

DIETARY INTAKE ASSESSMENT 24-HOUR RECALL

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Dietary intake assessment 24-hour recall

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Dietary intake assessment: 24-hour recall

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Abu Dhabi Food Control Authority (2014). A Photographic Atlas of Food Portions for the Emirate of Abu Dhabi. Abu Dhabi: ADFCA

Measuring Guides for the Dietary Recall Interview. Available at:
http://www.cdc.gov/nchs/nhanes/measuring_guides_dri/measuringguides02.htm [accessed 25 April 2016]

The Wordlwide web

Friede Wenhold (photographs from University of Pretoria Dietetics students' portion size estimation aids)

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Purpose of Manual

To describe the procedures used to collect dietary intake data using a 24-hour dietary recall method for research participants older than two years.

To guide researchers to assemble a dietary kit for their study.

To be used as a resource by researchers when training interviewers to conduct a 24-hour dietary recall.

This manual should not be used for dietary assessment of infants.

This manual does not include information on baby foods, alcoholic drinks or nutritional supplements.

End-user defined

Collecting, analysing and interpreting dietary intake data is a specialised field.

Dietary intake data should be overseen and managed by trained dietitians or nutritionists.

The person taking overall responsibility for the dietary data as well the person who will train the interviewers must be experienced in collecting dietary intake data.

This manual should therefore be used by only dietitians or nutritionist who are experienced in collecting dietary intake data.

The use of a 24-hour dietary recall within the context of food security

Dietary intake data collected by 24-hour recall can be used to:

- determine the types of food and liquids consumed
- assess average nutrient intakes for groups of >50 individuals per group
- calculate dietary diversity scores^{1,2}
- calculate dietary quality scores
- evaluate food intake in terms of food-based dietary guidelines³
- determine food patterns
- determine the contribution of specific foods to nutrient intake

A single 24-hour recall cannot be used for the habitual dietary intake of an individual.

The content of the manual (e.g. the language use, foods) is relevant to the South African context at the time of the development of the manual.

IMPORTANT: The intention of this manual is not to cover ALL different types of food on the market, but rather to sensitise the researcher to the pitfalls to look out for. New types of food and beverages enter the market daily. It is the responsibility of the researcher to familiarise her/himself with the latest foods and beverages available on the market and include it as examples in the dietary kit.

¹ Kennedy GA, Ballard T, Dop MC. Guidelines for measuring household and individual dietary diversity. Rome: Food and Agriculture Organization, 2010. Available at: http://www.fao.org/fileadmin/user_upload/wa_workshop/docs/FAO-guidelines-dietary-diversity2011.pdf [accessed 23 April 2016]

² Martin-Prévela Y, Allemanda P, Wiesmann D, Arimond M, Ballard T, Deitchler M, Dopa M-C, Kennedy G, Leed WTK, Moursi M. On choosing a standard operational indicator of women's dietary diversity. Rome: Food and Agriculture Organization, 2015. Available at: <http://www.fao.org/3/a-i4942e.pdf> [accessed 23 April 2016]

³ Food-based dietary guidelines for South Africa. South African Journal of Clinical Nutrition 2013; 26(3) (Supplement): S2 – S164. Available at: <http://www.sajcn.co.za>

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1. DIETARY ASSESSMENT

The end-user of this Manual should be familiar with the following statistical terms used within the context of dietary assessment.

TABLE 1: Statistical terms within the context of dietary assessment.

| |
|---|
| <p>Validity</p> <p>Extent to which a measurement (method) measures what it is intended to measure.</p> |
| <p>Reliability / Reproducibility / Precision</p> <p>Degree to which a method produces the same results when applied repeatedly in the same population under the same circumstances.</p> |
| <p>Accuracy</p> <p>Extent to which the measurement is close to the true value.</p> |
| <p>Random error</p> <p>Deviation from the true value due to chance alone.</p> <p>It does not affect the estimate of the mean, but it increases the variance around the mean.</p> <p>Random errors include:</p> <ul style="list-style-type: none">(i) errors in the reported amounts of food,(ii) omission of foods,(iii) coding errors. <p>Random errors can be minimised by using standardised methods, using appropriately trained interviewers and data entry / coding staff, and implementing quality control measures.</p> |
| <p>Systematic error / Bias</p> <p>Deviation from the true value in a consistent direction (e.g. tendency of a measurement to produce on average an over- or under-estimation).</p> <p>For example:</p> <ul style="list-style-type: none">- the tendency to over report the consumption of certain “good” foods and under report the consumption of certain “bad” foods,- the tendency of obese respondents to under report. <p>If biased, the estimated mean intake is not equal to the true mean intake. It therefore reduces the accuracy of the method, but does not affect reproducibility or precision.</p> |
| <p>Selection bias</p> <p><i>Self-selection bias</i>: when including volunteers in the study sample.</p> <p><i>Referral bias</i>: when cases are recruited through a health facility but controls from an adjacent village.</p> <p><i>Nonresponse bias</i>: when excluding individuals who did not respond to the initial invitation to participate from the study sample when non-participants differ significantly from participants.</p> <p><i>Diagnostic bias</i>: when selecting study participants using different criteria.</p> <p><i>Drop-out bias</i>: when ignoring possible systematic differences between those who fail to complete a study and those who do complete the study.</p> |

TABLE 1 (continued): Statistical terms within the context of dietary assessment.

| |
|---|
| <p>Measurement bias (error)</p> <p>Error in dietary intake estimation due to the measurement process itself.</p> <p>Examples of measurement bias include the following:</p> <ul style="list-style-type: none">- under-reporting of alcohol because of social desirability,- differences in the way in which different interviewers obtain and record information (interviewer bias),- recall bias occurs when information is being collected retrospectively,- errors in the food composition database. <p>Measurement bias (error) reduces reliability and validity.</p> |
| <p>Relative validity</p> <p>The validity of a dietary assessment method against a reference dietary assessment method (both methods should reflect the same time period; e.g. a 24-hour recall relative to a single food record).</p> |
| <p>Within-person variability</p> <p>Variation in dietary intake within an individual from day to day.</p> <p>Within-person variability reduces reliability.</p> |
| <p>Between-person variability</p> <p>Variation in dietary intake between individuals.</p> <p>Considered true variability when estimating intakes of groups.</p> |

Source: Gibson (2005)

When planning and conducting a dietary assessment survey, it is important to be aware of the potential sources of random and systematic error. These errors can be minimised through careful design of the study and should be taken into account in the data analyses.

Various methods to collect dietary intake data are available (e.g. 24-hour recall, food record, quantified food frequency questionnaire). The choice of which assessment method to use will depend on the following:

- the aim of the study (research question)
- the foods or nutrient(s) of interest
- the need for group versus individual data
- availability of resources (e.g. budget, time, interviewers)
- characteristics of the study population (e.g. age, literacy, lifestyle, habits)
- response burden (e.g. time and effort required from the respondents)

A summary of the characteristics, strengths and limitations of the 24-hour recall method, the dietary record and quantified food frequency questionnaire is given in Table 2.

TABLE 2: Summary of the characteristics, strengths and limitations of the 24-hour dietary recall, dietary records and quantified food frequency questionnaires to collect dietary information from individuals to determine nutrient intake.

| | 24-hour recall | Dietary record | Quantified food frequency |
|---------------------------|---|---|--|
| General description | Trained interviewer asks the respondent to recall the type and amount of all foods and drinks consumed over the past 24 hours (yesterday). Amounts are estimated using portion size estimation aids (see Section 5). | Respondent records all foods and drinks and the amounts of each consumed for a specified period; the recording should be done at the time of the eating occasion. <i>Weighed records:</i> foods are weighed before consumption; amount consumed is recorded taking into account left-overs. <i>Estimated records:</i> amounts are recorded using a combination of weights, dimensions, measurements, household measures, food models, photographs, commercial packaging (see Section 5). | Trained interviewer asks respondent about the frequency and amount of foods and drinks consumed over a specified period; can be self-administered. Amounts are estimated using portion size estimation aids (see Section 5). In some instances, “standard” portion sizes are used. |
| Quantification | | | |
| Type of data | Retrospective data. Actual intake on a specific day. | Prospective data. Multiple days of recording are needed to reflect usual intake. | Retrospective data. Reflects usual intake. |
| Period of data collection | Past 24 hours (yesterday). Doing repeated recalls over a period of time will reduce variability. Several / many days over a defined time period are required to estimate usual nutrient intake; the number of days depends on the nutrient of interest. The number of days is particularly important for nutrients with large day-to-day variation, such as cholesterol, vitamin A, calcium, iron. | Specified period; number of days required depends on the aim of the study. After four consecutive days, the quality of the recording usually decreases because of respondent fatigue. Consumption on consecutive days is often related (e.g. left overs eaten the next day); recording single non-consecutive days may increase representativeness of the individual’s usual intake. Number of days is important for nutrients with large day-to-day variation, such as cholesterol, vitamin A, calcium, iron. | Specified period (e.g. 7 days, a month, 3 months). |

TABLE 2 (continued): Summary of the characteristics, strengths and limitations of the 24-hour dietary recall, dietary records and quantified food frequency questionnaires to collect dietary information from individuals to determine nutrient intake.

| | 24-hour recall | Dietary record | Quantified food frequency |
|-----------------------|---|--|--|
| Detail of information | Provides information on food details and food preparation methods for single days of intake. | Provides information on food details and food preparation methods for the recording period. Description of foods eaten away from home is less accurate than that of foods eaten at home. | Provides limited information on food details and food preparation methods. |
| Form / questionnaire | An open form is used (see Addendum for examples). Less often a pre-coded questionnaire is used (e.g. as used in the 1999 National Food Consumption Survey; available at www.sun.ac.za). The interview can be tape recorded (provided that ethical clearance has been obtained and respondent consents). | Each respondent is provided with (i) booklet / sheets for recording; (ii) clear verbal instructions; and (iii) an instruction booklet. Each respondent can be supplied with a food scale, but he/she must be able to use the scale and take the weights correctly. Respondents should not change their dietary habits because of record keeping. The dietary records should be checked periodically, and all uncertainties should be clarified with the respondent. | Various questionnaires are available; the questionnaire used must be valid for the study population and the food lists must include foods consumed by the study population. Commonly used quantified food frequency questionnaires have often been developed more for the general population and major subgroups; the food lists may therefore not contain the foods consumed by all cultural and ethnic groups and may not be appropriate for all cultural dietary patterns. |
| Training needed | Interviewer must be well trained. [preferably a dietitian or nutritionist] | Respondent must be trained to record food intake in sufficient detail. Person instructing the respondent and checking the records must be well trained. | Interviewer must be well trained. [preferably a dietitian or nutritionist] |
| Respondent burden | Requires less effort from the respondent; low respondent burden. High response rates / low refusal rates. Takes on average 30 – 45 min to complete, depending on complexity of the diet. | Requires much effort and accuracy from the respondent; high respondent burden. <i>Estimated records</i> have lower respondent burden and higher respondent cooperation than <i>weighed records</i> . Lower response rates. | Low to medium response burden, depending on the length of the questionnaire. High response rates. |

TABLE 2 (continued): Summary of the characteristics, strengths and limitations of the 24-hour dietary recall, dietary records and quantified food frequency questionnaires to collect dietary information from individuals to determine nutrient intake.

| | 24-hour recall | Dietary record | Quantified food frequency |
|-----------------------------|--|---|---|
| Strengths / advantages | <p>Random sampling is possible. Suitable for large scale surveys. Does not alter dietary intake.</p> | <p>Most accurate method (weighed records are more accurate than estimated records). Not dependant on respondent's memory. Controls for day-to-day variation.</p> | <p>Suitable for large scale surveys. More representative of usual intake.</p> |
| Limitations / disadvantages | <p>Relies on the respondent's memory. A single day is not representative of usual intake because of within-person day-to-day variation. Can get under- and/or over-reporting of certain foods and drinks. Probing for certain food items is needed (e.g. salad dressings, sweets, sauces, etc). Recalls for week-end days are a challenge. The coding may be burdensome, leading to high personnel cost.</p> | <p>Respondent may change dietary intake, both in terms of types of food and amounts eaten; and may simplify the diet to ease recording. High respondent burden (respondent burden lower for <i>estimated records</i> compared to <i>weighed records</i>). Need high cooperation from respondent. Respondent must be literate. Respondents are often volunteers (non-random sample). Sample size is usually limited. The coding may be burdensome, leading to high personnel cost.</p> | <p>Standard portion sizes (if used) may not be representative of the amounts consumed by the study population. Depends on respondent's ability to describe own diet. Reporting frequency of intake is a difficult cognitive task. May result in over-estimation. Difficult to estimate intake of individual food items when foods are grouped in the questionnaire.</p> |
| Reliability | <p>Tend to under-estimate energy intake. Repeated 24-hour recalls and larger sample sizes will increase reliability.</p> | <p>Tend to under-estimate energy intake.</p> | <p>Tend to over-estimate energy intake.</p> |
| Usage recommendations | <p>Used to estimate average intake of groups of > 50 individuals; should not be used to determine nutrient intake for individuals. Cross-sectional surveys; cohort studies; intervention studies</p> | <p>Used for meal patterns; eating habits; nutrient intakes; groups and individuals. Cohort studies; small intervention studies</p> | <p>Used to assess relationships between diet and disease; and rank respondents as high or low consumers. Cross-sectional surveys; cohort studies; case-control studies; intervention studies</p> |

2. HUMAN RESOURCES NEEDED

All members of the research team that will be part of the data collection process need to be adequately trained. The roles of the various team members are summarised in Table 3.

Table 3: Human resources needed to conduct a dietary assessment study, using a 24-hour recall.

| Human Resources | Characteristics | Role |
|------------------|---|--|
| Researcher | Dietitian or nutritionist experienced in collecting dietary intake data. | Overall responsibility for the dietary assessment; analysis and interpretation of results. |
| Field supervisor | Dietitian or nutritionist (can be the same person as the researcher). | Supervise and manage data collection process (quality control). |
| Interviewers | See Section 2.3. | Interview research participants. |
| Coder(s) | Need to be able to collect 24-hour dietary recall data themselves. Need to be trained in dietary coding. | Code food intake data (either manually or using a software programme). |

2.1 Researcher

Collecting, analysing and interpreting dietary intake data is a specialised field.

According to ethical guidelines “Researchers must be suitably qualified and technically competent to carry out the proposed research”.⁴ The researcher taking overall responsibility for the dietary assessment should therefore be a trained dietitian or nutritionist who is experienced in collecting dietary intake data.

2.2 Field supervisor

The field supervisor needs to be either a nutritionist or a dietitian.

In some instances the researcher and field supervisor will be the same person.

The field supervisor must have good organisation skills, understand the importance of adhering to the study protocol and standard operating procedures, be capable of ensuring that the interviewers follow the instruction correctly, and have the skills to anticipate or detect possible problems that may affect the overall quality of dietary data.

The field supervisor is responsible for supervising the collection and management of the dietary data.

The field supervisor should continuously check the completed recalls and give feedback to interviewers as mistakes are being picked up to avoid common mistakes to re-occur.

The field supervisor, in consultation with the researcher, is responsible for the development of study entry rules e.g. dietary coding rules and/or assumptions (see Section 8), and should check the coded recalls.

⁴ Ethics in Health Research. Principles, processes and structures. South African Department of Health, 2015, p17.

2.3 Interviewers

Interviewers must be extensively trained before data collection.

Although it is preferable that the interviews are done by dietitians and/or nutritionists (or students studying in these fields), this is not always feasible.

Interviewers recruited from local communities must be literate and numerate, with at least grade 12.

Interviewers should be carefully selected.

It has been reported that the interviewer's body mass index may have an effect on the quality of the data collected; e.g. it has been shown respondents tend to under-report if the interviewer is underweight, and to over-report if the interviewer is obese.⁵

Interviewers should be fluent in the local language.

Interviewers should be able to establish and maintain easy rapport with the respondents, be sensitive and be able to adapt an interviewing style and approach that will make the respondent comfortable, be able to empathise with the respondents, and preferably be from the respondents' social stratum.

