t1,t1+1)
      if (t2.in.(01:09)) pensions(t2) = 1; pensions(10) = 1
1926 continue

/*
/*     Number of adults in household
/*
noadults = 0
do 1278 t1 = 1222,1272,10
      if (c(t1,t1+2).in.(16:120)) noadults = noadults + 1
1278 continue

/*social class of head of household
```

```
hhclas=0
if (c102'2'.or.c(1227,1228)=$01$) hhclas=c1831
+else;hhclas=c1861

/*
/*      Benefits received
/*
benefits(1) = 0
benefits(2) = 0
benefits(3) = 0
benefits(4) = 0
benefits(5) = 0
benefits(6) = 0
benefits(7) = 0
benefits(8) = 0
benefits(9) = 0
benefits(10) = 0
benefits(11) = 0
benefits(12) = 0

do 1946 t1=1927,1945,2
      t2 = c(t1,t1+1)
      if (t2.in.(01:11)) benefits(t2) = 1; benefits(12) = 1
1946 continue

/*
/*      Ownership of pets
/*

do 1947 t1 = 1,6
      pets(t1) = 0
1947 continue

do 1948 t1 = 1327,1331
      t2 = c(t1)
      if (t2.in.(1:5)) set pets(t2) = 1; set pets(6) = 1
1948 continue
/*
/*      Set up type of supplements taken
/*
supps(1)=0
supps(2)=0
supps(3)=0
supps(4)=0
supps(5)=0
supps(6)=0
supps(7)=0
supptot=0

t1 = c642
if (t1.in.(1:7)) supps(t1) = supps(t1) + 1; supptot = supptot + 1
t1 = c662
if (t1.in.(1:7)) supps(t1) = supps(t1) + 1; supptot = supptot + 1
t1 = c722
if (t1.in.(1:7)) supps(t1) = supps(t1) + 1; supptot = supptot + 1
t1 = c742
if (t1.in.(1:7)) supps(t1) = supps(t1) + 1; supptot = supptot + 1
```

```
t1 = c762
if (t1.in.(1:7)) supps(t1) = supps(t1) + 1; supptot = supptot + 1


/*
/*     Preparing for the axes for question 4c of the main questionaire
/*

/* food4c index - 101:165,199 reason 1, 201:265,299 reason 2
/* 99 for reason recoded to 15. ie 1501:1565,1599
do 30 t1 = 1,1599
      food4c(t1) = 0
30 continue

do 31 t1 = 1,15
      why(t1) = 0
31 continue

do 32 t1 = 1,65
      whatfood(t1) = 0
/* difchew/dent set up for transfer of data for dental survey
      difchew(t1) = 0
      difdent(t1) = 0
      easchew(t1) = 0
      easdent(t1) = 0
32 continue

do 1000 t1 = 341, 365, 6
      if (.not.(c(t1,t1+1).in.(1:65))) go to 1001
      t10 = c(t1,t1+1)
      whatfood(t10) = 1
      t11 = c(t1+2,t1+3)
/*     record t11=99 - just to reduce array sizes
      if (t11.eq.99) t11=15
      if (t11.in.(1:15)) why(t11) = 1
      if (t10.lt.70) food4c((100*t11)+t10  ) = 1
/*     bits for dental transfer
      if (t11.eq.9) difchew(t10)=1
      if (t11.eq.10) difdent(t10)=1
      t11 = c(t1+4,t1+5)
      if (t11.eq.99) t11=15
      if (t11.in.(1:15)) why(t11) = 1
      if (t10.lt.70) food4c((100*t11)+t10) = 1
/*     bits for dental transfer
      if (t11.eq.9) difchew(t10)=1
      if (t11.eq.10) difdent(t10)=1
1001 continue
1000 continue

/*
/*     Add the codes for question 5, main questionaire, to those of
/*     the previous question
/*

/*filedef findat data len=4
t11 = 1
do 1002 t1 = 411, 431, 5
      if (c(t1)'1') why(t11)=1
```

```
      t10 = c(t1+1,t1+2)
      c(390,391)=c(t1+1,t1+2)
      c(392)=t11
      if (t10.in.(1:65)) food4c((t11*100)+t10) = 1
+          whatfood(t10) = 1
/* +        write findat c(390,392)
      t10 = c(t1+3,t1+4)
      c(390,391) = c(t1+3,t1+4)
      if (t10.in.(1:65)) f ood4c((t11*100)+t10) = 1
+          whatfood(t10) = 1
/* +        write findat c(390,392)
      t11 = t11+1
      if (t11.eq.3) t11 = 6
1002 continue

/*
/*    Preparing for the axes for question 6c of the main questionaire
/*

do 40 t1 = 1,1599
      food6c(t1) = 0
40 continue

do 41 t1 = 1,15
      why2(t1) = 0
41 continue

do 42 t1 = 1,65
      whtfood2(t1) = 0
42 continue

do 1010 t1 = 441, 465, 6
      if (.not.(c(t1,t1+1).in.(1:65))) go to 1011
      t10 = c(t1,t1+1)
      whtfood2(t10) = 1
      t11 = c(t1+2,t1+3)
        if (t11.eq.99) t11=15
      if (t11.le.15) why2(t11) = 1
      if (t10.lt.70) food6c((100*t11)+t10) = 1
/*      bits for dental transfer
        if(t11.eq.9) easchew(t10)=1
        if(t11.eq.10) easdent(t10)=1
      t11 = c(t1+4,t1+5)
        if (t11.eq.99) t11=15
      if (t11. le.15) why2(t11) = 1
      if (t10.lt.70) food6c((100*t11)+t10) = 1
/*      bits for dental transfer
        if(t11.eq.9) easchew(t10)=1
        if(t11.eq.10) easdent(t10)=1
1011 continue
1010 continue


q23n=-1
if(c(808,809)u$  $) q23n=c(808,809)

/* Q25 numbers of each medication type
```

```
do 838 t1=823,837,2
 t2=(t1-821)/2
 q25d(t2)=-1
 if(c(t1,t1+1)u$  $) q25d(t2)=c(t1,t1+1)
838 continue

q25e=-1
if(c(839,840)u$  $) q25e=c(839,840)

q45n=-1
if (c(1039,1048)=$ $) goto 1049
if (c(1039,1048)=$9999999999$) goto 1049
q45n=0
do 1048 t1=1039,1048
if (c(t1).eq.1) q45n=q45n+1
1048 continue
1049 continue
/*
/*    Data for Q74, Main questionaire
/*

do 50 t1 = 1,65
      whtfood3(t1)=0
      oftfood3(t1)=0
50 continue

do 51 t1 = 1438,1450,3
      t10 = c(t1,t1+1)
      t11 = c(t1+2)
      if (.not.(t10.in.(1:65))) go to 52
      whtfood3(t10) = 1
      oftfood3(t10) = t11
51 continue
52 continue

/*
/*    Compiling data for the household grid on the main questionaire
/*    (Question 54)
/*

alone=0
partner=0
others=0
meninhh=0
wominhh=0
totinhh=0
age04=0
age0515=0
age1619=0
age2029=0
age3049=0
age5064=0
age6574=0
age7584=0
age85=0

do 1300 t1=1221,1271,10
```

```
        if (c(t1)'1') meninhh=1
        if (c(t1)'2') wominhh=1
        if (c(t1)'129') totinhh=totinhh+1
        if (c(t1+4,t1+5)=$01$) go to 1300
        if (c(t1+4,t1+5).in.(02,03)) partner=1
        if (c(t1+4,t1+5).in.(04,09)) others=1
        if (c(t1+1,t1+3).in.(01:04)) age04 = age04 + 1
        if (c(t1+1,t1+3).in.(05:15)) age0515 = age0515 + 1
        if (c(t1+1,t1+3).in.(16:19)) age1619 = age16  19 + 1
        if (c(t1+1,t1+3).in.(20:29)) age2029 = age2029 + 1
        if (c(t1+1,t1+3).in.(30:49)) age3049 = age3049 + 1
        if (c(t1+1,t1+3).in.(50:64)) age5064 = age5064 + 1
        if (c(t1+1,t1+3).in.(65:74)) age6574 = age6574 + 1
        if (c(t1+1,t1+3).in.(75:84)) age758  4 = age7584 + 1
        if (c(t1+1,t1+3).in.(85:120)) age85 = age85 + 1
1300 continue

/* Physical activity measures
do 1500 t1=1,5
phact(1)=-1
1500 continue
/* sport
if (c(1536,1537).eq.6 .and.c1538.in.(1:5)) phact(1)=1;goto 1502
if (c(1521,1522).eq.1 .and.c1523.in.(1:5)) phact(1)=2;goto 1502
if (c(1524,1525).eq.2 .and.c1526.in.(1:5)) phact(1)=2;goto 1502
if (c(1533,1534).eq.5 .and.c1535.in.(1:5)) phact(1)=2;goto 1502
if (c(1539,1540).eq.7 .and.c1541.in.(1:5)) phact(1)=2;goto 1502
if (c(1527,1528).eq.3 .and.c1529.in.(1:5)) phact(1)=3;goto 1502
if (c(1530,1531).eq.4 .and.c1532.in.(1:5)) phact(1)=3;goto 1502
if (c(1542,1543).eq.8 .and.c1544.in.(1:5)) phact(1)=3;goto 1502
if (c(1545,1546).eq.9 .and.c1547.in.(1:5)) phact(1)=3;goto 1502
if (c(1548,1549).eq.10.and.c1550.in.(1:5)) phact(1)=3;goto 1502
if (c(1551,1552).eq.11.and.c1553.in.(1:5)) phact(1)=3;goto 1502
if ( (c1520'1'.and.phact(1).eq.-1).or.c1520'2') phact(1)=4
1502 continue

