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Dietary Record Protocol: Weighed Food Record and Recall [↗](#)

PLOS One

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1 Works for me [dx.doi.org/10.17504/protocols.io.xitfken](https://doi.org/10.17504/protocols.io.xitfken)

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ABSTRACT

This protocol explains how to conduct a 12-hour weighed food record (by cadres or mothers) and 12-hour food recall.

EXTERNAL LINK

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THIS PROTOCOL ACCOMPANIES THE FOLLOWING PUBLICATION

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MATERIALS TEXT

Equipment

1. Dietary scales and spare batteries
2. Plastic plate, bowl, spoon, cup
3. Clay or plasticin
4. Weighed record and recipe form
5. Photographs of banana, fish, crackers, vegetables and beans
6. Pen/pencils
7. Food List with item designated for record of mixed dishes involving separate ingredients marked
8. Dietary Record form

BEFORE STARTING

Tips to Remember!

- PRINT CLEARLY- keep in mind that someone has to read your writing in order to enter the information on the computer
- Confusion between a zero and the letter O and D can be avoided if the O is crossed and the D is carefully written.
- Record the time in the time column according to the 24.00 clock. Example: 6 pm is 18.00, 6 am is 6.00.
- Each new eating time needs to be recorded only once, regardless of how many foods were eaten at that particular time.

12-HOUR WEIGHED FOOD RECORD

1

Preparing the Cadre for the Weighed Record: Conduct training for the cadres


2 Explain procedures with examples and simulations.

- 3 Equip the cadres with tools needed: scale, set of forms, pen/pencil, plate/bowl, cup, and spoon.
- 4 Carry out a training session with respondents, accompanied by the instructors.
- 5 Evaluate practice results.

Preparing the Respondents for Weighed Record

- 6 Introduce yourself to the respondents; explain the objectives of the session.
- 7 Explain to the respondents the purpose of the weighed food record and the procedures involved. Ensure that this explanation is consistent with the information given on the consent form.
- 8 Explain that the procedure consists of three components: a) Recording all foods and drinks consumed during the food record period; b) Describing the foods and drinks consumed during the food record period; c) Weighing the amounts of food and drinks consumed during the food record period.
- 9 Explain that this procedure will be used for the mother.
- 10 Explain the importance of following a usual eating pattern on the intake recording day: this will decrease the likelihood of altering eating behavior on the recall day.
- 11 Explain that you will record a description and weigh each ingredient used in the mixed dishes in the home. The weight of the mixed dish after cooking will also be recorded.
- 12 If the mixed dish was prepared before then the detail of the ingredients and the amounts must be recalled using Food List with item designated for record of mixed dishes involving separate ingredients marked. The amount of mixed dish after cooking must be estimated using the methods given in this protocol.
- 13 Prepare a visiting schedule for each respondent. Inform the respondent that the cadre will arrive at their household at 06.00 AM on the scheduled survey days and to stay there until 06.00 PM (for 12 hours).

Recording the Foods and Drinks Consumed

- 14 Use Weighed Record Form (Form A) and Recipe Form (Form B).
 [Dietary record form.pdf](#)
- 15 First, record mother's name, ID number, interview date, day of the week and cadre's name at the top of each page of the weighed food record form. Use a separate set of forms for each respondent.
- 16 Start by calibrating the scale with standard weight (500 Rp silver coin) and record the calibration weight on the form.

