GNA/MNA FFQ Processing System
Technical Documentation

Paper + Online

Contents

Overview

The FFQ Processing System generates several datasets, most notably the daily nutrient intake dataset, from the frequency and portion size data collected using paper or online FFQs. This documentation outlines the major components of the processing system and provides details about the calculations and defaults used in producing the output datasets. It is intended for users of NASR's GNA and MNA FFQs and their Spanish language equivalents.

The FFQ Processing System uses the same calculations for both paper and online formats.

Slight differences exist between the paper and online formats, including: the process leading up to calculation of daily nutrient intake; error reporting; and output file formats. These differences are noted in the sections on Paper FFQs and Online FFQs below.

There are minor differences in output variables between two the formats. For example, paper FFQ output includes a “srvid” variable which represents the unique booklet ID, whereas “code” is the online FFQ variable representing the unique survey link code. Studies using both formats are provided with SAS code to combine the FFQ data. Details about variables can be found in the data dictionaries provided to each study.

Calculating Daily Nutrient Intake

Phases

The calculation of daily nutrient intake can be broken into two phases: (1) the estimation of annual servings and (2) the estimation of the nutrients associated with those annual servings.

(1) Annual Servings

In the first phase, the processing system estimates the number of annual medium servings for each FFQ line item. For a "regular" line item, this means simply multiplying the reported frequency by the reported portion size. For example, a participant reporting a frequency of "1 per week" and a portion size of "Small" for the line item "Eggs" would be assigned 26 annual medium servings of "Eggs"—which is 52 annual medium servings for "1 per week" (see formats for Regular Food Frequencies below) multiplied by 0.5 for "Small" (see formats for Portion Size below).

For "adjusted" line items, the calculation of annual medium servings varies in complexity depending on the type of adjustment used. An example of a fairly simple adjustment is the calculation for "Cold cereal." Take a participant who reported "1 per day" as the frequency, "Medium" for the portion size, and marked the first and second cereals for the adjustment question that reads, “When you ate cold cereal, what type did you usually eat?" The total annual medium servings of "Cold cereal" would be 365 (365 x 1.0). But this would be divided between two types of cereal so that there were 182.5 annual medium servings of "Highly fortified cereals" and 182.5 annual medium servings of "High fiber or bran cereals." Note that there is no line item in the nutrient database called "Cold cereals." Instead, there are the four cereal types listed in the adjustment question.

These types of adjustments are described in the section titled Adjustment Questions. More complex adjustments include the vegetable and fruit adjustments described in the Summary Questions section.

(2) Nutrient Database

In the second phase, the processing system estimates annual nutrients consumed. For each line item, the annual medium servings are multiplied by the single medium serving nutrient data for that line item. These nutrient data are stored in a nutrient database, where each record represents the nutrient content of a single medium serving of a single line item. For example, the nutrient database record for the line item "Eggs" has an FfqLineItem ID followed by values for gram weight, calories, total fat, etc. When calculating annual nutrients consumed for "Eggs," each single medium serving nutrient value is multiplied by the annual medium servings for "Eggs" arrived at in the first phase. When this has been done for all line items, the line item nutrient results are summed and divided by 365, resulting in the average daily intake of each nutrient.

Adjustment Questions: Application and Defaults

(1) Skin on chicken

When you ate chicken or turkey, how often did you eat the skin?

1. Adjusts the following FFQ line item: Chicken and turkey
2. Question options:
    a. Almost always - 100% with skin, 0% without skin
    b. Often - 75% with skin, 25% without skin
    c. Sometimes - 50% with skin, 50% without skin
    d. Rarely - 25% with skin, 75% without skin
    e. Never - 0% with skin, 100% without skin
3. If a frequency is given for Chicken and turkey, but for any reason this adjustment question is missing, then a) the value **defaults to the "Sometimes" option**, and b) an error is reported if the answer to the "Yes/No" part of the question is "Yes."

(2) Fat on meat

When you ate beef, pork, ham or lamb, how often did you eat the fat?

1. Adjusts the following FFQ line item: Beef, pork, ham and lamb
2. Question options:
    a. Almost always - 100% with fat, 0% without fat
    b. Often - 75% with fat, 25% without fat
    c. Sometimes - 50% with fat, 50% without fat
    d. Rarely - 25% with fat, 75% without fat
    e. Never - 0% with fat, 100% without fat
3. If a frequency is given for Beef, pork, ham and lamb, but for any reason this adjustment question is missing, then a) the value **defaults to the "Rarely" option**, and b) an error is reported if the answer to the "Yes/No" part of the question is "Yes."