Interviewers should be good listeners, and be able to pick up verbal and non-verbal responses.

Interviewers should preferably be familiar with the dietary intake patterns of the study population, and have knowledge of the local region and its food culture.

An advantage of recruiting and training interviewers from the area where the research will be conducted, especially in rural areas and informal settlements, is that they know the local food customs and type of food available. For example, they will know the nickname for a dish, i.e. 'walky-talky' refers to chicken legs and head, and 'chip-roll' means a bread roll with 'slap' chips in it.



Chicken legs and head



Chip roll

3. QUALITY CONTROL

Measurement error affects the precision of the data collected. Quality control at all levels of dietary intake assessment is therefore important to reduce measurement error and increase reliability. Quality assurance should be applied at the following levels:

- Interviewer, both in terms of selection and training
- Interview / data collection process
- Data entry in terms of food coding and classification
- Data calculation (not covered in this manual)
- Data analysis (not covered in this manual)

⁵ Eisinga R, te Grotenhuis M, Larsen JK, Pelzer B. Interviewer BMI effects on under- and over-reporting of restrained eating: evidence from a national Dutch face-to-face survey and a postal follow-up. *International Journal of Public Health* 2012; 57: 643–647.

Table 4: Quality control measures in the various steps of dietary assessment to reduce error and enhance data quality.

| | | |
|-------------------------|---|--------------------------|
| Interviewers | Careful selection based on selection criteria. Appropriately trained. | Section 2.3 Section 7 |
| Data collection process | Use of appropriate dietary assessment aids. Each completed 24-hour recall should be checked immediately after the interview, while the respondent is still available to provide additional information, if needed. Continuous supervision and monitoring. | Section 5 |
| Coding | Coders must be appropriately skilled and trained. Use of a code book. Use of appropriate assumptions. | Section 8 Section 8 |

4. DATA COLLECTION PROCESS FOR THE 24-HOUR RECALL

The 24-hour recall is used to estimate the average intake for groups.

The respondents should be representative of the population under study.

Ideally, the survey should be conducted in such a way that all the days of the week are equally represented. This is challenging, particularly for completing recalls for Friday and Saturday, as this means that respondents should be interviewed on Saturday (to recall foods consumed on Friday) and Sunday (to recall foods consumed on Saturday).

Repeating 24-hour recalls during different seasons of the year may provide a better estimation of intake.

For multiple 24-hour recalls (to estimate usual intake), the number of repeats needed per individual will depend on the day-to-day variation in food intake within an individual, as well as the nutrient(s) under study.

4.1 Collecting 24-hour recall dietary data for children

According to the guidelines of the British Medical Research Council,⁶ the parent / caregiver should be present for children younger than 16 years.

Children 5 years and younger

The parent or primary caregiver provides all information.

More than one proxy respondent may be needed to provide information on dietary intake for the full 24-hour recall period to capture foods eaten at home, crèche, day care, preschool and other places.

⁶ 24-Hour recall instructions. Available at: http://dapa-toolkit.mrc.ac.uk/documents/en/24h/24hr_instructions_LIDNS.pdf [accessed 23 April 2016]

For children who attend crèche, what they ate and how much at the crèche should be confirmed with staff at the crèche. For large studies, it may be helpful to get information on the crèche menus beforehand.

Children 6 years and older

For children 6 – 12 years, the parent or primary caregiver provides the majority of the information; the child can make a few additions.

For children 12 – 16 years, the child provides most information; with additions from the parent or primary caregiver (particularly with regards to preparation methods).

At the beginning of the interview, the degree of participation of the child and the parent or primary caregiver should be established. Either the child provides most of the information with the parent filling in the gaps, or the parent provides most of the information with the child filling in the gaps.

A consensus approach is often used, where parents help the child remember the amounts consumed.

For school children, what they ate and how much while at school should be recorded; this includes e.g. lunch box, foods bought from the tuck shop or on the way to school, the school meal, and food eaten at after care. Foods served through the school meal should be confirmed with the school. For large studies, it may be helpful to get information on the school meal beforehand (e.g. school menu, food preparation methods).

It is often difficult to establish what children ate at a friend's house, especially for younger children.

4.2 General guidelines for the 24-hour dietary recall interview

Each interviewer should have a complete set of dietary assessment aids (dietary kit; see Section 5); the dietary kit should include only measurement aids that were agreed upon before the onset of the study.

The interviewer should unpack the dietary kit before starting the interview.

The respondent should be interviewed in a quiet place, without interruptions and distractions.

The interviewer should aim to sit opposite the respondent.

The interviewer should introduce him/herself to the respondent in a friendly and professional manner.



The following introductory sentence can be used: “I would like to ask you a few questions about what you had to eat and drink the previous day – this means during the day as well as during the night.”

The interviewer needs to tell the respondent that he/she will also be asked when and where the food was consumed, how much of each food item was consumed, and how the food was prepared.

The interviewer needs to assure the respondent that there are no wrong or right answers, and that it is important that the respondent tries to remember everything he/she ate or drank the previous day, also remembering snacking like sweets, fruit and cookies. It also includes any water or food picked from the garden and/or veld.

The interviewer needs to assure the respondent that all communication is confidential. Only the project number of the respondent should appear on the 24-hour recall form – no name or surname.

A person's food intake is often influenced by activities done during the day. Therefore, it is useful to link the recorded day's food intake with the recorded day's activities, as this may assist the respondent to recall all foods consumed.

If the respondent finds it difficult to remember what he/she ate, the interviewer should ask about his/her activities the previous day. Example: "When you got up what did you do?"

Before starting the recall, the interviewer should explain to the respondent the ways in which quantities eaten and drank could be quantified. For example, if a photo atlas is being used as a portion size estimation aid, the interviewer should show the respondent examples of the pictures portraying different amounts of food, and explain to the respondent that he/she should indicate which picture or example is the closest to the amount eaten. If the amount is smaller, between the sizes or bigger than the pictures, it should be indicated as such.

Leading questions should be avoided.

Unstandardised leading probes should not be used.

Probing questions should not be too specific, e.g. the interviewer should not ask "was it fried"; but rather ask "how was it prepared".

If the respondent fails to respond to the more generic probe, then the probe should be more specific, but all possibilities should be mentioned, rather than one specific possibility. For example, if the respondent fails to answer the initial probe "how was it prepared", then the follow-up question can be "was it boiled, fried, roasted, grilled etc"? It is important that all options are listed. Probes such as "was it boiled?" is a leading question and should thus be avoided.

When foods come in different varieties, the "standard" variety should be referred to first; e.g. "was it full cream milk or was it low fat, 2% or fat free?" Another example is "was it normal coke or was it diet coke / coke light?"

The interviewer should always remain neutral, and never look shocked or surprised about the information that the respondent provides; and should not express in words or facial expression approval or disapproval of information provided.

The interviewer should always be friendly and patient with the respondent. If the respondent is slow in answering a question, the interviewer should not hurry him/her or argue with him/her. The interviewer should allow the respondent time to answer the question.

The interviewer should listen carefully to what the respondent is saying, and look for both verbal and non-verbal responses.

The interviewer should not assume certain dietary practices.

The interviewer should also not assume that preparation methods are similar for all individuals.

The interviewer should write down all the information in as much detail as possible (it is better to write down too much information, rather than too little).

When recording the information provided by the respondent, the interviewer should write as clear as possible; if the clarity of writing and spelling is poor, it will be difficult for others to read.

After completion of the 24-hour recall, the respondent should be asked whether "yesterday" (the recorded day) was a normal day, in other words, was it a good reflection of what the respondent normally eats. If what the respondent ate the previous day is not the same as what he/she normally eats, the interviewer should ask for the reason why it was not the same as usual; the reason should be recorded.

A recipe sheet for recording recipes should be included.

The completed 24-hour recall should always be reviewed immediately after the interview, while the respondent is still available to provide additional information, if needed.

At the end of the interview, the interviewer should thank the respondent for his/her valuable time.

4.3 The five-step multiple pass approach

Using a five-step multiple-pass approach is designed to enhance complete and accurate food recall and reduce respondent burden.

TABLE 5: Five step multiple pass method.

| Step | Purpose |
|----------------------|---|
| 1. Quick list | Compile a list of foods and beverages consumed by the respondent during the previous day. |
| 2. Forgotten foods | Probe for foods forgotten during the Quick List, using a list of nine food categories usually forgotten during the 24-hour recall. These nine food categories are: <ul style="list-style-type: none"> • non-alcoholic beverages, e.g. coffee, tea, cold drinks, fruit juice, milk • alcoholic beverages • sweets and biscuits • savoury snacks • fruit • vegetables • cheese • breads and rolls • any other foods |
| 3. Time and occasion | Collect information on the time at which the respondent ate each food and the name of the eating occasion. Occasion can be defined as e.g. breakfast, brunch, morning snack, lunch, afternoon snack, supper, extended consumption. In some instances, location is also recorded. |
| 4. Detail and review | For each food, collect detailed information on the type of food, the amount consumed, and preparation method (see “dietary logic”; Figure 1). Review each eating occasion and the intervals between eating occasions to prompt additional recall. Review the 24-hour day. Probe to get more complete information about foods already reported. |
| 5. Final probe | Final review; probe for anything else consumed. |

[<http://www.ars.usda.gov/Services/docs.htm?docid=7710>]

Different types of probes, either on their own or in combination, can be used to determine which foods were eaten:

- Probe related to time.
- Probe related to activities (link food intake to activities)
- Probe related to place

4.4 Information needed for each research participant

Certain information is needed for the analysis and interpretation of 24-hour dietary recall data (see Table 6). This information is usually recorded on the cover sheet of the 24-hour recall. Information related to food and beverage consumption that is recorded for the 24-hour recall is given in Table 7.

TABLE 6: Information to be collected and recorded on the cover sheet.

| |
|---|
| <i>Project code of respondent</i> |
| Each research respondent should have a unique project code (identification number). In research, recording of personal details such as respondent name and surname is not allowed because of the ethical requirement of confidentiality. Linking the project code with personal detail of the research respondent should be filed separately. |
| <i>Age or birth date</i> |
| Needed for comparing nutrient intake with age appropriate reference values. |
| <i>Gender</i> |
| Needed for comparing nutrient intake with gender appropriate reference values. |
| <i>Date of interview</i> |
| Needed to calculate the age of respondent, together with date of birth. Provides information on the time of year and day of week of the recall. |
| <i>Day of the week represented by the recall</i> |
| To ensure that (i) weekdays and weekend days are representative in the final sample and (ii) weekdays are proportionately represented in the final sample. |
| <i>Was recorded day a usual day?</i> |
| Needed to explain unusual results. |
| <i>If multiple 24-hour recalls are completed for the same individual, the number of the repeat</i> |
| To capture day-to-day variation in intake. |
| <i>Interviewer's name / code</i> |
| For quality control purposes. |

TABLE 7: Information obtained when using a 24-hour dietary recall.

| | |
|--|--|
| The <i>time</i> of each eating occasion | It is not possible to always record the <u>exact</u> time of the day; time categories can be used, for example: breakfast time (before 09h00) mid-morning (between 9h00-12h00) lunch time (12h00-14h00) afternoon (14h00- till supper) supper time after supper, at bedtime and through the night. Foods taken over an extended period e.g. 500 mL orange juice throughout the afternoon, can be reported as follows: 13:00 – 19:00 : 500 mL orange juice. |
| The <i>type</i> of meal | For example: breakfast / lunch / supper / snacks |
| The <i>location</i> where meal or snack has been consumed | In some studies, the meal location (e.g. home, school, work) is recorded; this information helps in the food description process (e.g. foods eaten in a restaurant may be prepared differently than foods prepared at home). Providing a list of pre-coded locations will ease recording. |
| <i>What</i> and <i>how much</i> was eaten (See Figure 1) | Information on all foods and beverages the respondent consumed during the whole of the previous day (i.e. “yesterday”) is recorded. This includes everything consumed at meal times, in-between meals (snacks) and during the night (after supper). |

The 24-hour period defined: From the time the participant got up until he/she went to bed at night, and anything taken during the night, until waking up the next morning. Some guidelines define the 24-hour period as “from mid-night to mid-night”.

The following information is needed for all foods/drinks consumed (this is called the dietary logic):

- **What** (the type of) food item(s) did the respondent eat and/or drink
- How was the food item(s) **prepared**
- What was **added** to the food item(s) during or after preparation
- **How much** (quantity) of the food item(s) / beverage did the respondent eat/drink.

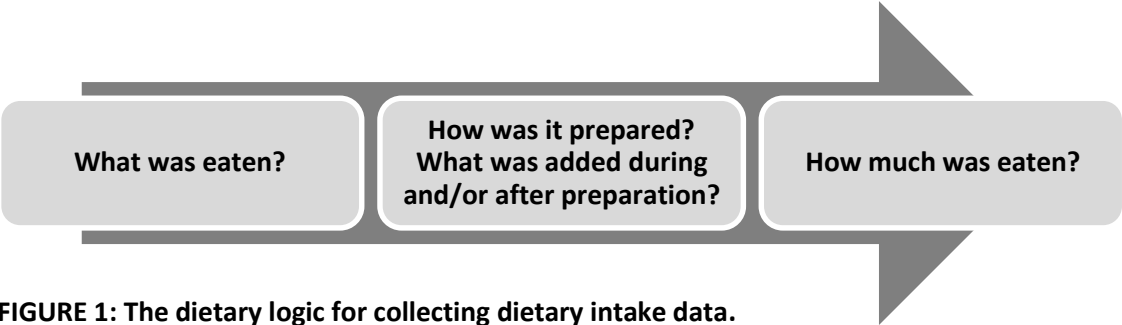







FIGURE 1: The dietary logic for collecting dietary intake data.

TABLE 8: Dietary logic: type of information collected.

| |
|--|
| <p><i>What was eaten?</i> Very specific description of each food item; using brand names where possible. Detailed description of combination dishes [dishes can be prepared in many different ways].</p> |
| <p><i>How was it prepared?</i> Raw versus cooked. If cooked, the type of preparation method e.g. boiled, fried, roasted, steamed, grilled (see Table 9). Other food items added to the food during preparation; this may require several prompts: “Did you add anything to [food name]?” If yes, “Did you add anything else?”. Repeat until the response is “no”. Food items added “at the table”. Brand name may provide some information on preparation e.g. Kentucky fried chicken.</p> |
| <p><i>How much was eaten?</i> Amount of food item that was <u>eaten</u>, not amount that was served (take left-over food into consideration). Important to record second helpings. Take away foods: recording where it was bought and the price may help to quantify the amount. The amount should never be guessed. Use dietary assessment aids to estimate the amount consumed (see Section 5). The amount can be recorded in various ways, e.g.:</p> <ul style="list-style-type: none"> • food specific units; for foods that can be counted, such as eggs, apples, biscuits • geometric shapes and dimensions • volume (e.g. mL, cup, tablespoons); for liquids and beverages, and non-liquid foods served in bowls, cups or glasses • weight; only if weight is available from e.g. package label, or when the portion size estimation aid indicates weight. |

Table 9: Cooking methods

| | | |
|---|--|--|
| <p>Baked Cooked in an oven.</p> |  | |
| <p>Roasted Cooked in an oven, with or without fat.</p> |  | |
| <p>Steamed Cooked in steam. There is no contact between the food and water.</p> |  | |
| <p>Boiled Cooked in boiling water. After boiling the excess water is usually discarded.</p> |  | |
| <p>Stewed Cooked using a lot of liquid. All food items are cooked together in one pot; the liquid is slightly thickened. Also used for stewing fruit.</p> |  | |
| <p>Grilled Cooked in an oven or over an open fire. No oil/fat is added. The fat of meat can drain off.</p> |  | |
| <p>Fried</p> <p>Shallow frying Cooked in a frying pan with a little amount of oil or fat.</p>  | <p>Deep frying Cooked using a lot of oil.</p>  | |

5. DIETARY ASSESSMENT AIDS

Dietary assessment aids can be divided into (i) those related to quantification (i.e. determining how much was eaten) and (ii) those related to detailed characterisation of the foods / drinks consumed.