/* Home
if (c1569.eq.1.and.c1570.in.(1:7)) phact(2)=1;goto 1504
if (c1571.eq.1.and.c(1572,1573).in.(1:7)) phact(2)=2;goto 1504
if (c1569'2'.and.c1571'2') phact(2)=3
if (c1569'1'.and.c1570.in.(8,9)) phact(2)=3
if (c1571'1'.and.c1572.in.(8,9)) phact(2)=3
1504 continue

/* Garden
if (c1575.eq.1.and.c1576.in.(1:7)) phact(3)=1;goto 1506
if (c1577.eq.1.and.c1578.in.(1:7)) phact(3)=2;goto 1506
if (c1575'2'.and.c1577'2') phact(3)=3
if (c1575'1'.and.c1576.in.(8,9)) phact(3)=3
if (c1577'1'.and.c1578.in.(8,9)) phact(3)=3
1506 continue

/* Walks
if (c1512.eq.1.and.c1513.in.(1:7).and.c1519.in.(3:4)) phact(4)=1;goto 1508
if (c1512.eq.1.and.c1513.in.(1:7)) phact(4)=2;goto 1508
if ( (c1512.eq.1.and.c1513.in.(8:9)) .or.c1512'2') phact(4)=3;goto 1508
1508 continue
```

```
/* Maximum intensity of physical activity
if (phact(1).eq.1) phact(5)=1;goto 1510
if (phact(1).eq.2.or.phact(2).eq.1.or.phact(3).eq.1.or.phact(4).eq.1)
phact(5)=2;goto 1510
if (phact(1).eq.3.or.phact(2).eq.2.or.phact(3).eq.2.or.phact(4).eq.2)
phact(5)=3;goto 1510
if (phact(1).eq.4.and.phact(2).eq.3.and.phact(3).eq.3.and.phact(4).eq.3)
phact(5)=4
1510 continue

/*
/*     Blood pressure measurements from nurse schedule
/*

syst1=-1;syst2=-1;syst3=-1;dias1=-1;dias2=-1;dias3=-1
map1=-1;map2=-1;map3=-1;pulse1=-1;pulse2=-1;pulse3=-1
/*
if(c(3911,3913)u$ $) map1=c(3911,3913)
if(c(3914,3916)u$ $) syst1=c(3914,3916)
if(c(3921,3923)u$ $) pulse1=c(3921,3923)
if(c(3924,3926)u$ $) dias1=c(3924,3926)
if(c(3931,3933)u$ $) map2=c(3931,3933)
if(c(3934,3936)u$ $) syst2=c(3934,3936)
if(c(3941,3943)u$ $) pulse2=c(3941,3943)
if(c(3944,3946)u$ $) dias2=c(3944,3946)
if(c(3951,3953)u$ $) map3=c(3951,3953)
if(c(3954,3956)u$ $) syst3=c(3954,3956)
if(c(3961,3963)u$ $) pulse3=c(3961,3963)
if(c(3964,3966)u$ $) dias3=c(3964,3966)
/*
/* lista c(3911,3913) $MAP 1$
/* lista c(3921,3923) $Pulse 1$
/* lista c(3914,3916) $Systolic 1$
/* lista c(3924,3926) $Diastolic 1$
/* lista c(3931,3933) $MAP 2$
/* lista c(3941,3943) $Pulse 2$
/* lista c(3934,3936) $Systolic 2$
/* lista c(3944,3946) $Diastolic 2$
/* lista c(3951,3953) $MAP 3$
/* lista c(3961,3963) $Pulse 3$
/* lista c(3954,3956) $Systolic 3$
/* lista c(3964,3966) $Diastolic 3$

/*
/*
/* set bp syst and dias to average of readings 2 and 3 when available

/* get summary of values available
/*     Systolic blo od pressure
       bp(1)=-1;t10=0
       if (syst1.in.(1:500)) t10=4
       if (syst2.in.(1:500)) t10=t10+2
       if (syst3.in.(1:500)) t10=t10+1
       if (t10.in.(3,7)) bp(1) = (syst2+syst3)/2.0
       if (t10.eq.6)    bp(1) = syst2
       if (t10.eq.5)    bp(1) = syst3
```

```
/*      Diastolic b lood pressure
        bp(2)=-1;t10=0
        if (dias1.in.(1:500)) t10=4
        if (dias2.in.(1:500)) t10=t10+2
        if (dias3.in.(1:500)) t10=t10+1
        if (t10.in.(3,7)) bp(2) = (dias2+dias3)/2.0
        if (t10.eq.6)    bp(2) = dias2
        if (t10.eq.5)    bp(2) = dias3

/* mean blood pressure
        bp(3) = -1
          if (bp(1).gt.0.and.bp(2).gt.0) bp(3) = bp(2) + ((bp(1)-bp(2))/3.0)

/*
/*      Time and date of blood and urine samples from
/*      Nurse schedule
/*
blddate = -1; bldtime = -1; weedate = -1; weetime = -1
/*
if(c(4029,4034)u$ $) blddate = 10000*c(4033,4034)+100*c(4031,4032)+c(4029,4030)
if(c(4035,4038)u$ $) bldtime = c(4035,4038)
if(c(4045,4050)u$ $) weedate = 10000*c(4049,4050)+100*c(4047,4048)+c(4045,4046)
if(c(4051,4054)u$ $) weetime = c(4051,4054)

/* set columns to hold the values of the times and dates so that they
/* can be listed
c(4090,4095) = blddate
c(4096,4099) = bldtime
c(4190,4195) = weedate
c(4196,4199) = weetime
/*
/* lista c(4090,4095) $Date of blood sample$
/* lista c(4096,4099) $Time of blood sample$
/* lista c(4190,4195) $Date of urine sample$
/* lista c(4196,4199) $Time of urine sample$

/*
/*      Time and date of postage of blood and urine samples from
/*      Nurse schedule
/*
pblddate = -1; pbldtime = -1; pweedate = -1; pweetime = -1
/*
if(c(4155,4160)u$ $) pblddate = 10000*c(4159,4160)+100*c(4157,4158)+c(4155,4156)
if(c(4161,4164)u$ $) pbldtime = c(4161,4164)
if(c(4165,4170)u$ $) pweedate = 10000*c(4169,4170)+100*c(4167,4168)+c(4165,4166)
if(c(4171,4174)u$ $) pweetime = c(4171,4174)

/* set columns to hold the values of the times and dates so that they
/* can be listed
c(4090,4095) = pblddate
c(4096,4099) = pbldtime
c(4190,4195) = pweedate
c(4196,4199) = pweetime
/*
/* lista c(4090,4095) $Date of postage of blood sample$
/* lista c(4096,4099) $Time of postage of blood sample$
/* lista c(4190,4195) $Date of postage of urine sample$
```

```
/* lista c(4196,4199) $Time of postage of urine sample$


/*
/*     Countries lived in from nurse schedule
/*
country1=-1; country2=-1; country3=-1; country4=-1
/*
if(c(4136,4138)u$ $) country1=c(4136,4138)
if(c(4139,4141)u$ $) country2=c(4139,4141)
if(c(4142,4144)u$ $) country3=c(4142,4144)
if(c(4145,4147)u$ $) country4=c(4145,4147)
/*
/* lista c(4136,4138) $Country lived in 1$
/* lista c(4139,4141) $Country lived in 2$
/* lista c(4142,4144) $Country lived in 3$
/* lista c(4145,4147) $Country lived in 4$
/*
/*     Eye-test results from nurses Schedule
/*
GACr1=-1; GACl1=-1; GACr2=-1; GACl2=-1
GACr3=-1; GACl3=-1; GACr4=-1; GACl4=-1;
/*
if(c(4061,4062)u$ $) GACr1=c(4061,4062)/10.0
if(c(4064,4065)u$ $) GACl1=c(4064,4065)/10.0
if(c(4071,4072)u$ $) GACr2=c(4071,4072)/10.0
if(c(4074,4075)u$ $) GACl2=c(4074,4075)/10.0
if(c(4111,4112)u$ $) GACr3=c(4111,4112)/10.0
if(c(4114,4115)u$ $) GACl3=c(4114,4115)/10.0
if(c(4121,4122)u$ $) GACr4=c(4121,4122)/10.0
if(c(4124,4126)u$ $) GACl4=c(4124,4125)/10.0
/*
/* lista c(4061,4062) $GAC score 1, right eye$
/* lista c(4064,4065) $GAC score 1, left eye$
/* lista c(4071,4072) $GAC score 2, right eye$
/* lista c(4074,4075) $GAC score 2, left eye$
/* lista c(4111,4112) $GAC score 3, right eye$
/* lista c(4114,4115) $GAC score 3, left eye$
/* lista c(4121,4122) $GAC score 4, right eye$
/* lista c(4124,4125) $GAC score 4, left eye$
/*
/*     Physical measurements from nurse schedule
/*
weight=-1.0 ; height=-1.0 ; demisp1=-1.0;demisp2=-1.0
waist1=-1.0 ; waist2=-1.0 ; hip1=-1.0 ; hip2=-1.0 ; arm1=-1.0 ; arm2=-1.0
rgrip1=-1.0 ; rgrip2=-1.0 ; lgrip1=-1.0 ; lgrip2=-1.0 ; muac = -1.0
/*height in cm, weight in kgms demisp in cm
/*waist, hip and mid-upper arm circumferences in cms
/*grip strength in kilograms
if (c(3634,3637)u$ $) height=cx(3634,3637)/10.0
if (height.gt.250) height=-1
if (c(3653,3656)u$ $) weight=cx(3653,3656)/10.0
if (weight.gt.250) weight=-1