(3) Type of ground meat

When you ate hamburger or other ground meat, was it usually…

1. Adjusts the following FFQ line item: Ground meat, including hamburgers and meatloaf
2. Question options:
    a. If only one option is marked
        i. Regular - 100% regular ground beef
        ii. Lean - 100% lean ground beef
        iii. Extra lean - 100% extra lean ground beef

iv. Ground chicken or turkey - 100% ground turkey
v. Don't know - 50% extra lean ground beef, 50% lean ground beef

b. If two or more options are marked, each of the chosen food options (i.-iv.) will be added at 1/n where n is the number of food options chosen. Note that in this case "Don't know" is not considered a "food" option.

3. If a frequency is given for Ground meat, including hamburgers and meatloaf, but for any reason this adjustment question is missing, then a) the value **defaults to 50% "Extra lean" and 50% "Lean,"** and b) an error is reported if the answer to the "Yes/No" part of the question is "Yes."

(4) Fortified juices

Were any of these vitamins or minerals added (specially fortified) to the juices you drank?

1. Adjusts the following FFQ line item: Orange juice and grapefruit juice
2. For each item below that is marked, the amount to the right of the item is added per medium serving of orange and grapefruit juice reported.
    a. Extra Vitamin C – 36 mg
    b. Vitamin E – 6 IU
    c. Calcium – 350 mg
    d. None – nothing added
    e. Don't know – nothing added

(5) Types of cold cereals

When you ate cold cereal, what type did you usually eat?

1. Adjusts the following FFQ line item: Cold cereal
2. Question options:
    a. If only one option is marked:
        i. Highly fortified cereals - 100% highly fortified cereals
        ii. High fiber or bran cereals - 100% high fiber cereals
        iii. Sweetened cereals - 100% sweetened cereals
        iv. Other cereals - 100% other cereals
    b. If two or more options are marked, each of the chosen food options (i.-iv.) will be added at 1/n where n is the number of food options chosen.
3. If a frequency is given for Cold cereal, but for any reason this adjustment question is missing, then a) the value **defaults to the "Other cereals" option**, and b) an error is reported if the answer to the "Yes/No" part of the question is "Yes."

(6) Milk, cream or creamer on cereal

When you put milk, cream or creamer on cereal, what type did you usually use?

1. Adjusts the following FFQ line item: Milk on cereals
2. Question options:
    a. If only one option is marked:
        i. Cream or half and half - 100% half-and-half/cream
        ii. Whole milk - 100% whole milk
        iii. 2% milk - 100% two-percent milk
        iv. 1% milk or buttermilk - 100% one-percent milk
        v. Nonfat or skim milk - 100% nonfat milk
        vi. Soy milk - 100% soy milk
        vii. Non-dairy creamer - 100% non-dairy creamer

viii. Don't know - 100% two-percent milk

b. If two or more options are marked, each of the chosen food options (i.-vii.) will be added at 1/n where n is the number of food options chosen. Note that in this case "Don't know" is not considered a "food" option.

3. If a frequency is given for Milk on cereals, but for any reason this adjustment question is missing, then a) the value **defaults to the "2% milk" option**, and b) an error is reported if the answer to the "Yes/No" part of the question is "Yes."

(7) Milk, cream or creamer on coffee or tea

When you put milk, cream or creamer in coffee or tea, what type did you usually use?

1. Adjusts the following FFQ line item: Milk, cream, or creamer added to tea and coffee
2. Question options:
    a. If only one option is marked:
        i. Cream or half and half - 100% half-and-half/cream
        ii. Whole milk - 100% whole milk
        iii. 2% milk - 100% two-percent milk
        iv. 1% milk or buttermilk - 100% one-percent milk
        v. Nonfat or skim milk - 100% nonfat milk
        vi. Soy milk - 100% soy milk
        vii. Non-dairy creamer - 100% non-dairy creamer
        viii. Don't know - 100% two-percent milk
    b. If two or more options are marked, each of the chosen food options (i.-vii.) will be added at 1/n where n is the number of food options chosen. Note that in this case "Don't know" is not considered a "food" option.
3. If a frequency is given for Milk, cream or creamer added to tea and coffee, but for any reason this adjustment question is missing, then a) the value **defaults to the "2% milk" option**, and b) an error is reported if the answer to the "Yes/No" part of the question is "Yes."

