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This file describes the methodology implemented in the SAS<sup>®</sup> program, HEI2005\_NHANES0102.SAS, which is the documented form of the code used to create Healthy Eating Index-2005 (HEI-2005) component and total scores for 1-day dietary intakes reported by participants in the National Health and Nutrition Examination Survey, 2001-2002 (NHANES 2001-2002). These scores were used to evaluate the HEI-2005. Please note, however, that the use of 1-day scores is not recommended for other purposes such as assessing diets of groups or individuals (see pages 29-30 of *Development and Evaluation of the Healthy Eating Index-2005 Technical Report* available at [www.cnpp.usda.gov/Publications/HEI/HEI-2005/HEI-2005TechnicalReport.pdf](http://www.cnpp.usda.gov/Publications/HEI/HEI-2005/HEI-2005TechnicalReport.pdf)).

This code was written by Lisa Kahle, Information Management Services, Inc. The CNPP MyPyramid Equivalents Database for Whole Fruit and Fruit Juice was created by WenYen Juan, Center for Nutrition Policy and Promotion, U.S. Department of Agriculture. Questions about the code or the fruit database should be directed to [support@cnpp.usda.gov](mailto:support@cnpp.usda.gov).

The 12 components of the HEI-2005 are Total Fruit; Whole Fruit; Total Vegetables; Dark Green and Orange Vegetables and Legumes; Total Grains; Whole Grains; Milk; Meat and Beans; Oils; Saturated Fat; Sodium; and Calories from Solid Fat, Alcohol, and Added Sugar (SoFAAS). The MyPyramid Equivalents Database (MPED) and NHANES 01-02 datasets are used to create six of the components: Total Fruit; Total Grains; Whole Grains; Oils; Saturated Fat; and Sodium. The CNPP MyPyramid Equivalents Database for Whole Fruit and Fruit Juice is used for one of the components: Whole Fruit. Additional steps are necessary to create the remaining five components: Total Vegetables; Dark Green and Orange Vegetables and Legumes; Milk; Meat and Beans; and Calories from Solid Fat, Alcohol, and Added Sugar (SoFAAS). These steps take place in different parts of the code and are described below.

Steps:

1. Locate the required datasets:

(a) MyPyramid Equivalents Database (MPED)

MyPyramid Equivalents Database for USDA Survey Food Codes, Version 1.0 (MyPyrEquivDB\_v1) can be extracted from the downloadable MyPyramid equivalents food data file, Myfddata.exe, on the Agricultural Research Service web site ([www.ars.usda.gov/Services/docs.htm?docid=8503&pf=1&cg\\_id=0](http://www.ars.usda.gov/Services/docs.htm?docid=8503&pf=1&cg_id=0)). All foods in the database are uniquely coded with an 8-digit USDA food code.

This database contains the number of equivalents per 100 grams of food for the following food groups, which we used to calculate the component and total scores for the HEI-2005:

Total Fruit (F\_TOTAL) in cup equivalents  
Total Vegetables (V\_TOTAL) in cup equivalents  
Dark Green Vegetables (V\_DRKGR) in cup equivalents

Orange Vegetables (V\_ORANGE) in cup equivalents  
Legumes (LEGUMES) in cup equivalents  
Total Grains (G\_TOTAL) in ounce equivalents  
Whole Grains (G\_WHL) in ounce equivalents  
Total Milk (D\_TOTAL) in cup equivalents  
Meat, Poultry, Fish (M\_MPF) in ounce equivalents  
Eggs (M\_EGG) in ounce equivalents  
Nut and Seeds (M\_NUTSD) in ounce equivalents  
Soybean products (M\_SOY) in ounce equivalents  
Discretionary oil (DISCFAT\_OIL) in grams  
Discretionary solid fat (DISCFAT\_SOL) in grams  
Added sugars (ADD\_SUG) in teaspoon equivalents

*Calculation notes for Milk and Meat and Beans (soy beverages):* Soy beverages are counted as part of the milk group in HEI-2005. This differs from the MPED, which groups them with other soy products in the Meats and Beans group. The reassignment process is completed in this step. Soy beverages (food codes 11310000, 11320000, 11321000, and 11330000) are changed from soybean products (M\_SOY) in ounce equivalents to milk (D\_TOTAL) in cup equivalents, based on their cup weights.

(b) CNPP MyPyramid Equivalents Database for Whole Fruit and Fruit Juice  
(cnppmypyrequivdb\_v1\_wjfrt.sas7bdat or cnppmypyrequivdb\_v1\_wjfrt.sav)

*Calculation notes for Whole Fruit:* This database was created by CNPP from the MyPyramid Equivalents Database for USDA Survey Food Codes, Version 1.0. A SAS<sup>®</sup>- or SPSS<sup>®</sup>-formatted database can be downloaded from the CNPP web site ([www.cnpp.usda.gov/HealthyEatingIndex-2005report.htm](http://www.cnpp.usda.gov/HealthyEatingIndex-2005report.htm)). Foods containing fruit were assigned to either Whole Fruit (WHOLEFRT) or Fruit Juice (FRTJUICE) in cup equivalents per 100 grams of foods. In the case of foods that contain both whole fruit and fruit juice, the Total Fruit equivalents were assigned to either Whole Fruit or Fruit Juice, whichever was the majority ingredient according to its description or recipe in the Food and Nutrient Database for Dietary Studies (FNDDS), version 1.0, developed by the Agricultural Research Service.

