

ReadMe for WHI's Healthy Eating Index (HEI)-2010 component and total scores computed from the food-frequency questionnaire (FFQ)

Data.

The tab delimited file, *f60_hei_2010_inv.dat*, includes participant common ID (*ID*), visit year (*F60VY*; 0 == baseline; 1 to 10 == annual visits), exclusion consideration status (*STATUS*; 1 == energy < 600 kcal consider excluding; 2 == energy > 5000 kcal consider excluding; 3 == energy intake is plausible), HEI-2010 component scores and total score (*HEI2010_TOTAL_SCORE*; sum of its twelve components ranges from 0 to 100). Higher scores indicate closer conformance to the 2010 dietary guidance for Americans. HEI scores, computed from FFQs completed closest to a participant's expected annual visit ([WHI Data Preparation and Use](#)), corresponding FFQ data ([MPEDs](#), [nutrients](#) or [items](#)) and scoring algorithm are described below, and apply only to [FFQs](#) collected during the [WHI study phase \(1993 to 2005\)](#). Available SAS-code and references, listed below, provide further details and motivation.

Computational notes: Intake of legumes count towards meeting the standard for the *Total Protein Foods* and *Seafood and Plant Proteins* components first. Once met, any additional legumes count towards the components *Total Vegetables* and *Greens and Beans*.

Calories from alcohol are considered to be *Empty Calories* for consumption beyond moderate amounts based on the 2010 dietary guidelines; 2 drinks per day (converted to 28 grams of ethanol). Consequently, up to 13 g of ethanol/1000 kcal are not counted towards *Empty Calories*.

Description of HEI-2010 scores.

Component	HEI-2010 scores	MPED/FFQ variables	Max score ¹	Standard: max score per 1000 kcal	Standard: min score (zero) per 1000 kcal
Adequacy:					
Total Vegetables ²	<i>HEIX1_TOTALVEG</i>	<i>V_TOTAL</i> ; may contain <i>LEGUMES</i> ²	5	≥1.1 cup equiv.	No Vegetables or legumes (if applicable)
Greens and Beans ²	<i>HEIX2_GREEN_AND_BEAN</i>	<i>V_DRKGR</i> ; may contain <i>LEGUMES</i> ²	5	≥0.2 cup equiv.	No Dark Green Vegetables or legumes (if applicable)
Total Fruit ³	<i>HEIX3_TOTALFRUIT</i>	<i>F_TOTAL</i>	5	≥0.8 cup equiv.	No Fruit
Whole Fruit	<i>HEIX4_WHOLEFRUIT</i>	<i>F_NJ_TOTAL</i>	5	≥0.4 cup equiv.	No Whole Fruit

Whole Grains	<i>HEIX5_WHOLEGRAIN</i>	<i>G_WHL</i>	10	≥1.5 oz equiv.	No Whole Grains
Dairy ⁴	<i>HEIX6_TOTALDAIRY</i>	<i>D_TOTAL + (D_MILKISM - D_MILK)</i>	10	≥1.3 cup equiv.	No Dairy
Total Protein Foods ^{2,5}	<i>HEIX7_TOTPROT</i>	<i>M_MPF + M_EGG + M_NUTSD + M_SOYESM</i> ; may contain <i>LEGUMES</i> ²	5	≥2.5 oz equiv.	No Protein Foods or legumes
Seafood and Plant Proteins ^{2,5,6}	<i>HEIX8_SEAPLANT_PROT</i>	<i>M_FISH_HI + M_FISH_LO + M_SOYESM + M_NUTSD</i> ; may contain <i>LEGUMES</i> ²	5	≥0.8 oz equiv.	No Seafood, Plant Proteins or legumes
Fatty Acids	<i>HEIX9_FATTYACID</i>	<i>(F60MFA + F60PFA)/F60SFA</i>	10	(PUFAs + MUFAs)/SFAs ≥2.5	(PUFAs + MUFAs)/SFAs ≤1.2
Moderation:					
Sodium ⁷	<i>HEIX10_SODIUM</i>	<i>F60SODUM</i>	10	≤1.1 gram	≥2.0 grams
Refined Grains	<i>HEIX11_REFINEDGRAIN</i>	<i>G_NWHL</i>	10	≤1.8 oz equiv.	≥4.3 oz equiv.
Empty Calories	<i>HEIX12_SOFAAS</i>	<i>F60ALC</i> ⁸ ; <i>ADD_SUG</i> ; <i>DISCFAT_SOL</i>	20	≤19% of energy	≥50% of energy

¹ Intakes between the minimum and maximum standards are scored proportionately.

² See computational note (above) on allocating legumes. Consult references and SAS-code for further details.

³ Includes 100% juice.

⁴ Total dairy including soy beverages.

⁵ Includes soybean products other than beverages.

⁶ Includes nuts and seeds.

⁷ The sodium nutrient data is reliant on the WHI FFQ, which did not target dietary sodium assessment and did not assess all sources of sodium. If interested in sodium as a primary exposure, the FFQ sodium should be biomarker-calibrated (4). However, calibrating within a dietary quality index does not apply.

⁸ See computational note (above) on computing empty calories from alcohol. Consult references and SAS-code for further details.

SAS-code.

For additional information, please refer to these SAS programs that processed FFQ-derived MPED data and computed HEI-2010 scores:

(i) *f60_hei_2010__pseudoCode_inv.sas*

(ii) *f60_hei_2010__beanspeas_allocation_macro.sas*

(iii) *f60_hei_2010_score_macro.sas*

References.

- (1) Guenther, P.M., Casavale, K.O., Reedy, J., Kirkpatrick, S.I., Hiza, H.A., Kuczynski, K.J., Kahle, L.L. and Krebs-Smith, S.M., 2013. Update of the healthy eating index: HEI-2010. *Journal of the Academy of Nutrition and Dietetics*, 113(4), pp.569-580.
- (2) HEI–2010 Fact Sheet (Guenther PM, Casavale KO, Reedy J, Kirkpatrick SI, Hiza HA, Kuczynski KJ, Kahle LL, Krebs-Smith SM. Healthy Eating Index–2010. CNPP Fact Sheet No. 2, Available at https://www.cnpp.usda.gov/sites/default/files/healthy_eating_index/CNPPFactSheetNo2.pdf).
- (3) McGuire S. US department of agriculture and US department of health and human services, dietary guidelines for Americans, 2010. Washington, DC: US government printing office, January 2011.
- (4) Huang, Y., Van Horn, L., Tinker, L.F., Neuhouser, M.L., Carbone, L., Mossavar-Rahmani, Y., Thomas, F. and Prentice, R.L., 2014. Measurement error corrected sodium and potassium intake estimation using 24-hour urinary excretion. *Hypertension*, 63(2), pp.238-244.