5.1 Portion Size Estimation Aids

In dietary assessment, determining portion sizes is one of the biggest challenges for both the researcher and the respondent. A portion is the amount of food / drink that a respondent consumed on one eating or drinking occasion. For a 24-hour recall, quantification will always be an estimation, as the data is collected retrospectively. The use of appropriate *portion size estimation aids* will help the respondent in recalling and reporting the amount of food or drink consumed.

Two dimensional portion size estimation aids include the following:

- food photographs (Section 5.1.1)
- pictures of foods from magazines, food advertisements, labels
- abstract (geometric) shapes; e.g. circles, rectangles, wedges (Section 5.1.5)
- drawings of real food and/or household measures (Section 5.1.2)

Three dimensional portion size estimation aids include the following:

- real or abstract food models (Section 5.1.3)
- empty food containers
- household measures; e.g. plates, bowls, cups (Section 5.1.7)
- non-food objects; e.g. bean bags, tennis balls (Section 5.1.4)

The NHANES website provides useful information for making portion size estimation aids.

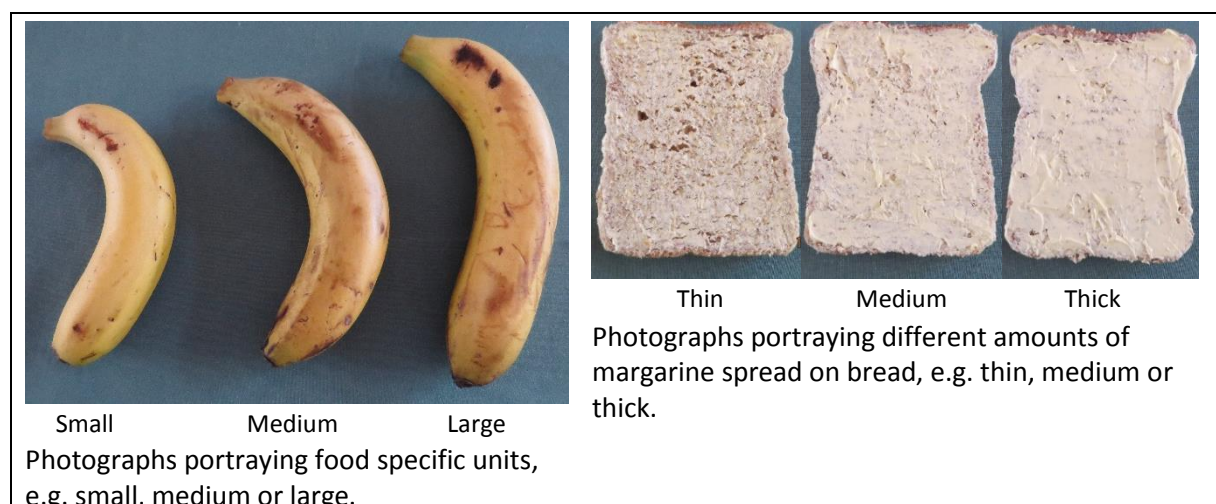
Although technology-assisted portion size estimation aids are available and have been used, to a limited extent, in developing countries, it is not yet commonly used in South Africa.

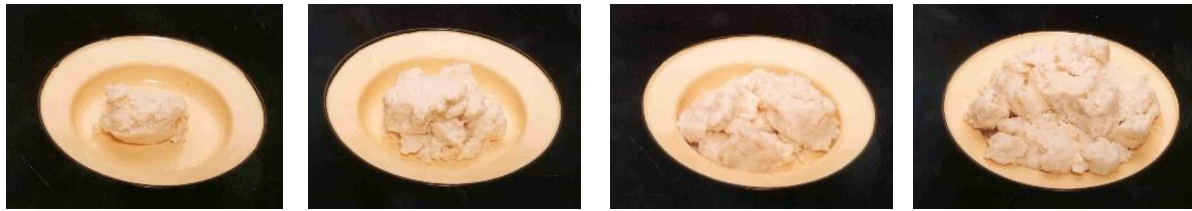
Serving size and exchange quantities teaching aids should not be used in dietary assessment studies.

Examples of portion size estimation aids, mostly home-made versions, are given on page 21 – 28.

5.1.1 Food photographs

A **photographic atlas** can include a series of food photographs taken either from the top, the side or at about a 45 degree angle portraying a range of portion sizes.





200 g

350 g

500 g

700 g

Photographs portraying a range of portion sizes [Source: MacIntyre, 1996].

When a set of graduated photographs is used, the respondent is asked to select the photograph which most closely resembles the amount he/she ate.

The photographs should be pre-tested to ensure that respondents recognize foods in the picture.

The range of quantities photographed should be relevant to the target group, age-appropriate and reflect the study participants' food intake quantities.



Photograph portraying a series of portion sizes with ruler to indicate size.



Photograph portraying a ruler used to indicate the size of a plate.

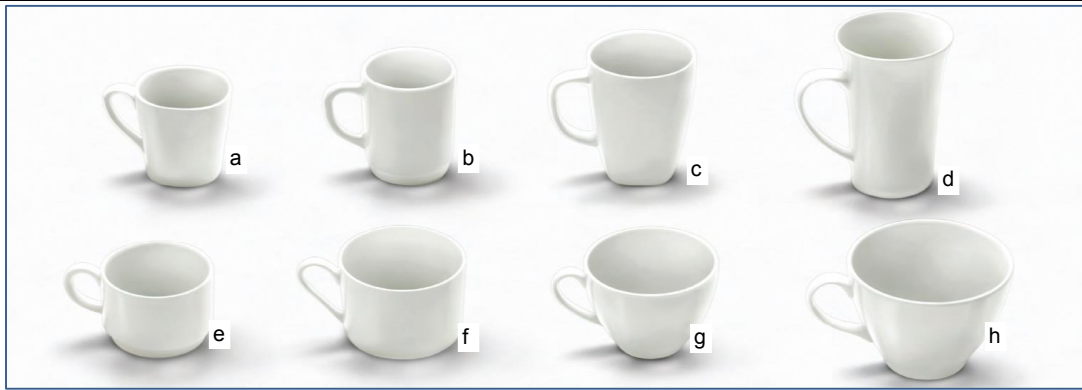
Photographs portraying a series of food portion sizes given with a grid to indicate size.

Example: photographs on a 1cm² grid, indicating amount of spread and sauce.



Photographs portraying different amounts of spread.





Photographs portraying a series of different cups and mugs

[Source: Abu Dhabi Food Control Authority, 2014]

The selection of cups and mugs portrayed in the photo should resemble the cups and mugs used by the study population (alternatively, a set of mugs and cups can be included in the dietary kit).

Photographs portraying different amounts of a drink.

Alternatively, a set calibrated glasses can be included in the dietary kit (see page 28).



[Source: Abu Dhabi Food Control Authority, 2014]



175 g

150 g

150 g

125 g

100 g

80 g

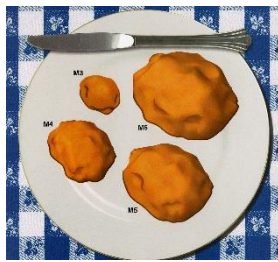
Photographs portraying food containers of different sizes.

The containers portrayed should resemble those used by the study population (alternatively, a set of empty containers can be included in the dietary kit).



Photographs portraying a selection of food wrappers (alternatively, a set of food wrappers can be included in the dietary kit).

5.1.2 Drawings of food



[Source: www.ars.usda.gov]

Drawings portraying a series of portion sizes.

The drawings should be pre-tested in the study population to ensure that the respondents will comprehend the drawings.

5.1.3 Food models



Commercial food models

The portion size portrayed by the food model should be applicable to the study population (e.g. adults).

Can be ordered from NASCO: <https://www.enasco.com/c/nutrition/>



Food models for decorative purposes are available from certain shops, but portion size should be determined.



Homemade paper mache or salt-dough replicas

Salt dough:
3 – 4 cups flour
1 – 1½ cups water
1 cup salt

Mix flour, water and salt; and kneed
Shape
Bake at ± 140 °C (± 2 hours; until hard)
Paint and varnish



Homemade sponge models

Use sponge to cut shapes of food, and paint to resemble the food.

5.1.4 Non-food objects



Homemade sponge models

Cut sheets of sponge into relevant shapes based on the size of foods; the sponge models should be marked to ease recording. The weight for specific foods for the sponge sizes must be determined and recorded in the code book.



Silicone mounds

Dry beans of known volumes are stuck together with silicon.



Bean bags

Make white muslin bags, and fill with dried white beans. Cut the shells as circles with sizes specified as below, and stitch securely with a 0.6 cm seam around.

| | | |
|------------|--------|---------|
| Bean bag 1 | ¼ cup | 9 cm |
| Bean bag 2 | ½ cup | 11.5 cm |
| Bean bag 3 | 1 cup | 13 cm |
| Bean bag 4 | 2 cups | 16.5 cm |

[Source: www.cdc.gov]



Non-food objects

For example, a tennis and golf ball can be used to indicate size of round foods e.g. fruit, vetkoek

For example, a match box can be used to indicate size of cheese, meat

5.1.5 Abstract (geometric) shapes

Concentric circles

Can be used to estimate the size (diameter) of round foods e.g. cookies, pancakes, biscuits, pies.

The thickness can be measured using a thickness measure or ruler.

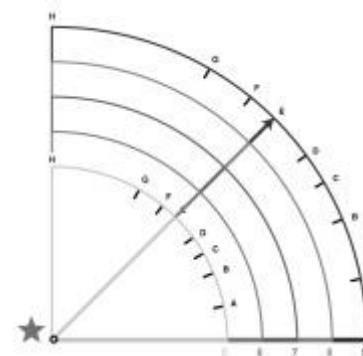
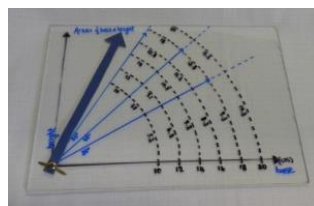


[Source: www.ars.usda.gov]

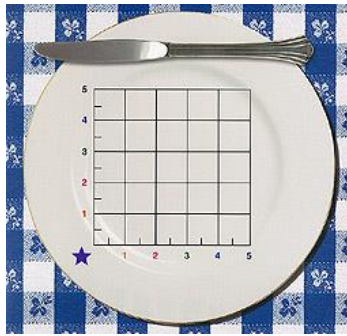
Wedges measures

Adjustable wedges can be used to estimate the portion size of wedge shaped foods, e.g. pizza and cake.

The wedge has an overlapping arrow pointer that moves along the arc of the wedge; the numbered increments along the length (radius) of the wedge are used to describe the estimates.



[Source: www.cdc.gov]



[Source: www.ars.usda.gov]

A grid can be used for foods such as lasagne and steak.

The grid is used by the participant imagining the food placed on the plate in the corner by the star. The numbers on the grid is then used to describe the length and width of the food.

The thickness can be measured using a thickness measure or ruler.



[Source: www.cdc.gov]

Thickness measure

Can be used to estimate the thickness of solid foods such as meat and cheese.

Ruler

Can be used to estimate dimensions (in cm), e.g. to estimate diameter, length, width, and/or height (thickness).



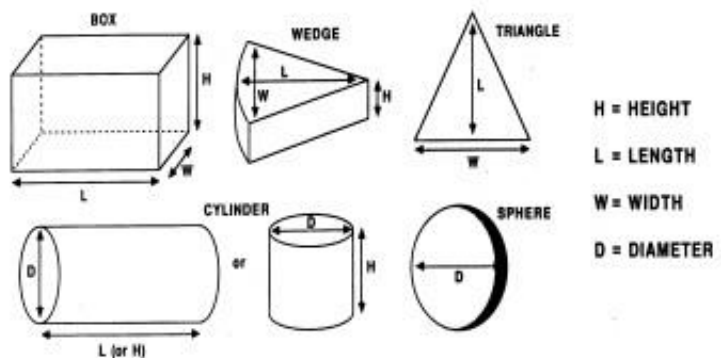
[Source: www.cdc.gov]

For example, fish cakes:



Shape chart

Can be used to describe the shape of the food; can be used along with a ruler.



[Source: www.cdc.gov]

5.1.6 Dish-up and measure



The respondent can use dried beans (for foods that are loosely packed, e.g. vegetables) or rice (for foods that are more dense e.g. mash) to dish up the amount that resembles the amount that was eaten; the interviewer then quantifies (in mL) the amount dished up using a measuring cup or a set of measuring spoons. Dry oats or popcorn can also be used.



Modelling clay

The respondent takes the amount of clay corresponding to the amount of food consumed and places it on a plate or in a bowl. The interviewer then quantifies the amount using a measuring cup or a set of measuring spoons.

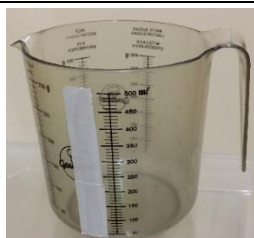
5.1.7 Household measures



Measuring cups and spoons

Can be used to estimate the volume of liquid, solid, and semisolid foods.

It is important to document the form of the food (e.g. sliced, chopped, or shredded) when using these models to quantify the volume of solid foods.



If a measuring cup is used, it is helpful to indicate where the reading should be taken.



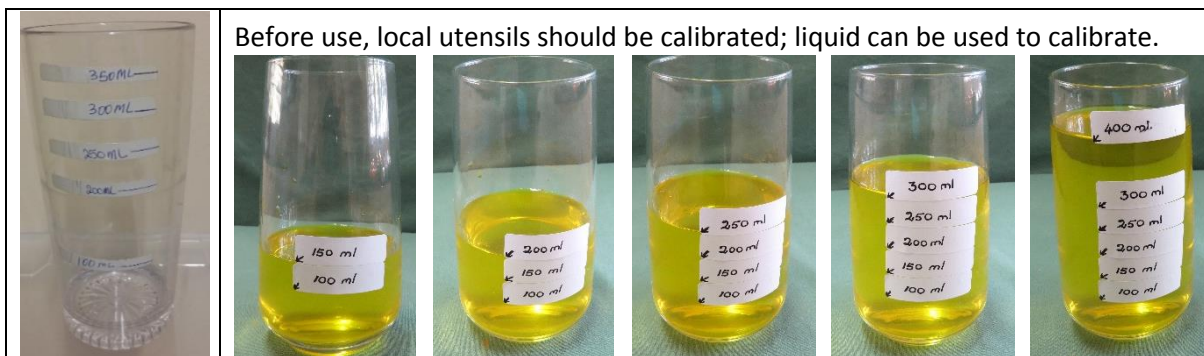
To minimize errors, all utensils in the dietary kit should be clearly marked.



Local utensils

A selection of local utensils such as glasses, mugs, cups, bowls, plates and spoons can be used.

It should not be assumed that the mug / bowl was full; the respondent should indicate the amount consumed, using the calibrated lines on the utensils.



The amount can be reported in number of spoonfuls. The size of the spoon can be determined either with life size photographs or drawings, or with actual spoons. It should always be indicated whether the spoons were level or heaped.

Abbreviations can be used when using spoons to record the amount of food eaten; abbreviations used should be agreed upon before the start of a study and must be standardised throughout the study.

| Spoon size | Level | | Heaped | |
|---------------|--------|--------|--------|--------|
| teaspoon | ˉ tsp | L-tsp | ^ tsp | H-tsp |
| dessert spoon | ˉ dsp | L-dsp | ^ dsp | H-dsp |
| tablespoon | ˉ Tbsp | L-Tbsp | ^ tbsp | H-Tbsp |
| serving spoon | ˉ ssp | L-ssp | ^ ssp | H-ssp |

In general, previous studies suggest that different forms of food are best quantified with different types of portion size estimation aids. Table 10 provides some guidelines of which portion size estimation aids can be used for the various forms of foods (also see Table 13).

