

Using the Food Patterns Equivalents (FPED) Database

Instructions for FPED Examples

Description of Examples

The provided SAS code generates estimates for the mean amounts of food patterns cup equivalents of fruit consumed per individual in the United States using (a) What We Eat in America (WWEIA), NHANES August 2021 – August 2023, and (b) Food Patterns Equivalent Database (FPED) 2021 – 2023.

FPED, a database produced and made publicly available by the USDA's Food Surveys Research Group (FSRG), converts the foods and beverages in the Food and Nutrient Database for Dietary Studies (FNDDS) to 37 USDA Food Patterns components. Further details on FPED and component definitions can be found in the 2021-2023 Food Patterns Equivalents Database Documentation file (1). FNDDS provides the nutrient values for foods and beverages reported in WWEIA, the dietary intake component of NHANES (2, 3).

FSRG uses WWEIA, NHANES and FPED to publish data tables reporting estimates for the mean amounts of food patterns equivalents consumed per individual in the United States for these 37 food patterns components among various subpopulations. The FPED data tables, organized by NHANES cycle, are located at: <https://www.ars.usda.gov/nea/bhnrc/fsrg/fpeddatatables> (4).

The examples presented here demonstrate how to use SAS to reproduce specific estimates found in these data tables. SAS has analysis capabilities for handling survey data with a complex sample design. See [NHANES Tutorials - Sample Design Module](#) for more details about the NHANES survey design and [NHANES Tutorials - NHANES Dietary Analyses Module](#) for more details specific to WWEIA, NHANES (5, 6).

- **Example 1: Replication of FPED Data Table 1a, Total Fruit, Stratified by Male/Female and Age**

The first example uses SAS to generate the estimated mean amounts of food patterns cup equivalents for **total fruit** consumed per individual, by **male/female** and **age**, in the United States, as seen in *Table 1a* of the *FPED Data Tables*.

- **Example 2: Replication of FPED Data Table 2a, All Fruit Components, Stratified by Race/Ethnicity and Age**

The second example uses SAS to generate the estimated mean amounts of food patterns cup equivalents for (a) **total fruit**, (b) **citrus, melons, and berries**, (c) **other fruit**, and (d) **fruit juice** consumed per individual, by **race/ethnicity** and **age**, in the United States, as seen in *Table 2a* of the *FPED Data Tables*.

The examples are presented and discussed using SAS v. 9.4 (Cary, NC). However, the steps could be adapted to other statistical software with complex survey capabilities.

Example 1: Replication of FPED Data Table 1A, Total Fruit, Stratified by Male/Female and Age

We will be replicating the total fruit component of *FPED Data Table 1a*. The provided SAS code will generate estimates of the means and standard errors by age group for all respondents, by age group for male respondents, and by age group for female respondents. The code will generate a permanent SAS dataset and an Excel workbook containing the information from Table 1a circled below. The organization of the SAS dataset and Excel workbook will be similar to that pictured, with columns for (a) male/female, (b) age group, (c) sample size, (d) mean for total fruit, and (e) standard error for total fruit and rows for each male/female and age group stratification.

Table 1a. Fruit: Mean Amounts of Food Patterns Cup Equivalents
Consumed per Individual, by Male/Female and Age, in the United States, August 2021-August 2023

Males/Females and age (years)	Sample size	Total Fruit	Fruit			
			Citrus, Melons, Berries †	Other Fruit †	Fruit Juice	
			cup eq (SE)			
Males:						
2 - 5.....	206	1.50 (0.115)	0.33 (0.041)	0.77 (0.060)	0.40 (0.065)	
6 - 11.....	301	1.23 (0.103)	0.31 (0.048)	0.56 (0.064)	0.35 (0.054)	
12 - 19.....	366	1.05 (0.064)	0.20 (0.037)	0.61 (0.055)	0.25 (0.038)	
20 - 29.....	196	0.64 (0.057)	0.11 (0.029)	0.30 (0.036)	0.22 (0.040)	
30 - 39.....	286	0.81 (0.128)	0.17 (0.031)	0.52 (0.112)	0.11 (0.021)	
40 - 49.....	260	0.85 (0.077)	0.14 (0.034)	0.53 (0.069)	0.18 (0.044)	
50 - 59.....	316	1.08 (0.136)	0.32 (0.061)	0.53 (0.067)	0.23 (0.047)	
60 - 69.....	545	1.06 (0.058)	0.29 (0.031)	0.57 (0.034)	0.20 (0.027)	
70 and over.....	512	1.23 (0.070)	0.33 (0.030)	0.69 (0.048)	0.22 (0.023)	
2 - 19.....	873	1.20 (0.049)	0.26 (0.030)	0.63 (0.038)	0.31 (0.031)	
20 and over...	2115	0.93 (0.061)	0.22 (0.022)	0.52 (0.041)	0.19 (0.013)	
2 and over...	2988	1.00 (0.051)	0.23 (0.018)	0.54 (0.036)	0.22 (0.016)	
Females:						
2 - 5.....	192	1.46 (0.099)	0.41 (0.084)	0.73 (0.060)	0.32 (0.038)	
6 - 11.....	308	1.38 (0.123)	0.34 (0.042)	0.69 (0.116)	0.35 (0.035)	
12 - 19.....	392	0.98 (0.120)	0.33*(0.103)	0.44 (0.064)	0.21 (0.022)	
20 - 29.....	262	0.83 (0.090)	0.17 (0.020)	0.38 (0.056)	0.28 (0.064)	
30 - 39.....	370	0.83 (0.071)	0.27 (0.038)	0.41 (0.047)	0.15 (0.021)	
40 - 49.....	335	0.87 (0.056)	0.23 (0.046)	0.51 (0.040)	0.13 (0.021)	
50 - 59.....	420	0.89 (0.053)	0.27 (0.025)	0.48 (0.043)	0.14 (0.022)	
60 - 69.....	723	0.94 (0.045)	0.30 (0.031)	0.49 (0.047)	0.15 (0.024)	
70 and over.....	573	0.97 (0.054)	0.27 (0.037)	0.52 (0.036)	0.18 (0.023)	
2 - 19.....	892	1.20 (0.081)	0.35 (0.067)	0.58 (0.064)	0.28 (0.015)	
20 and over...	2683	0.89 (0.034)	0.25 (0.015)	0.46 (0.026)	0.17 (0.013)	
2 and over...	3575	0.96 (0.043)	0.27 (0.025)	0.49 (0.029)	0.19 (0.012)	
Males and females:						
2 - 19.....	1765	1.20 (0.053)	0.30 (0.039)	0.60 (0.041)	0.30 (0.019)	
20 and over...	4798	0.91 (0.042)	0.24 (0.016)	0.49 (0.029)	0.18 (0.010)	
2 and over...	6563	0.98 (0.042)	0.25 (0.018)	0.52 (0.030)	0.21 (0.011)	

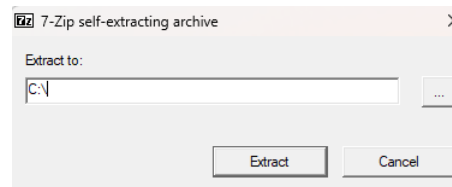
Step 1: Download Data

Navigate to the *FPED Documentation and Databases* webpage at:

<https://www.ars.usda.gov/northeast-area/beltsville-md-bhnrc/beltsville-human-nutrition-research-center/food-surveys-research-group/docs/fped-doc-and-datasets/>.

