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SURVEY GUIDANCE DOCUMENT

An Overview of the Main Pre-Survey Tasks Required for Large-Scale Quantitative 24-Hour Recall Dietary Surveys in Low- and Middle-Income Countries

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About *Intake*

Intake is a Center for Dietary Assessment that aims to strengthen policies and programs to improve nutritional status by increasing the availability, quality, comparability, and use of reliable dietary data in low- and middle-income countries (LMICs). We hope that the availability of valid, concise, effective diet-related metrics, along with *Intake* technical assistance for the planning, design, collection, analysis, and use of dietary data, can play an important role in helping actors in LMICs to develop evidence-based nutrition and agriculture policies and programs to ensure high-quality diets for all.

User Feedback

At *Intake*, we aim to make our technical assistance tools, templates, and guidance materials as useful as possible. We therefore welcome input and feedback from users of our technical assistance documents, so that we can continue to improve the materials and the technical assistance we provide. If you have suggestions or feedback related to this document that you would like to share with *Intake*, please contact us via email at feedback@intake.org.

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List of Abbreviations

EA	enumeration area
FCDB	food composition database
FCT	food composition table
FGD	facilitated group discussion
FRIL	food, recipe, and ingredient listing
g	gram(s)
KI	key informant
LMIC	low- and middle-income country
PSEM	portion size estimation method

Introduction

The purpose of this document is to provide an overview of the main pre-survey tasks that should be considered as part of the planning, designing, and budgeting process for a large-scale quantitative 24-hour recall dietary survey in a low- or middle-income country context. The pre-survey tasks described here are those that are required to guide the preparation of data collection tools and job aids used in the conduct of the 24-hour recall dietary survey, as well as those that are required for the development of auxiliary databases, required for calculating food and nutrient intakes from the dietary survey data collected.

The auxiliary databases that should be prepared in advance of a quantitative 24-hour recall dietary survey include a food, recipe, and ingredient listing (FRIL); a standard recipe database; a portion size estimation method (PSEM) conversion factor database; and a food composition database (FCDB). The time, skills, and resources required for the compilation, collection, and processing of data to build these databases are substantial; when not prepared in advance of data collection for the survey, long delays in the cleaning, processing, and analysis of the dietary data will very likely result. In the worst case, the dietary data collected may not be of sufficient quality or provide the level of detail needed to allow for reliable processing and analysis of the data.

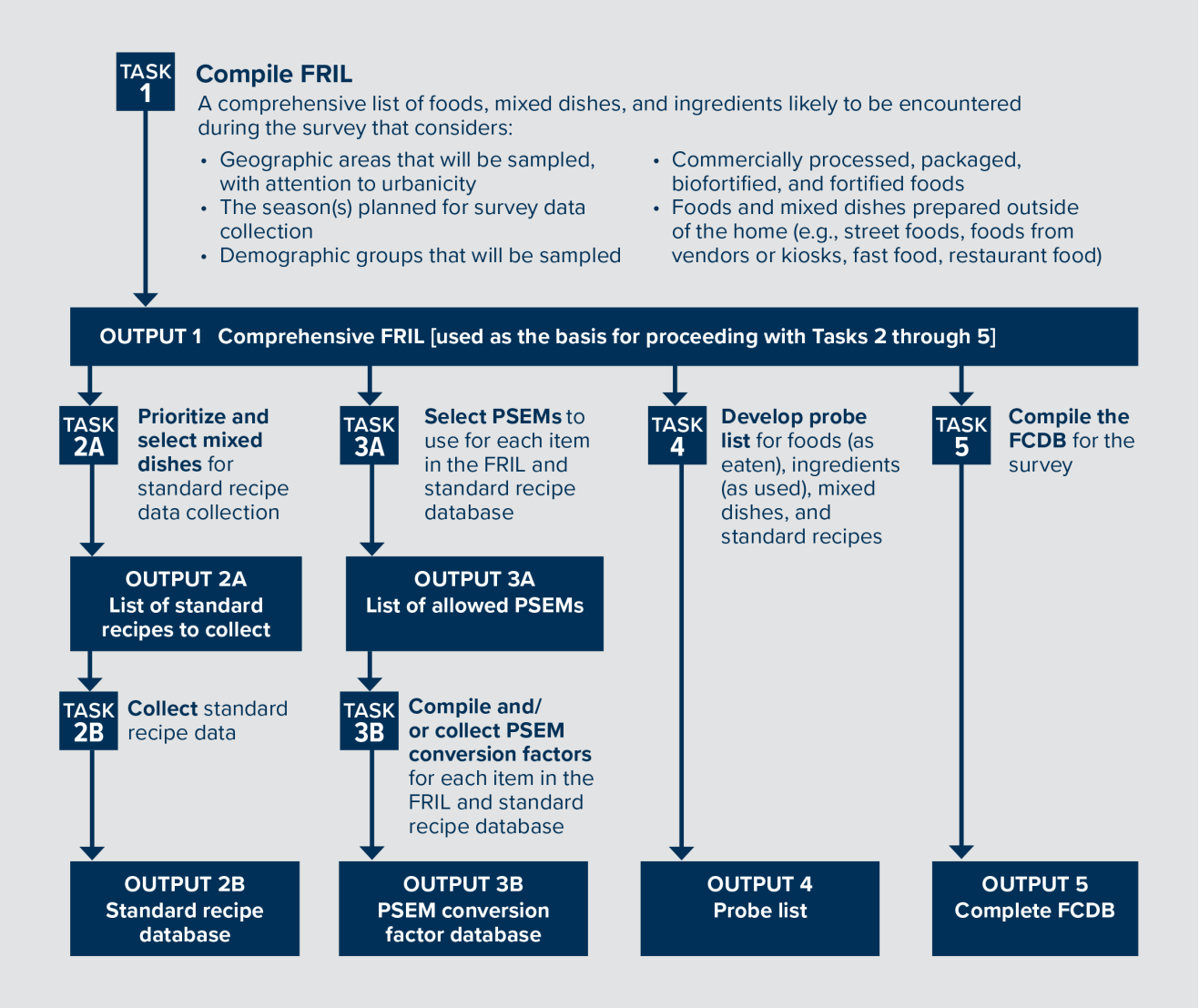
Along with an overview of the main pre-survey tasks required in advance of a quantitative 24-hour recall dietary survey, we briefly describe the set of activities corresponding to each task, the location (i.e., at a central/national level or in various geographic areas of focus for the survey) where each respective activity might best be carried out, an estimate for the time required for carrying out each task, and the output that is the aim to produce from each task.

Users should note that this document is not meant to provide comprehensive guidance for *how* to carry out the pre-survey tasks described here. This is beyond the scope of this overview document; however, *Intake* is currently in the process of developing a detailed set of tools and guidance materials to address this need. Once finalized, these tools and guidance materials will be available at Intake.org.