- 17 Make sure that the scale displays a "0"(zero) before you start.
- 18 Record in column 3 each food and drink(including snacks and drinkingwater)consumed by mother in sequential order; start with the first item consumed sincethe cadre arrives in the morning, and finish with the last item consumed beforethe cadre leaves.
- 19 Record **time (column 1)** and **place (column 2)** for when and where each food and drink (including snacks) is consumed. Use more than one page per day as needed
- 20 Also record all snacks, meals, or drinksconsumed outside the house. Therefore, the cadres should accompany mothers andbring their tools (scale, forms, and pen/pencil) so that any snacks, meals, ordrinks consumed outside the house during the recording day can be weighed andrecorded on the Weighed Record Form.
- 21 Record the name of food or drink as they are consumed in column 3 of the Weighed Record Form (Form A).
- 22 For mixed dishes: record the name of the mixed dish on Weighed Record Form (Form A) (e.g., vegetable stir-fry, friedrice) in column 3 and note the number of the recipe in column 9. Record thesame number of this recipe on the Recipe Form (Form B).
- 23 Also note in column 9 of the WeighedRecord Form (Form A) if the cook has prepared the mixed dish the day before,then proceed with asking the details of ingredients of the mixed dish using therecall procedure

Describing the Foods and Drinks Consumed

- 24 Record the **description** of each food or drink in **column 4** according to the guidelines in Table1

Food type	Required detailed information	Cooking Method
Rice	Kind of rice: white/brown Sticky rice / not Porridge / steamed rice Condiments	Boiled / fried Steam / baked
Flesh meat	Kind of meat: beef/goat/lamb/ Description of cut: lean/thick; fat removed/plus fat With bone/not	Fresh/boiled/fried/baked/ stir-fried/steamed/stewed/br aised
Organ meats	Kind of organ: liver/kidney/intestines/heart	Fresh/boiled/fried/baked/ stir-fried/steamed/stewed/br aised
Fish/ sea food	Kind of fish: fresh/dried/canned such as anchovies, tuna, sardines; roe/fish eggs Kind of shell fish: clams/oysters/shrimp Snails; Octopus/squid	Fresh/boiled/fried/baked/ stir-fried/steamed/stewed/br aised

Poultry	Kind of poultry: chicken/duck/bird Parts or pieces eaten: breast/thigh/wing/feet/etc. Raw / cooked weight White / dark meat With / without skin With / without bones	Fresh/boiled/fried/baked/ stir- fried/steamed/stewed/br aised
Dark yellow or orange-fleshed roots, tubers, and others	Carrot; Pumpkin; Red Pepper (sweet); Squash (orange or dark yellow-fleshed only); sweet potato (orange or dark yellow-fleshed only) Fresh/ frozen/ canned Peeled/ unpeeled	Boiled/fried/baked/stir- fried/steamed/stewed
Roots, tubers, and plantains (non- coloured items)	Bread fruit; Cassava; Turnip; Yam; Potatoes (purple/blue/pink/yellow); Sweet potato (white/pale yellow-fleshed) Peeled/unpeeled Fresh/dried Prepared as stiff porridge or noodles	Boiled/fried/baked/stir- fried/steamed/stewed
Milk products	Kind of milk: cow/goat/horse; Type of milk: fresh/dried/UHT; Full cream/2% fat/skimmed/low fat Brand name (if appropriate) Fortified / not Ice cream: kind of ice cream Yoghurt: kind of milk; sweetened/unsweetened; fruit added/plain	
Cheese	Kind of processed cheese: block/sheets Brand name (if appropriate) Low fat/regular	
Bird's Eggs	Kind: chicken/duck/quail Part of eggs consumed: yolk/white part/whole	Boiled/fried/baked/scram bled/poached/omelet
Fats, oils, & butter	Butter; Margarine (fortified/unfortified); Mayonnaise; Palm oil (NOT red palm oil); Cream; Oil (vegetable/nut/seed); Coconut milk	
Bread, rolls	Type of grain: wheat/rice/etc. Type of flour Brand Size Toasted/baked/not Added ingredients: jam/others	
Baked goods	Type of product: cakes/biscuits/pastries Homemade/commercial Iced/not (type of icing); Filled/not; Type of filling: sugar/cram/jam/chocolate	