Select the *FPED 2021-2023* tab and download the file *FPED_DR1TOT_2123_sas.exe*. Also, download the Variable Descriptions File.

Once *FPED_DR1TOT_2123_sas.exe* is downloaded, double-click on it to begin the data extraction process. A window will open, prompting you to select a file location for permanent storage of the dataset *FPED_DR1TOT_2123.sas7bdat*.



The examples use the location *C:/* but you can designate a location of your choosing. Once you designate a location and click *Extract*, a copy of the dataset should be saved in that location.

The dataset *FPED_DR1TOT_2123.sas7bdat* contains merged data from both *WWEIA*, *NHANES* and *FPED*. It has one row per survey respondent for the *WWEIA*, *NHANES* day 1 dietary intake. It includes data fields such as respondent age, race/ethnicity, ratio of family income to poverty, and day 1 dietary sample weights as well as the total day 1 consumption of 37 food patterns components. For a complete list of variables and definitions, open and view the Variable Descriptions File that you also downloaded.

Step 2: Read in the Data and Recode Variables

Read the dataset *FPED_DR1TOT_2123.sas7bdat* into SAS and prepare the data for further analysis. The code below defines a library named *input* as the location *C:*. The location should be changed if you indicated a location different than *C:* in Step 1.

```
libname input "C:\";
```

Using a data step, create the working dataset *data1* from *input.FPED_DR1TOT_2123* (i.e., *C:\FPED_DR1TOT_2123*).

```
data data1;  
  set Input.FPED_DR1TOT_2123;
```

Table 1a of the *FPED Data Tables* is generated for respondents at least two years of age with a reliable day 1 dietary intake record that did not consume breastmilk. It is presented by age group and males/females. The relevant variables in *FPED_DR1TOT_2123.sas7bdat* for identifying respondents for inclusion in the analysis, as described in the Variable Descriptions File, are:

Variable	Description	Code or Value
DR1DRSTZ	Dietary Recall Status, Day 1	1 = Reliable and met minimum criteria 2 = Not reliable or not met minimum criteria 4 = Reported consuming breastmilk 5 = Not done
DRABF	Breast-fed infant (either day)	1 = Yes, infant breast fed on day 1 or day 2 2 = No
RIDAGEYR	Age in years at screening	0 to 79 = Age in years, as entered 80 = 80 years of age and over
RIAGENDR	Gender of the participant	1 = Male 2 = Female

Create the variable **incohort** to identify respondents for inclusion, where **incohort** = 1 if the respondent is included in the analysis for Table 1a (i.e., if **RIDAGEYR** ≥ 2 and **DRABF** ≠ 1 and **DR1DRSTZ** = 1) and **incohort** = 0 if the respondent is not included.

```
if (RIDAGEYR>=2) and (DRABF ne 1) and (DR1DRSTZ=1) then incohort = 1;
else incohort = 0;
```

Capture the desired stratifications for age and male/female reflective of Table 1a by creating the new variables **sex** (male, female), **agegroup1** (2-5, 6-11, 12-19, 20-29, 30-39, 40-49, 50-59, 60-69, 70+ years), and **agegroup2** (2-19, 20+ years).

```
sex = RIAGENDR;

if      2 <= RIDAGEYR <= 5      then agegroup1 = 1;
else if 6 <= RIDAGEYR <= 11    then agegroup1 = 2;
else if 12 <= RIDAGEYR <= 19   then agegroup1 = 3;
else if 20 <= RIDAGEYR <= 29   then agegroup1 = 4;
else if 30 <= RIDAGEYR <= 39   then agegroup1 = 5;
else if 40 <= RIDAGEYR <= 49   then agegroup1 = 6;
else if 50 <= RIDAGEYR <= 59   then agegroup1 = 7;
else if 60 <= RIDAGEYR <= 69   then agegroup1 = 8;
else if RIDAGEYR >= 70         then agegroup1 = 9;

if      ( 2 <= RIDAGEYR <= 19)  then agegroup2 = 1;
else if (RIDAGEYR >= 20)       then agegroup2 = 2;

run;
```

Step 3: Generate the Weighted Mean Intakes of USDA Food Patterns Component

Estimate the mean amount of food patterns cup equivalents for total fruit for the various age and male/female stratifications captured in *Table 1a* while accounting for the complex sample design used in the collection of WWEIA, NHANES. For more detail on the complex sample design, see [NHANES Tutorials - Sample Design Module](#) (5).

Start by estimating the mean amounts for all respondents in the entire cohort of interest (i.e., both male and female respondents ≥ 2 years of age). The variable in *FPED_DR1TOT_2123.sas7bdat* which captures the day 1 total fruit food patterns component for each respondent is **DR1T_F_TOTAL**, defined as ‘Total intact fruits and fruit juices (cup eq)’.

```
proc surveymeans nobks mean stderr data = data1;
  strata SDMVSTRA;
  cluster SDMVPSU;
  weight WTD RD1;
  domain incohort;
  var DR1T_F_TOTAL;
  ods output domain=est_all;
run;
```

Defining each piece of the **proc surveymeans** code (7):

Code Component	Explanation
proc surveymeans	Indicates use of the SAS surveymeans procedure to compute means for data collected using a complex sample design.
nobs mean stderr	Indicates computation of the number of non-missing observations (nobs), mean (mean), and standard error (stderr).
data = data1	Indicates computations should be performed on the temporary SAS dataset work.data1 (created in Step 3).
strata SDMVSTRA	Identifies SDMVSTRA (pseudo-stratum variable in NHANES) as the variable defining the first-level strata in the sample design.
cluster SDMVPSU	Identifies SDMVPSU (pseudo-PSU variable in NHANES) as the variable defining the clusters in the sample design.
weight WTDRD1	Identifies WTDRD1 (day 1 dietary weight in WWEIA, NHANES) as the variable defining the sampling weight.
domain incohort	Indicates subpopulations for estimation. Produces estimates by all levels of incohort , i.e., where incohort = 1 (desired subpopulation) and where incohort = 0 (will be ignored).
var DR1T_F_TOTAL	Identifies DR1T_F_TOTAL (FPED total fruit component) as the variable for which the number of non-missing observations, means, and standard errors will be calculated.
ods output domain=est_all	Identifies the output dataset (<i>est_all</i>) that will store the estimated nobs mean stderr for DR1T_F_TOTAL within the subpopulation(s) specified in the domain statement (incohort = 1 and incohort = 0).

Mean amounts of interest are shown in the Domains section of the **surveymeans** output.