(8) Milk as a beverage

When you drank milk or beverages made with milk, was it usually…

1. Adjusts the following **two** FFQ line items: Milk as a beverage **and** Latte, mocha or hot chocolate
2. Question options:
    a. If only one option is marked:
        i. Whole milk - 100% whole milk
        ii. 2% milk - 100% two-percent milk
        iii. 1% milk or buttermilk - 100% one-percent milk
        iv. Nonfat or skim milk - 100% nonfat milk
        v. Soy milk - 100% soy milk
        vi. Don't know - 100% two-percent milk
    b. If two or more options are marked, each of the chosen food options (i.-v.) will be added at 1/n where n is the number of food options chosen. Note that in this case "Don't know" is not considered a "food" option.
3. If a frequency is given for Milk as a beverage **or** Latte, mocha and hot chocolate, but for any reason this adjustment question is missing, then a) the value **defaults to the "2% milk" option**, and b) an error is reported if the answer to the "Yes/No" part of the question is "Yes."

(9) Type of salad dressing used

When you used salad dressing, what type did you usually use?

1. Adjusts the following FFQ line item: Salad dressing (all types)
2. Question options:
    a. If only one option is marked:
        i. Regular - 100% regular dressing
        ii. Low or reduced fat - 100% low or reduced fat dressing
        iii. Fat free or nonfat - 100% fat-free or nonfat dressing
    b. If two options are marked, each of the chosen food options (i.-iii.) will be added at 1/n where n is the number of food options chosen.
3. If a frequency is given for Salad dressing, but for any reason this adjustment question is missing, then a) the value **defaults to 50% "regular dressing" and 50% "low or reduced fat dressing,"** and b) an error is reported if the answer to the "Yes/No" part of the question is "Yes."

(10) Type of mayonnaise used

When you used mayonnaise, what type did you usually use?

1. Adjusts the following FFQ line item: Mayonnaise and mayonnaise-type spreads
2. Question options:
    a. If only one option is marked:
        i. Regular - 100% regular fat mayonnaise
        ii. Low or reduced fat - 100% diet mayonnaise
        iii. Fat free or nonfat - 100% fat-free mayonnaise
    b. If two options are marked, each of the chosen food options (i.-iii.) will be added at 1/n where n is the number of food options chosen.
3. If frequency is given for Mayonnaise and mayonnaise-type spreads, but for any reason this adjustment question is missing, then a) the value **defaults to the "Regular" option**, and b) an error is reported if the answer to the "Yes/No" part of the question is "Yes."

(11) Low fat cookies and cakes

When you ate cookies or cakes, how often were they fig bars, angel food cakes, or other types of low or nonfat cookies or cakes?

1. Adjusts the following FFQ line item: Cookies and cakes
2. Question options:
    a. Almost always - 100% lowfat, 0% regular
    b. Often - 75% lowfat, 25% regular
    c. Sometimes - 50% lowfat, 50% regular
    d. Rarely - 25% lowfat, 75% regular
    e. Never - 0% lowfat, 100% regular
3. If a frequency is given for Cookies and cakes, but for any reason this adjustment question is missing, then a) the value **defaults to the "Rarely" option**, and b) an error is reported if the answer to the "Yes/No" part of the question is "Yes."

(12) Type of fat used when cooking vegetables or frying meat

In your household, what kinds of fat were usually used when cooking, for example to flavor vegetables or fry meat?

1. Adjusts the following FFQ line item: Summary Question 1: How often did you eat foods that were cooked in fat?
2. Question options:
    a. If only one option is marked:
        i. Butter - 100% Butter

ii. Butter blended with oil or margarine – 100% Butter blended with oil or margarine
iii. Stick margarine - 100% Stick margarine
iv. Regular tub margarine - 100% Regular tub margarine
v. Diet or light margarine - 100% Diet or light margarine
vi. Olive oil - 100% Olive oil
vii. Canola oil - 100% Canola oil
viii. Other oils - 100% Soybean/cottonseed oil
ix. Lard, bacon fat or meat drippings - 100% Lard
x. Didn't use fat or used non-stick spray - If necessary to adjust line item (i.e. some fat use was reported in Summary Question 1: How often did you eat foods that were cooked in fat?) then 50% Olive oil, 50% Canola oil

b. If two or more options are marked, each of the chosen food options (i.-ix.) will be added at 1/n where n is the number of food options chosen. Note that in this case "Didn't use fat" is not considered a "food" option.