The Main Pre-Survey Tasks Required for a Quantitative Dietary Survey

Figure 1 provides a visual schematic of the main pre-survey tasks that should be carried out before collecting data for a large-scale quantitative 24-hour recall dietary survey. A summary of the activities inherent to each task and the expected outputs from each task are also indicated. As noted in the figure, the output from Task 1 (the FRIL) is the basis for all subsequent tasks reflected in the figure and, therefore, is essential in laying the groundwork for all work to be undertaken in preparation for a quantitative dietary survey. In the following sections of this document, we provide a descriptive overview of each of the pre-survey tasks in Figure 1, along with its associated activities and outputs.

Figure 1. Schematic of the Main Pre-Survey Tasks Required for a Quantitative Dietary Survey



Task 1. Compile a FRIL

The objective of compiling a FRIL[1] is to list all the foods[2] consumed as individual items, as well as all mixed dishes, and the ingredients used to prepare those mixed dishes (see Box 1 for definitions) that are likely to be encountered during the 24-hour recall dietary survey. Developing a comprehensive FRIL is a critical first step in pre-survey work, and all other tasks described in this document rely on the quality of this list.

To develop a comprehensive FRIL, the first step is to compile an initial draft list from available secondary data, including previous national and sub-national survey data and other sources, for example, from existing national or regional Food Composition Tables (FCTs), national food registries (if accessible), and recipe books (to retrieve names, and sometimes ingredients, of mixed dishes). In cases where information within the country is limited, resources from neighboring countries with similar diets can also be used.

Due to changing diets or limited geographical or demographic coverage of existing data, the initial list compiled may be judged incomplete. There are several ways survey planners can augment the data compiled from secondary sources, including through expert consultation meetings or key informant (KI) interviews, facilitated group discussions (FGDs), and market survey work (see Box 2 for definitions). These various activities, if designed appropriately, can also help identify the likelihood of encountering items on the FRIL during the survey time frame,[3] which can, in turn, help inform the scope and design for later pre-survey activities, such as standard recipe data collection (refer to Tasks 2a and 2b).

To ensure a comprehensive FRIL is compiled:

- Include information across different geographic areas to be represented in the 24-hour recall dietary survey (e.g., survey strata), with attention to urbanicity[4]
- When appropriate, consider the season(s) when data will be collected to ensure that the FRIL appropriately reflects the foods that may be more likely to be consumed during the season(s) planned for data collection
- Pay attention to foods specific to the target demographic groups that will be sampled (e.g., complementary foods for children 6–23 months)
- Compile information on usual ingredients in mixed dishes
- Include foods prepared outside of the home
- Include commercially processed, packaged, biofortified, and fortified foods
- Include street foods/foods from vendors or kiosks, fast food, and restaurant foods

The food and ingredient items included in the FRIL must be well described; typically, the name given to all food and ingredient items in the FRIL should include “descriptors” with details. Relevant descriptive details vary by food group. Examples include variety/type/color; state (e.g., fresh, dried); maturity (ripe, unripe); part (e.g., seed, flesh, with or without bones); mechanical processing (e.g., grated, chopped, sliced, pounded); other processing (e.g., fermented, brined, smoked, frozen, canned); cooking methods (boiled, roasted, shallow-fried, deep-fried);

[1] Although the definition of FRIL includes the word “recipe,” it is actually unlikely that recipes (see Box 1 for definitions) are included in the FRIL. Instead, the FRIL usually lists the names of mixed dishes.

[2] We use the term “food” in this technical brief to also refer to beverages (see Box 1 for definitions). Therefore, where the term “food” is used in this brief, it refers to both food and beverages.

[3] Expert consultation meetings, KI interviews, and/or FGDs can be used to collect data on the frequency or likelihood of consumption of foods, mixed dishes, and ingredients listed in the FRIL among the targeted population for the survey. This information is used to rank items according to how likely they will be reported during the survey (e.g., ranked as consumed “always” or “often”).

[4] If diets are known to be very similar in all geographic areas, this is not necessary. But in many countries, diets vary regionally and by agro-ecological zone. Diets may also vary between urban and rural areas.

additions (e.g., salted, added sugar); brand, fortification, and enrichment (for commercial products); and the presentation mode or the way in which a food or ingredient is served and consumed (e.g., chicken leg eaten on the bone; chicken leg cut off the bone before eating). Each food and ingredient listed in the FRIL should have a separate line, by descriptive detail, for each variation of a food or ingredient likely to be reported as consumed during the survey. Likewise, mixed dishes (some of which are prioritized for the development of standard recipes; see Box 3 for definitions) must be clearly described with an informative name that identifies a given dish clearly and distinguishes it from others.

Activities

1. Develop an initial, draft FRIL from previous national or sub-national survey data and other available relevant data.
2. Identify gaps in the initial FRIL, including, for example, in regional or urbanicity representation in existing data sets and lists; in seasonality; or for specific demographic groups of focus for the survey (e.g., complementary foods for children 6-23 months).
3. Define the outputs desired from data collection, and adapt data collection methods and templates, accordingly.
4. Develop a feasible fieldwork plan for the selected data collection activities, considering geographic areas to be covered in the survey.
5. Obtain ethical approval as needed.
6. Train data collection, moderator, and/or note-taking staff, who should have a high level of knowledge of foods and culinary practices in the targeted geographic areas. If data will be collected through multiple data collection activities (e.g., expert consultation meeting, KI interviews, FGDs, and/or market survey work), then different training sessions for each data collection activity will likely be required.[5]
7. Conduct expert consultation meeting (at a central location, involving experts from different regions of the country), if deemed a useful/relevant activity to obtain the data output desired.
8. Conduct KI interviews (usually with nutrition and agriculture experts in selected survey areas to be sampled), if deemed a useful/relevant activity to obtain the data output desired.[6]
9. Conduct FGDs (with participants in selected survey areas, who should be similar in food consumption behaviors to the respondents to be targeted for the survey), if deemed a useful/relevant activity to obtain the data output desired.
10. Conduct market surveys — at fresh markets, kiosks, vendors, supermarkets, as well as at fast food and other restaurants (in selected survey areas),[7] if deemed a useful/relevant activity to obtain the data output desired.
11. Summarize the data collected from various data collection activities.
12. Compile all relevant information into a comprehensive FRIL, which will form the basis for Tasks 2–5.
13. If using a technology-assisted platform for the collection of the 24-hour recall dietary data, prepare the required files that include the FRIL information according to software-specific requirements for upload into the software.

[5] Note that the work to carry out each of these data collection activities requires a different skill set, so it may not always be possible for the same individuals to serve as data collectors in all activities. However, when skill sets allow, there are advantages for the same individuals to be involved in the full range of activities that are carried out to compile the FRIL.