Cereals and other grains	Corn; Oats; Wheat Whole/refined Fresh/dried Porridge: thin/thick/stiff(steamed rice) Fermented/unfermented Brand name Noodles: instant/fresh/glass/rice/etc. Fortified/unfortified Added: milk/water/oil/spices/sugar/none	Boiled/steamed/baked/fried
Beans, peas, lentils, nuts & seeds	Kind of bean: red bean/mung bean/soy bean/peanut/etc. Sprouted/not Soy products: fermented (tofu/tempeh/tauco/etc.) / unfermented Gnemon: fresh/dried (chips) Peanuts: with/without skin; raw/roasted/fried; peanut butter Mung bean porridge; Mung bean noodle	Fresh/boiled/fried/baked/stir-fried with/without salt
Dark green leafy vegetables	Cassava greens; Chinese cabbage; Bitter leaf; Broccoli; Lettuce; Papaya leaves; Spinach; Sweet potato leave; Water spinach; Stalk and leaves/ leaves only	Fresh/boiled/fried/baked/stir-fried/steamed/stewed
Other vegetables	Bamboo shoot; Bitter melon; Bean sprouts; Cabbage; Cauliflower; Corn; Cucumbers; Eggplant; Garlic; Green pepper; Lettuce; Luffa; Mushroom; Onion; Shallot; Tomato (red/yellow/green/ not orange) Peeled/unpeeled Stalk and leaves/leaves only	Fresh/boiled/fried/baked/stir-fried/steamed/stewed
Fruits (dark yellow or orange)	Mango; Papaya; Passion fruit (ripe): Cantaloupe melon; Loquat; Hog plum; Persimmon (ripe) Peeled/unpeeled	Fresh/boiled/baked/dried
Other Fruits	Apple; Avocado; Banana; Coconut flesh; Durian; Grape fruit; Grapes; Guava; Jackfruit; Lemon; Lime; Litchi; Honeydew melon; Orange; Pear; Pineapple; Pomegranate; Rambutan; Star fruit; Strawberry; Tangerine; Watermelon Peeled/unpeeled	Fresh/boiled/baked/dried /canned
Beverages, soup	Fresh / frozen Fruit juice Sweetened / unsweetened Added vitamins or minerals Coffee: instant/ground; water/milk added Recipe	

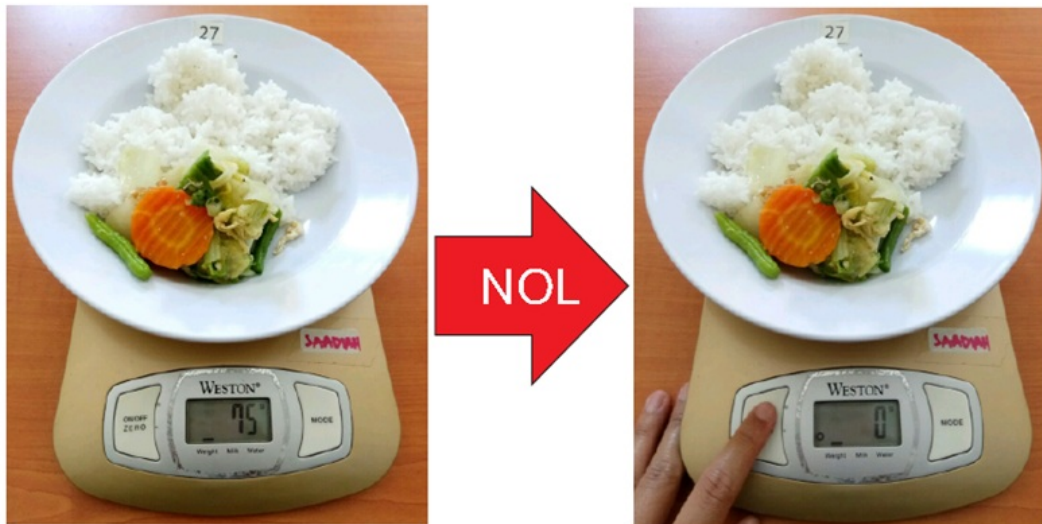
Street foods and processed foods	Type of food Brand name Package size Price per portion Condiments added Vendor's name/location Write ingredients and amounts from packet Fortified/not Ask the mother where the product was purchased, collect the package, detail from the package should be recorded.	
Mixed dishes	Dish name Brand name Homemade/commercial List recipe ingredients Total amount cooked Total amount consumed by mother	
Condiments	Chilies; Fish sauce; Salty soy sauce; Stock cubes; Sweet soy sauce; spices. Brand names Cooking method of the dish	