3. If a frequency is given for Summary Question 1: How often did you eat foods that were cooked in fat?, but for any reason this adjustment question is missing, then a) the value **defaults to 50% Olive oil and 50% Canola oil**, and b) an error is reported.

(13) Type of fat added at the table on breads, vegetables or potatoes

What kinds of fat did you use at the table, for example on breads, vegetables or potatoes?

1. Adjusts the following **two** FFQ line items: Butter or margarine on breads, cereals, pancakes, etc. **and** Butter, margarine, sour cream and other fat added to vegetables, potatoes and rice
2. Question options:
    a. If only one option is marked:
        i. Butter – 100% Butter
        ii. Butter blended with oil or margarine – 100% Butter blended with oil or margarine
        iii. Stick margarine - 100% Stick margarine
        iv. Regular tub margarine - 100% Regular tub margarine
        v. Diet or light margarine - 100% Diet or light margarine
        vi. Olive oil - 100% Olive oil
        vii. Sour cream - 100% Sour cream
        viii. Didn't use fat - If necessary to adjust line item (i.e. some fat use reported in Butter or margarine on breads… **or** Butter, margarine, sour cream and other fat added to vegetables…) then 50% Butter, 50% Tub margarine
    b. If two or more options are marked, each of the chosen food options (i.-vii.) will be added at 1/n where n is the number of food options chosen. Note that in this case "Didn't use fat" is not considered a "food" option.
3. If a frequency is given for Butter or margarine on breads… **or** Butter, margarine, sour cream and other fat added to vegetables…), but for any reason this adjustment question is missing, then a) the value **defaults to 50% Butter and 50% Tub or liquid margarine**, and b) an error is reported.

Summary Questions: Defaults and Adjustments

(1) Fat in Cooking Default

If Summary Question 1, How often did you eat foods that were cooked in fat?, is missing or bad, the "1-2 per week" option is assigned.

(2) Vegetable Serving Adjustments

Summary Question 2, How often did you eat a serving of vegetables?, is used to adjust the consumption frequency of ten vegetable items. A ratio (calculated using the summary question and the vegetable frequency items) is applied to each of the items, resulting in revised consumption for the items.

The following vegetable items are included:

1. Carrots
2. Broccoli
3. Cauliflower, cabbage and Brussels sprouts
4. Green or string beans
5. Green peas
6. Corn and hominy
7. Summer squash and zucchini
8. Winter squash such as acorn, butternut and pumpkin
9. Yams and sweet potatoes
10. Cooked greens such as spinach, mustard greens and collards

The ratio is calculated using the following equation:

ratio = (frequency as answered in Summary Question 2) / (sum of frequencies in items above)

Note that portion sizes are not included in the calculation of the denominator.

Adjustments to the ratio:

1. If Summary Question 2 is missing or bad, the following **default ratios** are used:
    a. for MNA: **0.90**
    b. for GNA: **0.95**[**]
2. **Upper and lower limits** are imposed on the ratio. These are:
    a. for both MNA and GNA: **min 0.25, max 4.00**

[**]This is an average of the men's (0.90) and women's (1.00) default ratios for the VITAL FFQ.

(3) Fruit Serving Adjustments

Summary Question 3, How often did you eat a serving of fruit?, is used to adjust the consumption frequency of ten fruit items. A ratio (calculated using the summary question and the fruit frequency items) is applied to each of the items resulting in revised consumption for the items.

The following fruit items are included:

1. Apples, applesauce and pears
2. Bananas
3. Peaches, nectarines and plums

4. Apricots (fresh, canned or dried)
5. Dried fruit (other than apricots) such as raisins and prunes
6. Oranges, grapefruit and tangerines (not juice)
7. Berries such as strawberries and blueberries
8. Cantaloupe, orange melon and mango
9. Watermelon and red melon
10. Any other fruit such as grapes, fruit cocktail, pineapple and cherries

The ratio is calculated using the following equation:

ratio = (frequency as answered in Summary Question 3) / (sum of frequencies in items above)

Note that portion sizes are not included in the calculation of the denominator.