TABLE 10: Examples of portion size estimation aids that can be used for the various forms of food.

| Food form | Suggested portion size estimation aids |
|--|---|
| Liquids, i.e. fluids such as beverages | Calibrated glasses, cups and mugs, or photographs thereof |
| Amorphous food, i.e. food that take on the shape of the container in which it is placed such as rice, porridge, chopped/mashed fruit and vegetables, mixed dishes, stews | Photographs, bean bags, “mounds”, dish-up and measure, household measures |
| Solid masses, i.e. food that keeps it shape like bread | Photographs, food models, abstract shapes |
| Solid counts (unit), i.e. units of food such as grapes, or containers | Wrappers and containers, geometric shapes, ruler, food models, non-food objects |

5.2 Food Description Aids

Apart from the details required to describe the way food was cooked (e.g. frying) or served (e.g. use of salad dressing) as discussed in Section 6, it may be useful if the dietary kit contained a collection of visual aids such as wrappers, containers and photographs that can be used to help the respondent

describe the food item that was consumed. Some examples of food description aids are given throughout Section 6.


Brand names are handy to describe the food (e.g. Kentucky fried chicken), but the interpretation of brand-specific information provided by a respondent needs to be done carefully, as respondents may name all different makes by one brand name, e.g. “Rama” for all margarines or “Simba” for all crisps. A series of food photographs can be used to assist the respondent to identify the specific food item (see example of picture chart portraying different types of margarine and butter on Page 34).

Photographs of foods available on the local market can be used to help the respondent in identifying the specifics needed for a particular study, e.g. the sugar / sweetener, fat or salt content of different brands or food classes.

Photographs can be used to obtain information on a specific brand (as opposed to generic descriptions).

The brand names and types that are available in the study population should be portrayed in the pictures.

This is an example of the different fat content for hard and soft Rama margarine.





Mixed dishes remain a challenge. Researchers should consider checking local cuisine and recipes to get an indication of the composition and ratios of ingredients, for example of stews and porridge-vegetable mixtures.

Pictures can be used to identify different preparation methods.



Maize : pumpkin = 3 : 1



Maize : pumpkin = 1 : 1



Maize : pumpkin = 1 : 3

Photographs portraying different ratios of ingredients used in a mixed dish [Source: Tani Lombard]

When the aim of the study is to look at e.g. the intake of different indigenous foods, using photographs of the various foods may be very useful; e.g. in the case of African Leafy Vegetables.

Portion size estimation and food description are complex and a major contributor to error in dietary assessment. Some scientific evidence is available to guide researchers in identifying and properly using measuring aids. This can improve the quantification, but one size does not fit all! Continuous quality improvement is essential.

5.3 Description and availability of (validated) dietary assessment aids in South Africa

Apart from several portion size estimation aid kits that have been developed for specific studies by research teams in South Africa, Table 11 summarises some major tools.

TABLE 11: Description and availability of some South African portion size estimation aids.

| | |
|---|---|
| <p>Food portion sizes book</p> | <p><u>Description:</u> About life-size, ± 45 degree angled image, mostly individual (i.e. one portion size per page) photographs of foods commonly consumed by target group, in a standard presentation (i.e. enamel plate or other household utensil typically used, with black background). For some foods (e.g. stiff porridge) up to four different portion sizes, reflective of consumption range in target population are given. The atlas is supplemented with photographs of the utensils and their respective volumes. Presentation in English, Afrikaans and Tswana.</p> <p><u>Target group:</u> 15-65 year old Tswana-speaking adults (North-West Province).</p> <p><u>Published validation study:</u> Venter CS, MacIntyre UE, Vorster HH. The development and testing of a food portion photograph book for use in an African population. <i>Journal of Human Nutrition and Dietetics</i> 2000; 13(3): 205-218.</p> <p><u>Reference:</u> MacIntyre UE. 1996. The Nutrition Transition Among the African Population of North West. <i>Food Portion Sizes</i>. Potchefstroom, Department Dietetics and Family Ecology. Potchefstroom, Potchefstroom University of CHE.</p> |
| <p>Ratio and Portion Size control Photo (RAPP)</p> | <p><u>Description:</u> Life-size photographs, ± aerial image of foods commonly eaten by target group, one portion size per page, food on white enamel plate with a wooden spoon as size marker; always on black background.</p> <p>Two sets of photographs:</p> <ul style="list-style-type: none"> • Individual foods • Mixed dishes of maize and vegetables in different ratios <p><u>Target group:</u> Xhosa-speaking people in rural Eastern Cape.</p> <p><u>Published validation study:</u> Lombard M, Steyn N, Burger HM, Charlton K, Senekal M. A food photograph series for identifying portion sizes of culturally specific dishes in rural areas with high incidence of oesophageal cancer. <i>Nutrients</i> 2013; 5(8): 3118-3130.</p> <p><u>Reference:</u> Lombard MJ, Burger HM. 2007.</p> |
| <p>Dietary Assessment and Education Kit (DAEK)</p> | <p><u>Description:</u> A colour-coded (by food groups) file with removable pages containing food photographs for food identification, supplemented with weights of household measures and the conversion thereof to grams for each food. For quantification, life-size drawings of many foods are included, as well as recipes for home-made food models. Examples of dietary assessment forms are provided. Flash cards are intended to aid nutrition education.</p> <p><u>Target group:</u> "South Africans"</p> <p><u>Validation:</u> Not applicable</p> <p><u>Reference:</u> Steyn NP, Senekal M. 2004 A Guide for the use of the Dietary assessment and Education Kit (DAEK). ISBN: 1-920015-09-04</p> |

5.4 Guidelines of how to assemble a “dietary kit” for a specific study

A “dietary kit” is the complete set of measuring aids, including portion size estimation aids and food description aids. When publishing the results of the study, it is important to clearly report which measuring aids or combination thereof were used in a study.

Scientific and practical considerations should be kept in mind when assembling a dietary kit for a study.

The dietary kit (measuring aids) should be:

- appropriate for age, gender and physiological condition of the respondents,
- be suitable for the culture and language of the study population,
- have acceptable performance characteristics (validity and reliability),
- be standardised across study groups.

Performance of measurement aids in previous, comparable studies should be checked. This means that the (i) aim, (ii) setting and (iii) target group of the previous study should be comparable to the study to be conducted. In the literature many portion size estimation aids validation studies have been reported. This includes some South African studies (see Table 11), sometimes for very specific target groups and at a particular point in time. The specifics of a validation study for the specific portion size estimation aids should be checked during the planning phase of a new study.

Using inappropriate portion size estimation aids may lead to misreporting.

In dietary assessment there are no “right” or “wrong” portions. The use of portion size estimation aids should be participant-driven, and researchers should be cautious about assumptions regarding “normal” or “typical” intake quantities.

The following factors can guide the compilation of a dietary kit for a specific study, when a validated, stand-alone measuring aid is not used:

- *Age of the study population*: relevant food quantities for young children differ from adults.
- *Numeracy and literacy of study population and interviewers*: complex technology may be experienced as intimidating, and some of the measuring aids may be perceived to be ‘toys’.
- *Setting*: example foods in the dietary kit should be relevant to urban and/or rural settings (depending on the study population) as well as socio-economic and cultural characteristics of the study population.
- The type of portion size estimation aids should match the form of food that is expected in the study population.
- Usually a combination of three dimensional and two dimensional tools is best, where some of the tools are “generic” and suitable for more than one food.
- *Bulkiness and weight of the dietary assessment kit*, particularly if interviewers need to carry it; this is less of a problem in cases where the interviews are done at a central study site.
- *Durability and maintenance* of the measurement aids.
- *Availability*: e.g. food models.
- *Cost* (in terms of money and time) of developing and/or acquiring the dietary kit, and of interpreting the recorded 24-hour dietary recall information.
- *Acceptability* to the researcher, interviewer and respondent (this includes ethical, cultural and functional aspects).
- *Pretesting* pictures and drawings to ensure that respondents recognize foods in picture charts.
- *Adaptability* (multi-purpose use) of the individual portion size estimation aids.

6. HOW TO DESCRIBE AND QUANTIFY THE FOOD ITEMS

In a country as diverse as South Africa, there is a large variation in the type of foods consumed as well as preparation methods. Certain foods may be very specific to a specific area or population group.

The researcher and interviewer should be aware that different foods may be called the same name, or similar foods may be called by different names in different study populations.

It is important to get detailed information (recipes) for traditional dishes.

In this section the guidelines for describing the foods consumed (based on the dietary logic, see Figure 1) are explained using a selection of food items.

IMPORTANT: The intention is not to cover ALL different types of food on the market, but rather to sensitise the researcher and interviewer to the pitfalls to look out for. New types of food and beverages enter the market daily. It is the responsibility of the researcher to familiarise her/himself with the latest foods and beverages available on the market and include it as examples in the dietary kit.

6.1 BREAD

Recording bread consumption involves the following steps:

- (i) Describe the type of bread and the amount eaten
- (ii) Describe the type of spread(s) and the amount(s) used
- (iii) If it was a sandwich, describe the food items used as filling (topping) and amount(s) thereof

1. Describe the type of bread and amount eaten

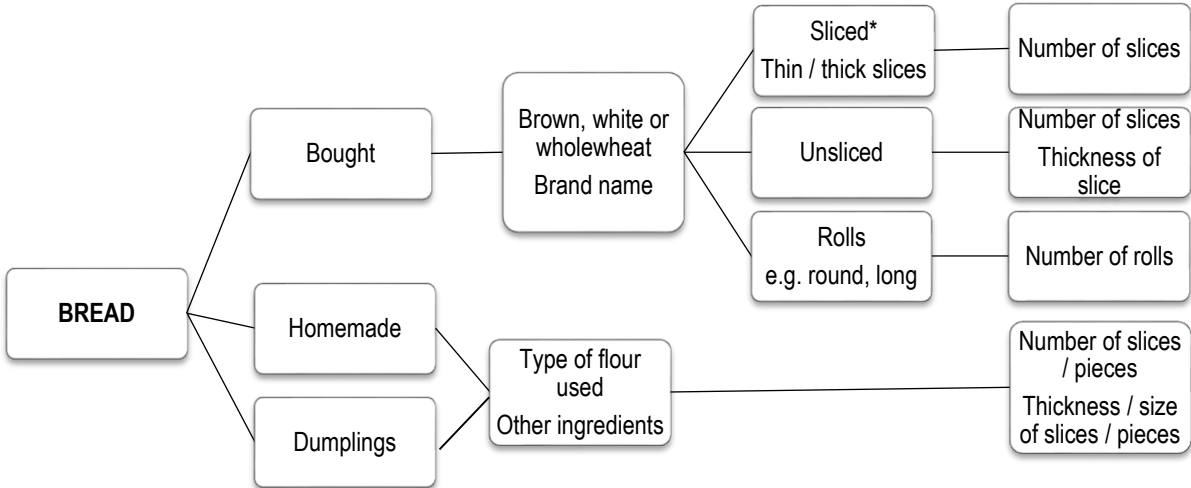


FIGURE 2: Describing the type and amount of bread eaten.

* If the bread was already sliced when bought from the shop, this can be indicated as “shop sliced”



Round "hamburger" roll



Long "hotdog" roll

The Brand name is recorded because the size of loafs and slices differ, as illustrated below. If bread is eaten frequently in large amounts, having an accurate indication of the size of the shop sliced bread is important (particularly as wheat flour, that is used to bake bread, is fortified in South Africa).



2. Describe the type of spread(s) and the amount(s) used

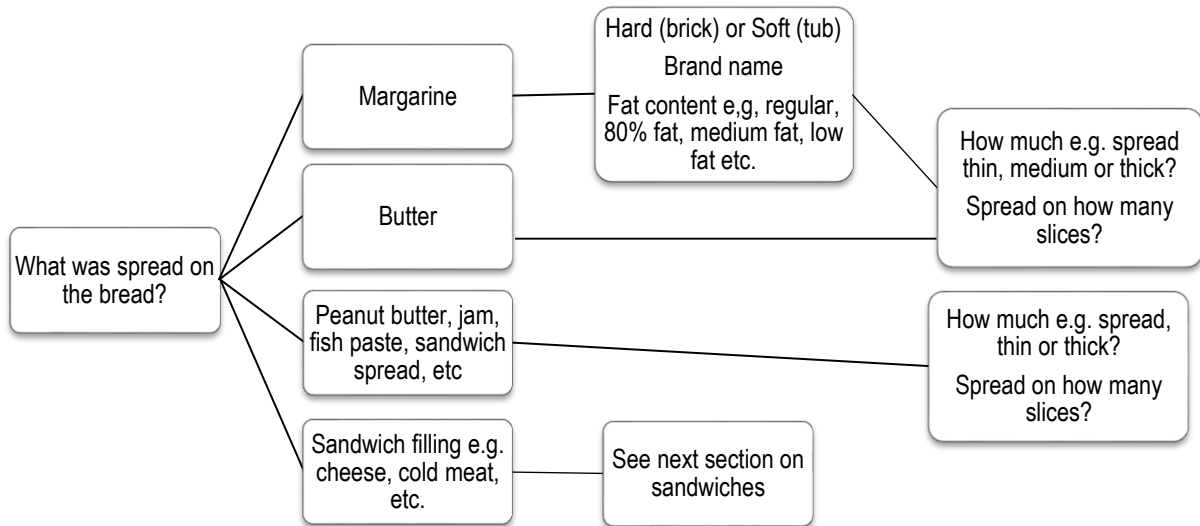


FIGURE 3: Describing the type and amount of spread(s) on bread.

Differentiate between (i) hard margarine (hard brick, wrapped in paper) and soft margarine/bread spread (sold in plastic containers), and (ii) the 'fat' content of the different types of margarine, for example if it is the medium fat, lite or spread for bread. The BRAND of the spread should be recorded, if possible. Some examples are shown on the next page.

Example of a picture chart portraying different types of butter and margarine:



To identify the type of margarine, picture cards could be used (see example on page 29).

It is difficult to quantify the amount of spread on bread. Photographs can be used to illustrate different amounts of spread on bread.

Descriptors can be used e.g. thin (scraped on), medium (well covered), thick (see teeth marks in spread).

Thick Medium Thin

Describe the spread other than margarine/butter on the bread, if any.


The amount of spread on bread can be described as e.g. thin, medium or thick.


Photographs can be used to illustrate different amounts of spread on bread.


3. If it was a sandwich, describe the food items used as filling (topping) and amount(s) thereof

Sandwiches should be split into bread, spread and filling. Each of these individual components and amount of each component should be recorded separately. Each individual component should be described in as much detail as possible; e.g. type of bread, type of spread, type of cheese. Some examples are given below.

| Tomato and cheese sandwich | <i>Food item</i> | <i>Description and amount</i> |
|---|------------------|--|
|  | Bread | According to Figure 2 |
| | Spread on bread | According to Figure 3 For a bought sandwich, the respondent will not be able to identify type |
| | Cheese | According to Section 6.12 |
| | Tomato | Number and size of slices |

| Ham sandwich | <i>Food item</i> | <i>Description and amount</i> |
|--|------------------|-------------------------------|
|  | Bread | According to Figure 2 |
| | Spread on bread | According to Figure 3 |
| | Ham | Number of slices |
| | Tomato | Number and size of slices |
| | Cucumber | Number and size of slices |
| | Lettuce | Number of lettuce leaves |

| Ham and egg sandwich | <i>Food item</i> | <i>Description and amount</i> |
|---|------------------|-------------------------------|
|  | Bread | According to Figure 2 |
| | Spread on bread | According to Figure 3 |
| | Ham | Number of slices |
| | Egg | According to Table 12 |
| | Tomato sauce | Amount |

| Egg mayonnaise sandwich | <i>Food item</i> | <i>Description and amount</i> |
|---|------------------|--|
|  | Bread | According to Figure 2 |
| | Spread on bread | According to Figure 3 |
| | Egg mayonnaise | The respondent may not be able to quantify the amount of egg and mayonnaise separately; the amount of "egg mayonnaise" should then be recorded |

6.2 PORRIDGE

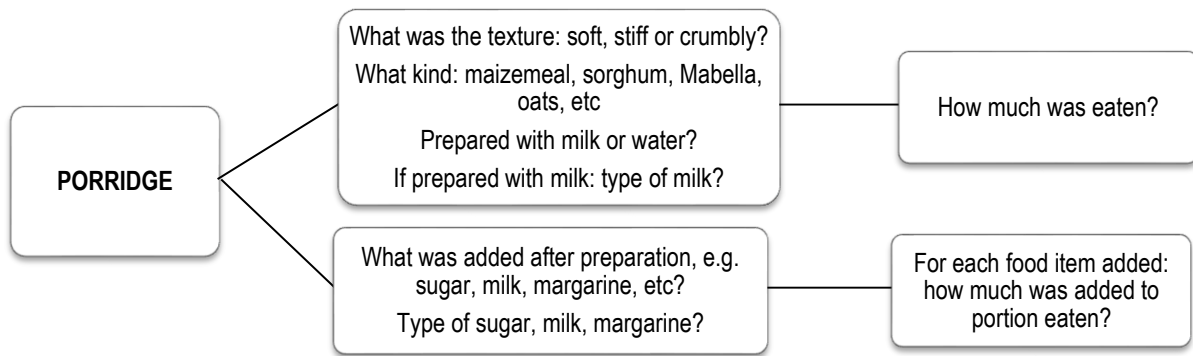


FIGURE 4: Describing the type and amount of porridge eaten.