[6] It is also possible to select nutrition and agriculture experts from selected survey areas and bring those local experts together for a centralized expert consultation meeting, hence, combining Activities 7 and 8 into one activity. This is a strategy that may be useful to expedite work in the case of a national or large-scale dietary survey.

[7] In some contexts, depending on the demographic groups of focus for the survey, it may also be important to collect FRIL-related information from pharmacies, if these are important venues for purchase of infant formula or other commercially produced foods for infants and young children.

Box 1. Definitions and Usage of Terms: Food, Mixed Dish, Recipe, and Ingredient Proportion and Type

Food: A food is a single food item that is not mixed with other foods (e.g., banana, ground nuts). In this document, for simplicity in language, we use the term "food" broadly to also include beverages.

Mixed dish (also called a "composite dish," "multi-ingredient food," "multiple ingredient food mixture," "combination food," or "food mixture"): A dish, usually with a specific culinary name, that is prepared using two or more ingredients mixed together.

Exceptions are usually made for items where the second ingredient is a seasoning (e.g., salted nuts, fruit with sugar). Simple fried foods, such as fried potatoes, are sometimes considered as a single food item even though they constitute a mixture of two different foods. Simple boiled or steamed foods are not considered as mixed dishes. Long-established composite foods such as bread and cakes, which are prepared with multiple ingredients, may also be treated as a single food item. They can be found in the FCT for many different countries, and their recipes are fairly standardized.

Recipe: A description of a mixed dish that provides the list of ingredients used to prepare the mixed dish, along with a detailed description of any processing and cooking methods applied to each ingredient before adding the ingredient to the mixed dish. The cooking methods applied to the mixed dish itself (if the dish is cooked) are also included as part of the recipe information. In dietary surveys, a recipe also includes information on the quantity (in grams) of each ingredient used to prepare the mixed dish and the final quantity of the mixed dish once it is fully prepared and/or cooked (to allow for calculating ingredient proportions [see definition below]).

Ingredient proportion (in a recipe): Refers to the proportion of a prepared mixed dish that is composed of a given ingredient (in the form and state in which it was added to the mixed dish). It is typically expressed as a proportion. For example, an ingredient with an ingredient proportion value of 0.3 corresponds to a weight of 60 g for that ingredient in a fully prepared (and if relevant, cooked) mixed dish with a total weight of 200 g.

There are three types of possible ingredients in a recipe:

(i) Main ingredients (also called "mandatory ingredients"): Mandatory ingredients that are the primary constituents of a mixed dish and often give the dish its name. An example is maize flour in "maize porridge" or orange fruit in "orange juice."

(ii) Major ingredients (also called "optional major ingredients" or "intermediate ingredients"): Optional ingredients that may be added or not added to the dish depending on choice and availability. An example is sugar or milk in "maize porridge." These optional ingredients are major because they alter the nutrient content of the dish but do not change the basic nature of the dish. "Maize porridge" with milk is still "maize porridge." In dietary surveys, the name of the mixed dish must indicate which optional major ingredients are included.

(iii) Minor ingredients or flavorings (also called "optional minor ingredients"): Optional ingredients that may be added or not added to the dish depending on choice and availability. The difference between optional major ingredients and optional minor ingredients is that minor ingredients are usually added in small quantities that are judged inconsequential to the overall nutrient content of the dish. The name of the mixed dish does not have to indicate which optional minor ingredients are included.

Box 2. Definitions and Usage of Terms: KI Interviews, FGDs, and Market Surveys

KI Interviews

Qualitative in-depth interviews with people who are very familiar with a defined topic for which data are being collected. The purpose of KI interviews is to collect information from key people—including community leaders, professionals, and/or residents—who have first-hand knowledge about the community. In the context of compiling a FRIL for a dietary survey, the defined topic areas for KI interviews could include foods, mixed dishes, food preparation, infant feeding practices, and food consumption behaviors in the community.

KI interviews are usually carried out separately as one-on-one interviews with each KI, with the interviews taking place in the area where the KI works or resides. Alternatively, it is possible to bring KIs who have been identified from different geographic areas of focus for the survey together centrally to participate in an expert consultation-type meeting, in which the knowledge of the KIs is solicited in a structured and organized way as part of a group meeting, to help inform the development of the FRIL for the survey.

FGDs

Organized group discussions moderated by a facilitator who uses an interview script (i.e., a set of predetermined, open-ended questions). Unlike focus group discussions where the intent is to elicit themes from focus group participants, the intent of FGDs is to elicit answers to predefined questions and themes. In the context of compiling a FRIL for a dietary survey, the FGDs are generally carried out with community members who have knowledge about food preparation and consumption behaviors in the community. Often, FGD participants are individuals responsible for preparing food for their household; all FGD participants generally come from the same community, which, in the context of compiling a FRIL, is usually a geographic area of focus for the planned dietary survey. The predefined questions and themes for FGDs carried out in the context of compiling a FRIL generally pertain to filling specific gaps in information in the FRIL. *Intake* is currently preparing detailed guidance related to designing and carrying out FGDs to fill in gaps in the FRIL for a dietary survey. Once finalized, this guidance document will be available at Intake.org.

Market surveys

Informal surveys, listings, and/or categorization of foods, particularly commercial, processed/packaged foods (including fortified foods), available in fresh markets, kiosks, vendors, and/or supermarkets; also, potentially fast food and other restaurants, with details about the foods of interest collected (e.g., nutrient composition), as deemed necessary. For the purpose of compiling a FRIL for a dietary survey, market surveys are generally limited to select (urban and/or peri-urban) geographic areas of focus for the survey. A specific data collection approach should be developed for the market survey work to be carried out. The approach and data collected should be tailored very specifically to filling in gaps in the FRIL in relation to commercial, processed/packaged (including fortified) foods.

Box 3. Definitions and Usage of Terms: Non-Standard Recipe, Standard Recipe, and Standard Recipe Variants

Non-standard recipe (also called a "household recipe" or "unique recipe"): A non-standard recipe is derived from data collection in the household, where the respondent (or the cook of the mixed dish in the household) provides the details of the mixed dish consumed by the respondent. This is typically done as part of the 24-hour dietary recall carried out during the survey.

Standard recipe (also called a "predefined recipe"): Standard recipes are "average" recipes that aim to reflect the way that mixed dishes are usually prepared by respondents in a survey area. Standard recipes can be used for mixed dishes that are known to be prepared similarly across a defined survey area (in terms of the ingredients used, the preparation methods for those ingredients and the mixed dish itself, and the relative proportion of each ingredient used in the mixed dish). Standard recipes are also typically used when survey respondents report consuming mixed dishes prepared outside the home (by vendors or in restaurants, or "ready meals" from stores). Typically, survey planners need to make decisions as to which mixed dishes consumed in the geographic area of focus for the survey are suitable for having a standard recipe collected as part of the pre-survey tasks to be carried out. When a mixed dish is reported by a respondent and a standard recipe is available for that mixed dish, the detailed information on the preparation of that mixed dish does not need to be collected uniquely from the respondent during the 24-hour recall interview, as an average (standard) recipe for that mixed dish has already been compiled and should therefore already be listed with the appropriate level of detail in the standard recipe database that has been compiled as part of the pre-survey work.