(c) NHANES 01-02 datasets for food intake (drxiff\_b), nutrient intake (drxtot\_b), demographics (demo\_b), and lactation status (rhq\_b)

NHANES 01-02 datasets for food intake (drxiff\_b), nutrient intake (drxtot\_b), demographics (demo\_b), and lactation status (rhq\_b) can be downloaded from the Center for Disease Control and Prevention, National Center for Health Statistics web site ([www.cdc.gov/nchs/about/major/nhanes/nhanes01-02.htm](http://www.cdc.gov/nchs/about/major/nhanes/nhanes01-02.htm)). The NHANES 01-02 food intake dataset, drxiff\_b, includes information on the list of foods eaten by individuals in gram amounts (DRXIGRMS) in 1 day. The NHANES 01-02 nutrient intake dataset, drxtot\_b, includes information on the total nutrient intake by individuals in 1 day. The following information is needed to determine intakes of saturated fat, sodium, calories from SoFAAS, and energy:

Foodcode (DRDIFDCD)

Energy (DRXTKCAL) in kcal  
Carbohydrates (DRXICARB) in grams  
Alcohol (DRXIALCO) in grams  
Saturated fat (DRXTSFAT) in grams  
Sodium (DRDTSODI) in grams

Only participants with reliable dietary data (DRDDRSTZ=1) are included. Because the HEI-2005 is designed for individuals age 2 and older and does not include specific standards for pregnant and lactating women, some exclusions are necessary. Therefore, demographic and reproductive health information is also needed. The NHANES 01-02 demographic dataset, demo\_b, includes information about individuals, such as age (RIDAGEYR) and pregnancy status (RIDPREG). Other variables from this dataset related to the survey sampling that were also used include data release number (SDDSRVYR), 2-year sample MEC exam weight (WTMEC2YR), Masked Variance Pseudo-PSU (SDMVPSU), and Masked Variance Pseudo-Stratum (SDMVSTRA). Lactation (RHQ200) status of women can be obtained from the reproductive health questionnaire dataset, rhq\_b. The following information is used from these datasets:

Reliable dietary recall status (DRDDRSTZ)  
Age (RIDAGEYR)  
Pregnancy status (RIDPREG)  
Data release number (SDDSRVYR)  
Two-year sample MEC exam weight (WTMEC2YR)  
Masked Variance Pseudo-PSU (SDMVPSU)  
Masked Variance Pseudo-Stratum (SDMVSTRA)  
Lactation status (RHQ200)

2. Combine the required datasets, make the necessary exclusions, and calculate NHANES 01-02 individual food and nutrient intakes:

MyPyramid Equivalents Database, version 1.0, and CNPP MyPyramid Equivalents Database for Whole Fruit and Fruit Juice are first combined and further merged with NHANES 01-02 individual food intake data to calculate individuals' 1-day intake in MyPyramid equivalents. Finally, reliable 1-day intakes data for individuals age 2 and older and women who are not pregnant or lactating are used to calculate the HEI-2005 total and component scores.

*Calculation notes for Calories from SoFAAS:* Individual's intake of Calories from SoFAAS is calculated using the discretionary solid fat and added sugars data from MPED and the alcoholic beverage intake data from NHANES 01-02. Alcohol intake in the HEI-2005 is defined as alcoholic beverages, such as beer, wine, and distilled spirits reported or coded separately or as an ingredient in a mixed drink; therefore, cooking wine is excluded. The first 3 digits of the 8-digit USDA food code are used to indicate alcoholic beverages (931 through 935), and the food code for cooking wine (93401300) is excluded. Calories from alcoholic beverages are calculated from the amounts of ethanol (DRXIALCO) and carbohydrate (DRXICARB) contained in the beverages. To prevent double-counting calories from added sugars, any calories from added sugars are subtracted from the calories from alcoholic beverages because they are accounted for in the Added Sugars part of the Calories from SoFAAS component.

3. Calculate intakes on a per 1000 calorie basis and the HEI-2005 component and total scores:

For each HEI-2005 component, a density value for the intake of food group or nutrient of interest is created. To do so, the amount of the food or nutrient reported is divided by the total daily energy intake and multiplied by 1000. Thus, it is (total food group equivalent or nutrient intake/total energy intake) \* 1000. Percentage of calories from saturated fat and SoFAAS are also calculated.

For each component, the density value is compared with the standard established for the component, and the HEI-2005 component score is determined. Depending on the component, the component score may have a maximum value of 5, 10, or 20 points. The scores are evenly prorated except for the Sodium and Saturated Fat components. These two components are prorated from 0 to 8 and from 8 to 10 (with 8 points based on the Dietary Guidelines level). Scores are capped at the maximum value. The sum of all 12 HEI-2005 component scores (HEI1 to HEI12) is the total HEI-2005 score (HEI2005). In the case of no reported food intake for the day, all component scores are set to zero.

*Calculation notes for Total Vegetables; Dark Green and Orange Vegetables and Legumes; Meat and Beans (legumes):* Intake of legumes counts toward meeting the standard for the Meat and Beans component first. Once the Meat and Beans standard is met, any additional amounts of legumes count as vegetables. Then, the intakes of dark green vegetables, orange vegetables, and legumes are summed to create and score that component. Legumes in the MPED are in cup equivalents; therefore, the cup equivalents are first converted to ounce equivalents of meat when they are counted for the Meat and Beans component, and are then converted back to cup equivalents when counted as vegetables. One-fourth cup of legumes is equal to 1 ounce equivalent of meat. Thus, the number of cup equivalents of legumes is multiplied by 4 to convert to ounce equivalents of meat.