

WHI Food Frequency Questionnaire (FFQ) Nutrient Values Estimation

Nutrient analysis for the WHI 1993-2005 was conducted by the Fred Hutchinson Cancer Research Center Nutrition Assessment Shared Resource (NASR) utilizing the Nutrition Data System for Research (NDSR) software developed by the Nutrition Coordinating Center (NCC), University of Minnesota, Minneapolis, MN. At the conclusion of the WHI main study in 2005, nutrient values were updated to the NDSR version 2005 NCC food and nutrient database.

The NCC food and nutrient database provides over 140 nutrients and bioactive compounds. Since it is not possible to analytically measure the exact nutrient amounts for each food, NCC estimates or imputes nutrient values for some of the foods in their large database. This information is provided to help WHI investigators understand which nutrients in the WHI FFQ database may have some of these estimated values rather than analytic values. For example, for the variable “dietary added sugars” 26-50% of the values are estimated or imputed rather than being exact analytic values from a laboratory assay. Estimations are generally based on a similar food, another form of the same food, a known nutrient value associated with the missing value, or recipes or formulations from manufacturers.

This document and the following table is intended to guide WHI investigators in their interpretation of the nutrient variables.

Table: WHI FFQ Nutrient Database Estimation (020916)

Form 60 Nutrient	Percent Estimated			
	0-25%	26-50%	51-75%	76-100%
Dietary Energy (kcal)	X			
Dietary Total Fat (g)	X			
Dietary Total Carbohydrate (g)	X			
Dietary Protein (g)	X			
Dietary Animal Protein (g)			X	
Dietary Vegetable Protein (g)			X	
Dietary Alcohol (g)	X			
Dietary Cholesterol (mg)	X			
<i>Dietary Total SFA (g)</i>	X			
Dietary Total MFA (g)	X			
Dietary Total PFA (g)	X			
Dietary Total Trans Fatty Acid (g)		X		
Dietary Added Sugars (g)		X		
Dietary Fructose (g)			X	
Dietary Galactose (g)		X		
Dietary Glucose (g)			X	
Dietary Lactose (g)			X	
Dietary Maltose (g)		X		
Dietary Sucrose (g)		X		
Dietary Starch (g)			X	
Dietary Fiber (g)	X			
Water Soluble Dietary Fiber (g)			X	
Insoluble Dietary Fiber (g)			X	
Dietary Pectins (g)			X	
Dietary Vitamin A (IU)	X			
Dietary Retinol (mcg)	X			
Dietary Beta-Carotene (mcg)	X			
Dietary Alpha-Carotene (mcg)	X			
Dietary Beta-Cryptoxanthin (mcg)	X			
Dietary Lutein+Zeaxanthin (mcg)	X			
Dietary Lycopene (mcg)	X			
Dietary Vitamin D (mcg)	X			
Dietary Vitamin E (IU)				X
Dietary Alpha-Tocopherol (mg)				X
Dietary Natural Alpha-Tocopherol (mg)		X		
Dietary Synthetic Alpha-Tocopherol (mg)				X
Dietary Total Alpha-Toc Eq (mg)				X
Dietary Beta-Tocopherol (mg)		X		
Dietary Gamma-Tocopherol (mg)			X	
Dietary Delta-Tocopherol (mg)		X		

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Form 60 Nutrient	Percent Estimated			
	0-25%	26-50%	51-75%	76-100%
Dietary Vitamin K (NDS Value) (mcg)	X			
Dietary Vitamin C (mg)	X			
Dietary Thiamin (mg)	X			
Dietary Riboflavin (mg)	X			
Dietary Niacin (mg)	X			
Dietary Pantothenic Acid (mg)	X			
Dietary Vitamin B6 (mg)	X			
Dietary Folacin (mcg)	X			
Dietary Folate Equivalents (mcg)	X			
Dietary Natural Folate (food folate) (mcg)	X			
Dietary Synthetic Folate (folic acid) (mcg)	X			
Dietary Vitamin B12 (mcg)	X			
Dietary Calcium (mg)	X			
Dietary Phosphorus (mg)	X			
Dietary Magnesium (mg)	X			
Dietary Iron (mg)	X			
Dietary Zinc (mg)	X			
Dietary Copper (mg)	X			
Dietary Manganese (mg)	X			
Dietary Selenium (mcg)	X			
Dietary Sodium (mg)	X			
Dietary Potassium (mg)	X			
Dietary SFA 4:0 (g)	X			
Dietary SFA 6:0 (g)	X			
Dietary SFA 8:0 (g)	X			
Dietary SFA 10:0 (g)	X			
Dietary SFA 12:0 (g)	X			
Dietary SFA 14:0 (g)	X			
Dietary SFA 16:0, Palmitic acid (g)	X			
Dietary SFA 17:0 (g)		X		
Dietary SFA 18:0, Stearic acid (g)	X			
Dietary SFA 20:0 (g)		X		
Dietary SFA 22:0 (g)		X		
Dietary MFA 14:1 (g)		X		
Dietary MFA 16:1 (g)	X			
Dietary MFA 18:1, Oleic acid (g)	X			
Dietary MFA 20:1 (g)	X			
Dietary MFA 22:1 (g)	X			
Dietary PFA 18:2, Linoleic Acid (g)	X			
Dietary PFA 18:3, Linolenic Acid (g)	X			

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Dietary PFA 18:4 (g)	X			
Dietary PFA 20:4 (g)	X			
Dietary PFA 20:5, EPA (g)	X			
Dietary PFA 22:5 (g)	X			
Dietary PFA 22:6, dha (g)	X			
Dietary Trans Fatty Acit, 161T (g)		X		
Dietary Trans Fatty Acit, 181T (g)		X		
Dietary Trans Fatty Acit, 182T (g)		X		
Dietary Tryptophan (g)		X		
Dietary Threonine (g)		X		
Dietary Isoleucine (g)		X		
Dietary Leucine (g)		X		
Dietary Lysine (g)		X		
Dietary Methionine (g)		X		
Dietary Cystine (g)		X		
Dietary Phenylalanine (g)		X		
Dietary Tyrosine (g)		X		
Dietary Valine (g)		X		
Dietary Arginine (g)		X		
Dietary Histidine (g)		X		
Dietary Alanine (g)		X		
Dietary Aspartic Acid (g)		X		
Dietary Glutamic Acid (g)		X		
Dietary Glycine (g)		X		
Dietary Proline (g)		X		
Dietary Serine (g)		X		
Dietary Daidzein (mg)	X			
Dietary Genistein (mg)	X			
Dietary Glycitein (mg)	X			
Dietary Coumestrol (mg)	X			
Dietary Biochanin A (mg)	X			
Dietary Formononetin (mg)	X			
Dietary Caffeine (mg)	X			
Dietary Phytic Acid (mg)		X		
Dietary Oxalic Acid (mg)		X		
Dietary 3-Methylhistidine (mg)	X			
Dietary Ash (g)	X			
Dietary Water (g)	X			