Adjustments to the ratio:

1. If Summary Question 3 is missing or bad, the following **default ratios** are used:
    a. for MNA: **0.55**
    b. for GNA: **0.60**[**]
2. **Upper and lower limits** are imposed on the ratio. These are:
    a. for both MNA and GNA: **min 0.25, max 2.50**

[**]This is an average of the men's (0.55) and women's (0.65) default ratios for the VITAL FFQ.

Daily Consumption of Vegetables and Fruits

The variables VEG5DAY and FRT5DAY hold the daily consumption of vegetables and fruit per day calculated using the "5-A-Day" method. These values are missing if summary questions on usual servings of vegetables and fruit are missing.

The variables VEGSUMM and FRTSUMM hold daily consumption of vegetables and fruit using the "summation" method, which is the sum of servings across all vegetable and fruit items without adjustments.

For more details on these methods, see Kristal AR, Vizenor NC, Patterson RE, Neuhouser ML, Shattuck AL, McLerran D. Precision and bias of food frequency-based measures of fruit and vegetable intakes. Cancer Epidemiol Biomarkers Prev 2000 Sep; 9(9):939-44.

(1) VEG5DAY Calculation

If Summary Question 2 (How often did you eat a serving of vegetables?) is answered,
VEG5DAY =

Summary Question 2 frequency +
Green salad +
Fresh tomatoes +
0.5 * Green peppers and green chilies +
0.5 * Red peppers and red chilies +
Potatoes (boiled, baked or mashed) +
Coleslaw +
Tomato juice, V8 and other vegetable juice

If Summary Question 2 is missing, then VEG5DAY will be missing. Note that the food/beverage variables are consumption variables and have the portion size factor (0.5, 1.0, or 1.5) applied to them.

(2) FRT5DAY Calculation

If Summary Question 3 (How often did you eat a serving of fruit?) is answered,
FRT5DAY =

Summary Question 3 frequency +
Orange juice and grapefruit juice +
Other 100% fruit juice

If Summary Question 3 is missing, then FRT5DAY will be missing. Note that the food/beverage variables are consumption variables and have the portion size factor (0.5, 1.0, or 1.5) applied to them.

(3) VEGSUMM Calculation

VEGSUMM=

Green salad +
Fresh tomatoes +
Carrots +
0.5 * Green peppers and green chilies +
0.5 * Red peppers and red chilies +
Broccoli +
Cauliflower, cabbage and Brussels sprouts +
Green or string beans +
Green peas +
Corn and hominy +
Summer squash and zucchini +
Winter squash +
Yams and sweet potatoes +
Cooked greens +
Potatoes (boiled, baked or mashed) +
Coleslaw +
Tomato juice, V8 and other vegetable juice

Note that these food/beverage variables are consumption variables and have the portion size factor (0.5, 1.0, or 1.5) applied to them.

(4) FRTSUMM Calculation

FRTSUMM =

Apples, applesauce and pears +
Bananas +
Peaches, nectarines and plums +
Apricots +
Dried fruit +
Oranges, grapefruit and tangerines +
Berries +
Cantaloupe, orange melon and mango +
Watermelon and red melon +
Any other fruit +
Orange juice and grapefruit juice +
Other 100% fruit juice

Note that these food/beverage variables are consumption variables and have the portion size factor (0.5, 1.0, or 1.5) applied to them.

Frequency and Portion Formats

(1) Regular food frequencies

Code	Label	Annual Servings
0	Never or less than once per month	0
1	1 per month	12
2	2 to 3 per month	28
3	1 per week	52
4	2 per week	104
5	3 to 4 per week	180
6	5 to 6 per week	264
7	1 per day	365
8	2 + per day	730

(2) Beverage frequencies

Code	Label	Annual Servings
0	Never or less than once per month	0
1	1-3 per month	22
2	1 per week	52
3	2-4 per week	144
4	5-6 per week	276
5	1 per day	365
6	2-3 per day	852
7	4-5 per day	1560
8	6+ per day	2190

(3) Portion size

Code	Label	Serving Ratio
0	S	0.5
1	M	1.0
2	L	1.5

(4) Fat summary frequencies

Code	Label	Annual Servings
0	Less than once per week	12
1	1-2 per week	75
2	3-4 per week	168
3	5-6 per week	264
4	1 per day	365
5	2 per day	730
6	3 per day	1095
7	4 per day	1460
8	5+ per day	1825