Statistics for incohort Domains					
incohort	Variable	Label	N	Mean	Std Error of Mean
0	DR1T_F_TOTAL	Total intact fruits and fruit juices (cup eq.)	131	1.017081	0.129896
1	DR1T_F_TOTAL	Total intact fruits and fruit juices (cup eq.)	6563	0.978181	0.042084

Estimates for **incohort** = 1. Since age group is not in the domain line, includes all respondents 2 years and older. Since sex is not in the domain line, includes males and females.

The output dataset created in the **ods output** statement, *est_all*, contains these same values.

	DomainLabel	incohort	VarName	VarLabel	N	Mean	StdErr
1	incohort	0	DR1T_F_TOTAL	Total intact fruits and fruit juices (cup eq.)	131	1.017081	0.129896
2	incohort	1	DR1T_F_TOTAL	Total intact fruits and fruit juices (cup eq.)	6563	0.978181	0.042084

For *est_all*, as well as all output datasets that will be created in future runs of the **surveymeans** procedure, we only want to retain estimates for the cohort of interest (i.e., where **incohort** = 1). In addition, we want to create variables that will be the same across the output datasets that capture the age group (**agegroup**) and male/female (**nsex**) stratifications seen in *Table 1a*. The values to be assigned to the variables **agegroup** and **nsex** are shown below.

Table 1a Structure	Value of nsex	Value of agegroup
Males:	1	
2 – 5.....		1
6 - 11		2
12 - 19		3
20 - 29		4
30 - 39		5
40 - 49		6
50 - 59		7
60 - 69		8
70 and over.....		9
2 - 19		10
20 and over.....		11
2 and over.....		12
Females:	2	
...		
Males and females:	3	
...		

Create the dataset *estimates_all* to make these modifications to the output dataset *est_all*.

```
data estimates_all;
  set est_all;
  if incohort=1;
  agegroup = 12;
  sex=3;
run;
```

Estimates_all looks similar to *est_all*, except that it only retains the rows where **incohort** = 1. In addition, it has the variables **nsex** (assigned a value of 3 since the estimates are for males and females combined) and **agegroup** (assigned a value of 12 since the estimates are for respondents 2 years and over).

	DomainLabel	incohort	VarName	VarLabel	N	Mean	StdErr	agegroup	nsex
1	incohort	1	DR1T_F_TOTAL	Total intact fruits and fruit juices (cup eq.)	6563	0.978181	0.042084	12	3

Continue estimating mean amounts for different subpopulations. For example, the next **surveymeans** procedure produces estimates by **agegroup2** (i.e., 2-19 and 20+ years).

```
proc surveymeans nobs mean stderr data = data1;
  strata SDMVSTRA;
  cluster SDMVPSU;
  weight WTD RD1;
  domain incohort*agegroup2;
  var DR1T_F_TOTAL;
  ods output domain=est_age2;
run;
```

Notice the domain statement now includes the cross-product **incohort*agegroup2**, indicating that estimates will be produced for combinations of **incohort** and **agegroup2** (i.e., all **agegroup2** categories where **incohort**=1 and all **agegroup2** categories where **incohort**=0). The Domains output contains the estimates of interest.

Statistics for incohort*agegroup2 Domains						
incohort	agegroup2	Variable	Label	N	Mean	Std Error of Mean
0	1	DR1T_F_TOTAL	Total intact fruits and fruit juices (cup eq.)	0	.	.
1	1	DR1T_F_TOTAL	Total intact fruits and fruit juices (cup eq.)	1765	1.203399	0.052527
	2	DR1T_F_TOTAL	Total intact fruits and fruit juices (cup eq.)	4798	0.909787	0.041926

Estimates for **agegroup2** = 1 (2-19 years) and **incohort** = 1. Since sex does not appear in the domain line, this is for both males and females.

Estimates for **agegroup2** = 2 (20+ years) and **incohort** = 1. Since sex does not appear in the domain line, this is for both males and females.

The output dataset **est_age2** contains these same results.

	DomainLabel	incohort	agegroup2	VarName	VarLabel	N	Mean	StdErr
1	incohort*agegroup2	0	1	DR1T_F_TOTAL	Total intact fruits and fruit juices (cup eq.)	0	.	.
2	incohort*agegroup2	1	1	DR1T_F_TOTAL	Total intact fruits and fruit juices (cup eq.)	1765	1.203399	0.052527
3	incohort*agegroup2	1	2	DR1T_F_TOTAL	Total intact fruits and fruit juices (cup eq.)	4798	0.909787	0.041926

Again, modify the output dataset to only include estimates for **incohort** = 1 and to add the variables **nsex** (assign a value of 3 to indicate the estimates are for males and females) and **agegroup** (assign values of 10 and 11 to reflect the 2-19 and 20+ age groups).

Create the dataset *estimates_age2* to make these modifications to the output dataset *est_age2*.

```
data estimates_age2;
  set est_age2;
  if incohort=1;
  if agegroup2=1 then agegroup = 10;
  if agegroup2=2 then agegroup = 11;
  nsex=3;
run;
```

	DomainLabel	incohort	agegroup2	VarName	VarLabel	N	Mean	StdErr	agegroup	nsex
1	incohort*agegroup2	1	1	DR1T_F_TOTAL	Total intact fruits and fruit juices (cup eq.)	1765	1.203399	0.052527	10	3
2	incohort*agegroup2	1	2	DR1T_F_TOTAL	Total intact fruits and fruit juices (cup eq.)	4798	0.909787	0.041926	11	3

Perform additional runs of the **surveymeans** procedure for the various age group and male/female stratifications in order to produce all the results needed to replicate the estimates from *Table 1a*. See the following page for additional code.

```
/* All included respondents by sex. */
proc surveymeans nobs mean stderr data = data1;
  strata SDMVSTRA;
  cluster SDMVPSU;
  weight WTD RD1;
  domain incohort*sex;
  var DR1T_F_TOTAL;
  ods output domain=est_sex;
run;
data estimates_sex;
  set est_sex;
  if incohort=1;
  agegroup = 12;
  nsex=sex;
run;

/* All included respondents by sex and agegroup1. */
proc surveymeans nobs mean stderr data = data1;
  strata SDMVSTRA;
  cluster SDMVPSU;
  weight WTD RD1;
  domain incohort*sex*agegroup1;
  var DR1T_F_TOTAL;
  ods output domain=est_sexage1;
run;
data estimates_sexage1;
  set est_sexage1;
  if incohort=1;
  agegroup = agegroup1;
  nsex=sex;
run;
```

```

/* All included respondents by sex and agegroup2. */
proc surveymeans nobs mean stderr data = data1;
  strata SDMVSTRA;
  cluster SDMVPSU;
  weight WTD RD1;
  domain incohort*sex*agegroup2;
  var DR1T_F_TOTAL;
  ods output domain=est_sexage2;
run;
data estimates_sexage2;
  set est_sexage2;
  if incohort=1;
  if agegroup2=1 then agegroup = 10;
  if agegroup2=2 then agegroup = 11;
  nsex=sex;
run;