/* calculate bmrn - Basal Metabolic Rate
if(c313'1'.and.age.in.(60:74)) bmrn = 2.930 + 0.0499*weight
if(c313'1'.and.age.gt.74)      bmrn = 3.434 + 0.0350*weight
if(c313'2'.and.age.in.(60:74)) bmrn = 2.875 + 0.0386*weight
```

```
      if(c313'2'.and.age.gt.74)      bmrn = 2.610 + 0.0410*weight
      if (weight.eq.-1) bmrn=-1

      if (c(3756,3759)u$ $) demisp1=cx(3756,3759)/10.0
      if (c(3760,3763)u$ $) demisp2=cx(3760,3763)/10.0
      if (c(3808,3811)u$ $) waist1=cx(3808,3811)/10.0
      if (c(3812,3815)u$ $) waist2=cx(3812,3815)/10.0
      if (c(3823,3826)u$ $) hip1=cx(3823,3826)/10.0
      if (c(3827,3830)u$ $) hip2=cx(3827,3830)/10.0
      if (c(3838,3841)u$ $) arm1=cx(3838,3841)/10.0
      if (c(3842,3845)u$ $) arm2=cx(3842,3845)/10.0
      if (c(3853,3855)u$ $) rgrip1=cx(3853,3855)/10.0
      if (c(3856,3858)u$ $) rgrip2=cx(3856,3858)/10.0
      if (c(3859,3861)u$ $) lgrip1=cx(3859,3861)/10.0
      if (c(3862,3864)u$ $) lgrip2=cx(3862,3864)/10.0


/*
/*    Calculate grip strength - use highest for each hand and overall
/*


/* 6/11/96 - to reduce number of variables variable rgrip is now rgrip3
/*           and lgrip is lgrip3.
      rgrip3 = -1.0; lgrip3 = -1.0; grip = -1.0

      if (rgrip1.ge.0.and.rgrip1.lt.95) rgrip3 = rgrip1
      if (rgrip2.ge.0.and.rgrip2.lt.95.and.rgrip2.gt.rgrip3) rgrip3 = rgrip2

      if (lgrip1.ge.0.and.lgrip1.lt.95) lgrip3 = lgrip1
      if (lgrip2.ge.0.and.lgrip2.lt.95.and.lgrip2.gt.lgrip3) lgrip3 = lgrip2

      grip = rgrip3
      if (lgrip3.gt.grip) grip = lgrip3

/*
/*    Calculate Mid-upper arm circumference
/*

      if (arm1.gt.1.and.arm1.lt.100)  muac = arm1
      if (arm2.gt.1.and.arm2.lt.100) muac = arm2
      if (arm1.gt.1.and.arm1.lt.100.and.arm2.gt.1.and.arm2.lt.100)
+         muac = ((arm1+arm2)/2.0)

bldvol=-1
/* filedef height.lst report
/* if (c102'2') reportn height.lst $height=$,height,$ c3634-37=$,c3634:4
/* lista c(3634,3637) $Height$
/* lista c(3653,3656) $Weight$
/* lista c(3756,3759) $Demi-span 1$
/* lista c(3760,3763) $Demi-span 2$
/* lista c(3808,3811) $Waist circumference 1$
/* lista c(3812,3815) $Waist circumference 2$
/* lista c(3823,3826) $Hip circumference 1$
/* lista c(3827,3830) $Hip circumference 2$
/* lista c(3838,3841) $Arm circumference 1$
/* lista c(3842,3845) $Arm circumference 2$
/* lista c(3853,3855) $Right grip strength 1$
/* lista c(3856,3858) $Right grip strength 2$
```

```
/* lista c(3859,3861) $Left grip strength 1$
/* lista c(3862,3864) $Left grip strength 2$


/*
/*     Calculate waist-hip circumference
/*
whratio=0
waist3 = 0
hip3 = 0
t1 = 0
t2 = 0

if (waist1.gt.1.and.waist1.lt.700) waist3 = waist1; t1 = 1
if (waist2.gt.1.and.waist2.lt.700) waist3 = waist2; t2 = 1
if (t1.eq.1.and.t2.eq.1) waist3 = (waist1 + waist2) / 2.0
t1 = 0
t2 = 0
if (hip1.gt.1.and.hip1.lt.700) hip3 = hip1; t1 = 1
if (hip2.gt.1.and.hip2.lt.700) hip3 = hip2; t2 = 1
if (t1.eq.1.and.t2.eq.1) hip3 = (hip1 + hip2) / 2.0

if (waist3.gt.0.and.hip3.gt.0) whratio = waist3/hip3


/*
/* Calculate mean demispan, Mindex and Demiquet and height to demispan ratio
/*

demisp = -1
mindex = -1
demiq  = -1
htodemi  = -1
t1 = 0
t2 = 0

if (demisp1.ge.1.and.demisp1.le.900) demisp = demisp1; t1 = 1
if (demisp2.ge.1.and.demisp2.le.900) demisp = demisp2; t2 = 1
if (t1.eq.1.and.t2.eq.1) demisp = (demisp1 + demisp2) / 2.0

if (demisp.gt.0.and.weight.gt.0)
+     mindex = weight / (demisp / 1 00.0)
+     demiq  = weight / ((demisp/100.0)*(demisp/100.0))

if (demisp.gt.0.and.height.gt.0)
+     htodemi = height*10.0/demisp

/*
/*     Calculate body mass index
/*

bmi = -1
if (height.gt.1.and.height.lt.250.and.weight.gt.1.and.weight.lt.200)
+     metre = height/100.0
+     bmi = weight/(metre*metre)

/*
/*     Volume of blood taken during nurse survey
/*
```

```
if (c(4022,4023)u$ $) bldvol=c(4022,4023)
/* lista c(4022,4023) $Volume of blood obtained$

/* count numbers of each medicine taken and total number of medicines reported
/* eg med(14) records number of times respondent reported medicine code 14
/*   assumes respondent could code 14 more than once.
/* first initialise counts
medtot=0
do 4300 t1=1,99
med(t1)=0
4300 continue
/*initialise grouped medicine counts
do 4305 t1=1,17
medtyp(t1)=0
4305 continue
hypoag=0
diuretn=0

do 4310 t1=4311,4381,10 / 4511,4591,10
medcode = c(t1,t1+1)
/* if (medcode.in.(28,40,41)) reportn test.rep $Med code = $, medcode
if (medcode.in.(1:99)) med(medcode)=med(medcode)+1;medtot=medtot+1
/* group into therapy areas
if (medcode.in.(1:11)) medtyp(1)=medtyp(1)+1
if (medcode.in.(12,13)) medtyp(2)=medtyp(2)+1
if (medcode.eq.14) medtyp(3)=medtyp(3)+1
if (medcode.in.(15:19)) medtyp(4)=medtyp(4)+1
if (medcode.in.(20:21)) medtyp(5)=medtyp(5)+1
if (medcode.in.(22:24,26,37:39)) medtyp(6)=medtyp(6)+1
if (medcode.in.(28,40,41)) medtyp(7)=medtyp(7)+1
if (medcode.eq.29) medtyp(8)=medtyp(8)+1
if (medcode.in.(30:32)) medtyp(9)=medtyp(9)+1
if (medcode.eq.33) medtyp(10)=medtyp(10)+1
if (medcode.eq.34) medtyp(11)=medtyp(11)+1
if (medcode.eq.35) medtyp(12)=medtyp(12)+1
if (medcode.eq.36) medtyp(13)=medtyp(13)+1
if (medcode.eq.97) medtyp(14)=medtyp(14)+1
if (medcode.eq.98) medtyp(15)=medtyp(15)+1
if (medcode.eq.99) medtyp(16)=medtyp(16)+1
/* Special variable set up for Neil Poulter - CH11/extra.qt
if (medcode.in.(1:7)) hypoag=hypoag+1
/* Special variable set up for CH12 - axis diuret
if (medcode.eq.1) diuretn=1
4310 continue

if (hypoag.eq.0.and.c820'9') hypoag=-1
if (diuretn.eq.0.and.c820'9') diuretn=-1

do 4311 t1 = 1,16
     if (medtyp(t1).gt.0) medtyp(17) = 1
4311  continue
/*
/*    Date of memory questionaire
/*

mdate =-1
if(c(2412,2417)u$ $) mdate = 10000*c(2416,2417)+100*c(2414,2415)+c(2412,2413)
```