Standard recipe variants (also called "standard recipe variations"): Standard recipe variants are mixed dishes that are often called by the same name in the local language used to describe the mixed dish but can vary in "major ingredients" (see Box 1). For example, "maize porridge" could have the following standard recipe variations:

- "Maize porridge plain," composed of maize flour and water
- "Maize porridge with sugar," composed of maize flour, water, and sugar
- "Maize porridge with milk," composed of maize flour and milk
- "Maize porridge with milk and sugar," composed of maize flour, milk, and sugar

The names given above for the standard recipe variations are how the names of these mixed dishes might be listed, although the local language would likely refer to all of the standard recipe variations given as examples here as simply "maize porridge."

Standard recipe variants can also be based on the type of ingredient, e.g., the sugar that is used in "maize porridge with sugar" could be fortified or not fortified, or the milk that is used in "maize porridge with milk" could be from different animals (cow, goat, or camel) or could be powdered milk.

Location

- Activities 1–7 and Activities 11–13 can be done centrally.
- Activities 8–10 would usually occur at selected sites[8] across different geographic areas to be represented in the main survey (e.g., survey strata), including urban, peri-urban, and rural areas.

Duration/Determinants of Time Required

The time required for the activities comprising Task 1 will vary widely depending on the extent and nature of existing secondary data in the country, on the complexity and diversity of the diet in the geographic area of focus for the survey, on the number of geographic areas where the data for Task 1 will be collected, and possibly according to which demographic groups will be targeted for the dietary survey (if there are differences in the foods and recipes that are consumed across the targeted demographic groups). The time required to complete Task 1 will also depend on the personnel available to carry out the data collection activities for this Task and on how these data collection activities are managed and implemented.

For a large-scale survey, it is possible that the above activities could require several months, depending on how the work is organized. The timeline for carrying out pre-survey work and the resources available for the survey must therefore be carefully considered when determining which of the above data collection activities to carry out, how to prioritize the data outputs needed for completing the FRIL, and where and how to implement the data collection activities. If the enumeration areas (EAs) where data for the survey will be collected have already been selected, the selected EAs can often serve as a useful starting point for identifying a subset of geographic locations for primary data collection for KI interviews, FGDs, and/or market survey work. If using a technology-assisted platform for data collection for the dietary survey, organizing the FRIL information into the required format will require additional time. The time required for this can be minimized if the format of files required for uploading into the technology-assisted platform to be used is considered from the beginning steps of compiling the FRIL.

Task Output

- Comprehensive FRIL (used as the basis for proceeding with tasks 2 through 5).

[8] Sites for conducting KI interviews, FGDs, and market survey data collection do not need to be randomly selected; there are advantages to purposively selecting sites for data collection to capture known variation in the foods and mixed dishes available and consumed.

Task 2a. Prioritize and Select Mixed Dishes for Standard Recipe Data Collection

In most settings, Task 1 will result in a long list of mixed dishes (and their ingredients), which may vary across geographic areas where the survey will be implemented. For some mixed dishes, survey planners may decide to compile/collect data for a standard recipe for the mixed dish (see Box 3 for definitions). Expert consultation meetings, KI interviews, FGDs, and/or market surveys can be designed to capture relevant information to prioritize mixed dishes for standard recipe collection. When a decision is taken to compile/collect data for a standard recipe, the detailed recipe information for this mixed dish is not collected during the 24-hour dietary recall with respondents; instead, it is collected/compiled in advance of carrying out the dietary survey.

To determine the scope of standard recipe data collection, survey planners will need to consider the advantages and disadvantages of using standard recipes as compared to collecting recipe data from respondents in the home (see Table 1 for a comparison). Most large-scale quantitative 24-hour recall dietary surveys in low- and middle-income countries (LMICs) use a mix of both approaches.

The use of a standard recipe is recommended for mixed dishes that are commonly and frequently consumed by the target population in the survey area and for which the main ingredients, their proportions, and their preparation for inclusion in the mixed dish do not vary significantly from household to household (see Box 1 for definitions). For prepared foods and meals commonly purchased outside the home, whether from restaurants, shops or supermarkets, mobile kiosks, or street vendors, standard recipes will always be needed, unless there are plans in the survey to follow up to collect recipe data from vendors after the collection of the 24-hour dietary recalls in each geographic area deemed necessary and appropriate. This is rarely feasible in large-scale surveys.

Survey planners will need to decide whether to use the same standard recipes across all geographic areas or to collect data separately for different geographic areas or survey strata (e.g., per region) or by urbanicity. The data collection plan developed for standard recipes should be designed based on prior knowledge of how much recipe composition varies by geography. If a mixed dish is prepared differently for different demographic groups of focus for the survey (e.g., adults vs. children 6–23 months) or if the preparation of a mixed dish varies by season, these factors also need to be accounted for in the design of the data collection plan for standard recipes. When planning standard recipe data collection, feasibility and the time and resources available to carry out the work also need to be considered.

In some cases, there may be existing data sources with details about mixed dishes that may be used to inform the standard recipes to be used for the survey, if it is determined that the available data would be representative of how these mixed dishes are prepared by the population(s) of interest. But oftentimes secondary data sources will not include information on the total weight of the prepared mixed dish and this information is needed to compute the ingredient proportions used in a standard recipe (see Box 1 for definitions). Depending on the PSEM assigned to a mixed dish, the density of the prepared mixed dish may also be needed in order to derive ingredient proportions used in a standard recipe (see Task 3a). If the needed information is not available from secondary data sources, the existing recipes for those mixed dishes should be prepared by survey staff at the central level to collect the missing data to permit the calculation of ingredient proportions for those recipes.