Table 1: Essential Details for the Description of Specific Food Items

- 25 For mixed dishes, record the following in Recipe Form (Form B):
- Description of each ingredient in column 4 following the guidelines in table 1 (BFC_SOP15).
 - Make sure you remember to enter each condiment, (e.g., sweet soy sauces, chili sauce) and seasoning (e.g., *gule* seasoning, *semur* seasoning) on a separate line in column 4 of Recipe Form.
 - **Cooking method in column 5** (e.g., boiling, baking, frying, roasting, etc.)

Weighing the Amounts of Food and Drink

- 26 The actual weight of each food and beverages *consumed* (including mixed dishes) must be recorded. Note particularly that the weights should be of the food as eaten. For example, do not record the weight or size of a *raw* chicken leg: instead, record the weight of the chicken meat consumed after it has been cooked.
- 27 1. Using the dietary scales:
- Adjust the scale to zero
 - Place the plate, bowl or cup on the scale, then record the weight
 - Adjust the scale to zero again
 - Place the first food or beverage item of the meal on the weighed plate, bowl, or cup
 - Read and record the weight of the first food or beverage item of the meal (in grams) in the column 6 of the food record form
 - Adjust the scale to zero again
 - Add the next item of food and record its weight
 - Again, adjust the scale to zero; and
 - Repeat this taring, weighing, and recording procedure until all the food and beverage items in the meal have been measured.



Adjust the scale to zero again



Add the next item of food and record its weight, again, adjust the scale to zero; and repeat this taring, weighing, and recording procedure until all the food and beverage items in the meal have been measured

28 If there is leftover on the subject's plate, please transfer the leftovers to another plate



Leftover food

- 29 Put the empty plate that was used for eating on the scale, and then transfer each ingredient of leftovers separately on to the plate and weigh.



Put the empty plate that was used for eating on the scale

- 30 Record the weigh of the plate and each leftover ingredient every time.

31 If each ingredient cannot be separated, weigh the plate, bowl, or cup and all the leftovers together.

Complete the Recipe Form.

32 The following details should be recorded on the mixed dish recipe form. Use a separate form for each “designated” mixed dish consumed by the respondent.

33 Record the name of the interviewer, date, day food eaten, and the subject’s name and ID number at the top of the recipe form.

34 Record local and general name of the mixed dish on the form (e.g., chicken curry). Weight of the whole mixed dish cooked is recorded in column 7b while part of it consumed by the subject will be recorded in the Weighed Record Form.

35 Record the weight of the empty cooking pot in column 7a.

36 Record the name of each ingredient of the mixed dish on a separate line of the form in column 3, followed by a complete description of each ingredient in column

37 Record a complete of each ingredients in column 4 using table 1 for the description of the ingredient.

38 Record the weight of the edible portion (i.e., as eaten) of each raw ingredient recorded in column 6. For example, for ingredients such as bananas, remove the skin part and only the edible portion is weighed.

39 If seasoning powder is used in the recipe, record only seasoning powder and the name of the recipe not individual spices or their amount.

40 Record the final weight of the cooked mixed dish plus the cooking pot in column 7b.

Calculate the Weight of Each Cooked Ingredient Consumed

41 Where possible, it is preferable to express the weight equivalents of ingredients consumed in mixed dishes as cooked foods to take into account any weight changes that may arise after cooking. This approach allows nutrient values for cooked foods to be used, and thus any nutrient losses or gains during cooking are taken into account. The steps involved are listed below.