```
mtime = -1
if (c(2418,2421)u$ $) mtime = c(2418,2421)


/*
/*      Age respondent gives in memory questionaire
/*
m1a=-1
if(c(2422,2424)u$ $) m1a = c(2422,2424)


/*
/*      Time respondent gives and real time from memory questionaire
/*
resptime = -1; realtime = -1
/*
if(c(2426,2429)u$ $) resptime = c(2426,2429)
if(c(2431,2434)u$ $) realtime = c(2431,2434)


/*
/*      Year of birth given by respondent from memory questionaire
/*
respyob = -1
/*
if(c(2442,2445)u$ $) respyob=c(2442,2445)


/*
/*      Number of Xs in memory questionaire
/*
noxs = -1
/*
if(c(2452,2453)u$ $) noxs = c(2452,2453)


/*
/*      End of interview time, memory questionnaire
/*
mendtime = -1
/*
if (c(2455,2458)u$ $) mendtime = c(2455,2458)
/*
/*      Time of interview, final visit qu estionnaire
/*
fvtime = -1
/*
if (c(2713,2716)u$ $) fvtime = c(2713,2716)
/*
/*      Final visit questionnaire, Question 4b&c
/*
fv4_1b = -1; fv4_1c = -1
fv4_2b = -1; fv4_2c = -1
fv4_3b = -1; fv4_3c = -1
fv4_4b = -1; fv4_4c = -1
fv4_5b = -1; fv4_5c = -1
/*
if (c(2730,2731)u$ $) fv4_1b = c(2730,2731)
if (c2732n' ') fv4_1c = c2732
if (c(2733,2734)u$ $) fv4_2b = c(2733,2734)
if (c2735n' ') fv4_2c = c2735
if (c(2736,2737)u$ $) fv4_3b = c(2736,2737)
```

```
if (c2738n' ') fv4_3c = c2738
if (c(2739,2740)u$ $) fv4_4b = c(2739,2740)
if (c2741n' ') fv4_4c = c2741
if (c(2742,2743)u$ $) fv4_5b = c(2742,2743)
if (c2744n' ') fv4_5c = c2744

/*
/*     End time and length of interview for final visit questionnaire
/*
fvend = -1; fvlen = -1
/*
if (c(2841,2844)u$ $) fvend = c(2841,2844)
if (c(2845,2847)u$ $) fvlen = c(2845,2847)

/* edits for card 49 of food diary
/* date of first day of diary
ddate = 10000*c(4917,4918)+100*c(4913,4914)+c(4911,4912)
agefd=c(4920,4922)

/* initialise array to hold food sub group weights
do 4910 t1=1,107
gwt(t1)=0.0
4910 continue
/* adjwater same as gwt99 except water in made up foods excluded
adjwater=0.0;fluid=0

/* initialise arrays to hold food group/sub group for selected nutrient total
do 4911 t1=1,56
nutg(t1)=0
4911 continue
do 4912 t1=1,107
nutgs(t1)=0
4912 continue

cereal = 0
dsupps = 0

/*initialise average nutrient intakes - anutpv includes supplements
/*person totals calculated - converted to averages in endlevel person
do 4920 t1=1,63
anutp(t1) =0.0
anutpv(t1)=0.0
anutpm(t1)=0.0
trim(t1)=0
4920 continue
/* folsup is flag to record if folate supplements taken
folsup=0
/* variables for energy sources from food outside/ different sources
kjoutp(1)=0.0;kjoutp(2)=0.0
kjsoup(1)=0.0; kjsoup(2)=0.0; kjsoup(3)=0.0; kjsoup(4)=0.0 ; kjsoup(5)=0.0
kcsoup(1)=0.0; kcsoup(2)=0.0; kcsoup(3)=0.0; kcsoup(4)=0.0 ; kcsoup(5)=0.0
alcons=0

typeill1 =  -1; typeill2 =  -1; typeill3 =  -1; typeill4 =  -1; typeill5 =  -1;
typeill6 =  -1; typeill7 =  -1; typeill8 =  -1; typeill9 =  -1; typeill10 = -1;
typeill11 = -1; typeill12 = -1; typeill13 = -1; typeill14 = -1; typeill15 = -1;
```

```
      if (c(1610,1617)=$ $) go to 1618
           call edsub1(1610,1616,01,42,97,99)
           if (qcodes(34).or.qcodes(35).or.qcodes(36)) typeill  1 = 1
           if (qcodes(15).or.qcodes(16).or.qcodes(17).or.qcodes(18).or.
++             qcodes(19).or.qcodes(20).or.qcodes(21))
+              typeill2 = 1
           if (qcodes(22).or.qcodes(23).or.qcodes(24).or.qcodes(25)) typeill3 = 1
           if (qcodes(26).or.qcodes(27).or.qcodes(28).or.qco   des(29)) typeill4 = 1
           if (qcodes(2).or.qcodes(3)) typeill5 = 1
           if (qcodes(6).or.qcodes(7).or.qcodes(8)) typeill6 = 1
           if (qcodes(9).or.qcodes(10)) typeill7 = 1
           if (qcodes(11).or.qcodes(12).or.qcodes(13).or.qcodes(14)) typeill8 = 1
           if (qcodes(30).o r.qcodes(31).or.qcodes(32).or.qcodes(33)) typeill9 = 1
           if (qcodes(4).or.qcodes(5)) typeill10 = 1
           if (qcodes(39)) typeill11 = 1
           if (qcodes(01)) typeill12 = 1
           if (qcodes(38)) typeill13 = 1
           if (qcodes(37)) typeill14 = 1
           if (qcodes(40).or.qcodes(41 ).or.qcodes(42)) typeill15 = 1
1618  continue
/* edits for card 49 of food diary
/* date of first day of diary
ddate = 10000*c(4917,4918)+100*c(4913,4914)+c(4911,4912)
agefd=c(4920,4922)

/* cx(1975,1978):0=rgrip
/* if (c313'1') lista c(1975,1978) $Right hand grip strength - Males$
/* if (c313'2') lista c(1975,1978) $Right hand grip strength - Females$

/* cx(1975,1978):0=lgrip
/* if (c313'1') lista c(1975,1978) $Left hand grip strength - Males$
/* if (c313'2') lista c(1975,1978) $Left hand grip strength - Females$

/* cx(1975,1978):0=grip
/* if (c313'1') lista c(1975,1978) $grip strength - Males$
/* if (c313'2') lista c(1975,1978) $grip strength - Females$

/* c(1975,1980)=waist3
/* lista c(1975,1980) $Average waist size$
/* c(1975,1980)=hip3
/* lista c(1975,1980) $Average hip size$
/* c(1975,1980)=whratio*100
/* lista c(1975,1980) $Waist/hip ratio$
/* c(1975,1980)=demisp
/* lista c(1975,1980) $Average demispan$
/* c(1975,1980)=mindex*100
/* lista c(1975,1980) $mindex$
/* c(1975,1980)=demiq*100
/* lista c(1975,1980) $demiq$

        depress = -1
      if (.not.thisread23) go to 2229
/*
/*    Set up 'depress' the number of negative statements made
/*
        depress = 0
      if (c2215'2') depress = depress + 1
```

```
      if (c2216'1') depress =  depress + 1
      if (c2217'1') depress = depress + 1
      if (c2218'1') depress = depress + 1
      if (c2219'2') depress = depress + 1
      if (c2220'1') depress = depress + 1
      if (c2221'2') depress = depress + 1
      if (c2222'1') depress = depress + 1
      if (c2223'1')  depress = depress + 1
      if (c2224'1') depress = depress + 1
      if (c2225'2') depress = depress + 1
      if (c2226'1') depress = depress + 1
      if (c2227'2') depress = depress + 1
      if (c2228'1') depress = depress + 1
      if (c2229'1') depress = depress + 1
2229 continue
/*
/*    Calculate 'bowelm', the average number of bowel movements per week
/*

      bowelm = -1.0

      if (.not.thisread23) go to 1619
           t2 = 0
           t3 = 0
           do 1620 t1=2312,2318
                if (c(t1).in.(0:8))
+                     t2 = t2 + c(t1)
+                     t3 = t3 + 1
1620  continue
      if (t3.gt.0)
+          bowelm = (t2*7.0)/(t3*1.0)
+          bowelmd = t2/(t3*1.0)
+     else
+          bowelm = -1.0
+          bowelmd = -1.0
1619  continue


do 3100 t1=1,61
  an(t1)= -1.0
3100 continue

if (.not.thisread31) goto 3200
an(1) = cx(3110,3113)
an(2) =   c(3114,3116)
an(3) = cx(3117,3121)
an(4) = cx(3122,3126)
an(5) = cx(3127,3132)
an(6) = cx(3133,3136)
an(7) = cx(3137,3140)
an(8) = cx(3141,3146)
an(9) = cx(3147,3152)
an(10) = cx(3153,3157)
an(11) = cx(3158,3162)
an(12) = cx(3163,3167)
an(13) = cx(3168,3171)
an(14) = cx(3172,3175)
```

```
an(15) = cx(3176,3180)
an(16) =  c(3181,3184)
an(17) = cx(3185,3189)
an(18) =  c(3190,3194)
/* derived analytes for tables
if (an(5).gt.0.and.an(1).ge.0) an(54) = an(1)/an(5)