```

Step 4: Create Formats for the Demographic Groups of Interest

The results from each **surveymeans** procedure will be aggregated into a common dataset in Step 5. In preparation, create formats for the variables **agegroup** (called *agegroupf*) and **nsex** (called *sexf*). The formats will be applied to in Step 5, essentially assigning labels to the variable values.

```

proc format;
  value agegroupf
    1 = " 2 - 5 "
    2 = " 6 - 11"
    3 = "12 - 19"
    4 = "20 - 29"
    5 = "30 - 39"
    6 = "40 - 49"
    7 = "50 - 59"
    8 = "60 - 69"
    9 = "70 and over"
    10 = "2-19"
    11 = "20 and over"
    12 = "2 and over";

  value sexf
    1 = "Males "
    2 = "Females"
    3 = "Males and females";
run;

```

Step 5: Create Permanent SAS Dataset of Results Matching Table 1a

The **surveymeans** procedures in Step 3 each produced a separate output dataset containing the estimates for the age group and male/female stratifications. Create a new dataset, *estimates_stacked*, that combines all the output datasets together and drops unneeded variables.

```
data estimates_stacked;
  set estimates_all estimates_age2 estimates_sex estimates_sexage1
      estimates_sexage2;
  drop domainlabel incohort agegroup1 agegroup2 sex;
run;
```

The combined output dataset *estimates_stacked* contains the estimates for the mean amounts for all stratifications by male/female and age group, as desired. However, the dataset structure does not yet match *Table 1a*. In order to create a final dataset that matches the structure of *Table 1a*, the following modifications to *estimates_stacked* must be made:

- Sort the rows by **nsex** and **agegroup** using **proc sort**.
- Order the columns as they appear in *Table 1a* (**nsex, agegroup, N, Mean, StdErr**) using a **retain** statement.
- Drop the variables **VarName** and **VarLabel** using a **drop** statement.
- Apply the formats for **nsex** and **agegroup**, replacing numeric values with format labels, using a **format** statement.
- Apply formats to **mean** and **stderr** to present the variables with 2 and 3 decimals, respectively.

Use a data step to make these changes, saving a permanent SAS dataset *FPED_Ex1* in the library *input* (previously defined as the location C:\).

```
proc sort data=estimates_stacked;
  by nsex agegroup;
run;
data input.FPED_Ex1;
  retain nsex agegroup N mean stderr;
  set estimates_stacked;

  *Remove variables no longer needed;
  drop VarName;

  *Apply formats to nsex and agegroup variables;
  format nsex sexf. agegroup agegroupf.;

  *Present mean/std error values to two/three decimal places;
  format mean 8.2 stderr 8.3;
run;
```

Navigate to the location specified by your input library and verify that the final, permanent SAS dataset *FPED_Ex1* appears. This dataset contains the estimates of the mean amounts of food patterns cup equivalents for **total fruit** consumed per individual, by **male/female** and **age**, in the United States, as seen in *Table 1a* of the *FPED Data Tables*.

	nsex	agegroup	N	mean	stderr
1	Males	2 - 5	206	1.50	0.115
2	Males	6 - 11	301	1.23	0.103
3	Males	12 - 19	366	1.05	0.064
4	Males	20 - 29	196	0.64	0.057
5	Males	30 - 39	286	0.81	0.128
6	Males	40 - 49	260	0.85	0.077
7	Males	50 - 59	316	1.08	0.136
8	Males	60 - 69	545	1.06	0.058
9	Males	70 and over	512	1.23	0.070
10	Males	2-19	873	1.20	0.049
11	Males	20 and over	2115	0.93	0.061
12	Males	2 and over	2988	1.00	0.051
13	Females	2 - 5	192	1.46	0.099
14	Females	6 - 11	308	1.38	0.123
15	Females	12 - 19	392	0.98	0.120
16	Females	20 - 29	262	0.83	0.090
17	Females	30 - 39	370	0.83	0.071
18	Females	40 - 49	335	0.87	0.056
19	Females	50 - 59	420	0.89	0.053
20	Females	60 - 69	723	0.94	0.045
21	Females	70 and over	573	0.97	0.054
22	Females	2-19	892	1.20	0.081
23	Females	20 and over	2683	0.89	0.034
24	Females	2 and over	3575	0.96	0.043
25	Males and females	2-19	1765	1.20	0.053
26	Males and females	20 and over	4798	0.91	0.042
27	Males and females	2 and over	6563	0.98	0.042

Step 6: Export the Data into Microsoft Excel (optional)

If desired, export the data into Excel. SAS has an export procedure; however, no variable formatting is retained. Because we wish to retain the formats *agegroupf* and *sexf* added to the variables *agegroup* and *nsex*, apply *ODS excel* to export the data (8).

```
ods excel file="C:\FPED_Ex1.xlsx";
ods excel options(sheet_name="Table 1A, Total Fruit");
proc print data=input.FPED_Ex1 noobs;
    title "Mean Cup Equivalents of Total Fruit Consumed Per
    Individual, by Male/Female and Age, in the United States,
    August 2021-August 2023";
run;
ods excel close;
```

Defining each piece of the *ods excel* code (8):

Code Component	Explanation
<i>ods excel file</i> ="C:\FPED_Ex1.xlsx "	Opens ODS excel, such that the output of all subsequent code will be sent to Excel, specifically to the file location specified, C:\FPED_Ex1.xlsx. The file location and name can be changed by the user if desired.
<i>ods excel options</i> (sheet_name="Table 1A, Total Fruit")	Generates a name 'Table 1a, Total Fruit' for the excel worksheet within the file C:\FPED_Ex1.xlsx where the output will be sent.
<i>proc print data</i> =input.FPED1A_fruit <i>noobs</i> ;	Prints the final permanent SAS dataset created in Step 5. Thus, basically generates a copy of the dataset for export. Noobs removes the default observations numbers from each row.
<i>title</i> "Mean Cup ... -August 2023";	Adds a title to the SAS output and to the generated Excel file. This title is viewable in Excel in print mode.
<i>ods excel close</i>	Closes ODS excel, ending the export of output to Excel.

After running this code, an excel file of the data will open on your screen. In addition, the Excel file *FPED_Ex1* will appear in the location specified in the *ods excel file* location.