The description of the product that was used to make porridge must be as specific as possible.

For example, the Brand Ace has a maize meal, an instant maize meal and a Cream of Maize. At the same time, Purity also has a Cream of Maize, which is a baby porridge. The micronutrient content of these products differ.



When an instant porridge was eaten, it needs to be clear whether the recorded amount refers to the dry amount used or to the amount as eaten (see example on page 38).

Maize and vegetable mixed dishes



These are dishes made with porridge mixed with pumpkin or green leafy vegetables.

The ratio of how much of the dish was maize meal and how much was vegetable should be specified; example is:

- half porridge, half pumpkin, or
- two thirds porridge and one-third pumpkin/green leafy vegetable.

[see page 29 for example of food description aid to describe the ratio]

Maize and sour milk mix



This is thin maize porridge (“slap pap”) that is mixed with sour milk.

The ratio of how much was maize meal and how much was sour milk should be specified; example is:

- half soft porridge and half sour milk, or
- one third soft porridge and two thirds sour milk.

Sometimes a combination of maize meal and sorghum is used.

6. 3 BREAKFAST CEREALS

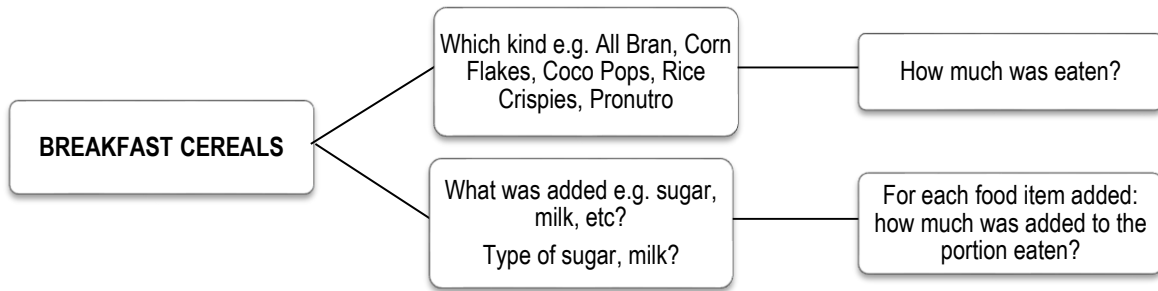


FIGURE 5: Describing the type and amount of breakfast cereal eaten.

Photographs can be used to help the respondent to describe the specific breakfast cereal in more detail (see Weetbix example below)



For foods that are bought in “standard size”, e.g. Weetbix, it is better to indicate counts (rather than to quantify immediately). The reason being that the food industry changes portion sizes. The 2016 size of one Weetbix biscuit is 20 g. It was 25 g previously.

Example: Weetbix is recorded as e.g. 2 Weetbix



All food items (e.g. milk and sugar) added to be breakfast cereal should be recorded separately (see example below)

Weetbix with sugar and milk



If the respondent ate only half of the above, the amounts for Weetbix, milk and sugar should be halved.



For products such as Morvite, Pronutro and Future Life, it needs to be clear whether the recorded amount is for the dry product or for the “as eaten” amount (see example below).

Example: different ways in which products such as Morvite, Pronutro and Future Life can be recorded.

Scenario 1: The respondent can indicate the dry amount used for the amount eaten.



Record the amount for the dry product.
Record the amount of liquid used.
If milk was used, record the type of milk.

Scenario 2: The respondent cannot indicate the dry amount and liquid used.

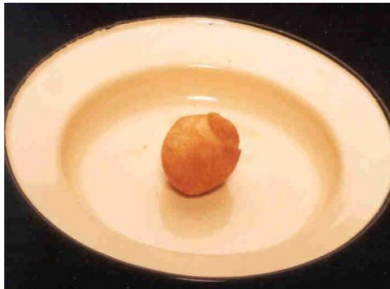


Record the amount for the prepared amount.
Indicate whether mixed with milk or water.
If milk was used, record the type of milk.

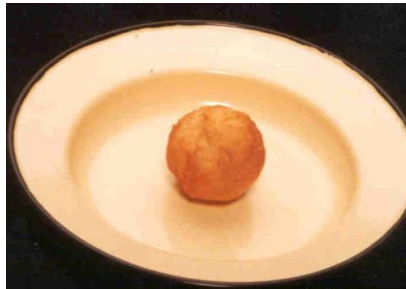


6.4 VETKOEK

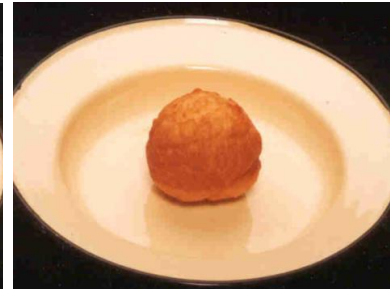
The size of a vetkoek can be described as small, medium or large (using photographs as measuring aid; example given below); or a ruler can be used to determine the diameter. A tennis ball or table tennis ball can also be used.



Small vetkoek



Medium vetkoek



Large vetkoek

[Source: MacIntyre, 1996]

Vetkoek, a commonly consumed food in many areas, can have various shapes and sizes. The visual aids in the dietary kit should resemble the shape and size mostly eaten in the study population.



It should be determined whether the vetkoek had a filling (e.g. jam, curry meat). If it had a filling: the type of filling and the amount of filling should be recorded.

Example of different fillings:



Mince and tomato sauce filling



Mince and bakes beans filling



Mince and vegetable filling

6.5 POTATO AND SWEET POTATO

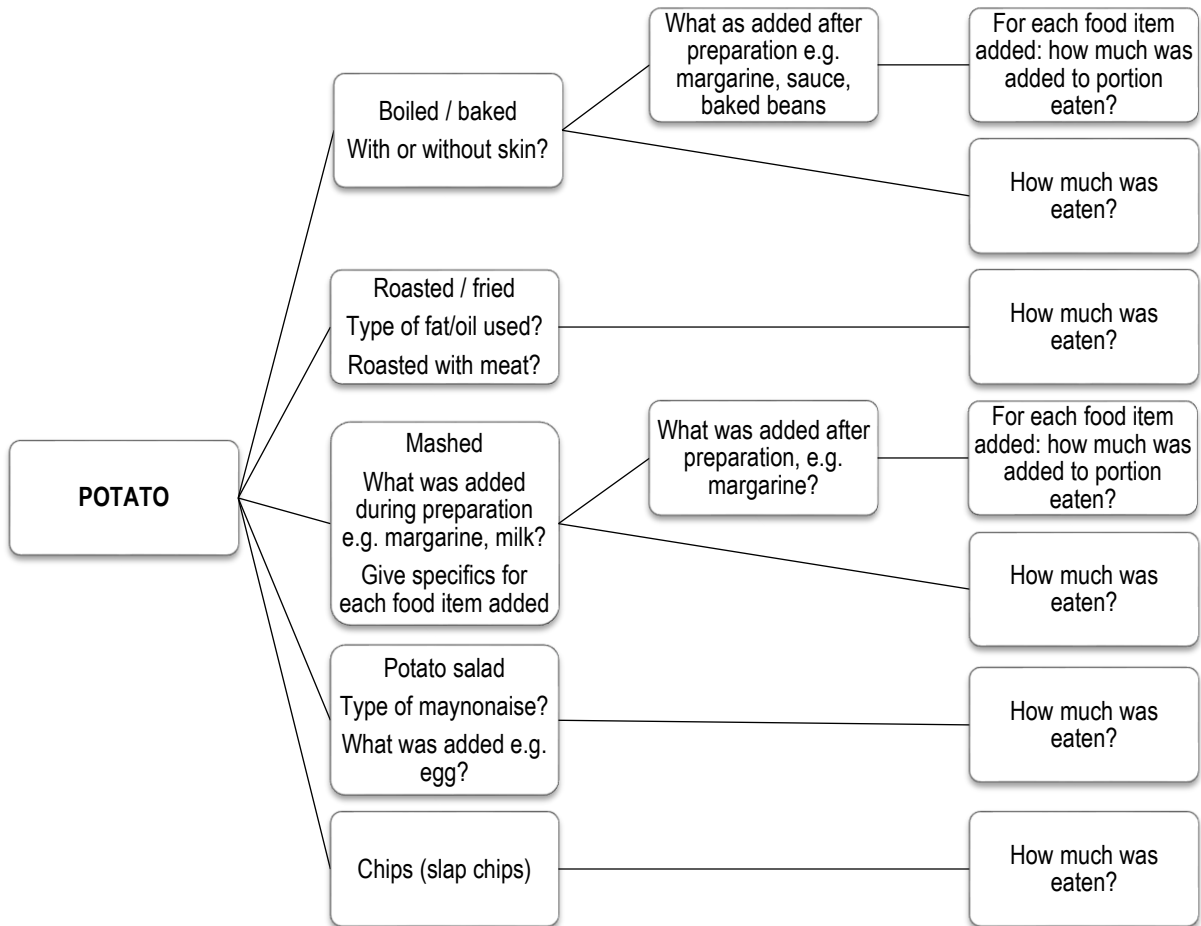


FIGURE 6: Describing the type and amount of potatoes eaten.

For sweet potato, the colour of the flesh of the sweet potato may vary from white to dark orange.

Photographs can be used to assist the respondent to identify the sweet potato eaten.

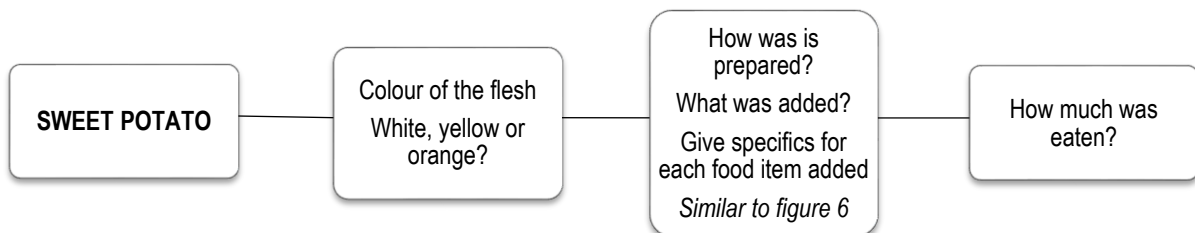


FIGURE 7: Describing the type and amount of sweet potatoes eaten.

6.6 VEGETABLES

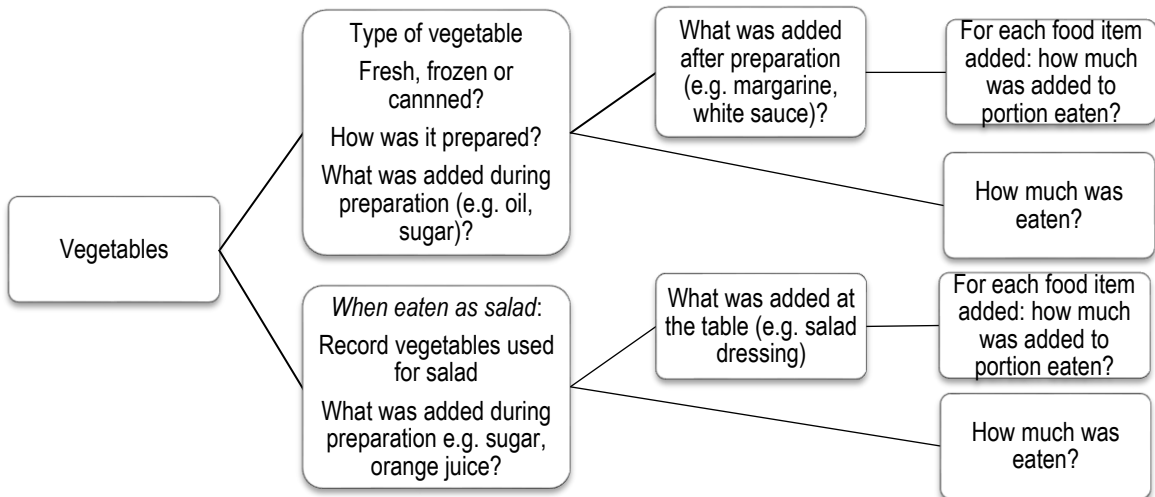


FIGURE 8: Describing the type and amount of vegetables eaten.

It should be indicated whether vegetables were whole, chopped, cubed, shredded, mashed, etc; particularly if household measures (e.g. spoons) are used to quantify the amount eaten.



Carrots, peas, corn



Carrots, broccoli, cauliflower

If mixed vegetables were eaten, individual vegetables in the mix should be specified. Ask if it was a commercial bought mix or mixed in the household.

Green leafy vegetables (spinach, imifino, marog)

If the respondent ate green leafy vegetables, the type of leaves he/she used should be determined. For example, distinguish between spinach and imifino / marog.

If the respondent ate imifino / marog, but is not sure what type of leaf it was, "imifino / marog" should be recorded. If he/she can recall the type of leaves, then the type of leaves should be written in brackets. For example: "imifino (imbuya mixed with uwata)"; or "imifino (pumpkin leaves)".

If the study has a strong focus on the role of green leafy vegetables in the diet, it will be helpful to use a series of photographs portraying various green leafy vegetables.

If the respondent ate a mixture of maize meal and green leafy vegetables, the ratio of maize meal to leaves should be indicated.



6.7 FRUIT

FRESH FRUIT



The type of fruit eaten needs to be determined; e.g. apple; orange; banana etc.

Was peel eaten (where applicable)?

The amount eaten needs to be determined (for whole fruit, the number of fruit eaten should be recorded).

The size of the fruit need to be determined.

For example, for whole fruit, a golf ball, a tennis ball, or a ruler can be used to determine the size, for example:

- 3 apricots size of golf ball; 1 apple size of tennis ball.
- 1 apple 8 cm diameter x 5 cm high.
- 1 banana, without peel (14 cm x 2 cm diameter).

Fruit can also be reported as small, medium and large (provided portion size aids portraying the various sizes are used).

Mashed fruit or cubed fruit can be recorded as number of spoons (level or heaped), bowls, beans bags etc.

For slices, e.g. watermelon, the number of slices and size of slice/wedge should be recorded.

CANNED FRUIT



Canned fruit can be either bought or home-made.

Distinguish between fruit canned in syrup and fruit canned in juice.

Amount: how many peach or pear halves/slices; bowls; mL

DRIED FRUIT



If stewed; what was added?

6.8 LEGUMES

Using a picture chart (see example below) may assist the respondent to accurately report the type of bean eaten.