3200 continue

if (.not.thisread32) goto 3300
an(19) = cx(3208,3211)
an(20) = cx(3212,3216)
an(21) = cx(3217,3221)
an(22) = cx(3222,3226)
an(23) = cx(3227,3233)
an(24) = cx(3234,3238)
an(25) = cx(3239,3243)
an(26) = cx(3244,3248)
an(27) = cx(3249,3252)
an(28) = cx(3253,3256)
an(29) = cx(3257,3260)
an(30) = cx(3261,3265)
an(31) = cx(3266,3269)
an(32) = cx(3270,3273)
an(33) = cx(3274,3278)

3300 continue
if (.not.thisread33) goto 3400
an(34) = cx(3308,3311)
an(35) = cx(3312,3316)
an(36) = cx(3317,3320)
an(37) = cx(3321,3324)
an(38) = c(3325,3327)
an(39) = c(3328,3330)
an(40) = c(3331,3333)
an(41) = c(3334,3335)
an(42) = cx(3336,3340)

3400 continue
if (.not.thisread34) goto 3498
an(43) = c(3408,3411)
an(44) = cx(3412,3416)
an(45) = cx(3417,3422)
an(46) = cx(3423,3428)
an(47) = cx(3429,3433)
an(48) = cx(3434,3439)
an(49) = cx(3440,3445)
an(50) = cx(3446,3451)
an(51) = cx(3452,3457)
an(52) = cx(3458,3463)
an(53) = cx(3464,3469)
an(56) = cx(3470,3474)
an(57) = cx(3475,3478)
an(59) = cx(3480,3486)
an(60) = cx(3487,3493)

3498 continue
```

```
/* remember to do these an calcs outside the skips above!
if (an(19).ge.0.and.an(22).ge.0) an(55) = an(19)-an(22)
if (an(19).ge.0.and.an(46).ge.0.and.an(47).gt.0) an(58) = (an(46)+an(47))/an(19)
if (an(38).ge.0.and.an(40).gt.0) an(61) = an(38)/an(40)

/* set certain analytes to missing - see letter 6/11/96 from the Dunn
c199=$ $
call fetch($../IN/anbad.fet$,c101,c199)
if(c199u$1$) goto 3499
an(4)=-9;an(7)=-9;an(8)=-9;an(9)=-9;an(10)=-9;an(13)=-9;an(18)=-9
3499 continue
return

/* Computations done at day level
level day
ddays=ddays+1
dayno=c5008
/* initialise daily nutrient totals. nutdv INCLUDES vitamin supplement
do 5000 t1=9,63
nutdv(t1)=0
5000 continue
/*initialise lastplat - last plate in day
lastplat=0
pltime=0
return

/* Computations done at plate level
level plate
/*pldayno, plno etc set up so that available if nqtspss used to transfer
/*to maff. These enable the plate level to be referenced from food serial
/*Not really needed in quanvert at food level but duplicated
/*for any linking MAFF may need to do. Probably best to give MAFF the
/*raw food data.

/*day number of plate
pldayno=c5108
/*plate number within day
plno=c(5109,5110)
/*plate time
pltime=c(5113,5116)
/*plate weight
plwt=cx(5117,5120)
/*weight left on plate
plleft=cx(5121,5125)-plwt
/* last plate in day
lastplat=pltime
/* weight of tap water - added from water.fet. Use to convert tea/coff/cordials
/* to made up weights.
wtwater=0.0
wtwater=cx(5146,5150)
return

/* Computations done at food level
level food
/*day number of food
fdayno=c5208
/*plate number within day
```

```
fplno=c(5209,5210)
/*food number within plate
fno=c(5211,5212)
/*plate time
ftime=c(5213,5216)
/* Wts - cumulative weight served not needed c(17,20)
/* c(22,25) is 9999 if any left over food
fcode=c(5227,5230)
foodwt=cx(5231,5235)

/* weight served - blank unless leftovers
fwtserv=cx(5245,5249)
/*set weight served to weight eaten if not set
if (fwtserv .eq. 0) fwtserv=foodwt
fbrandn=c(5238,5241)
/* set values from nutrient database
/* food alpha only set up for quanvert run
/* call lalpha(4,$food$,c5360,40)
dilut=c(5348,5352)
baseu=c(5322,5325)
/* reportn temp $serial=$,serial,$ food=$,foodno,$ base=$,baseu

/* set food group
fgroup = c(5317,5318)
fsgroup=0
/* set food sub group
if (c(5317,5319)=$ 1A$) fsgroup=1
if (c(5317,5319)=$ 1B$) fsgroup=2
if (c(5317,5319)=$ 1C$) fsgroup=3
if (c(5317,5319)=$ 1R$) fsgroup=4
if (c(5317,5319)=$ 2R$) fsgroup=5
if (c(5317,5319)=$ 3R$) fsgroup=6
if (c(5317,5319)=$ 4A$) fsgroup=7
if (c(5317,5319)=$ 4R$) fsgroup=8
if (c(5317,5319)=$ 5R$) fsgroup=9
if (c(5317,5319)=$ 6R$) fsgroup=10
if (c(5317,5319)=$ 7R$) fsgroup=11
if (c(5317,5319)=$ 8A$) fsgroup=12
if (c(5317,5319)=$ 8R$) fsgroup=13
if (c(5317,5319)=$ 9A$) fsgroup=14
if (c(5317,5319)=$ 9B$) fsgroup=15
if (c(5317,5319)=$ 9R$) fsgroup=16
if (c(5317,5319)=$10R$) fsgroup=17
if (c(5317,5319)=$11R$) fsgroup=18
if (c(5317,5319)=$12R$) fsgroup=19
if (c(5317,5319)=$13B$) fsgroup=20
if (c(5317,5319)=$13R$) fsgroup=21
if (c(5317,5319)=$14A$) fsgroup=22
if (c(5317,5319)=$14R$) fsgroup=23
if (c(5317,5319)=$15A$) fsgroup=24
if (c(5317,5319)=$15B$) fsgroup=25
if (c(5317,5319)=$15R$) fsgroup=26
if (c(5317,5319)=$53R$) fsgroup=27
if (c(5317,5319)=$16A$) fsgroup=28
if (c(5317,5319)=$16B$) fsgroup=29
if (c(5317,5319)=$17R$) fsgroup=30
if (c(5317,5319)=$18A$) fsgroup=31
```

```
if (c(5317,5319)=$18B$) fsgroup=32
if (c(5317,5319)=$19A$) fsgroup=33
if (c(5317,5319)=$19R$) fsgroup=34
if (c(5317,5319)=$20A$) fsgroup=35
if (c(5317,5319)=$20B$) fsgroup=36
if (c(5317,5319)=$20C$) fsgroup=37
if (c(5317,5319)=$21A$) fsgroup=38
if (c(5317,5319)=$21B$) fsgroup=39
if (c(5317,5319)=$22R$) fsgroup=40
if (c(5317,5319)=$23R$) fsgroup=41
if (c(5317,5319)=$24R$) fsgroup=42
if (c(5317,5319)=$25R$) fsgroup=43
if (c(5317,5319)=$26R$) fsgroup=44
if (c(5317,5319)=$27R$) fsgroup=45
if (c(5317,5319)=$28R$) fsgroup=46
if (c(5317,5319)=$29R$) fsgroup=47
if (c(5317,5319)=$30R$) fsgroup=48
if (c(5317,5319)=$31R$) fsgroup=49
if (c(5317,5319)=$32R$) fsgroup=50
if (c(5317,5319)=$33R$) fsgroup=51
if (c(5317,5319)=$34B$) fsgroup=52
if (c(5317,5319)=$34A$) fsgroup=53
if (c(5317,5319)=$35R$) fsgroup=54
if (c(5317,5319)=$36A$) fsgroup=55
if (c(5317,5319)=$36B$) fsgroup=56
if (c(5317,5319)=$36C$) fsgroup=57
if (c(5317,5319)=$37A$) fsgroup=58
if (c(5317,5319)=$37B$) fsgroup=59
if (c(5317,5319)=$37C$) fsgroup=60
if (c(5317,5319)=$37D$) fsgroup=61
if (c(5317,5319)=$37E$) fsgroup=62
if (c(5317,5319)=$37F$) fsgroup=63
if (c(5317,5319)=$37G$) fsgroup=64
if (c(5317,5319)=$37R$) fsgroup=65
if (c(5317,5319)=$38A$) fsgroup=66
if (c(5317,5319)=$38B$) fsgroup=67
if (c(5317,5319)=$38R$) fsgroup=68
if (c(5317,5319)=$39R$) fsgroup=69
if (c(5317,5319)=$42R$) fsgroup=70
if (c(5317,5319)=$40A$) fsgroup=71
if (c(5317,5319)=$40B$) fsgroup=72
if (c(5317,5319)=$40C$) fsgroup=73
if (c(5317,5319)=$40D$) fsgroup=74
if (c(5317,5319)=$40E$) fsgroup=75
if (c(5317,5319)=$40R$) fsgroup=76
if (c(5317,5319)=$56R$) fsgroup=77
if (c(5317,5319)=$41A$) fsgroup=78
if (c(5317,5319)=$41B$) fsgroup=79
if (c(5317,5319)=$41R$) fsgroup=80
if (c(5317,5319)=$43R$) fsgroup=81
if (c(5317,5319)=$44R$) fsgroup=82
if (c(5317,5319)=$45R$) fsgroup=83
if (c(5317,5319)=$46A$) fsgroup=84
if (c(5317,5319)=$46B$) fsgroup=85
if (c(5317,5319)=$47A$) fsgroup=86
if (c(5317,5319)=$47B$) fsgroup=87
if (c(5317,5319)=$48A$) fsgroup=88
```