42 Apply a weight change factor to adjust the weight of the raw ingredients to cooked weights. Use the Australian/New Zealand or USDA weight change factors if local data are not available. For example, if the weight of raw carrots in mixed dish = 55g and weight change factor for boiled carrots = - 7%, then the loss of weight of carrots after boiling is: $55g = 55 \times (7/100) = 3.85g$. Therefore, the cooked weight of the carrots is: $55 - 3.85 = 51.15g$. (Note if carrots had gained weight, then 3.85 g would have been added to the raw weight value). Enter this cooked weight in column 5 of the recipe form. Repeat this calculation for each raw ingredient listed in step 1, applying weight change factors as appropriate.

43 Calculate the *proportion* of each cooked ingredient in the homemade mixed dish recipe by dividing the weight of each cooked ingredient by the total cooked weight (in g) of the mixed dish. Record these proportions in column 8 of the recipe form.

44 Calculate the weight equivalent of each cooked ingredient *consumed* by the respondent by multiplying the proportion of each cooked ingredient in column 8 by the total weight of the cooked mixed dish (in grams) consumed by the respondent. Enter these weight equivalents in column 9 of the recipe form and in column 6 of the weighed record form.

Food type	Weight change factors (%)
Boiled rice	189
Grains (other than rice) simmered eg. Maize porridge	-13
Other grains (boiled)	54
Carrots & similar root vegetables	-7
Leaf & stalk vegetables, boiled	-15
Peas & edible podded peas	-7
Tomato, boiled	-22
Pumpkin, baked	-15
Squash, Zucchini, boiled	-16
Other vegetables, boiled	
Corn-on-cob	-1
Corn kernels	-4
Onions, boiled	-10
Vegetable mixture, boiled	-11
Mature legumes and pulses	
Beans, dried, boiled	149
Chick peas, dried, boiled	163
Split lentils, dried, boiled	227
Whole lentils, dried, boiled	142
Split peas	150

Examples of Weight Change Factors

12-HOUR FOOD RECALL INSTRUCTION

45 *How to ask mothers to recall what they ate from 6 pm (18.00) yesterday to 6 am (6.00) today*

Introduction

46 Remind the mother that the questions will only cover all food and drinks that she consumed from 6 pm (18.00 hours) yesterday to 6 am (6.00 hours) today.

47 Stress that all the responses of the mother will be confidential.

48 Stress the importance of providing the correct information.

49 Give the mothers sufficient time to consider their responses and to clarify answers where necessary. At all times during the interview, keep an open mind and avoid showing signs of surprise, approval, or disapproval of the mother's eating pattern.

List of all food and drink consumed from 6pm (18.00 hours) yesterday to 6am (6.00 hours) today

50 Start the interview with the following: "*I would like you to tell me what you had to eat or drink from **6 pm (18 hours) yesterday to 6 am (6.00 hours) today.***" Next ask, "*What was the first thing you ate or drank from 6 pm yesterday? What did you have next and at what time?*"

Proceed through the evening, repeating these questions as necessary, and record each food or drink (including drinking water) consumed in

- 51 **column 3** of the recall form. Remember to probe for any snacks and drinks consumed *after* the main evening meals and during the night or away from home
- 52 Make sure that each new food or drink consumed is entered on a new line in **column 3** of the form
- 53 If a designated mixed dish is consumed record on the recall form: steamed rice (mixed dish – see recipe) in **column 3** of the Recall Form (Form C), and write the number of recipe in column 8 of the Recall Form (Form C) and column 1 on the Recipe Form (Form D)
- 54 When the end of the time period (i.e., 6 am today) has been reached, check to make sure that all the items (including drinks and snacks) have been entered on the Recall Form (Form C)