	A	B	C	D	E
1	nsex	agegroup	N	mean	stderr
2	Males	2 - 5	206	1.50	0.115
3	Males	6 - 11	301	1.23	0.103
4	Males	12 - 19	366	1.05	0.064
5	Males	20 - 29	196	0.64	0.057
6	Males	30 - 39	286	0.81	0.128
7	Males	40 - 49	260	0.85	0.077
8	Males	50 - 59	316	1.08	0.136
9	Males	60 - 69	545	1.06	0.058
10	Males	70 and over	512	1.23	0.070
11	Males	2-19	873	1.20	0.049
12	Males	20 and over	2115	0.93	0.061
13	Males	2 and over	2988	1.00	0.051
14	Females	2 - 5	192	1.46	0.099
15	Females	6 - 11	308	1.38	0.123
16	Females	12 - 19	392	0.98	0.120
17	Females	20 - 29	262	0.83	0.090
18	Females	30 - 39	370	0.83	0.071
19	Females	40 - 49	335	0.87	0.056
20	Females	50 - 59	420	0.89	0.053
21	Females	60 - 69	723	0.94	0.045
22	Females	70 and over	573	0.97	0.054
23	Females	2-19	892	1.20	0.081
24	Females	20 and over	2683	0.89	0.034
25	Females	2 and over	3575	0.96	0.043
26	Males and females	2-19	1765	1.20	0.053
27	Males and females	20 and over	4798	0.91	0.042
28	Males and females	2 and over	6563	0.98	0.042
29					
< >		Table 1A, Total Fruit		+	

Example 2: Replication of FPED Data Table 2A, Total Fruit, Citrus/Melons/Berries, Other Fruit, and Fruit Juice, Stratified by Race/Ethnicity and Age

We will explore how Example 1 would change if we wanted to estimate mean amounts for several FPED components at once and across different subgroups of interest. We will be replicating elements of FPED Data Table 2a by estimating mean amounts of all four fruit components: (a) **total fruit**, (b) **citrus, melons, berries**, (c) **other fruit**, and (d) **fruit juice** and stratifying the results by **race/ethnicity** and **age** rather than **male/female** and **age**. The provided SAS code will generate estimates of the means and standard errors by age group within race/ethnicity groups. The code will generate a permanent SAS dataset and an Excel workbook containing the information from Table 2a circled below. The organization of the SAS dataset and Excel workbook will be similar to that pictured, with columns for (a) race/ethnicity, (b) age group, (c) sample size, ((d) mean for total fruit, (e) standard error for total fruit, (f) mean for citrus, melons, berries, (g) standard error for citrus, melons, berries, (h) mean for other fruit, (i) standard error for other fruit, (j) mean for fruit juice, and (k) standard error for fruit juice and rows for each race/ethnicity and age group stratification. Relative to FPED Data Table 1a, some age groups are collapsed due to small sample sizes.

Table 2a. Fruit: Mean Amounts of Food Patterns Cup Equivalents
Consumed per Individual, by Race/Ethnicity and Age, in the United States, August 2021-August 2023

Race/ethnicity and age (years) ‡	Sample size	Fruit			
		Total Fruit	Citrus, Melons, Berries †	Other Fruit †	Fruit Juice
----- cup eq (SE) -----					
Non-Hispanic White:					
2 - 19.....	716	1.26 (0.102)	0.37 (0.074)	0.63 (0.061)	0.26 (0.021)
20 and over.....	2969	0.89 (0.048)	0.24 (0.024)	0.49 (0.029)	0.15 (0.009)
2 and over...	3685	0.96 (0.052)	0.27 (0.030)	0.52 (0.032)	0.17 (0.009)
Non-Hispanic Black:					
2 - 19.....	261	0.99 (0.072)	0.21 (0.055)	0.43 (0.047)	0.36 (0.037)
20 and over.....	555	0.87 (0.042)	0.19 (0.025)	0.35 (0.035)	0.33 (0.027)
2 and over...	816	0.90 (0.043)	0.19 (0.020)	0.37 (0.036)	0.34 (0.026)
Non-Hispanic Asian:					
2 - 19.....	123	0.94 (0.073)	0.20* (0.063)	0.56 (0.072)	0.18* (0.054)
20 and over.....	199	1.28 (0.073)	0.43 (0.051)	0.71 (0.058)	0.15 (0.028)
2 and over...	322	1.17 (0.051)	0.35 (0.043)	0.66 (0.049)	0.16 (0.032)
Hispanic:					
2 - 19.....	513	1.27 (0.105)	0.25 (0.034)	0.63 (0.052)	0.39 (0.058)
20 and over.....	776	0.92 (0.117)	0.19 (0.029)	0.52 (0.070)	0.22 (0.032)
2 and over...	1289	1.03 (0.106)	0.21 (0.025)	0.55 (0.057)	0.27 (0.039)

Step 1: Download Data

See Step 1 from Example 1.

Step 2: Read in the Data and Recode Variables

Create a library and the working dataset *data2* from *input.FPED_DR1TOT_2123*, as described in Example 1.

```
libname input "C:\";  
data data2;  
    set Input.FPED_DR1TOT_2123;
```

Table 2a of the *FPED Data Tables* is presented by race/ethnicity and age group. The variable in *FPED_DR1TOT_2123.sas7bdat* capturing race/ethnicity, as described in the Variable Descriptions File, is:

Variable	Description	Code or Value
RIDRETH3	Race/Hispanic origin with Non-Hispanic Asian	1 = Mexican American 2 = Other Hispanic 3 = Non-Hispanic White 4 = Non-Hispanic Black 6 = Non-Hispanic Asian 7 = Other Race – Including Multi-Racial

As done in Example 1, create the variable **incohort** to identify respondents for inclusion in the analysis and define the variables capturing the age and race/ethnicity stratifications in Table 2a. Also create data labels for the variables capturing all the fruit components.

```
if (RIDAGEYR>=2) and (DRABF ne 1) and (DR1DRSTZ=1) then incohort=1;  
else incohort=0;  
  
if ( 2 <= RIDAGEYR <= 19) then agegroup2 = 1;  
else if (RIDAGEYR >= 20) then agegroup2 = 2;  
  
if RIDRETH3 = 3 then race_eth = 1;  
else if RIDRETH3 = 4 then race_eth = 2;  
else if RIDRETH3 = 6 then race_eth = 3;  
else if RIDRETH3 in(1 2) then race_eth = 4;  
else race_eth = 5;
```

```

label DR1T_F_TOTAL      = "Total_Fruit";
label DR1T_F_CITMLB     = "Citrus_Melons_Berries";
label DR1T_F_OTHER      = "Other_Fruit";
label DR1T_F_JUICE      = "Fruit_Juice";
run;

```

Step 3: Generate the Weighted Mean Intakes of USDA Food Patterns Components

As done in Example 1, estimate the mean amount of food patterns cup equivalents for total fruit, citrus/melons/berries, other fruit, and fruit juice for the various age and race/ethnicity stratifications captured in *Table 2a* while accounting for the complex sample design used in the collection of WWEIA, NHANES.