```
if (c(5317,5319)=$48B$) fsgroup=89
if (c(5317,5319)=$48C$) fsgroup=90
if (c(5317,5319)=$49A$) fsgroup=91
if (c(5317,5319)=$49B$) fsgroup=92
if (c(5317,5319)=$49C$) fsgroup=93
if (c(5317,5319)=$49D$) fsgroup=94
if (c(5317,5319)=$51A$) fsgroup=95
if (c(5317,5319)=$51B$) fsgroup=96
if (c(5317,5319)=$51C$) fsgroup=97
if (c(5317,5319)=$51D$) fsgroup=98
if (c(5317,5319)=$51R$) fsgroup=99
if (c(5317,5319)=$50A$) fsgroup=100
if (c(5317,5319)=$50B$) fsgroup=101
if (c(5317,5319)=$50R$) fsgroup=102
if (c(5317,5319)=$54A$) fsgroup=103
if (c(5317,5319)=$54B$) fsgroup=104
if (c(5317,5319)=$54C$) fsgroup=105
if (c(5317,5319)=$54R$) fsgroup=106
if (c(5317,5319)=$55R$) fsgroup=107
gwt(fsgroup)=gwt(fsgroup)+foodwt
/* adjwater is weight of water excluding that contributing to made up weights
/*calculated below. adjwater is same as gwt99 except for foods converted to made
/*up weights below. Note fcode=5000 only food in subgroup 51R
if (fcode.eq.5000) adjwater=adjwater+foodwt

/* set flag to indiate alcohol consumer
if (fsgroup.in.(86:94)) alcons=1

/* adjust to weight served by adding tap water. ie convert to made
/* up weight. Tap water weight stored at plate level.
/* tea/coffee
if (fcode.in.(2304,2308,2316,8314,8318)) gwt(fsgroup)=gwt(fsgroup) + wtwater
+adjwater=adjwater-wtwater
/* squash/cordials undiluted
if (fcode.in.(2331,2346,2348,2349,2351)) gwt(fsgroup)=gwt(fsgroup) + wtwater
+adjwater=adjwater-wtwater
if (fcode.in.(2353,2651,7906,7911,7913:7915))gwt(fsgroup)=gwt(fsgroup) + wtwater
+adjwater=adjwater-wtwater
if (fcode.in.(7917,7919,8458,8460,8462)) gwt(fsgroup)=gwt(fsgroup) + wtwater
+adjwater=adjwater-wtwater
if (fcode.in.(8464,8466,8468,8471,8485)) gwt(fsgroup)=gwt(fsgroup) + wtwater
+adjwater=adjwater-wtwater
if (fcode.in.(8491,8608,8610,8616,8706)) gwt(fsgroup)=gwt(fsgroup) + wtwater
+adjwater=adjwater-wtwater
if (fcode.in.(8760,8788,8791,8792,8850)) gwt(fsgroup)=gwt(fsgroup) + wtwater
+adjwater=adjwater-wtwater
if (fcode.in.(9005,9170,9183,9187)) gwt(fsgroup)=gwt(fsgroup) + wtwater
+adjwater=adjwater-wtwater

/* if (c(5317,5318)=$46$) write test.dat c(5301,5380)
/* if (c(5317,5318)=$46$) reportn test.rep $group=$,fgroup,$ fsgroup=$,fsgroup,$
$,c5201:16

/* set nutrient values per unit of measure
do 454 t1=5416,5488,8
t2 = 7 + (t1-5400)/8
nut(t2)=cx(t1,t1+7)
```

```
      454 continue

      do 455 t1=5516,5588,8
      t2 = 17 + (t1-5500)/8
      nut(t2)=cx(t1,t1+7)
      455 continue

      do 456 t1=5616,5688,8
      t2 = 27 + (t1-5600)/8
      nut(t2)=cx(t1,t1+7)
      456 continue

      do 457 t1=5716,5788,8
      t2 = 37 + (t1-5700)/8
      nut(t2)=cx(t1,t1+7)
      457 continue

      do 458 t1=5816,5888,8
      t2 = 47 + (t1-5800)/8
      nut(t2)=cx(t1,t1+7)
      458 continue

      do 459 t1=5916,5948,8
      t2 = 57 + (t1-5900)/8
      nut(t2)=cx(t1,t1+7)
      459 continue

      /* set up filter to exclude certain food codes - prescribed supplements
      /* Note that anutpv used for most analyses will now exclude these codes
      presnut=0
      if
      (fcode.in.(9046,9302,9500:9505,9507,9512,9592,9599,9657,9658,9665,9694,9714,9765
      ,9784,9857,9958,9979)) presnut=1
      if (fcode.in.(9502,9658)) folsup=1

      /* calculate nutrient values - per food and daily total
      /* anutd excludes vitamin supplement, excludes prescribed supplement codes
      /* anutpv includes vitamin supplement, excludes prescribed supplements
      /* anutpm includes prescribed supplement food codes - ie all codes
      /* anutpv holds values usually included in tables
      /*keep daily totals (nutdv) and person level totals (anutp,anutpv,anutpm)
      /*anutp totals are later converted to daily averages.
      do 499 t1=9,63
      if(baseu.gt.0) nut(t1) = (nut(t1)*foodwt)/baseu
      anutpm(t1) = anutpm(t1) + nut(t1)
      if (presnut.eq.0)
      + nutdv(t1) = nutdv(t1) + nut(t1)
      + anutpv(t1) = anutpv(t1) + nut(t1)
      if (c(5317,5318)u$54$.and.presnut.eq.0)
      + anutp(t1) = anutp(t1) + nut(t1)
      499 continue

      if (c(5317,5318)=$54$) dsupps = 1
      if (c(5317,5318)=$ 5$.or.c(5317,5318)=$ 6$) cereal = cereal + 1

      /* now store energy from food outside home and from other sources
      /* used in tables 5i and 5j in original spec
```

```
if (c5243'1') kjoutp(1)=kjoutp(1) + nut(14)
if (c5243'2') kjoutp(2)=kjoutp(2) + nut(14)


if (c5237'1') kcsoup(1)=kcsoup(1) + nut(13)
if (c5237'2') kcsoup(2)=kcsoup(2) + nut(13)
if (c5237'3') kcsoup(3)=kcsoup(3) + nut(13)
if (c5237'4') kcsoup(4)=kcsoup(4) + nut(13)
if (c5237'5') kcsoup(5)=kcsoup(5) + nut(13)


if (c5237'1') kjsoup(1)=kjsoup(1) + nut(14)
if (c5237'2') kjsoup(2)=kjsoup(2) + nut(14)
if (c5237'3') kjsoup(3)=kjsoup(3) + nut(14)
if (c5237'4') kjsoup(4)=kjsoup(4) + nut(14)
if (c5237'5') kjsoup(5)=kjsoup(5) + nut(14)

/* select nutrient to be used in food type tables
/* controlled by s_gnut
/* grpnut.icl is specific for each nutrient. energy example shown below
/* gnut = 14
/* template for creating include file setgnut.icl
/* sets nutrient to be used for food type tables
gnut=14

/* Vitamin A
nut(3) = nut(29) + nut(30)/6.0
/* nutg(1...56) stores total selected nutrient  for each food group
nutg(fgroup) = nutg(fgroup) + nut(gnut)
/* nutgs(1...107) stores total selected nutrient for each food sub-group
nutgs(fsgroup) = nutgs(fsgroup) + nut(gnut)
return

/* Computations done when all records for a day have been processed
endlevel day
/* last plate in day
if (ddays.eq.0) lastplat=-1
lastplat=pltime
return

/* Computations done when all records for a person have been processed
endlevel person
totfwt = -1
if (ddays.eq.0) goto 4999

/* adjust food sub group weights by 7/number of diary days completed
/* to get 7 day estimate
do 4910 t1=1,107
gwt(t1)=gwt(t1)*7.0/ddays
totfwt = totfwt + gwt(t1)
4910 continue
adjwater=adjwater*7.0/ddays
fluid=gwt(17)+gwt(18)+gwt(19)+gwt(21)+gwt(83)+gwt(84)+gwt(85)+gwt(86)+gwt(87)
fluid=fluid+gwt(88)+gwt(89)+gwt(90)+gwt(91)+gwt(92)+gwt(93)+gwt(94)+gwt(95)
fluid=fluid+gwt(96)+gwt(97)+gwt(98)+adjwater+gwt(101)+gwt(106)
afluid=fluid/7.0

/* check if supplements taken
dsupps=0
```

```
if (gwt103.gt.0) dsupps=1
if (gwt104.gt.0) dsupps=1
if (gwt105.gt.0) dsupps=1
if (gwt106.gt.0) dsupps=1