Table 1. Advantages and Disadvantages of the Use of Standard and Non-Standard Recipes in 24-Hour Dietary Recalls in Large-Scale Surveys

Use of:	Advantages	Disadvantages
Standard recipes	▪ Simplifies and speeds 24-hour recall dietary data collection with respondents; can substantially reduce respondent burden ▪ Reduces time required for daily supervisor review of incoming data ▪ More feasible for enumerators with lower capacity and/or training ▪ Where quality of data for non-standard recipes is poor, standard recipes introduce less error	▪ Requires substantial investment of time and resources to develop standard recipes, ideally well in advance of survey ▪ Where quality of data for non-standard recipes is excellent, standard recipes introduce more error in 24-hour recall dietary data
Non-standard recipes	▪ Substantially lowers burden of pre-survey work ▪ When quality of 24-hour recall dietary data is excellent and enumerators are very well trained, more accurately captures the variability in the preparation of recipes, particularly where these vary seasonally or by available cash in the household	▪ Demands substantially more time for collecting 24-hour recall dietary data per respondent, especially when consumption of multiple recipes per day is common ▪ Demands more time for supervisor review of incoming data ▪ Requires very well-trained enumerators with a high level of capacity ▪ Where quality of non-standard recipe data is likely to be poor, non-standard recipes may result in more error ▪ Lack of standard recipes developed in advance may mean that certain ingredients are not anticipated and are thus not in the PSEM conversion factor database or the FCDB ▪ Respondents may not be able to report the ingredients, their quantities, and the preparation method used for mixed dishes prepared outside the home
Both standard and non-standard recipes *Practically speaking, when using standard recipes, it is almost always necessary to use some non-standard recipes, as not all recipes will be anticipated in advance of data collection*	▪ Simplifies and speeds 24-hour recall dietary data collection with respondents in comparison to collecting only non-standard recipes; can substantially reduce respondent burden in comparison to collecting only non-standard recipes	▪ A long list of standard recipes may be confusing for enumerators during the 24-hour recall dietary interview; enumerators will need to identify when to collect non-standard recipe data and when to use standard recipes

Activities

1. Prioritize and then select a final list of mixed dishes, with details on ingredients, to collect as standard recipes in each geographic area.
2. Similarly, prioritize and then select a final list of mixed dishes to collect as standard recipes from street food vendors, restaurants, kiosks, and shops.
3. When using existing data sources for standard recipes, ensure that all data needed are available, such as the total weight (and possibly also the density) of the prepared mixed dish. If not available, survey staff will need to prepare these mixed dishes to obtain the needed data.

Location

This work can be done centrally by survey technical leads, so long as the team has sufficient knowledge of culinary practices across all survey areas.

Duration/Determinants of Time Required

Work at the central level can be done quite quickly. In most cases, if the listing of mixed dishes is comprehensive and indicates how commonly the mixed dishes are consumed, several days should be sufficient for a small technical team to review the list of mixed dishes and then prioritize and select the mixed dishes for standard recipe data collection in each geographic area. When using existing data sources for standard recipes that require that the mixed dishes be prepared by the survey team to obtain any missing data (e.g., the total weight and density of the prepared mixed dish), additional time will be required.

Task Output

- List of standard recipes to collect.

Task 2b. Collect Standard Recipe Data

A standard recipe database is the compilation of the standard recipes that have been selected for use (see Task 2a) for a given survey and includes, for each standard recipe, the following information: a descriptive recipe name, along with descriptive recipe variant names (as relevant),[9] recipe ingredient details, and information on average ingredient proportions for that mixed dish (see Box 1 for definitions). As for foods and ingredients, the standard recipe database should be developed considering:

- Diverse geographic areas, including urbanicity
- Attention to foods that may be specific to demographic groups of focus for the survey (e.g., complementary foods)
- The season(s) when data will be collected for the survey
- Mixed dishes prepared as street foods and by vendors/restaurants

In brief, fieldwork for standard recipe data collection typically involves gathering small groups of home cooks per cooking session in a given geographic area and providing them with all the supplies for cooking the selected mixed dishes. *Intake* recommends that cooking sessions include six cooks — three cooks per data collector — as this number of cooks and this ratio of cooks to data collector can typically be well managed during one cooking session. In a small-scale survey, the small group of home cooks in a given cooking session would generally prepare the same set of mixed dishes, but in a large-scale survey, to ensure geographic variability is reflected in the recipes prepared for each mixed dish, it is sometimes preferable for each home cook at a given cooking session to prepare a unique set of mixed dishes. This is one strategy to help keep the number of total observations across all cooking sessions across all geographic areas to a more manageable number, although this strategy can also make the logistics of obtaining the ingredients for the mixed dishes to be prepared at any one cooking session more complicated. Regardless of which approach is taken to organizing recipe sessions, for each mixed dish prepared, a set of replicate recipes (ideally, 6–10 replicates per mixed dish) are prepared for a given geographic area. These replicates comprise the data that are then averaged[10] into a standard recipe for that geographic area.

The home cooks selected to participate in the cooking sessions should be similar to the cooks at households of respondents who will be targeted for the survey. Standard recipe data collection staff[11] observe the cooking session and record the following details for each mixed dish prepared by each cook:

- The name and full description of every ingredient used (refer to “descriptors” mentioned in Task 1)
- The weight of each ingredient before adding to the mixed dish (excluding any inedible portion and any leftover quantity from the total amount of ingredient provided by the data collection team to the cook)
- The steps and methods used to prepare the mixed dish

[9] All standard recipe variants likely to be encountered during the dietary survey should be reflected in the standard recipe database. This standard recipe is then often used as the basis from which the details for standard recipe variants with fewer or different major recipe ingredients can be estimated, through calculation.

[10] In some cases, outlier values may be observed in a home cook’s recipe for the preparation of a mixed dish for which a standard recipe is being collected. Survey planners will need to consider if such outlying values will be included in the data that are averaged to comprise the standard recipe for that mixed dish, or if the outlying values should be excluded from the average used to comprise the standard recipe for that mixed dish.

[11] Ideally, the field staff who collect the standard recipes are the same staff who have been involved in earlier activities to compile the FRIL, as they will then already be familiar with the mixed dishes and ingredients. However, the skill set required to collect standard recipe data requires careful attention to detail and strong numeracy skills, whereas numeracy skills are not essential for carrying out some of the earlier data collection activities to compile the FRIL (e.g., KI interviews).

- The weight of the final prepared mixed dish, which is needed to compute ingredient proportions to allow for calculation of the nutrient value of the final mixed dish, and of each ingredient in the mixed dish
- The density of the final prepared mixed dish, which may be needed, depending on the PSEM assigned (see Task 3a)

The total number of cooking sessions to be carried out will be a function of the number of mixed dishes for which standard recipes will be collected and the number of replications of preparation desired per mixed dish and per geographic area.

Collecting recipes for mixed dishes from vendors and restaurant cooks is challenging because the recipes may be considered by the vendor as proprietary information, or vendors may not know the ingredients in their recipes (e.g., where vendors purchase processed or prepared multi-ingredient items in bulk, for example, meatballs). In addition, vendors and restaurant cooks may be unavailable to participate in group cooking sessions. In these cases, recipes for mixed dishes could be collected from vendors by recall.[12]

Multiple vendors should be interviewed to develop the standard recipe for the mixed dish. The ideal number will depend on the complexity and expected variability in the mixed dish, but ideally, 4–6 replicate observations (i.e., recipe data from a minimum of 4–6 different vendors) for each mixed dish should be collected for a given geographic area.