Small white beans



Kidney beans



Red speckled beans



Green split peas

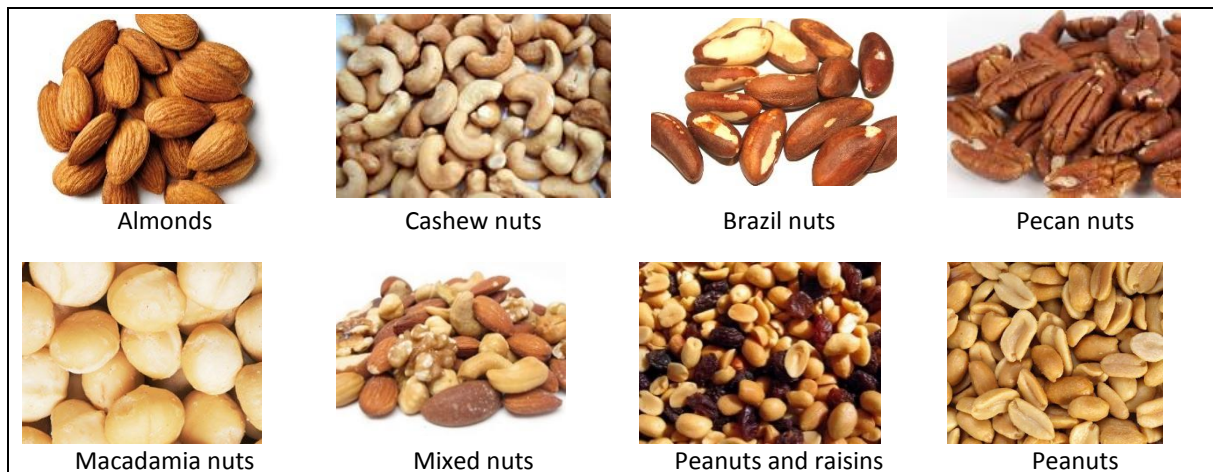
It should be recorded whether the beans were eaten on its own, or mixed with other food items.

For mixed dishes (e.g. samp-and-beans), the ratio should be recorded (e.g. ratio of samp to beans). If the respondent finds it difficult to describe the ratio, ask “was it half beans and half samp”, or “was it more beans and less samp” or “was it more samp and less beans”?

What was added during preparation (e.g. oil/fat)?

6.9 NUTS AND SEEDS

Using a picture chart (see example below) may assist the respondent to accurately report the type of nuts eaten.



Photographs can be used to illustrate different types of nuts and seeds.

6.10 MILK AND NON-DAIRY CREAMERS

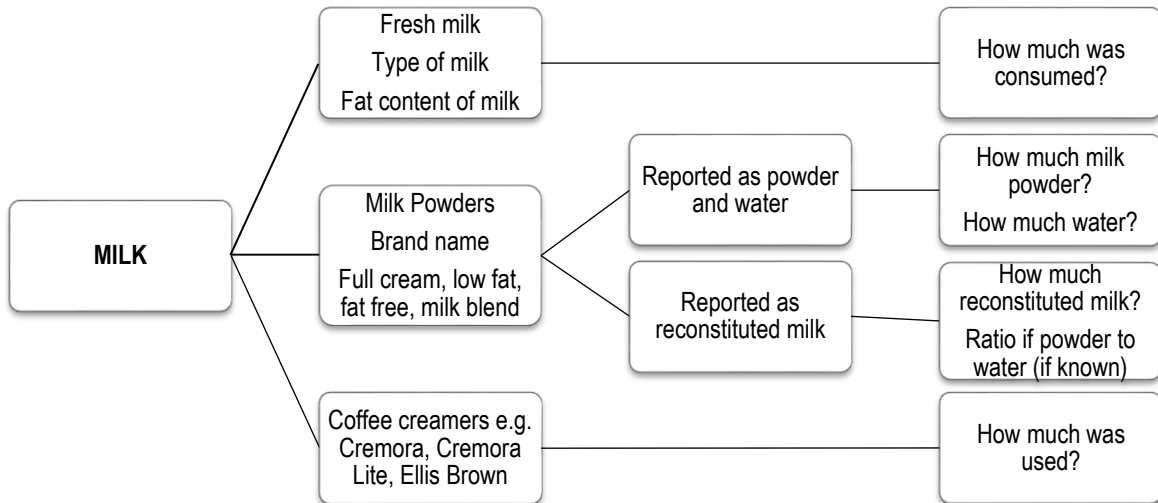


FIGURE 9: Describing the type and amount of milk consumed.

Milk can be consumed as such, in tea, in coffee, with porridge, etc



The type of milk should be indicated, e.g. fresh whole milk (this refers to cow's milk), goats milk or soy milk.

There are different types of milk on the market; according to new legislation the different classes of milk are high fat, full fat, medium fat, low fat and fat free⁷

Photographs can be used to differentiate between the different types of milk drinks available on the market



⁷ Regulations relating to the classification, packing and marketing of dairy products and imitation dairy products intended for sale in the Republic of South Africa. Agricultural Product Standards Act, 1990 (Act no 119 of 1990). No. R.260 Department of Agriculture, Forestry and Fisheries. 27 March 2015.

If milk powder was used, the brand name should be recorded, e.g. Klim, Nespray.
It should be indicated whether it is full cream, low fat or skimmed.



Distinguish between dry milk powder and reconstituted milk.

Milk in a can should be recorded as either evaporated milk or condensed milk, depending on which one was used.

It should be indicated whether a full fat or low fat variety was used.



Evaporated milk



Condensed milk, full cream



Condensed milk, low fat

The amount of milk used in tea and coffee can be described based on the colour of the tea / coffee.

Little milk: the tea was strong or had a dark colour.

Medium milk: the tea had a light brown colour.

A lot of milk: the tea was creamy or white

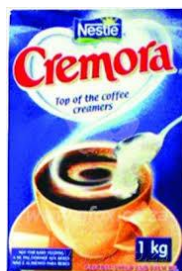
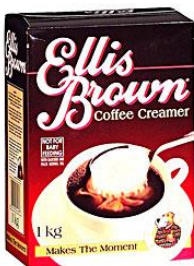
Photographs can be used to portray the colour of the tea/coffee using different amounts of milk.



It should be indicated whether non-dairy creamers e.g. Cremora, Ellis Brown etc. were used.

Distinguish between Cremora and Cremora light.

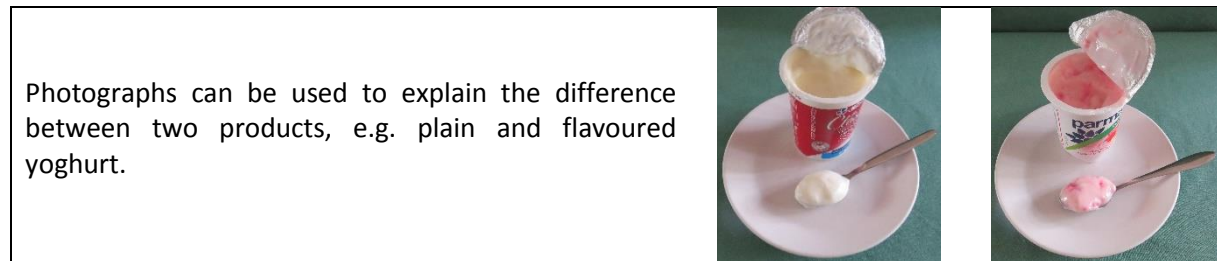
These creamers should **not** be referred to as milk or milk powder.



6.11 YOGHURT

There should be a distinction between the following:

- Plain (white, unflavoured, unsweetened) versus flavoured, sweetened [give brand name]
- Double cream, full fat, low fat or fat free [or high fat, full fat, medium fat, low fat, fat free; as per new legislation⁸]
- Drinking yoghurt



Example of a picture chart portraying different types of yoghurt:

| | Double Cream | Full cream | Low fat | Fat free |
|-------------------|---|---|--|---|
| Plain yoghurt |  |  |  |  |
| Flavoured yoghurt |  |  |  |  |
| Drinking yoghurt | |  |  |  |

Note that there is a Mayo drinking yoghurt available in some areas in South Africa; this should be recorded as “Mayo drinking yoghurt” and not just as Mayo to avoid confusion with mayonnaise.

⁸ Regulations relating to the classification, packing and marketing of dairy products and imitation dairy products intended for sale in the Republic of South Africa. Agricultural Product Standards Act, 1990 (Act no 119 of 1990). No. R.260 Department of Agriculture, Forestry and Fisheries. 27 March 2015.

6.12 CHEESE

Photographs can be used to differentiate between the different types of cheese (some examples are given below).

HARD CHEESE

When recording the amount, distinguish between a block / cube / slice / wedge of cheese and grated cheese.



Mozarella Cheddar Gouda



FETA CHEESE



PROCESSED CHEESE



Individually wrapped slices Cheese spread Wedges


SOFT CHEESE

Cottage cheese

Distinguish between *Cottage cheese* and *Cream cheese*


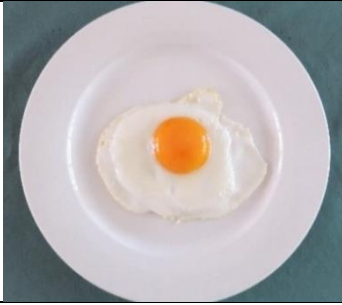



Distinguish between full cream, medium fat, low fat and fat free

Cream cheese



6.13 EGGS

TABLE 12: Describing the type and amount of eggs eaten.

| | | Description | Amount eaten |
|-----------------------------------|---|--|---|
| Boiled egg Poached egg |  | Was the whole egg eaten (white en yolk)? | Number of eggs |
| Fried egg |  | What was used to fry the eggs (see Figure 13)? | Number of eggs |
| Scrambled egg |  | What was added during preparation (e.g. type of fat [see Figure 13] / type of milk [see Figure 9])? What was added after preparation (e.g. sauce)? If any, what was added and how much? | Number of eggs; or in household measurements; or using portion size estimation aids |
| Omelette |  | What was added during preparation (e.g. type of fat [see Figure 13] / type of milk [see Figure 9])? What was added after preparation (e.g. sauce)? If any, what was added and how much? | Number of eggs used in omelette Or size of omelette |
| Omelette with filling |  | If omelette had a filling, what was in the filling? | How much filling? |

6.14 MEAT

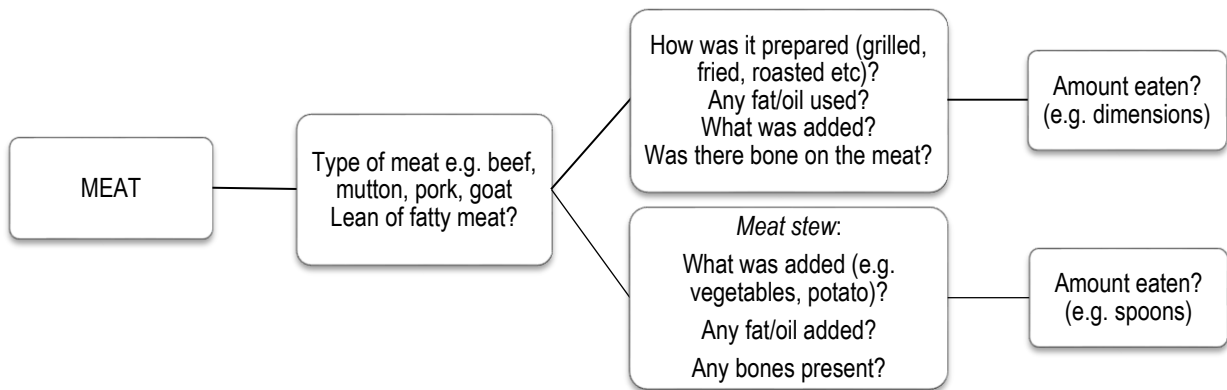


FIGURE 10: Describing the type and amount of meat eaten.

Differentiate between lean and fatty meat:

Lean meat = no visible fat or the visible fat has been removed;

Fatty meat = is prepared and eaten with visible fat.

Photographs can be used illustrate the difference between lean meat (no visible fat) and fatty meat (visible fat)



Lean meat (no visible fat)



Meat with visible fat



Indicate whether any bones were included

Differentiate between the different preparation methods (see Table 9)

Fried, i.e. with extra fat, oil or dripping Roasted, e.g. pot roast, little extra fat, basting

Stewed with liquid, such as casserole Grilled, i.e. no fat added



Fried



Roasted



Stewed: what was added



Grilled

Stews:

Indicate whether there were plenty vegetables and little meat, or plenty meat and little vegetables.



Sausage

What type of sausage, pork or beef or mutton or chicken?

Is it thin, medium or thick sausage?



Pork



Beef



Chicken



Vienna



Frankfurter



Russian

Polony:

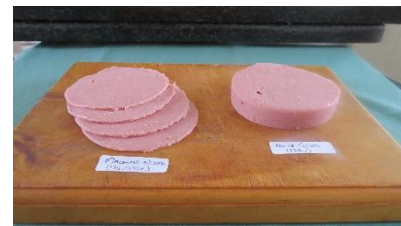
What type of polony, beef or chicken?



What is the diameter of the polony?



How thick is the slice?



6.15 CHICKEN

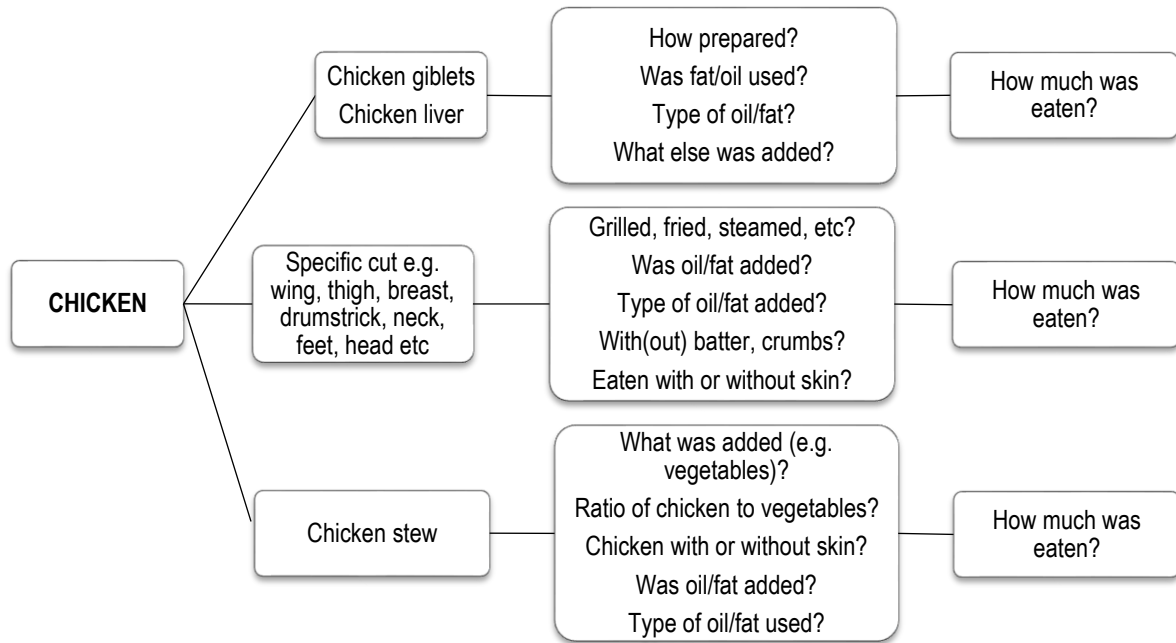
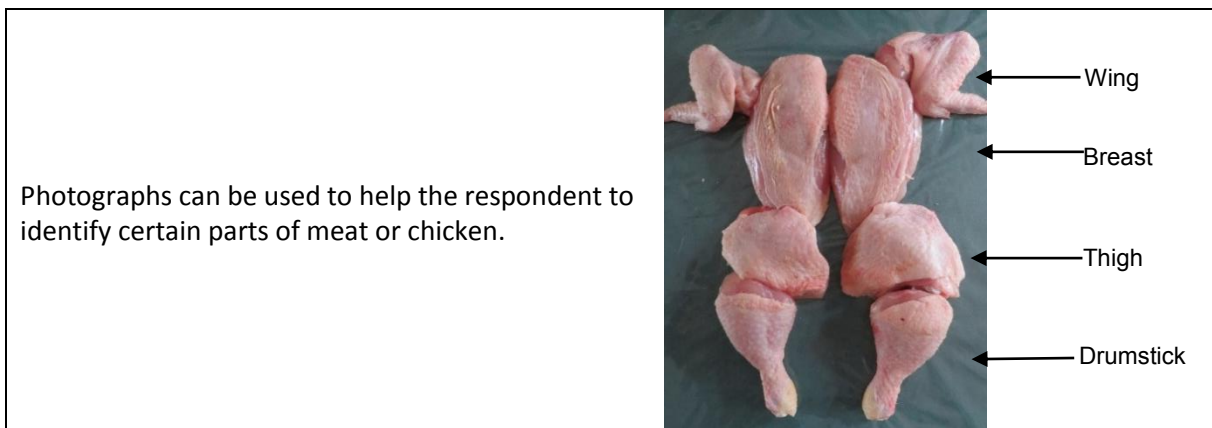
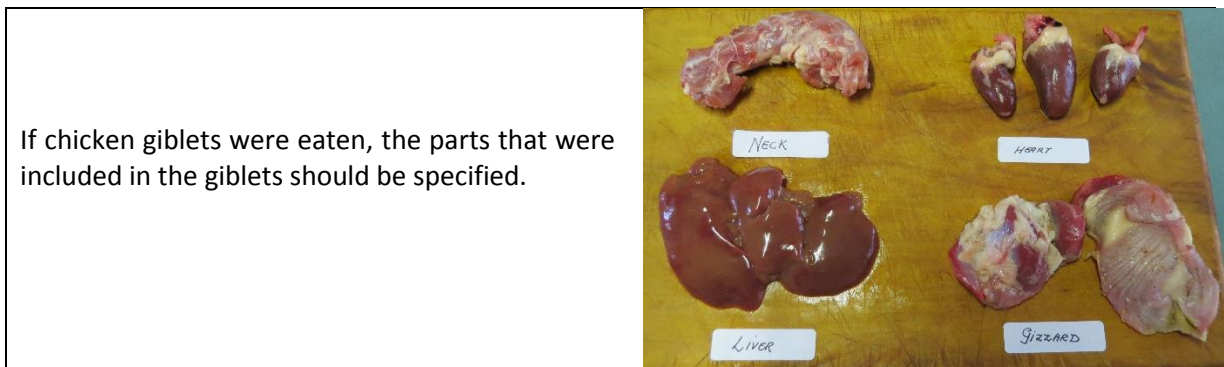