The relevant original variables in *FPED_DR1TOT_2123.sas7bdat* capturing the day 1 component totals for each respondent, as described in the Variable Descriptions File, are:

Variable	Description (Day 1)	Value
DR1T_F_TOTAL	Total intact fruits and fruit juices (cup eq.)	Numeric
DR1T_F_CITMLB	Intact fruits of citrus, melons, and berries (cup eq.)	Numeric
DR1T_F_OTHER	Intact fruits; not citrus, melons, and berries (cup eq.)	Numeric
DR1T_F_JUICE	Fruit juices, citrus and non-citrus (cup eq.)	Numeric

Start by estimating the mean amount for all respondents in the cohort of interest (i.e., all respondents ≥ 2 years of age) by race/ethnicity. Modify the **var** statement in the **surveymeans** procedures to include the four fruit component variables. Also, change the variables listed in the **domain** statement, using **race_eth** rather than **sex**.

```

proc surveymeans nobs mean stderr data = data2;
  strata SDMVSTRA;
  cluster SDMVPSU;
  weight WTD RD1;
  domain incohort*race_eth;
  var DR1T_F_TOTAL DR1T_F_CITMLB DR1T_F_OTHER DR1T_F_JUICE;
  ods output domain=est_race;
run;

```

The output dataset created in the [ods output](#) statement, `est_race`, contains the mean amounts for each fruit component by race/ethnicity for all respondents at least 2 years of age:

	DomainLabel	incohort	race_eth	VarName	VarLabel	N	Mean	StdErr
1	incohort*race_eth	0	1	DR1T_F_TOTAL	Total_Fruit	49	1.032176	0.124726
2	incohort*race_eth	0	1	DR1T_F_CITMLB	Citrus_Melons_Beries	49	0.227916	0.055229
3	incohort*race_eth	0	1	DR1T_F_OTHER	Other_Fruit	49	0.604167	0.107529
4	incohort*race_eth	0	1	DR1T_F_JUICE	Fruit_Juice	49	0.200338	0.047840
5	incohort*race_eth	0	2	DR1T_F_TOTAL	Total_Fruit	16	0.629121	0.144115
6	incohort*race_eth	0	2	DR1T_F_CITMLB	Citrus_Melons_Beries	16	0.075069	0.058571
7	incohort*race_eth	0	2	DR1T_F_OTHER	Other_Fruit	16	0.338729	0.135331
8	incohort*race_eth	0	2	DR1T_F_JUICE	Fruit_Juice	16	0.215322	0.062223
9	incohort*race_eth	0	3	DR1T_F_TOTAL	Total_Fruit	11	1.137439	0.611065
10	incohort*race_eth	0	3	DR1T_F_CITMLB	Citrus_Melons_Beries	11	0.116438	0.083281
11	incohort*race_eth	0	3	DR1T_F_OTHER	Other_Fruit	11	0.608655	0.378390
12	incohort*race_eth	0	3	DR1T_F_JUICE	Fruit_Juice	11	0.404680	0.265058
13	incohort*race_eth	0	4	DR1T_F_TOTAL	Total_Fruit	37	1.212732	0.344215
14	incohort*race_eth	0	4	DR1T_F_CITMLB	Citrus_Melons_Beries	37	0.240377	0.081655
15	incohort*race_eth	0	4	DR1T_F_OTHER	Other_Fruit	37	0.411897	0.120616
16	incohort*race_eth	0	4	DR1T_F_JUICE	Fruit_Juice	37	0.558233	0.394394
17	incohort*race_eth	0	5	DR1T_F_TOTAL	Total_Fruit	18	0.811116	0.203236
18	incohort*race_eth	0	5	DR1T_F_CITMLB	Citrus_Melons_Beries	18	0.190894	0.052894
19	incohort*race_eth	0	5	DR1T_F_OTHER	Other_Fruit	18	0.340963	0.119513
20	incohort*race_eth	0	5	DR1T_F_JUICE	Fruit_Juice	18	0.279259	0.130135
21	incohort*race_eth	1	1	DR1T_F_TOTAL	Total_Fruit	3685	0.959773	0.052245
22	incohort*race_eth	1	1	DR1T_F_CITMLB	Citrus_Melons_Beries	3685	0.268459	0.029690
23	incohort*race_eth	1	1	DR1T_F_OTHER	Other_Fruit	3685	0.518826	0.031766
24	incohort*race_eth	1	1	DR1T_F_JUICE	Fruit_Juice	3685	0.171419	0.009302
25	incohort*race_eth	1	2	DR1T_F_TOTAL	Total_Fruit	816	0.901756	0.043264
26	incohort*race_eth	1	2	DR1T_F_CITMLB	Citrus_Melons_Beries	816	0.193115	0.020041
27	incohort*race_eth	1	2	DR1T_F_OTHER	Other_Fruit	816	0.370189	0.035734
28	incohort*race_eth	1	2	DR1T_F_JUICE	Fruit_Juice	816	0.338072	0.026499
29	incohort*race_eth	1	3	DR1T_F_TOTAL	Total_Fruit	322	1.167836	0.051433
30	incohort*race_eth	1	3	DR1T_F_CITMLB	Citrus_Melons_Beries	322	0.353659	0.043493
31	incohort*race_eth	1	3	DR1T_F_OTHER	Other_Fruit	322	0.660048	0.048874
32	incohort*race_eth	1	3	DR1T_F_JUICE	Fruit_Juice	322	0.156434	0.032229
33	incohort*race_eth	1	4	DR1T_F_TOTAL	Total_Fruit	1289	1.032439	0.106356
34	incohort*race_eth	1	4	DR1T_F_CITMLB	Citrus_Melons_Beries	1289	0.211233	0.025027
35	incohort*race_eth	1	4	DR1T_F_OTHER	Other_Fruit	1289	0.550808	0.056811
36	incohort*race_eth	1	4	DR1T_F_JUICE	Fruit_Juice	1289	0.270374	0.038638
37	incohort*race_eth	1	5	DR1T_F_TOTAL	Total_Fruit	451	0.956639	0.071950
38	incohort*race_eth	1	5	DR1T_F_CITMLB	Citrus_Melons_Beries	451	0.264894	0.033016
39	incohort*race_eth	1	5	DR1T_F_OTHER	Other_Fruit	451	0.541316	0.063015
40	incohort*race_eth	1	5	DR1T_F_JUICE	Fruit_Juice	451	0.149247	0.014083

Estimates for **race_eth** = 1 (Non-Hispanic White) and **incohort** = 1 for each fruit component. Since **agegroup2** does not appear in the domain line, this is for respondents 2 years and over.

Estimates for **race_eth** = 2 (Non-Hispanic Black) and **incohort** = 1 for each fruit component. Since **agegroup2** does not appear in the domain line, this is for respondents 2 years and over.

Estimates for **race_eth** = 3 (Non-Hispanic Asian) and **incohort** = 1 for each fruit component. Since **agegroup2** does not appear in the domain line, this is for respondents 2 years and over.

Estimates for **race_eth** = 4 (Hispanic) and **incohort** = 1 for each fruit component. Since **agegroup2** does not appear in the domain line, this is for respondents 2 years and over.