Activities

1. Develop a fieldwork plan for standard recipe data collection, considering geographic areas where standard recipe data collection will be required and any specific demographic groups or seasonality issues that have implications for data collection.
2. Prepare the data collection forms and the data entry mask for standard recipe data to be collected.
3. Obtain ethical approval for all data collection activities as needed.
4. Train data collection teams who will collect standard recipe data.
5. Complete all logistics and preparatory activities related to the cooking sessions (e.g., seeking appropriate local permissions and identifying a local facility/space; identifying groups of home cooks and/or vendors to invite to cooking sessions; obtaining equipment and supplies, including high-quality digital scales and recipe ingredients).
6. Convene the cooking sessions, divided into half-day sessions with 5–6 cooks per session, with each cook preparing 3–4 different mixed dishes per session, and collect the recipe data for each mixed dish prepared.
7. Double enter the recipe data collected into a properly formatted data entry mask in an electronic database; check data entry for errors.[13]

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[12] Many commercial cooks may be able to state the amount of each ingredient used by weight or otherwise describe quantitatively the amounts typically used in a recipe. However, it is also necessary to obtain a weight of the final cooked mixed dish obtained from those ingredient amounts. In many cases, a vendor might be able to explain, for example, that a pastry recipe yields a batch of 20 individual pastries, in which case, the recipe data collection team can determine the average weight of an individual pastry by directly weighing a sample of individual pastries prepared by that vendor to derive the weight of the entire batch of 20 pastries. If a vendor cannot recall the total quantity produced by the recipe given, the recipe data collection team will need to prepare that mixed dish to calculate the proportion of ingredients (see Box 1 for definitions) and, if the PSEM assigned to the vendor recipe requires it, the density of the prepared mixed dish will also need to be recorded (refer to Task 3b).

[13] *Intake* recommends collecting data for standard recipes on carefully developed paper forms, with the data collected double-entered into a computer database, to check for any errors in data entry, and reconcile any potential data entry errors against the data recorded on the paper forms. *Intake* advises against using tablets for standard recipe data collection given the logistic difficulty of ensuring accurate electronic data entry during a recipe session where multiple mixed dishes are being prepared simultaneously.

8. Summarize and process the replicate recipe data collected, carry out the required calculations to derive the standard recipe for each mixed dish (according to geographic area, as appropriate), and compile all relevant information into a standard recipe database.[14]
9. Finalize the standard recipe database. If using paper for data collection for the dietary survey, develop a list of standard recipes (and recipe variants) for enumerators to carry as an aid (possibly laminated) to use during the 24-hour recall dietary interview. If a technology-assisted platform will be used to collect the 24-hour recall dietary data, the standard recipe files will need to be formatted according to software-specific requirements, and uploaded, as appropriate.

Location

- Preparation of the fieldwork plan, data collection templates and masks, data entry and processing, and preparation and formatting of all final files and databases can be done at the central level. In addition, training of data collection teams at the central level may be most efficient and will help ensure consistency in data collection.
- Standard recipe data collection can be done at the national level or per geographic region, depending on the extent of geographic variation in recipes.

Duration/Determinants of Time Required

The time required for standard recipe data collection (and for preparation of the final standard recipe database) varies widely depending on:

- Number of geographic areas where the standard recipe data will be collected and travel time within and between areas
- Number of standard recipe data collection teams (e.g., one team traveling between geographic areas, or one team per area)
- Previous training and experience of standard recipe data collection teams, as this will affect the extent of the standard recipe data collection training
- Total number of mixed dishes identified for standard recipe data collection, including mixed dishes that need to have standard recipes collected by or for specific demographic groups (for example, special porridges or other complementary foods prepared for infants and young children)
- Total number of vendor- or restaurant-prepared mixed dishes to be collected as standard recipes
- Number of replicates of each mixed dish preparation to collect per geographic area

Task Output

- Standard recipe database.

[14] *Intake* is currently preparing detailed guidance on the collection and processing of data for standard recipes. Once finalized, the guidance document will be available at Intake.org.

Task 3a. Select PSEMs to Use for Each Item in the FRIL and Standard Recipe Database

The comprehensive FRIL and standard recipe database provide the framework for identifying preferred PSEMs per item listed. As described in Task 1, each food and ingredient listed in the FRIL should have a separate line, by descriptive detail, for each variation of that food or ingredient likely to be reported as consumed during the survey (i.e., variety/type/color, state, maturity, part, mechanical processing, cooking methods); additions (e.g., salted, added sugar); brand, fortification, and enrichment (for commercial products); and presentation mode. The relevant descriptive detail per food and ingredient listed in the FRIL has implications for how respondents might best estimate the portion size consumed (i.e., PSEM to be used). PSEMs should also be selected for each type of mixed dish and standard recipe.

To promote standardization in methods and reduce potential for error among enumerators, *Intake* recommends that a limited number of PSEMs be used for dietary surveys in LMICs. Ideally, the total number of PSEMs used in a survey should be fewer than five, with one preferred PSEM identified per item. In some cases, survey planners may deem it beneficial or necessary that one alternative PSEM be allowed for certain items.

Intake recommends the following PSEMs for primary use in dietary surveys in LMICs: proxy weight using materials that can be shaped, such as modeling clay or play dough; proxy weight using free-flowing dry materials, such as raw rice and/or beans or water[15]; standard unit size; calibrated spoons, scoops, and/or ladles; and direct weight (i.e., direct weight of fresh foods available in the respondent's household[16] or salted models of food carried by the enumerator).

The selection of PSEMs and the process of assigning a primary PSEM (and possibly an alternative PSEM) to each item in the FRIL and standard recipe database can be done centrally by a core technical team. When carrying out this work, the core technical team should consider PSEMs that have previously been tested and used in the survey area. If a new PSEM is proposed to be used with the survey population that has not been used in previous dietary surveys in the country, the PSEM should be tested for feasibility and ease of use, first by survey staff and then, ideally, in a range of the geographic areas to be covered by the survey. It is also ideal for any new PSEM to be validated against a gold standard (i.e., weighed portion size of food), but resources (time, money) for such validation work are often not available.

Before finalizing the list of PSEMs to be used in the survey, there should be some pre-testing of the full set of PSEMs among the survey population to ensure that the identified methods (regardless of whether they have been used in previous survey) are feasible to use for the various items to which they have been assigned.

[15] The use of water as a proxy free-flowing material for collecting the estimated quantity of a food consumed by a respondent is a PSEM that should only be considered for use in survey contexts, when survey conditions are such that it is ethical, culturally appropriate, and practical to request that water be supplied by the household (i.e., where water is readily available in the survey context and not regarded as a scarce or valuable resource by households).

[16] The use of fresh foods available in the respondent's household for collecting the estimated quantity of a food consumed by a respondent is a PSEM that should only be considered for use in survey contexts, when survey conditions are such that it is ethical, culturally appropriate, and practical for fresh food to be supplied by the household for the purpose of the PSEM. Before deciding to use fresh foods available in a respondent's household, survey planners should consider if doing so could potentially lead to the respondent considering the food used for the PSEM as undesirable or inappropriate for later consumption, thus leading to waste of the fresh food. The risk of a respondent falling ill and then possibly attributing the sickness to the survey staff (i.e., the handling of fresh food that was later consumed by the respondent) should also be carefully considered before the use of fresh food is adopted as a PSEM for a survey.