FIGURE 11: Describing the type and amount of chicken eaten.



For a chicken stew, the same procedures should be followed as for meat stews. In other words, ask whether there were plenty vegetables and little chicken, or plenty chicken and little vegetables.



6.16 FISH

Differentiate between fresh (or frozen) fish and tinned fish.

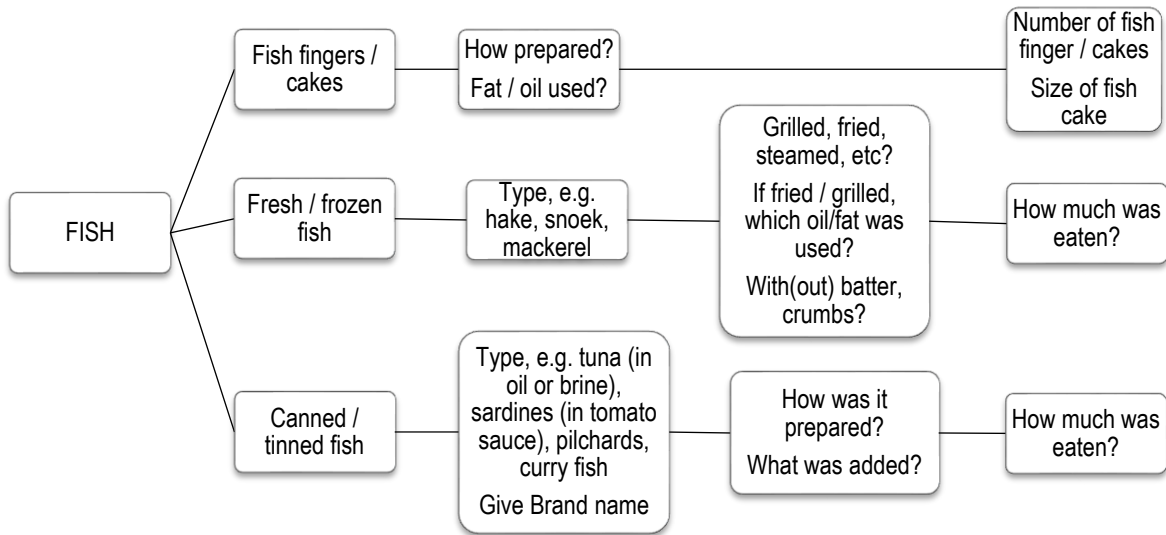


FIGURE 12: Describing the type and amount of fish eaten.



Fried fish in batter



Grilled fish



Fish in crumbs



Fish fingers



Fish cake fried in crumbs

Tinned fish: examples are tinned tuna; tinned pilchards in tomato sauce; and tinned sardines.

Recording the brand name, if available, is useful

How was the tinned fish prepared? E.g. fish cakes from pilchards, fried in sunflower oil.

How much? Ask how many spoons, level or heaped for, e.g. tinned tuna or minced pilchards?

Ask how many fishes, e.g. 1 pilchard with sauce, 1 sardine?



6.17 FAT, MARGARINE AND OIL USED IN FOOD PREPARATION

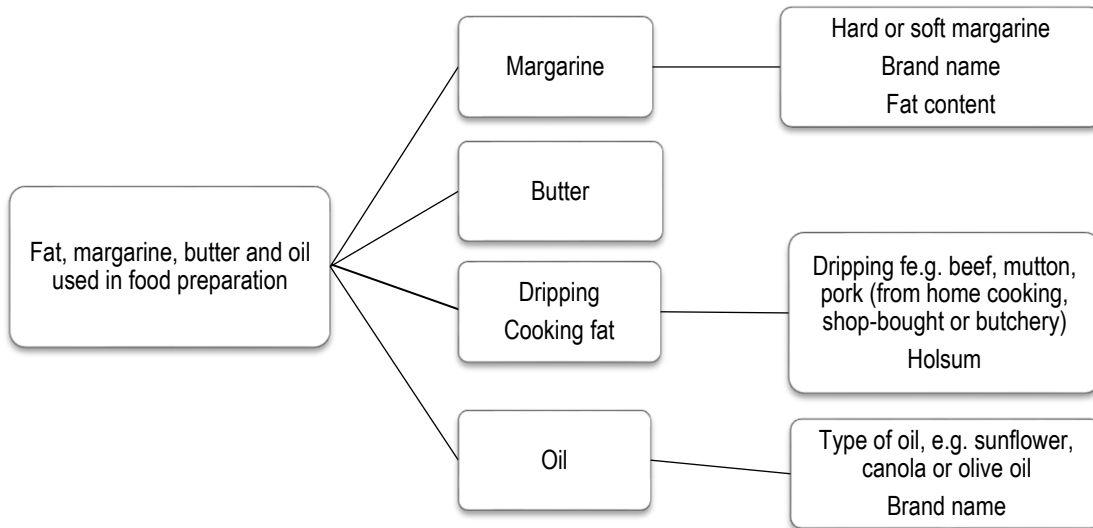


FIGURE 13: Describing the type and amount of fat used in dishes.

Also see page 33 for margarines and butter used on bread.

It is difficult to quantify the amount of fat / oil added during food preparation. Often an assumption is made regarding the amount added.



6.18 SOUP

Determine what type of soup was consumed. Record the main ingredients in the soup, e.g. water; vegetables (e.g. cabbage, carrots); potato; dried beans; soup mix; meat; meat bones.

Distinguish between a watery and a thick soup.

If commercial soup powder was used, distinguish between soup (liquid) and soup powder (dry).

Sometimes the soup powder (dry) is mixed with, for example, porridge to flavour the porridge.



6.19 BISCUITS AND COOKIES

Describe the biscuits/cookies consumed, in detail.

Use brand names, e.g: Marie biscuit, Lemon Creams, Eat-sum-more, Romany creams, Tennis biscuits, etc.

If brand name is not known for commercial biscuits, ask whether it was a plain biscuit or one with a filling.

6.20 SWEETS

Distinguish between the different types of products. Give Brand names, where possible.

| | | | |
|--------------|---|--|---|
| Chocolates |  | Chocolate coated nuts  | |
| Fudge |  |  |  |
| Toffees |  |  |  |
| Hard sweets |  |  |  |
| Soft sweets |  |  |  |
| Marshmallows |  |  |  |

Distinguish between small, medium or large chocolates / bars



6.21 NICKNAKS, CHIPS, CHEESE CURLS, POPCORN



The packet sizes of the products (supplied in the dietary kit) can be used to determine the quantity consumed



Often e.g. nikkaks are bought in bulk, repacked and sold. Determine the average weight for a randomly selected number of packets sold in the study area; record the weight in the code book (see Section 8)

6.22 TEA AND COFFEE

It is important to distinguish between **tea** and **rooibos tea**.

What was added?

Milk: If milk was added, what type of milk, and how much (see Section 6.10).

Sugar: If sugar was added, what type of sugar (e.g. white, brown) and how much (e.g. 1 level teaspoon [˘ tsp] or 1 heaped teaspoon [^ tsp])

6.23 JUICE

There needs to be a clear distinction between (i) fruit juice, (ii) dairy mixes (milk mixed with fruit juice, such as e.g. Frulati, Fiesta, Tropica), and (iii) cold drinks.

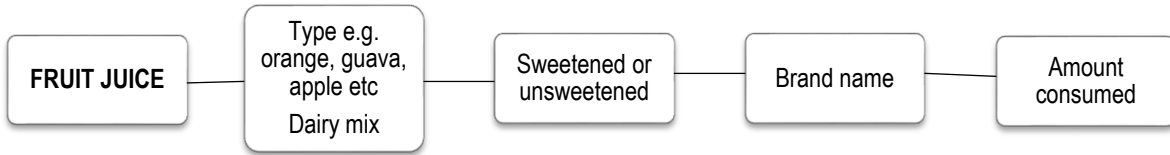
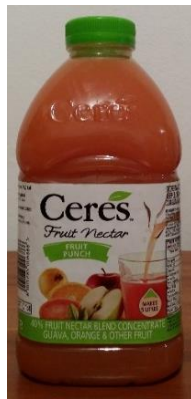


FIGURE 14: Describing the type and amount of fruit juice consumed.

Although brand names provide important information, it does not always provide sufficient information (as shown in example below)



Brand: Ceres
Blended fruit squash
6% fruit juice
[this is a cordial]



Brand: Ceres
Fruit nectar
40% fruit nectar



Brand: Ceres
100% fruit juice

Clearly indicate if it is a dairy-fruit mix



Ready to drink dairy-fruit-mix



Dairy-and-fruit mix concentrate to be mixed with water. The protein content of these products is very low; can thus be recorded as a **squash with sugar**

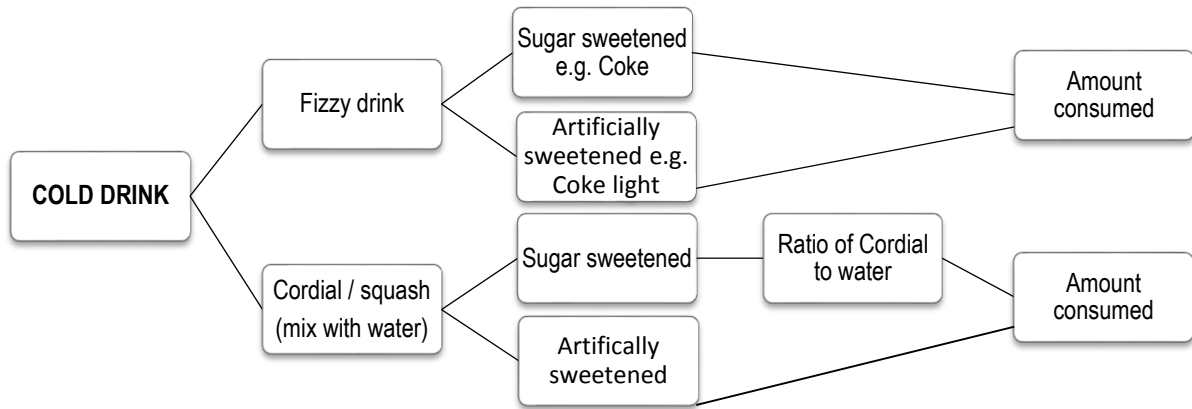
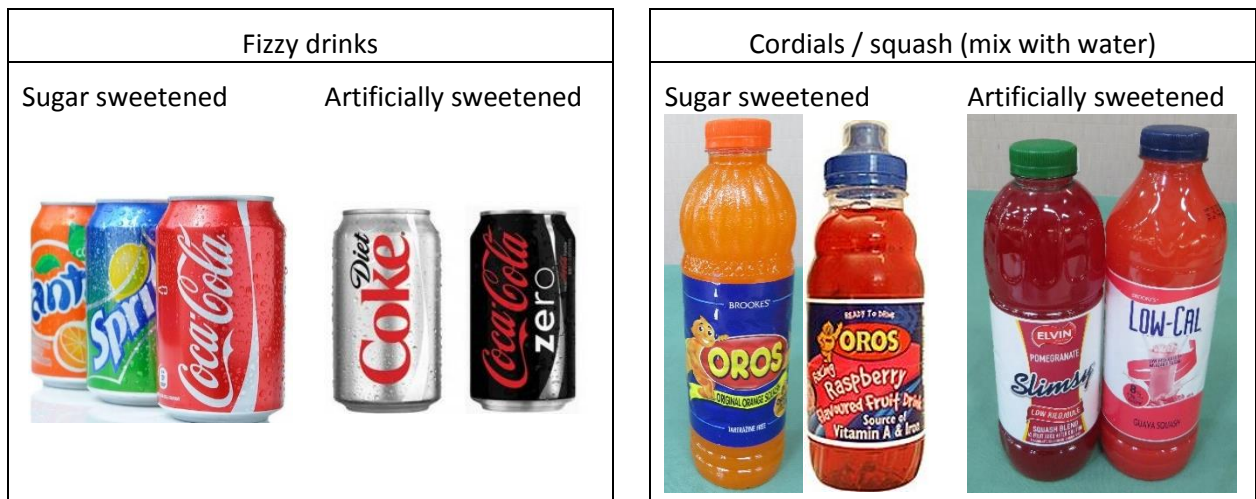


FIGURE 15: Describing the type and amount of cold drink consumed.



WATER

Distinguish between plain water (tap water or bottled water), flavoured water and “vitamin” water.



6.25 EXAMPLES OF PORTION SIZE ESTIMATION AIDS THAT CAN BE USED TO ESTIMATE THE AMOUNT EATEN.

Table 13 provide some guidance on which portion size estimation aids can be used for different food items to estimate the amount eaten.