/*calculate gwtx for use in table 4s
gwtx=gwt(100)+gwt(102)

/*calculate daily average for each nutrient for each person
do 4920 t1=9,63
anutp(t1) = anutp(t1)*1.0/ddays
anutpv(t1) = anutpv(t1)*1.0/ddays
anutpm(t1) = anutpm(t1)*1.0/ddays
4920 continue

/* 28/2/97 Trimming large values. Note that although anutp variables also
/* potentially trimmed here when data checked only anutp(58) actually affected
/* see file trim.rep in CH8
if (anutpv(32).gt.151.3) anutpv(32) = 151.3;trim32=1
if (anutp(32).gt.151.3) anutp(32) = 151.3
if (anutpv(33).gt.51.6) anutpv(33) = 51.6;trim33=1
if (anutp(33).gt.51.6) anutp(33) = 51.6
if (anutpv(37).gt.52.2) anutpv(37) = 52.2;trim37=1
if (anutp(37).gt.52.2) anutp(37) = 52.2
if (anutpv(39).gt.5363.3) anutpv(39) = 5363.3;trim39=1
if (anutp(39).gt.5363.3) anutp(39) = 5363.3
if (anutpv(36).gt.412.8) anutpv(36) = 412.8;trim36=1
if (anutp(36).gt.412.8) anutp(36) = 412.8
if (anutpv(40).gt.51.4) anutpv(40) = 51.4;trim40=1
if (anutp(40).gt.51.4) anutp(40) = 51.4
if (anutpv(53).gt.38.76) anutpv(53) = 38.76;trim53=1
if (anutp(53).gt.38.76) anutp(53) = 38.76
if (anutpv(58).gt.445.55) anutpv(58) = 445.55;trim58=1
if (anutp(58).gt.445.55) anutp(58) = 445.55

/* *****************************************************************
/* Use spare cells in anutpv array to calculate combinations of nutrients
/* used in tables

anutp(1) = anutp(11) + anutp(62)
anutpv(1) = anutpv(11) + anutpv(62)
anutpm(1) = anutpm(11) + anutpm(62)

/* Total cis
anutpv(2) = anutpv(44) + anutpv(45)
anutpm(2) = anutpm(44) + anutpm(45)
anutp(2)  =  anutp(44) +  anutp(45)

/* Vit E to total poly ratio - see CH8
if (anutp(2).gt.0) anutp(6)=anutp(36)/anutp(2)
if (anutpv(2).gt.0) anutpv(6)=anutpv(36)/anutpv(2)
if (anutpm(2).gt.0) anutpm(6)=anutpm(36)/anutpm(2)

/* filedef xx.rep report
/* reportn xx.rep serial,$ anuntp2=$,anutp2,$ anuntp44=$,anutp44,$
anuntp45=$,anutp45
```

```
/* reportn xx.rep serial,$ anuntpv2=$,anutpv2,$ anuntpv44=$,anutpv44,$
anuntpv45=$,anutpv45
/* reportn xx.rep serial,$ anuntpm2=$,anutpm2,$ anuntpm44=$,anutpm44,$
anuntpm45=$,anutpm45

/*  calculate vitamin A
anutpv(3) = anutpv(29) + anutpv(30)/6
anutpm(3) = anutpm(29) + anutpm(30)/6
anutp(3) = anutp(29) + anutp(30)/6

/* ratio of haem/non-haem iron
  if (anutpv(60).ge.0)
+     anutpv(4) = anutpv(59)/anutpv(60)
+     anutpm(4) = anutpm(59)/anutpm(60)
+     anutp(4) = anutp(59)/anutp(60)
+ else
+     anutpv(4) = -1
+     anutpm(4) = -1
+     anutp(4) = -1

anutpv(5) = anutpv(42) + anutpv(43) + anutpv(44) + anutpv(45) + anutpv(46)
anutpm(5) = anutpm(42) + anutpm(43) + anutpm(44) + anutpm(45) + anutpm(46)
anutp(5) = anutp(42) + anutp(43) + anutp(44) + anutp(45) + anutp(46)

/* *********************************************************************

/*calculate percent intakes of energy (food and total) from
/*carbohydrate,fat and protein, sugars etc. Conversion rates supplied by ceri.
/*eg 37kj per g of fat.

do 4918 t1=1,63
  pctte(t1)=0.0
  pctfe(t1)=0.0
4918 continue

if (anutpv(14).gt.0)
+pctte(10)=anutpv(10)*100*16/anutpv(14)
+pctte(11)=anutpv(11)*100*16/anutpv(14)
+pctte(15)=anutpv(15)*100*17/anutpv(14)
+pctte(16)=anutpv(16)*100*37/anutpv(14)
+pctte(17)=anutpv(17)*100*16/anutpv(14)
+pctte(18)=anutpv(18)*100*29/anutpv(14)
+pctte(42)=anutpv(42)*100*37/anutpv(14)
+pctte(43)=anutpv(43)*100*37/anutpv(14)
+pctte(44)=anutpv(44)*100*37/anutpv(14)
+pctte(45)=anutpv(45)*100*37/anutpv(14)
+pctte(46)=anutpv(46)*100*37/anutpv(14)
+pctte(47)=anutpv(47)*100*37/(anutpv(14)*1000.0)
+pctte(61)=anutpv(61)*100*16/anutpv(14)
+pctte(62)=anutpv(62)*100*16/anutpv(14)
+pctte(2) = anutpv(2)*100*37/anutpv(14)
+pctte(5)=anutpv(5)*100*37/anutpv(14)
+pctte(1) = anutpv(1)*100*16/anutpv(14)
/* pctte(1) used for intrinsic and milk sugars plus starch

/* calculate energy from food sources (ie not alcohol) - kj
/* For people who take no alcohol fooden may come out very slighly
```

```
/* higher than total energy - presumably because conversion factors
/* are rounded to nearest integer. Fix below avoids oddities in
/* the percent total/food energy tables.
fooden=0.0
fooden = (anutpv(15)*17) + (anutpv(16)*37) + (anutpv(17)*16)
if (fooden.gt.anutpv(14)) fooden=anutpv(14)

/* calculate percentage input of food energy from various nutrients
if (fooden.gt.0)
+pctfe(10)=anutpv(10)*100*16/fooden
+pctfe(11)=anutpv(11)*100*16/fooden
+pctfe(15)=anutpv(15)*100*17/fooden
+pctfe(16)=anutpv(16)*100*37/fooden
+pctfe(17)=anutpv(17)*100*16/fooden
+pctfe(42)=anutpv(42)*100*37/fooden
+pctfe(43)=anutpv(43)*100*37/fooden
+pctfe(44)=anutpv(44)*100*37/fooden
+pctfe(45)=anutpv(45)*100*37/fooden
+pctfe(46)=anutpv(46)*100*37/fooden
+pctfe(47)=anutpv(47)*100*37/(fooden*1000.0)
+pctfe(61)=anutpv(61)*100*16/fooden
+pctfe(62)=anutpv(62)*100*16/fooden
+pctfe(2) = anutpv(2)*100*37/fooden
+pctfe(5)=anutpv(5)*100*37/fooden
+pctfe(1)=(anutpv(11) + anutpv(62)) *100*16/fooden
/* pctfe(1) used for intrinsic and milk sugars plus starch

/*calculate daily average for energy from eating out/source
do 4921 t1=1,5
kcsoup(t1) = kcsoup(t1)*1.0/ddays
kjsoup(t1) = kjsoup(t1)*1.0/ddays
4921 continue
kjoutp(1) = kjoutp(1)*1.0/ddays
kjoutp(2) = kjoutp(2)*1.0/ddays

/* calculate average energy as % of ear
if (c313'1'.and.age.in.(65:74))  kjear = anutpv(14)*100.0/9710
if (c313'1'.and.age.in.(75:110)) kjear = anutpv(14)*100.0/8770
if (c313'2'.and.age.in.(65:74))  kjear = anutpv(14)*100.0/7960
if (c313'2'.and.age.in.(75:110)) kjear = anutpv(14)*100.0/7610
/* was rounded to nearest integer until table 5g.1 changed to <EAR
/* kjear=x1+0.5

/*Calculate ratio of daily energy (MJ) to BMR
mjbmr=-1
if (bmrn.gt.0.and.anutpv(14).gt.0) mjbmr = anutpv(14)/(1000.0*bmrn)

/* calculate average daily intake of nutrients from food sources
/* per 1000 kcal of total energy
/* average daily intake of nutrients per MJ of food energy not needed now
/* fooden is in kJ. 4.184 Joules to the Calorie

do 4931 t1=1,63
permce(t1)=0.0
/* permje(t1)=0.0
permce(t1) = 1000.0 * anutp(t1)/anutpv(13)
/* permje(t1) = 1000.0 * anutp(t1)/anutp(14)
```

```
4931 continue

/*

/* calculate percentage from food supplements of total intake
do 4933 t1=1,63
pctsup(t1)=0.0
if (anutpv(t1).gt.0) pctsup(t1) = 100.0*((anutpv(t1)-anutp(t1))/anutpv(t1))
4933 continue