(5) Vegetable summary frequencies

Code	Label	Annual Servings
0	Less than once per week	12
1	1-2 per week	96
2	3-4 per week	180
3	5-6 per week	276
4	1 per day	365
5	2 per day	730
6	3 per day	1095
7	4 per day	1460
8	5+ per day	1825

(6) Fruit summary frequencies

Code	Label	Annual Servings
0	Less than once per week	12
1	1-2 per week	89
2	3-4 per week	180
3	5-6 per week	276
4	1 per day	365
5	2 per day	730
6	3 per day	1095
7	4 per day	1460
8	5+ per day	1825

Calculating Healthy Eating Index Scores

In order to calculate Healthy Eating Index scores, FFQ line items are broken down into the finest level available in the NDSR software ("components"). For example, the "Spaghetti and other pasta with tomato sauce (no meat)" line item includes the following components:

- grains, pasta or noodles, spaghetti noodles, white, cooked in salted water
- food industry additives and ingredients, water, used in commercial manufacturing
- vegetables, tomato, paste
- vegetables, tomato, canned, low sodium
- vegetables, onion, white, yellow, or red, cooked
- sweeteners, sugar, white granulated
- fats, oil, soybean – unhydrogenated
- vegetables, celery, cooked
- vegetables, peppers, green pepper – sweet, cooked
- vegetables, carrots, cooked from frozen
- vegetables, squash, zucchini, cooked from frozen
- spices, garlic, powder
- spices, salt, regular

All the unique components in the FFQ database are mapped to a food item in the MyPyramid Equivalents Database (MPED 2.0), which has the additional fields necessary to calculate Healthy Eating Index scores. Since the MPED database contains these measures in "per 100 grams" amounts, these are scaled to the amounts used in the FFQ. The values of the MPEDs measures are then combined at the FFQ line item level and added to the FFQ nutrient database.

FFQs are then processed as described above. This returns a dataset containing one record per participant with average daily intake values for ~150 nutrients/servings counts (including the MPED variables). Then HEI scoring SAS code is applied, which calculates the HEI components and the HEI index (total score). More details about the variables used in this calculation are available upon request.

Paper FFQ

Scanning

The first stage of paper FFQ processing is the scanning of a batch. FFQs are passed through a mark sense scanner where hand-marked questionnaire responses are converted into ASCII data.

Error Checking

The ASCII data produced by the scanner is checked for errors. If errors are detected, they are written to a text file—this file is known as the error report and is included in the batch output. If errors are detected on a questionnaire, processing is still completed. It is the responsibility of the researcher to evaluate the severity of the errors and determine whether a given FFQ should be considered "acceptable." However, the processing system does provide the outcome of a pass/fail test which is written to the error report as a reasonable guideline for acceptability.

Error Report and Error Defaults

The error report lists the locations and types of all errors. The report is sorted by FFQ booklet ID number.

The following types of errors are reported:

- Multiple marks when only one is allowed
- Missing values when a value is required
- Food sections with less than half the foods marked

The table below shows the default behavior if errors or missing values are encountered in the frequency section of the FFQ. Note that the default behaviors for adjustment questions and summary questions are described above.

Scenario	Default Behavior
Food frequency is present, but portion size is missing	No error is reported. Medium portion size is used.
Food frequency is missing, but portion size is present	Error is reported. No consumption for this food.
Multiple marks for food frequency	Error is reported. No consumption for this food.
Food frequency is missing and portion size is missing	No error is reported. No consumption for this food.
Multiple marks for portion size	Error is reported. Medium portion size is used.

Pass/Fail Test

The error report includes the outcome of a pass/fail test. Any one of the following errors will generate a "fail" outcome:

- One or more illegal multiple mark response (this can be a food frequency, a portion, a summary, or an adjustment question)
- One or more missing summary question
- One or more bad page number (i.e. booklet IDs don't match)
- More than half the foods in a section are missing
- Illegal missing responses for three or more adjustment questions

Output Files

After error checking and daily nutrient intake calculations are complete, output files (datasets) are generated. Paper FFQ output files are posted to the secure NASR Portal for client download from the study-specific Files tab. There are two types of output: individual batch output and cumulative output.

Individual Batch Output

The individual batch output is the group of files created by the processing of a single batch (a group of FFQ forms that are scanned together). These files are zipped into a single folder with a name of the form **ABC_NNN_YYYY_MM_DD_HHmm_scan.zip** where "ABC" is the three-letter project code, "NNN" is the batch number, and YYYY_MM_DD_HHmm is the processing date and time. “Scan” denotes that these files were generated from scanned paper FFQs.