As in Example 1, a common variable named **agegroup** will be created to take on the age group stratifications in *Table 2a* for all the results datasets (and **race_eth** values will be retained, as they already match the stratifications in *Table 2a*). The variable **agegroup** will take on the following values:

Table 2a Structure	Value of race_eth	Value of agegroup
Non-Hispanic White:	1	
2 - 19		1
20 and over.....		2
2 and over.....		3
Non-Hispanic Black:	2	
2 - 19		1
20 and over.....		2
2 and over.....		3
Non-Hispanic Asian:	3	
...		
Non-Hispanic Asian:	4	
...		

Create the dataset *estimates_race*, as done in Example 1, retaining those respondents in the cohort of interest (**incohort** = 1), excluding respondents in the ‘other’ race/ethnicity category, and assigning a value of 3 to **agegroup** (since **agegroup2** was not included in the domain statement). Continue estimating the mean amounts by race/ethnicity and by age group.

```

data estimates_race;
  set est_race;
  if incohort=1 and race_eth^=5;
  agegroup=3;
run;

/* All included respondents by race/ethnicity and agegroup2. */
proc surveymeans nobs mean stderr data = data2;
  strata SDMVSTRA;
  cluster SDMVPSU;
  weight WTD RD1;
  domain incohort*race_eth*agegroup2;
  var DR1T_F_TOTAL DR1T_F_CITMLB DR1T_F_OTHER DR1T_F_JUICE;
  ods output domain=est_raceage2;
run;
data estimates_raceage2;
  set est_raceage2;
  if incohort=1 and race_eth^=5;
  agegroup = agegroup2;
run;

```

Step 4: Create Formats for the Demographic Groups of Interest

As done in Example 1, create the formats for **agegroup** (called *agegroupf*) and **race_eth** (called *race_ethf*).

```
proc format;
  value agegroupf
    1 = "2-19"
    2 = "20 and over"
    3 = "2 and over";

  value race_ethf
    1 = "Non-Hispanic White"
    2 = "Non-Hispanic Black"
    3 = "Non-Hispanic Asian"
    4 = "Hispanic";
run;
```

Step 5: Create Permanent SAS Dataset of Results Matching Table 2a

The **surveymeans** procedures in Step 3 each produced a separate output dataset of results for the various stratifications of age group and race/ethnicity. Create a new dataset, *estimates_stacked*, that combines all the output datasets together and drops unneeded variables.

```
data estimates_stacked;
  set estimates_race estimates_raceage2;
  drop domainlabel incohort agegroup2;
run;
```

The dataset *estimates_stacked* contains the estimates for the mean amount of each fruit component for all combinations of race/ethnicity and age group. The first nine lines are shown below. However, as with Example 1, the dataset structure does not yet match *Table 2a*. Additional modifications are needed.

	race_eth	VarName	VarLabel	N	Mean	StdErr	agegroup
1	1	DR1T_F_TOTAL	Total_Fruit	3685	0.959773	0.052245	3
2	1	DR1T_F_CITMLB	Citrus_Melons_Berries	3685	0.268459	0.029690	3
3	1	DR1T_F_OTHER	Other_Fruit	3685	0.518826	0.031766	3
4	1	DR1T_F_JUICE	Fruit_Juice	3685	0.171419	0.009302	3
5	2	DR1T_F_TOTAL	Total_Fruit	816	0.901756	0.043264	3
6	2	DR1T_F_CITMLB	Citrus_Melons_Berries	816	0.193115	0.020041	3
7	2	DR1T_F_OTHER	Other_Fruit	816	0.370189	0.035734	3
8	2	DR1T_F_JUICE	Fruit_Juice	816	0.338072	0.026499	3
9	3	DR1T F TOTAL	Total Fruit	322	1.167836	0.051433	3

In order to create a final dataset that matches the structure of *Table 2a*, the following changes to *estimates_stacked* must be made:

- Sort the rows by **race_eth** and **agegroup**.
- Transpose the data so that there is a column for **Mean** and **StdErr** for each fruit component.
- Order the columns as they appear in *Table 2a* (**race_eth**, **agegroup**, **N**, Mean for Total Fruit, StdErr for Total Fruit, Mean for Citrus/Berries/Melons, StdErr for Citrus/Berries/Melons, Mean for Other Fruit, StdErr for Other Fruit, Mean for Fruit Juice, StdErr for Fruit Juice).
- Drop the variables **VarName** and **VarLabel**.
- Apply the formats for **race_eth** and **agegroup**, replacing numeric values with category labels.

Use the **sort** procedure to sort the rows by **race_eth** and **agegroup** and then use the **transpose** procedure to create columns of the number of observations, **N**, for each component.

```
proc sort data=estimates_stacked;
  by race_eth agegroup VarLabel;
run;

proc transpose data=estimates_stacked out=FPED_N prefix=N_;
  by race_eth agegroup;
  var N;
  id VarLabel;
run;
```

Defining each piece of the **transpose** code (9):

Code Component	Explanation
proc sort data=estimates_stacked	Sorts the temporary SAS dataset <i>work.estimates_stacked</i> . Sorting is necessary in order to use a by statement when transposing the data.
by race_eth agegroup VarLabel	Sorts <i>estimates_stacked</i> by the variables race_eth , agegroup , and VarLabel (the names of the four fruit components).
proc transpose data=estimates_stacked	Transposes elements of the SAS dataset <i>estimates_stacked</i> , creating additional columns from the rows.
out=FPED_N prefix=N_	Stores the new transposed dataset in a new dataset <i>FPED_N</i> . Assigns the prefix 'N_' to all the transposed variables.
by race_eth agegroup	Forms groups by race_eth and agegroup when transposing.
var N	Transposes the variable N , the number of observations. The transpose procedure will be repeated for the means and standard errors.
id VarLabel	Indicates the variable VarLabel should be used for naming the variables in the output dataset.

The resulting dataset *FPED_N* retains rows for the various combinations of race/ethnicity and age group but contains the number of observations, **N**, for each of the four fruit components in a separate column, with the variable appearing as **N_fruit_component_name**.

	race_eth	agegroup	_NAME_	N_Citrus_Melons_Berries	N_Fruit_Juice	N_Other_Fruit	N_Total_Fruit
1	1	1	N	716	716	716	716
2	1	2	N	2969	2969	2969	2969
3	1	3	N	3685	3685	3685	3685
4	2	1	N	261	261	261	261
5	2	2	N	555	555	555	555
6	2	3	N	816	816	816	816
7	3	1	N	123	123	123	123
8	3	2	N	199	199	199	199
9	3	3	N	322	322	322	322
10	4	1	N	513	513	513	513
11	4	2	N	776	776	776	776
12	4	3	N	1289	1289	1289	1289

Use additional transpose statements to change the structure of the datasets containing the means and standard deviations.

```

/* Repeat for the means. */
proc transpose data=estimates_stacked out=FPED_mean prefix=Mean_;
  by race_eth agegroup;
  var mean;
  id VarLabel;
run;

/* Repeat for the standard errors. */
proc transpose data=estimates_stacked out=FPED_stderr prefix=stderr_;
  by race_eth agegroup;
  var stderr;
  id VarLabel;
run;