Describing the foods and drinks consumed

- 55 Note that description of seasonings and condiments (e.g. sweet soy sauce, chili sauce, etc) should also be included because they are often an important source of micronutrients. When different types of flour are used for the staple, record the specific flour type (e.g., refined [preferably with extraction-rate] or unrefined (e.g. whole wheat) on the recall form. Always consult to the table 1 for the descriptions of all food and drink
- 56 Go back over the list of food and drink recorded in column 3, and for each food and drink item in the recall, record the **time** in column 1, **place** in column 2, and then a **complete description (column 4)** of each item on the recall form. Consult the descriptions that have been prepared for each item in Table 1. When appropriate, brand name of the processed food should also be recorded in column 3 on the form
- 57 1. For homemade designated mixed dishes, record on the recipe form (Form D) the following details:
 Number of recipe (column 1)
 Name of each ingredient of mixed dishes (column 2)
 All ingredients (column 3)
 Description of all ingredients (column 4)
 Method of preparation and cooking (column 5)

Note : If the mixed dish is not on the food list, always collect the recipe

**Note: If the mother does not know the amount of each ingredient, try and find out about the ratio of the main ingredients of a mixed dish. For example, for a vegetable mixture containing potatoes, sweet potato, and dark green leafy vegetables, you must find out about the ratio of each of these items in the final dish.*

***Note: Ask the mother to indicate the level on the side of the cooking pot. Fill the empty cooking pot up to the level indicates with beans or water and measure the weight. Record the total weight of the cooked mixed dish in gr at the top of the recipe form.*

Estimating the amount of foods and beverages consumed

- 58 This is the most challenging part of the recall interview, but also one of the most critical for ensuring high quality results. Examples of ways to estimate portion sizes of specific food items are listed in the Table 2. Weigh leftovers for food whenever possible because mothers will find it easier to visualize the amounts consumed when these are used
- 59 Start at the beginning of the itemized list of foods and drinks already recorded during Step 1 on the recall form
- 60 Select the method for estimating the amount consumed by first checking the methods recommended in **Table 2**, and then following the appropriate detailed instructions below

Estimate weight using:	Notes
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REAL FOOD – from left over	Most preferred method! Always ask mother whether there is left over from what mother ate yesterday. Weigh according to the amount that mother ate.
Plasticine / Play-doh	Use plasticine if there is no left over food. Use plasticine for solid food and pieces of food. Ask mother to make a replica as similar as it could be to the shape and size of food she ate using the plasticine.
Water	Use water if the item mother consumed is mostly water. Use water to estimate volume of drinks mother consumed. Pour water into the glass/cup/etc. that mother used, weigh the water in it.

Table 2 Weight Estimation Method

- 61 Ask the mother to first visualize the amount of the food consumed
- 62 Adjust the dietary scale to zero, and then place the empty plate, bowl, or cup used by the mother on the scale and record the weight (**column 6**)
- 63 Adjust the scale to zero again
- 64 Ask the mother to measure the amount eaten using the method from **Table 2**. Ask the mother to confirm the amount shown was actually eaten by asking, 'Did you eat all of this?'. Remove any leftovers, if necessary, and then weigh and record the amount consumed (in grams) in **column 7a (if using real food), column 7b (if using plasticine), or column 7c (if using water)** on the recall form (Form C)
- 65 When, eggs, biscuits, buns, slices of bread, and candies, were consumed, please count the number of each item. Record the number in **column 7a**
- 66 Make sure that you record on the recall form and the recipe form the amount of each mixed dish consumed by the mother

Complete the recipe form during the food recall

- 67 The following details should be recorded on the mixed dish recipe form. Use a separate form for each "designated" mixed dish consumed by the respondent
- 68 Record the name of the interviewer, date, day food eaten, the location, and the subject's name and ID number at the top of the recipe form
- 69 Record the number of the mixed dish on the form.
If the mother has any leftovers or real food, record the weight of the empty plate, bowl, or cup she used in column 6. Then ask the mother to estimate the original amount of the mixed dish she ate using the leftovers. Record in column 7a
- 70 If there are no leftovers or real food, ask the mother to estimate the volume using clay or plasticine, try to make a similar shape of mixed

dish. Record the weight of plasticine ingram, in column 7b

- 71 For all mixed dishes use water to estimate the total cooked volume. Fill the utensil in which mixed dish was cooked with water up to the level indicated by the mother. Measure the weight of water in grams and record in column 7c
- 72 Record the name of each ingredient of the mixed dish on a *separate line* of the form in column 3, followed by a complete description of each ingredient in column 4
- 73 Weight all volume of the whole cooked mixed dish cooked is recorded in column 8b, while the amount consumed by the subject will be recorded in the Recall Form