The table below describes the files included in the individual batch output. Note that all datasets are provided in SAS, SPSS, and CSV formats. CSV files can be opened in Excel.

ABC = three-letter project code
NNN = batch number (e.g. 001, 002)
FFF = form name (e.g. GNA, MNA)
YYYY_MM_DD_HHmm = date and time processed

Filename	Contents
ABC_NNN_YYYY_MM_DD_HHmm.err	Error report: text file that details the errors for each FFQ in the batch.
abc_NNN_YYYY_MM_DD_HHmm_error.sas7bdat (SAS) ABC_NNN_YYYY_MM_DD_HHmm_error.sav (SPSS) ABC_NNN_YYYY_MM_DD_HHmm_error.csv (CSV/Excel)	Error dataset. This includes summary error information. There is one record per survey.
abc_NNN_YYYY_MM_DD_HHmm_nut.sas7bdat (SAS) ABC_NNN_YYYY_MM_DD_HHmm_NUT.sav (SPSS) ABC_NNN_YYYY_MM_DD_HHmm_NUT.csv (CSV/Excel)	Nutrient dataset. This includes average daily consumption of each nutrient. There is one record per survey.
abc _NNN_YYYY_MM_DD_HHmm_srv.sas7bdat (SAS) ABC_NNN_YYYY_MM_DD_HHmm_SRV.sav (SPSS) ABC_NNN_YYYY_MM_DD_HHmm_SRV.csv (CSV/Excel)	Serving dataset. This includes annual medium servings for each FFQ line item for each survey. There are "n" records per survey where "n" is the number of line items for the FFQ type.
abc_NNN_YYYY_MM_DD_HHmm_sur.sas7bdat (SAS) ABC_NNN_YYYY_MM_DD_HHmm_SUR.sav (SPSS) ABC_NNN_YYYY_MM_DD_HHmm_SUR.csv (CSV/Excel)	Survey dataset. This includes participant responses to the survey. There is one record per survey.
FFF_data_dictionary_dbYYYY_scan.xlsx	Data dictionary specific to the FFQ database used for processing. Lists the contents of each dataset.
fff_line_items.sas7bdat (SAS) FFF_line_items.sav (SPSS) FFF_line_items.csv (CSV/Excel)	FFQ line items and their IDs and descriptions.
formats.sas7bcat (SAS)	SAS formats file which records special formats for the above SAS datasets.

Filename	Contents
README.txt	Provides information about the contents of the output files.

Cumulative Output

The cumulative output includes all batches processed up to the time the cumulative run occurs. So, for example, the cumulative run at the time batch 006 is run will include batches 001, 002, 003, 004, 005 and 006.

These cumulative output files are zipped into a single folder with a name of the form **ABC_FFF_YYYY_MM_DD_HHmm_scan.zip** where "ABC" is the three-letter project code, "FFF" is the form name (GNA or MNA), and YYYY_MM_DD_HHmm is the processing date and time. “Scan” denotes that these files were generated from scanned paper FFQs.

The table below describes the files included in the cumulative output. Note that all datasets are provided in SAS, SPSS, and CSV formats. CSV files can be opened in Excel.

ABC = three-letter project code
FFF = form name (e.g. GNA, MNA)
YYYY_MM_DD_HHmm = date and time processed