TABLE 13: Examples of portion size estimation aids that can be used to estimate the amount eaten.

| | Counts | Photographs | Photograph on grid | Drawings | Geometric circles | Adjustable wedge | Thickness measure | Ruler | Wrapper, containers | Food models | Bean bags, mounds | Mugs, cups | Spoons | Non-food objects | Description (e.g. small, medium, large) | Household measures |
|-----------------------|--------|-------------|--------------------|----------|-------------------|------------------|-------------------|-------|---------------------|-------------|-------------------|------------|--------|------------------|---|--------------------|
| Bread | ✓ | ✓ | | ✓ | | | ✓ | ✓ | | ✓ | | | | | | |
| Spread on bread | | ✓ | ✓ | | | | | | | | | | ✓ | | ✓ | |
| Porridge | | ✓ | | ✓ | | | | | | ✓ | ✓ | | ✓ | | | |
| Cereals | | ✓ | | ✓ | | | | | | ✓ | ✓ | | ✓ | | | |
| Weetbix | ✓ | | | | | | | | | | | | | | | |
| Rice | | ✓ | | ✓ | | | | | | ✓ | ✓ | | ✓ | | | |
| Pasta | | ✓ | | ✓ | | | | | | ✓ | ✓ | | ✓ | | | |
| Velkoek | ✓ | ✓ | | ✓ | ✓ | | ✓ | ✓ | | | | | | ✓ | ✓ | |
| Potato | ✓ | ✓ | ✓ | | | | | ✓ | | ✓ | ✓ | | ✓ | | ✓ | ✓ |
| Vegetables | | ✓ | | | | | | | | ✓ | ✓ | | ✓ | | | |
| Fruit, whole | ✓ | ✓ | | | | | | | | | | | | ✓ | ✓ | |
| Fruit, diced / pieces | | ✓ | | | | | | | | | ✓ | | | | | |
| Legumes | | | | | | | | | | | ✓ | ✓ | ✓ | | | ✓ |
| Nuts | | | | | | | | | | | ✓ | ✓ | ✓ | | | ✓ |
| Milk | ✓ | ✓ | | | | | | | | | | | | | | ✓ |
| Milk in coffee, tea | | ✓ | | | | | | | | | | | | | ✓ | |
| Yoghurt | | ✓ | | | | | | | ✓ | | | ✓ | ✓ | | | ✓ |
| Hard cheese | | ✓ | | | | | | | | | | | | ✓ | | |
| Eggs | ✓ | | | | | | | | | | | | | | | |
| Meat | | ✓ | | ✓ | | | | | | ✓ | | | ✓ | | | ✓ |
| Chicken | | ✓ | | ✓ | | | | | | ✓ | | | | | | |
| Fish, piece | | ✓ | | ✓ | | | ✓ | ✓ | | ✓ | | | | ✓ | | |

TABLE 13 (continued): Examples of portion size estimation aids that can be used to estimate the amount eaten.

| | Counts | Photographs | Photograph on grid | Drawings | Geometric circles | Adjustable wedge | Thickness measure | Ruler | Wrapper, containers | Food models | Bean bags, mounds | Mugs, cups | Spoons | Non-food objects | Description (e.g. small, medium, large) | Household measures |
|-----------------------|--------|-------------|--------------------|----------|-------------------|------------------|-------------------|-------|---------------------|-------------|-------------------|------------|--------|------------------|---|--------------------|
| Fish cake | ✓ | ✓ | | ✓ | ✓ | | ✓ | ✓ | | ✓ | | | | ✓ | | |
| Fish finger | ✓ | ✓ | | ✓ | | | ✓ | ✓ | | ✓ | | | | | | |
| Fish, tinned, whole | ✓ | ✓ | | ✓ | | | ✓ | ✓ | | ✓ | | | | | | |
| Fish, chopped, flaked | | ✓ | | ✓ | | | | | | ✓ | ✓ | | ✓ | | | |
| Cake | | ✓ | | ✓ | | ✓ | | ✓ | | ✓ | | | | | | |
| Biscuits | ✓ | | | | | | | | ✓ | | | | | | | |
| Cold drinks | | ✓ | | | | | | | ✓ | | | ✓ | | | | |

7. INTERVIEWER TRAINING

Appropriate training of interviewers is essential; the selection of interviewers should be finalised after completion of the training [trainees who did not cope with the 24-hour recall should not be employed as interviewers in the study].

Depending on the qualification and skills of the potential interviewers (trainees), training is usually done over a 5-day period.

The following should be covered:

- Short overview of the aim of the specific research study.
- Specific requirements when collecting research data (e.g. confidentially).
- Interviewing techniques (do's and don'ts).
- Communication skills.
- Overview of the 24-hour recall method, using the multiple pass approach.
- Use of the dietary kit; each item in the dietary kit should be explained; and the trainees should be comfortable using each item in the dietary kit.
- Description of foods; Section 6 in this manual can be used as a guide.
- Portion size estimation and description of amounts.
- How to collect and record recipes.
- How to handle difficult scenarios.

Training of interviewers should be participatory and include discussions, small group exercises, role playing and a field exercise.

Each exercise or activity should be followed by a group discussion. The following should be included during these discussions:

- The trainer needs to give an overview of how the trainees did in the exercise or activity.
- When feedback is given, the names of individual trainees should not be used, as this may cause embarrassment.
- Point out where trainees tended to do well.
- Point out where trainees did not do well.
- Emphasize areas where recorded information was incomplete, either in the description of food or the amount eaten, and where improvements are needed; discuss probes that can be used to elicit additional information.
- Difficulties encountered and how to solve these.

When training interviewers to record dietary intake information, a systematic approach is used and the information recorded becomes progressively more detailed. An example is given on page 61.

Example of how the training on completing the 24-hour recall becomes progressively more detailed

| | |
|-----------------------------------|--|
| Record own food intake | <p>Trainees to write down what they ate the previous day. <i>Followed by: trainer provides an overview on how to describe foods.</i></p> |
| | <p>Trainees to revise what they have written down in terms of foods eaten the previous day. <i>Followed by: feedback from trainees and group discussion on specific problems encountered.</i></p> |
| | <p>Trainees to write down the amount for each food eaten the previous day. <i>Followed by: trainer provides an overview on how to describe amounts.</i></p> |
| | <p>Trainees to revise the amount for each food eaten the previous day. <i>Followed by: feedback from trainees and group discussion on specific problems encountered.</i></p> |
| Role play | <p>Role play: 24-hour recall interview. <i>Followed by: group discussion; focusing on both the positives and negatives observed during the role play.</i></p> |
| Interview each other | <p>Trainees to interview each other. <i>Followed by: feedback from trainees and group discussion on specific problems encountered.</i></p> |
| Interview family member or friend | <p>Trainees to interview a family member or friend at home. Completed 24-hour recalls to be checked by trainer. <i>Followed by: feedback to trainees on completed 24-hour recalls; feedback from trainees and group discussion on specific problems encountered.</i></p> |
| Interview a pseudo participant | <p>Trainees asked to each bring someone with to be interviewed by one of the other trainees. Completed 24-hour recalls to be checked. <i>Followed by: feedback to trainees on completed 24-hour recalls; feedback from trainees and group discussion on specific problems encountered.</i></p> |
| Field exercise | <p>Field exercise. Completed 24-hour recalls to be checked. <i>Followed by: feedback to trainees on completed 24-hour recalls; feedback from trainees and group discussion on specific problems encountered in the field.</i></p> |
| Set daily intake | <p>Recording a set daily intake, using food models and plates of food. <i>Followed by: a scoring system can be used to score and evaluate the trainees.</i></p> |

8. CODING OF 24-HOUR RECALL DATA

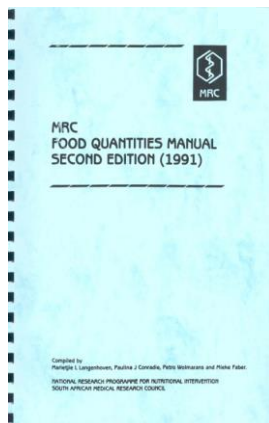
Coding refers to (i) matching each food item reported with the food's unique code in the food composition database and (ii) converting amounts reported in household measures into grams.

Coding can be done using a software programme such as FoodFinder, or manually.

For manual coding the following are needed: (i) Condensed Food Composition Tables for South Africa and (ii) Food Quantities manual.

The Food Quantities Manual can be used to convert amounts that are recorded in household measures to grams.

In the **Food Quantities Manual**, weights are given for the following household measures:



- teaspoon
- ^ teaspoon
- dessertspoon
- ^ dessertspoon
- tablespoon
- ^ tablespoon
- ladlespoon
- ^ ladlespoon
- 125 mL (mL to gram)
- Unit (small, medium, large) – for some foods

The spoons referred to in the Food Quantities manual are based on the following:

- Teaspoon = 3 mL
- Dessert spoon = 7 mL
- Table spoon = 12 mL
- Serving (ladle) spoon = 30 mL

If a spoon of different sizes is used, e.g. a 2 mL teaspoon, the average weight for the food items should be determined through weighing, and this should be recorded in the Code book.

The weight per 125 mL can be used to calculate the conversion factor from mL to grams.

During coding, each food or drink item recorded during the 24-hr recall is matched with a food code in South African Food Composition database. For composite items, which could be split into their component parts, for example sandwiches, each individual component is coded (see page 35).

Not all foods are included in the food composition database. Coders will therefore have to make numerous judgements when coding 24-hour dietary recalls. Irrespective of the skill and experience of the coder some degree of estimation and 'guesswork' is involved in the coding process.

Type of coding errors that can occur

Entering: writing or entering the wrong food code or amount.

Choice of food code: e.g. entering the code for hard margarine when soft margarine was recorded.

Subjective decisions: e.g. when the type of bread is not specified, entering the code for white bread, whereas according to the code book it should have been brown bread.

Calculations: making an error when calculating the weight for the amount of food consumed.

Interpretation: e.g. if it was recorded that half of the porridge was not eaten, the amount of porridge is halved, but not the amount of sugar that was added to the porridge.

Coding errors can be minimised by providing training for dietary coders, implementing quality control checks, and standardising the coding process.

Dietary coders need to be able to collect 24-hour dietary recall data themselves, and they need to be trained in dietary coding.

Quality control checks

- Quality control procedures such as routine spot-checks should be implemented. It is good practice to check all entries keyed by new coders until the error rate drops to acceptable levels. Thereafter, a pre-agreed % error may be checked on a regular basis as a means of ongoing quality control.
- If dietary coding is done using a software programme, the programme should include edit checks to prevent gross data entry errors such as entering 1000 g of pasta instead of 100 g.

Standardising the coding process

- There should be a standardised protocol for handling the coding of each new and/or substitute food item ('food rules') to ensure that all coders deal with these items in a consistent manner.
- There should be a 'code book' or set of default rules to deal with missing information for certain types of foods and beverages e.g. for unknown types of cooking fat or an unknown type of milk added to a bowl of cereal.
- By using a "code book" the coding process is standardised, and it removes the need for coders to make subjective decisions.
- The number of errors during coding may also be minimized if 'coding rules' are established to deal with incomplete or ambiguous entries in the food record.

Assumptions (to be recorded in Code book)

- Assumptions must be based on the specific study population in terms of dietary habits and food environment.
- Assumptions can not be made immediately; the researcher first needs to understand the study population.
- Assumptions need to be consistent, and therefore need to be recorded in the Code book.

The Food Quantities Manual provides guidelines for "assumptions" which assist in standardizing decisions for situations when respondents cannot provide information

TABLE 14: Type of assumptions made during dietary coding.

| | Example | Assumption¹ |
|--|---|--|
| Insufficient detail on type of food | Milk (not known whether full fat, low fat or fat free) | Define default code |
| Food item not in Food Composition Tables | Unprocessed food item e.g. casava | Create new code; borrow nutrient information from other database |
| | Indigenous food | Chemical analysis and create new code |
| | New commercial product (e.g. Future life; different types of margarine) | Compare products (using food labels) and use best available existing code Get information from package or from manufacturer and create new code |
| | Combined dishes, e.g. pizza | Build composition |
| | Recipes, e.g. homemade bread | Obtain recipe, analyse using the Food Composition Tables, and create new code |
| Amount not recorded | ½ cup muesli; milk added | Define default amount for milk added |
| Insufficient detail on amount | 1 teaspoon sugar | Define whether default is heaped or level |
| Description of amount | Chicken head | Obtain average weight for head |

¹ all assumptions need to be recorded in the Code book; assumptions are specific for each study population

Code book

If no code book is available, start with a blank code book.

As decisions / assumptions are made, enter this into the code book.

The code book should have rules for default codes and default portion size (to be used when inadequate information is available to code an item or amount).

Approach used when coding dietary data

Different approaches can be used when coding dietary data:

- All foods are coded, entered and analysed as individual foods.
- Dishes are identified and coded as combinations, and thus entered and analysed as aggregates.
- Coding must be aligned with the aim of the study. Whether dishes are coded as individual food items or as aggregates will therefore depend on the aim of the study. If the aim is to report on nutrients provided by foods per se, dishes cannot be coded as aggregates.

Table 15 shows how the two different coding approaches are applied for samp-and-beans.

Table 15: Different approaches that can be used when coding dietary data.

| Food reported in 24-hour recall | Approach | Coded | | |
|--|--|-------------------------------------|------|--------|
| | | Food | Code | Amount |
| 100 g samp-and-beans (50:50) | Foods items coded individually | Samp, cooked | 3250 | 50 g |
| | | Sugar beans, cooked | 3205 | 50 g |
| | Combination of food items coded as aggregate | Samp-and-beans | 3402 | 100 g |
| 100 g spinach, boiled, with hard margarine | Foods items coded individually ¹ | Spinach, boiled | 3913 | 95 g |
| | | Hard margarine | 3484 | 5 g |
| | Combination of food items coded as aggregate | Spinach, boiled with hard margarine | 3898 | 100 g |

¹ the ratio of spinach and margarine was obtained from the recipe given in the Condensed Food Composition Tables for South Africa (page 2-44)

Key considerations

Key considerations to take in to account in the coding process include the following:

- Familiarise oneself with the types of foods and supplement products consumed by the study population.
- Become accustomed with the workings of the dietary analysis program and its food composition database.
- Keep the database up-to-date. This will include updating nutritional composition data on foods already listed on the database and adding new foods.
- Keep an inventory of food composition information for foods that are not included in the food composition database. These may need to be added if a suitable substitute is not already on the database. This may be particularly the case for 'niche' foods such as sports products or low-fat varieties. Baby and toddler foods may also have to be dealt with in the same way.
- Asking respondents to keep packaging of e.g. ready meals and unusual processed foods to return with the record can help with identification and coding.

(Braakhuis et al., 2003; Conway et al., 2004)

Requirements for coders for dietary data

- Must have read the Introduction section of the Condensed Food Composition Tables for South Africa.
- Be familiar with the different chapters of the Food Composition Tables.
- Be familiar with the recipes at the end of each of the chapters in the Food Composition Tables.
- Have good knowledge on food products available in the market (nutritional information on food labels).
- Have good knowledge of the study population and foods available in the study population.
- Must be well trained.

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Wolmarans P, Danster N, Dalton A, Rossouw K, Schönfeldt H. Condensed Food Composition Tables for South Africa. Medical Research Council, Cape Town, 2010.

ADDENDUM. Examples of 24-hour recall recording forms

The 24-hour recall form can have various formats, as shown in the examples given here after.

Example 1:

| Time of day | Type of food item and drink consumed | Preparation method (cooked / fried / grilled / steamed / baked) What was added? | Quantity of food Item or drink consumed |
|--|--------------------------------------|--|---|
| Waking up to about 9 o'clock (breakfast time) | | | |
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| | | | |
| | | | |
| | | | |
| Mid-morning (09h00 – 12h00) | | | |
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| Lunch time (12h00 – 14h00) | | | |
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| Afternoon (14h00 - 17h00) | | | |
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| Supper time (17h00 – sunset) | | | |
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| | | | |
| After supper; during the night | | | |
| | | | |
| | | | |

Example 2:

Coding is done on the same form as the recording

| Time of day | Type of food item and drink consumed | Preparation method (cooked / fried / grilled / steamed / baked) What was added? | Quantity of food Item or drink consumed | OFFICE USE | |
|--|--------------------------------------|--|---|------------|------|
| | | | | Food code | Gram |
| Waking up to about 9 o'clock (breakfast time) | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Mid-morning (09h00 – 12h00) | | | | | |
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| Lunch time (12h00 – 14h00) | | | | | |
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| Afternoon (14h00 - 17h00) | | | | | |
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| Supper time (17h00 – sunset) | | | | | |
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| After sunset till waking up next morning | | | | | |
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Example 3:

| Time of day | Meal | Place where consumed | Type of food item and drink consumed | Preparation method (cooked / fried / grilled / steamed / baked) What was added? | Quantity of food item or drink consumed |
|-------------|------|----------------------|--------------------------------------|--|---|
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