Finalizing the recall form

- 74 Check the form for all the required information: time, place, name of food/drink, full descriptions of all foods, amount eaten (including mixed dishes) for each food or drink (including drinking water)
- 75 Ask the questions at the bottom of the recall form: Was food intake unusual etc.? Record the answers on the bottom of the form
- 76 Check whether the mother had taken any medication or vitamin and mineral supplements in the recall period
- 77 Most importantly, thank the respondent for her time and co-operation

Estimating the composition of street foods (to be performed by the dietary coordinator)

- 78 This can be done at the end of the study when all the recalls and weighed records have been collected
- 79 Prepare a list of all the food or beverage items purchased as "street foods"
- 80 Classify items into types of items based on the composition of the major staple and cooking method.
- 81 Visit ~ five vendors in the study area who sell each of the classified items and ask for information on each ingredient, method of preparation of each ingredient, the amount, method of cooking, and total volume or weight of prepared dish. Enter these data on a recipe form.
- 82 Convert the amount of each ingredient in the recipe into weight equivalents
- 83 Compile nutrient values for each ingredient from a local food composition table.
- 84 Use the chop suey SOP spreadsheet to calculate the nutrient content of the mixed dish (per 100 g), applying USDA retention and yield factors where appropriate. Calculate an *average* nutrient composition (per 100 g) for each street food type from the five items collected from the vendor. This nutrient composition will be added as a line in your food composition table for the nutrient composition of that specific type of street food

Calculating the weight of the ingredients of a mixed dish consumed by the respondent (to be performed by the dietary coordinator)

- 85 The first stage in the conversion of foods to nutrients is to convert the amount of each of the food items consumed and recorded in column 4 of the recall form into weight equivalents; these data are entered into column 5 of the recall form. Several methods can be used, including using published specific gravity data for the items for which the amounts consumed have been reported in mL and the formula: (weight (g) = volume (mL) x specific gravity (g/mL) (see FAO specific gravity data), and nutrient composition tables (eg USDA) for portion sizes given in household measures and grams
- 86 The amount of each raw ingredient (excluding water) recorded on the recipe form for each mixed dish must also be converted to weight equivalents and entered into column 4 of the recipe form
- 87 The amount of the mixed dish eaten by the respondent and the total amount of the recipe must also be converted to weight equivalents
- 88 Next calculate the *proportion* of each *raw* ingredient in the homemade mixed dish recipe by dividing the weight of each raw ingredient by the total cooked weight (in g) of the mixed dish. Record these proportions in **column 6** of the recipe form
- 89 Then calculate the weight equivalent of each *raw* ingredient *consumed* by the mother by multiplying the proportion of each raw ingredient in **column 6** by the weight of the cooked mixed dish (in grams) consumed by the respondent. Enter these weight equivalents in **column 7** of the recipe form. Applying an example, if person was said to consume 120 g pumpkin leaf relish, then the corresponding weight equivalents for the three *raw* ingredients consumed would be: $120 \times 0.52 = 62.4$ g of leaves; $120 \times 0.13 = 15.6$ g tomato; and $120 \times 0.08 = 9.6$ g groundnut flour. These are the weights that should be entered into **column 7** of the recipe form and transferred to **column 5** of the 24-hr recall form
- 90 You are now ready to code and then calculate the energy and nutrient intakes using a nutrient analysis system. You can use STATA/SPSS for your nutrient analysis. Consult your handout on how to perform this task
- 91 Check your input data for coding and weight errors. Strategies for detecting weight errors are given in your handout



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