```

Merge the three transposed datasets (*FPED_N*, *FPED_mean*, and *FPED_stderr*) together by **race_eth** and **agegroup**. Use a data step to retain the needed variables in the correct order and format **race_eth** and **agegroup**. Then save a permanent SAS dataset *FPED_Ex2* in the library *input* (previously defined as the location C:\).

```
data FPED;
    merge FPED_N FPED_mean FPED_stderr;
    by race_eth agegroup;
    drop _NAME_ _LABEL_;
run;
data input.FPED_Ex2;
    retain race_eth agegroup N_total_fruit mean_total_fruit
    stderr_total_fruit
    mean_citrus_melons_berries stderr_citrus_melons_berries
    mean_other_fruit stderr_other_fruit
    mean_fruit_juice stderr_fruit_juice;
    set FPED;

    *Apply a common sample size name (N) to the sample size variable;
    rename N_total_fruit=N;

    *Remove variables no longer needed;
    drop N_citrus_melons_berries N_fruit_juice N_Other_fruit;

    *Apply formats to nsex and agegroup variables;
    format race_eth race_ethf. agegroup agegroupf.;

    *Present mean values to two decimal places and standard errors to
    three decimal places;
    format mean_total_fruit 8.2 mean_citrus_melons_berries 8.2
    mean_other_fruit 8.2 mean_fruit_juice 8.2
    stderr_total_fruit 8.3 stderr_citrus_melons_berries 8.3
    stderr_other_fruit 8.3 stderr_fruit_juice 8.3;
run;
```

Navigate to the location specified by your input library and verify that the final, permanent SAS dataset *FPED_Ex2* appears. The final, permanent SAS dataset *input.FPED_Ex2* contains the estimates of the mean amounts of food patterns cup equivalents for **all fruit components** consumed per individual, by **race/ethnicity** and **age**, in the United States, as seen in *Table 2a* of the *FPED Data Tables*.

Step 6: Export the Data into Microsoft Excel (optional)

Export the data to Excel using a variation of the code from Example 1, specifying new dataset and file names.

```
ods excel file="C:\FPED_Ex2.xlsx";
ods excel options(sheet_name="Table 2A, Total Fruit");
proc print data=input.FPED_Ex2 noobs;
  title "Mean Cup Equivalents of Total Fruit, Citrus/Melons/Berries,
  Other Fruit, and Fruit Juice Consumed per Individual,
  by Race/Ethnicity and Age, in the United States,
  August 2021-August 2023";
run;
ods excel close;
```

As previously explained, after running this code, an excel file of the data will open on your screen. In addition, the Excel file *FPED_Ex2* will appear in the location specified in the `ods excel file` location.

	A	B	C	D	E	F	G	H	I	J	K
	race_eth	agegroup	N	mean_total_fruit	stderr_total_fruit	mean_citrus_melons_berries	stderr_citrus_melons_berries	mean_other_fruit	stderr_other_fruit	mean_fruit_juice	stderr_fruit_juice
2	Non-Hispanic White	2-19	716	1.26	0.102	0.37	0.074	0.63	0.061	0.26	0.021
3	Non-Hispanic White	20 and over	2969	0.89	0.048	0.24	0.024	0.49	0.029	0.15	0.009
4	Non-Hispanic White	2 and over	3685	0.96	0.052	0.27	0.030	0.52	0.032	0.17	0.009
5	Non-Hispanic Black	2-19	261	0.99	0.072	0.21	0.055	0.43	0.047	0.36	0.037
6	Non-Hispanic Black	20 and over	555	0.87	0.042	0.19	0.025	0.35	0.035	0.33	0.027
7	Non-Hispanic Black	2 and over	816	0.90	0.043	0.19	0.020	0.37	0.036	0.34	0.028
8	Non-Hispanic Asian	2-19	123	0.94	0.073	0.20	0.063	0.56	0.072	0.18	0.054
9	Non-Hispanic Asian	20 and over	199	1.28	0.073	0.43	0.051	0.71	0.058	0.15	0.028
10	Non-Hispanic Asian	2 and over	322	1.17	0.051	0.35	0.043	0.66	0.049	0.16	0.032
11	Hispanic	2-19	513	1.27	0.105	0.25	0.034	0.63	0.052	0.39	0.058
12	Hispanic	20 and over	776	0.92	0.117	0.19	0.029	0.52	0.070	0.22	0.032
13	Hispanic	2 and over	1289	1.03	0.106	0.21	0.025	0.55	0.057	0.27	0.039

Resources

1. USDA, Agricultural Research Service, Food Surveys Research Group. (2026). 2021-2023 Food Patterns Equivalents Database Documentation. <https://www.ars.usda.gov/northeast-area/beltsville-md-bhnrc/beltsville-human-nutrition-research-center/food-surveys-research-group/docs/fped-doc-and-datasets/>
2. USDA, Agricultural Research Service, Food Surveys Research Group. (2026). Overview of Food Patterns Equivalents Database. Food Patterns Equivalents Database. <https://www.ars.usda.gov/nea/bhnrc/fsrg/fped>
3. USDA, Agricultural Research Service, Food Surveys Research Group. (2024, August 1). Overview. Food and Nutrient Database for Dietary Studies. <https://www.ars.usda.gov/nea/bhnrc/fsrg/fndds>
4. USDA, Agricultural Research Service, Food Surveys Research Group. (2026). Data Tables. Food Patterns Equivalents Database. <https://www.ars.usda.gov/nea/bhnrc/fsrg/fpeddatatables>
5. Centers for Disease Control and Prevention, National Center for Health Statistics. Sample Design. National Health and Nutrition Examination Survey. <https://wwwn.cdc.gov/nchs/nhanes/tutorials/SampleDesign.aspx>
6. Centers for Disease Control and Prevention, National Center for Health Statistics. NHANES Dietary Analyses. National Health and Nutrition Examination Survey. <https://wwwn.cdc.gov/nchs/nhanes/tutorials/DietaryAnalyses.aspx>
7. SAS® Institute Inc. (2019). The SURVEYMEANS Procedure. SAS/Stat User's Guide. SAS® 9.4 and SAS Viya® 3.4 Programming Documentation. SAS® Help Center. https://go.documentation.sas.com/doc/en/pgmsascdc/9.4_3.4/statug/statug_surveymeans_examples.htm
8. SAS® Institute Inc. (2025). ODS EXCEL Statement. SAS Output Delivery System: User's Guide. SAS® 9.4 and SAS Viya® 3.4 Programming Documentation. SAS® Help Center. https://go.documentation.sas.com/doc/en/pgmsascdc/9.4_3.5/odsug/p09n5pw9ol0897n1qe04zeur27rv.htm
9. SAS® Institute Inc. (2026). TRANSPOSE Procedure. Base SAS Procedures Guide. SAS® 9.4 and SAS Viya® 3.4 Programming Documentation. SAS® Help Center. https://go.documentation.sas.com/doc/en/pgmsascdc/9.4_3.5/proc/n1xno5xgs39b70n0zydov0owajj8.htm