Filename	Contents
ABC_FFF_YYYY_MM_DD_HHmm.err	Error report: text file that details the errors for each FFQ.
abc_fff_YYYY_MM_DD_HHmm_error.sas7bdat (SAS) ABC_FFF_YYYY_MM_DD_HHmm_error.sav (SPSS) ABC_FFF_YYYY_MM_DD_HHmm_error.csv (CSV/Excel)	Error dataset. This includes summary error information. There is one record per survey.
abc_fff_YYYY_MM_DD_HHmm_nut.sas7bdat (SAS) ABC_FFF_YYYY_MM_DD_HHmm_NUT.sav (SPSS) ABC_FFF_YYYY_MM_DD_HHmm_NUT.csv (CSV/Excel)	Nutrient dataset. This includes average daily consumption of each nutrient. There is one record per survey.
abc_fff_YYYY_MM_DD_HHmm_srv.sas7bdat (SAS) ABC_FFF_YYYY_MM_DD_HHmm_SRV.sav (SPSS) ABC_FFF_YYYY_MM_DD_HHmm_SRV.csv (CSV/Excel)	Serving dataset. This includes annual medium servings for each FFQ line item for each survey. There are "n" records per survey where "n" is the number of line items for the FFQ type.
abc_fff_YYYY_MM_DD_HHmm_sur.sas7bdat (SAS) ABC_FFF_YYYY_MM_DD_HHmm_SUR.sav (SPSS) ABC_FFF_YYYY_MM_DD_HHmm_SUR.csv (CSV/Excel)	Survey dataset. This includes participant responses to the survey. There is one record per survey.
FFF_data_dictionary_dbYYYY_scan.xlsx	Data dictionary specific to the FFQ database used for processing. Lists the contents of each dataset.
fff_line_items.sas7bdat (SAS) FFF_line_items.sav (SPSS) FFF_line_items.csv (CSV/Excel)	FFQ line items and their IDs and descriptions.
formats.sas7bcat (SAS)	SAS formats file which records special formats for the above SAS datasets.

Filename	Contents
README.txt	Provides information about the contents of the output files.
ABCscan.lst	Text file that lists the batches included in a cumulative run. Only provided for cumulative output.

Online FFQ

Generating Datasets

Online FFQ processing takes place when study personnel use the “Generate Dataset” function on the NASR Portal.

Error Checking

The FFQ Processing System checks for errors. If errors are detected on a questionnaire, processing is still completed. It is the responsibility of the researcher to evaluate the severity of the errors and determine whether a given FFQ should be considered "acceptable."

Error Dataset and Error Defaults

The Error dataset for online FFQs lists the locations and types of all errors. The following error types are included:

- Frequency response missing
- Portion response missing with non-zero frequency selected
- Y/N adjustment response missing
- Y/N adjustment response indicates Yes, but follow-up single-select question missing
- Y/N adjustment response indicates Yes, but follow-up multi-select question missing
- Y/N adjustment response indicates No/Missing, but non-zero consumption reported for related frequency question
- Stand-alone multi-select response missing
- Summary adjustment response missing

The table below shows the default behavior if errors or missing values are encountered in the frequency section of the FFQ. Note that the default behaviors for adjustment questions and summary questions are described above.

Scenario	Default Behavior
Food frequency is present, but portion size is missing	No error is reported. Medium portion size is used.
Food frequency is missing, but portion size is present	Error is reported. No consumption for this food.
Food frequency is missing and portion size is missing	No error is reported. No consumption for this food.

Output Files

After error checking and daily nutrient intake calculations are complete, output files (datasets) are generated. Online FFQ datasets contain cumulative information only (for all FFQs that have been submitted prior to the time the dataset is generated).

Cumulative Output

When datasets are generated on the NASR Portal, a zip folder is added to the Files tab. The name of this folder is in the form **ABC_FFF_YYYY-MM-DD.zip** where "ABC" is the three-letter project code, "FFF" is the form name (GNA or MNA), and YYYY-MM-DD is the processing date.

The table below describes the files included in the zip folder. All output datasets are CSV files that can be easily converted to other formats (Excel, SAS, SPSS, etc.).

ABC = three-letter project code
FFF = form name (e.g. GNA, MNA)
YYYY-MM-DD = date processed

Filename	Contents
ABC_FFF_**ERR**_YYYY-MM-DD.csv	Error dataset. This includes error information. There is one record per error, so a survey can have 0 or 1 or more records.
ABC_FFF_**NUT**_YYYY-MM-DD.csv	Nutrient dataset. This includes average daily consumption of each nutrient. There is one record per survey.
ABC_FFF_**SRV**_YYYY-MM-DD.csv	Serving dataset. This includes annual medium servings for each FFQ line item for each survey. There are "n" records per survey where "n" is the number of line items for the FFQ type.
ABC_FFF_**SUR**_YYYY-MM-DD.csv	Survey dataset. This includes participant responses to the survey. There is one record per survey.
FFF_data_dictionary_dbYYYY.xlsx	Data dictionary specific to the FFQ database used for processing. Lists the contents of each dataset.
FFF_line_items.csv	FFQ line items and their IDs and descriptions.
README.txt	Provides information about the contents of the output files.

Other Files

Studies using both paper and online formats will be provided with SAS code to combine the FFQ data. This will be posted to the study-specific Files tab in the Portal.