/* Calculate the vitamin and mineral intakes as a percentage of the RNIs for
/* both food sources and all sources (i.e. including dietary supplements
/* calculate percentage from food supplements of total intake
do 4935 t1=1,63
pctrni(t1)=0.0
pctrniv(t1)=0.0
4935 continue

if (c313'1') pctrni(3)   = 100.0*(anutp(3)/700.0)
if (c313'2') pctrni(3)   = 100.0*(anutp(3)/600.0)
if (c313'1') pctrniv(3)  = 100.0*(anutpv(3)/700.0)
if (c313'2') pctrniv(3)  = 100.0*(anutpv(3)/600.0)
if (c313'1') pctrniv(15) = 100.0*anutpv(15)/53.3
if (c313'2') pctrniv(15) = 100.0*anutpv(15)/46.5
if (c313'1') pctrni(15)  = 100.0*anutp(15)/53.3
if (c313'2') pctrni(15)  = 100.0*anutp(15)/46.5
             pctrni(19)  = 100.0*(anutp(19)/1600.0)
             pctrniv(19) = 100.0*(anutpv(19)/1600.0)
             pctrni(20)  = 100.0*(anutp(20)/3500.0)
             pctrniv(20) = 100.0*(anutpv(20)/3500.0)
             pctrni(21)  = 100.0*(anutp(21)/700.0)
             pctrniv(21) = 100.0*(anutpv(21)/700.0)
if (c313'1') pctrni(22)  = 100.0*(anutp(22)/300.0)
if (c313'2') pctrni(22)  = 100.0*(anutp(22)/270.0)
if (c313'1') pctrniv(22) = 100.0*(anutpv(22)/300.0)
if (c313'2') pctrniv(22) = 100.0*(anutpv(22)/270.0)
             pctrni(23)  = 100.0*(anutp(23)/550.0)
             pctrniv(23) = 100.0*(anutpv(23)/550.0)
             pctrni(24)  = 100.0*(anutp(24)/8.7)
             pctrniv(24) = 100.0*(anutpv(24)/8.7)
             pctrni(25)  = 100.0*(anutp(25)/1.2)
             pctrniv(25) = 100.0*(anutpv(25)/1.2)
if (c313'1') pctrni(26)  = 100.0*(anutp(26)/9.5)
if (c313'2') pctrni(26)  = 100.0*(anutp(26)/7.0)
if (c313'1') pctrniv(26) = 100.0*(anutpv(26)/9.5)
if (c313'2') pctrniv(26) = 100.0*(anutpv(26)/7.0)
             pctrni(27)  = 100.0*(anutp(27)/2500.0)
             pctrniv(27) = 100.0*(anutpv(27)/2500.0)
             pctrni(28)  = 100.0*(anutp(28)/140.0)
             pctrniv(28) = 100.0*(anutpv(28)/140.0)
             pctrni(31)  = 100.0*(anutp(31)/10.0)
             pctrniv(31) = 100.0*(anutpv(31)/10.0)
if (c313'1') pctrni(32)  = 100.0*(anutp(32)/0.9)
if (c313'2') pctrni(32)  = 100.0*(anutp(32)/0.8)
if (c313'1') pctrniv(32) = 100.0*(anutpv(32)/0.9)
if (c313'2') pctrniv(32) = 100.0*(anutpv(32)/0.8)
if (c313'1') pctrni(33)  = 100.0*(anutp(33)/1.3)
```

```
if (c313'2') pctrni(33)   = 100.0*(anutp(33)/1.1)
if (c313'1') pctrniv(33)  = 100.0*(anutpv(33)/1.3)
if (c313'2') pctrniv(33)  = 100.0*(anutpv(33)/1.1)
if (c313'1') pctrni(34)   = 100.0*(anutp(34)/16.0)
if (c313'2') pctrni(34)   = 100.0*(anutp(34)/12.0)
if (c313'1') pctrniv(34)  = 100.0*(anutpv(34)/16.0)
if (c313'2') pctrniv(34)  = 100.0*(anutpv(34)/12.0)
             pctrni(35)   = 100.0*(anutp(35)/40.0)
             pctrniv(35)  = 100.0*(anutpv(35)/40.0)

/* RNI's changed 1/5/98 - email from Steven
/*if (c313'1') pctrni(37)   = 100.0*(anutp(37)/1.4)
/*if (c313'2') pctrni(37)   = 100.0*(anutp(37)/1.2)
if (c313'1'.and.age.lt.75) pctrni(37)   = 100.0*(anutp(37)/1.3)
if (c313'1'.and.age.ge.75) pctrni(37)   = 100.0*(anutp(37)/1.2)
if (c313'2') pctrni(37)   = 100.0*(anutp(37)/1.0)

/* if (c313'1') pctrniv(37)  = 100.0*(anutpv(37)/1.4)
/* if (c313'2') pctrniv(37)  = 100.0*(anutpv(37)/1.2)
if (c313'1'.and.age.lt.75) pctrniv(37)   = 100.0*(anutpv(37)/1.3)
if (c313'1'.and.age.ge.75) pctrniv(37)   = 100.0*(anutpv(37)/1.2)
if (c313'2') pctrniv(37)   = 100.0*(anutpv(37)/1.0)


             pctrni(38)   = 100.0*(anutp(38)/1.5)
             pctrniv(38)  = 100.0*(anutpv(38)/1.5)
             pctrni(39)   = 100.0*(anutp(39)/200.0)
             pctrniv(39)  = 100.0*(anutpv(39)/200.0)


/*calculate daily average contribution of food group to selected nutrient
do 4960 t1=1,56
nutg(t1) = nutg(t1)*1.0/ddays
4960 continue
/*calculate daily average contribution of food sub group to selected nutrient
do 4961 t1=1,107
nutgs(t1) = nutgs(t1)*1.0/ddays
4961 continue
/*reportn test.rep $anutp(14)=$,anutp(14),$ anutpv(14)=$,anutpv(14),$
xtemp=$,xtemp
/*reportn test.rep $nutgs(84)=$,nutgs(84),$ nutgs(85)=$,nutgs(85),$
nutg(46)=$,nutg(46)



4999 continue
return

/*        subroutine to edit mult1-answer codes
/*        The codes must be two digit,coded in consecutive pairs of columns
/*                              (all must be on the same card)
/*
/*        Parameters passed as the following integers:-
/*        a)    column of first code to be edited (left hand)
/*        b)    column of last code to be edited (left hand)
/*        c)    lowest normal value
/*        d)    highest normal value
```

```
/*        e)    lowest 'other' value
/*        f)    highest 'other' value
/*
return
subroutine edsub1(start,end,nlo,nhi,ulo,uhi)
int start
int end
int nlo
int nhi
int ulo
int uhi
int imq 1
/*
if  (start.ge.end)
+call qfprnt(0,$%30bEDSUB1 program error: start column > end: %4i,%4i
$,start,end);stop
set imq=(end-start)/2
if (imq*2.ne.(end-start))
+call qfprnt(0,$%30bEDSUB1 program error: should be even range of cols: %4i,%4i
$,start,end); stop
if (nlo.gt.nhi)
+call qfprnt(0,$%30bEDSUB1 program error: code normal values  incorrect: %4i,%4i
$,nlo,nhi);stop
if (ulo.gt.uhi)
+call qfprnt(0,$%30bEDSUB1 program error: exclusive values incorrect %4i,%4i
$,ulo,uhi);stop
/*
/*
/*
clear qcodes(1,99)
/*
      if (c(start,end+1)=$ $)
+ print $$;reject;  call qfprnt(0,$%30bNo codes cols %4i,%4i $,start,end+1)
/*
       if (c(start,start+1)=$ $.and.c(start+2,end+1)u$ $)
+ print $$;reject; call qfprnt(0,$%30bFirst codes missing cols %4i,%4i
$,start,end+1)
/*
      if (range(start,start+1,ulo,uhi).and.c(start+2,end+1)u$ $)
+ print $$;reject;call qfprnt(0,$%30bCols %4i,%4i should be blank as %4i,%4i are
other codes $,start+2,end+1,start,start+1)
/*
C     do 9187 t1=start,end,2
      set imq=start
9150  continue
      if (.not.(range(imq,imq+1,1,99))) go to 9186
      if (qcodes(c(imq,imq+1)))
+ print $$;reject;  call qfprnt(0,$%30bDuplicate codes cols %4i,%4i
$,start,end+1)
      set qcodes(c(imq,imq+1))=1
 9186 continue
      if (c(imq,imq+1)u$ $
++      .and..not.((range(imq,imq+1,nlo,nhi).or.range(imq,imq+1,ulo,uhi))))
+ print $$;reject;  call qfprnt(0,$%30bVals out of range cols %4i,%4i
$,imq,imq+1)
      if (imq.ne.start.and.c(imq,imq+1)=$ $.and.c(imq,end+1)u$ $)
```

```
+ print $$;reject; call qfprnt(0,$%30bBlanks within codes cols %4i,%4i
$,start,end+1)
       if (range(imq,imq+1,ulo,uhi).and.imq.ne.start)
+ print $$;reject;
+  call qfprnt(0,$%30bOther codes %4i-%4i not permissible cols %4i,%4i
$,ulo,uhi,imq,imq+1)
C9187   continue
set imq=imq+2
if (imq.le.end) go to 9150
return
/*
end
```