Activities

1. Select an appropriate PSEM for each item listed in the FRIL and each standard recipe listed in the standard recipe database.
2. Test the feasibility and/or validate any new PSEM considered for use in the survey.
3. Test the feasibility of all the PSEMs selected for use among the survey population, i.e., carry out a pre-test of the PSEMs.
4. Finalize the list of allowed PSEMs for each item in the FRIL and standard recipe database. If using paper for data collection for the dietary survey, develop a list (possibly laminated) of selected primary (and possibly alternative) PSEMs for enumerators to carry as an aid during the 24-hour recall dietary interview. If using a technology-assisted platform for 24-hour recall dietary data collection, prepare the file according to software-specific requirements and upload.

Location

- Activities 1 and 4 can be done at the central level.
- Activities 2 and 3 should ideally be done in several geographic areas, with individuals similar (in age/sex, education level, etc.) to the respondent groups of focus for the main survey to be carried out.

Duration/Determinants of Time Required

Work required at the central level (Activities 1 and 4) depends on how extensive the FRIL and standard recipe database is and how many people are involved, but typically can be completed relatively quickly, for example, in 1–2 weeks (not including pre-testing of methods). A validation study of a new PSEM (Activity 2) will require a much longer timeline; several months may be required. One to two weeks is necessary for pre-testing all PSEMs selected for use (Activity 3), in the context of a large-scale quantitative 24-hour recall dietary survey and for making any indicated adjustments to the PSEMs initially identified. Formatting the list of allowed PSEMs to software-specific requirements, if using a technology-assisted platform for 24-hour recall dietary data collection, should be relatively quick.

Task Output

- List of allowed PSEMs.

Task 3b. Compile and/or Collect PSEM Conversion Factors for Each Item in the FRIL and Standard Recipe Database

Once PSEMs are selected for each item in the FRIL and standard recipe database, develop a PSEM conversion factor database to convert quantities estimated as consumed (or as used in a mixed dish) by the respondent into a gram unit weight. A PSEM conversion factor is uniquely associated with each PSEM used in the survey and will vary by item in the FRIL and standard recipe database.

When the amount of a food item consumed is estimated with inedible parts included — as may be done when it is easier to visualize the amount consumed with the inedible parts included[17] — an edible portion factor,[18] which is uniquely assigned to each item in the FRIL and standard recipe database, is also needed to convert the quantity estimated as consumed into the gram unit weight of the edible portion.

Several PSEMs require the density of the reported food, ingredient, or recipe to convert the quantity estimated by the respondent as consumed to be converted into a gram unit weight. For example, density data are needed to convert measured weights of proxy materials (e.g., play dough, dry rice or beans) into gram equivalents of the reported item and to convert the volume of calibrated spoons, scoops, or ladles into gram equivalents.

Compiling the PSEM conversion factor database associated with the FRIL and standard recipe database is a somewhat complex activity and requires guidance from experienced technical experts.

The PSEM conversion factor database will need to:

- Include unique PSEM conversion factors for each food and ingredient (and each food and ingredient variation) included in the FRIL (e.g., different conversions for raw, cooked, whole, chopped, grated variations of a food or ingredient)
- Include unique PSEM conversion factors for each recipe included in the standard recipe database
- When relevant, include an edible portion factor for each item in the FRIL and standard recipe database

Conversion factors by PSEM will need to be collated uniquely for the survey at hand. Density factors have been published for many foods, but may not be available or appropriate for all local foods, so data collection on densities could be required. Similarly, edible portion factors have been published for many foods, but these tend to vary, and, in some cases, it may be worthwhile to collect edible portion factors, if resources and time allow and none are available for the country, and significant variation is expected.[19]

Standard recipes collected as part of Task 2b would normally have density data collected as part of that task. If borrowing standard recipe data from a previous dietary survey, it is unlikely that density data will be available for these standard recipes. For non-standard recipes collected during the 24-hour dietary recall interview with the respondent, it is not feasible to collect density data for the reported recipe. The need for density data for non-standard recipes can be bypassed when the same PSEM is used for estimating the quantity of the final mixed dish

[17] Common examples of foods served and estimated with inedible portions include chicken, fish, and other meat served with bone; groundnuts in shell; maize on the cob; and many fruits with inedible seeds, stones, or peels.

[18] The edible portion factor is defined as the proportion of a food that is usually eaten expressed as a ratio of the entire food, i.e., edible portion ÷ (edible + inedible portions). The edible portion factor is a value ≤1. The edible portion factor is equal to 1 when the entire food is edible. For standard recipes, the edible portion factor is almost always equal to 1, as the inedible portion of any ingredients used in a standard recipe has typically already been accounted for at the ingredient level in the PSEM conversion factor database for the FRIL.

[19] *Intake* is currently preparing detailed guidance on compiling and collecting edible portion factors and density data. Once finalized, the guidance document will be available at Intake.org.

prepared and the quantity of the mixed dish consumed by the respondent. In situations in which different PSEMs are used, and the PSEM requires density data (e.g., when using proxy weights), it may be necessary for survey staff to prepare the non-standard recipe reported by the respondent to collect the needed density information to calculate ingredient proportions and convert them into a gram weight unit.

Activities

1. Determine which PSEM conversion factors are needed for each item in the FRIL and standard recipe database.
2. Collate/collect data needed for PSEM conversions for each item in the FRIL and standard recipe database according to the PSEM selected for that item (e.g., food density data, density of proxy materials, volume of calibrated spoons, edible portion factors).
3. Compute the PSEM conversion factors for each item in the FRIL and standard recipe database.[20]
4. Finalize the PSEM conversion factor database for each item in the FRIL and standard recipe database. If using paper for data collection for the dietary survey, this database will be needed for processing the data after the survey data have been collected. If using a technology-assisted platform for 24-hour recall dietary data collection, this information may be required for upload before data collection, in which case, the requisite file will need to be prepared according to software-specific requirements and uploaded.

Location

- In many cases, food density data and edible portion factors can be collated from existing sources.
- If food density data and edible portion factors need to be collected, data may need to be collected in different geographic areas, for example, if the food items are very differently sized across geographic areas where the 24-hour recall dietary data will be collected. However, if judged sufficient by survey planners and/or resources do not allow, all food density and edible portion factors can be collected at the central level rather than in multiple geographic areas (unless the food is unique to a particular geographic area where data will be collected). This will also simplify their use during data processing (i.e., one PSEM conversion factor per item in the FRIL for a given PSEM).
- Once the data for the PSEM conversions for each item in the FRIL and standard recipe database have been compiled/collected, the PSEM conversion factor for each item in the FRIL and standard recipe database can be computed at the central level. Work to format and finalize (and upload, if relevant) the PSEM conversion factor database can also be completed at the central level.

Duration/Determinants of Time Required

Duration for this work depends highly on previous work in the country. Collation of existing food density and edible portion factors depends on the extent of the FRIL, but 2–3 weeks is usually sufficient, if the core technical team has access to databases from previous surveys. The time needed for data collection for missing PSEM conversion factors (such as food density and edible portion factors), if restricted to being carried out at the central level only, will vary depending on the extent of gaps. The time required to compute the PSEM conversion factors once there are no missing conversion factor data for any item in the FRIL or standard recipe database should be very quick. Any additional time required to format (and upload, if relevant) the finalized PSEM conversion factor database should be minimal.

Task Output

- PSEM conversion factor database.

[20] *Intake* is currently preparing detailed guidance on how to compute PSEM conversion factors. Once finalized, the guidance document will be available at Intake.org.

Task 4. Develop the Probe List for Foods (as Eaten), Ingredients (as Used), Mixed Dishes, and Standard Recipes

Before data collection, a probe list should be developed to provide enumerators with a set of questions that should be asked for each item reported during the 24-hour recall dietary interview. Enumerators will use the probe list to ensure that they collect adequate relevant details about each food or ingredient consumed (i.e., descriptors as described in Task 1). Probe lists for mixed dishes also need to be developed, when, for example, enumerators need to ask probing questions to determine whether to collect a non-standard recipe or use a standard recipe or to determine if a mixed dish can be considered as a variation of a standard recipe. The probe list is based on the comprehensive FRIL developed in Task 1 and the set of standard recipes collected in Task 2b. The probes are item-specific, but often similar probes are needed within a food group.

The probe list either will be a job aid (possibly laminated) if paper will be used for data collection for the dietary survey, or can be programmed into software if a technology-assisted platform is used for the 24-hour recall dietary data collection. In the latter case, when the enumerator types or selects a food or ingredient item, the software should then prompt the enumerator to ask all relevant food/ingredient-specific and mixed dish probing questions.

Activities

1. Develop the probe list for foods (as eaten), ingredients (as used), mixed dishes, and standard recipes based on information in the complete FRIL and standard recipe database.
2. If using paper for data collection for the dietary survey, develop a probe list to carry as an aid (possibly laminated) during the 24-hour recall dietary interview. If using a technology-assisted platform for electronic collection of the 24-hour recall dietary data, prepare the file according to software-specific requirements and upload.

Location

This work can be done centrally.

Duration/Determinants of Time Required

Once the FRIL and standard recipe database are completed and reviewed by the technical team, the probe list can typically be completed within 1–2 weeks by a member of the team. The time needed to program the probe list, if relevant, depends on the software used to collect 24-hour recall dietary data.

Task Output

- Probe list.

Task 5. Compile the FCDB for the Survey

The purpose of the FCDB for the survey is to provide the energy and nutrient composition and the quantity of other food substances of interest (e.g., trans fat, non-intrinsic sugars, sugars) for all items listed in the FRIL per 100 g of edible food. The FCDB for a dietary survey must:

- Include all foods and ingredients in the FRIL (which should, by definition, also include all ingredients, as used, in standard and non-standard recipes)[21]
- Incorporate retention factors as needed, to reflect nutrient losses during cooking

The set of nutrients to include in the FCDB is usually determined by the specific objectives of the dietary survey and the quality and availability of nutrient composition data.

The FRIL developed in Task 1 and the standard recipe database developed in Task 2b are crucial to ensuring the completeness of the FCDB for the survey. Experience has shown that when the FCDB for a survey is incomplete, and particularly when commonly consumed foods are missing, problems arise during data processing and there are long delays in producing survey results.

Activities

Developing a FCDB for a dietary survey can be a complex task and describing all the activities required to develop a FCDB for a dietary survey is beyond the scope of this brief document. There is extensive guidance available from the Food and Agriculture Organization's INFOODS website (http://www.fao.org/infoods), including criteria for inclusion of values in the database and guidance on imputation.

The final completed FCDB for a dietary survey should include all foods listed in the FRIL[22] and all ingredients used in standard and non-standard recipes, along with the energy, nutrient, and food substance content associated with each respective item.[23] Listing recipes in the FCDB for the survey (i.e., with each recipe listed as a single line in the FCDB) is optional.

If using a technology-assisted platform for processing of the 24-hour recall dietary data, the final FCDB file should be prepared according to software-specific requirements and uploaded.

Location

This work can be done centrally.

Duration/Determinants of Time Required

The process of developing a context-specific FCDB for use in a large-scale dietary survey is lengthy and complicated, especially if there is no existing FCDB on which to build. In most cases, the starting point will be a previously used database that requires revision and the addition of new items, based on a different geographic

[21] Note that although non-standard recipes are collected only at the time of the 24-hour recall dietary data collection with the respondent, if the FRIL is complete at the time data collection for the dietary survey begins, it is assumed that the ingredients used in all non-standard recipes will have already been listed and accounted for in the FCDB for the survey, prior to data collection.

[22] Any foods or ingredients reported as consumed during the survey that were not already included in the FRIL, PSEM conversion factor database, or FCDB for the survey would need to be added after data collection and before data processing and data analysis.

[23] *Intake* strongly recommends listing recipe ingredients in the FCDB for the survey; this allows the ingredients used in recipes to be included in food-based and nutrient-based analyses.

scope and/or on changing intake patterns. It is not possible to give a generic estimate on the time required to complete a FCDB, as it depends, among others on:

- The starting point (existing databases, their completeness, documentation, and quality)
- The number of foods/ingredients for which missing nutrient values will need to be imputed or for which food samples might be analyzed
- The number of foods/ingredients for which nutrient retention adjustments will need to be applied
- The number of macro- and micronutrients of interest for analysis and for which food composition data will need to be compiled
- Availability of team members with specific and sufficient experience in completing a FCDB for a survey
- The overall size of the database (total number of foods/ingredients and nutrients/food substances of interest)

While highly variable, experiences with several large-scale dietary surveys suggest that after compiling a complete and sufficiently detailed FRIL, several weeks or months may be required to update and complete the FCDB for the survey. This is the case even when a recently updated national or regional FCT is available. When using a technology-assisted platform for data processing, preparation of the FCDB information for the survey into the required format will require additional time. The time required for this can be minimized if the format of files required for uploading into the technology-assisted platform to be used is considered from the beginning steps of compiling the FCDB for the survey. After survey data are collected, additional time is typically needed to fill in gaps and identify the energy, nutrient, and food substance (i.e., trans fat, non-intrinsic sugars, sugars) content of foods and ingredients that may not have been previously included in the FRIL.

Task Output

- Complete FCDB.

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