B

Selected Illustrative Calculations Using a Population-Weighted Approach

The tables included in this appendix are not recommended values for either the U.S. or the Canadian population. They were developed using the formulas and methodology described in Chapter 5 to illustrate how a population-weighted approach could be applied to generating Daily Values. The development of actual numerical values would necessitate careful discussion and decisions regarding the selection of the best representative numbers to use for each variable in the formulas. In addition, decisions regarding such factors as numerical rounding and certain aspects of the calculations would need to be made. The population base chosen for these examples is indicated within each table. For details of other variables see the methodological description in Chapter 5.

TABLE B-1 Illustrative Calculations of Population-Weighted Estimated Average Requirements (EARs) for Persons 4 Years of Age and Older Using 2005 U.S. Population Figures and of the Highest EAR for Each Nutrient (Nonweighted)

Nutrient[a]	Median Weighted EAR	Percent Within 20%[b]	Percent Within 30%[c]	Highest EAR[d]	Percent Within 20%[e]	Percent Within 30%[f]
Vitamin A (μg RAE)	529	54	72	630	51	71
Vitamin C (mg)	63	65	79	75	60	80
Vitamin E (mg α-tocopherol)	12	83	91	12	84	91
Thiamin (mg)	0.9	80	90	1.0	78	89
Riboflavin (mg)	1.0	73	88	1.1	67	87
Niacin (mg)	11	70	86	12	71	86
Vitamin B_6 (mg)	1.1	69	83	1.4	51	77
Folate (μg DFE)	314	84	92	330	84	91
Vitamin B_{12} (μg)	2.0	83	91	2.0	84	91
Copper (μg)	684	84	92	700	84	91
Iodine (μg)	93	85	95	95	85	94
Iron (mg)	6.1	59	77	8.1	39	64
Magnesium (mg)	286	60	79	350	53	75
Molybdenum (μg)	33	84	92	34	84	91
Phosphorus (mg)	588	75	81	1,055	14	15
Selenium (μg)	44	84	92	45	85	92
Zinc (mg)	7.5	61	79	9.4	48	75

NOTE: Population subgroup proportions for this table were computed using the U.S. Census Bureau middle series of the national population projections (Population Projections Program, 2000). The source data, which give the age distribution for each age and gender, were aggregated in concordance with the Dietary Reference Intakes age and gender categories.

[a] RAE = retinol activity equivalents, DFE = dietary folate equivalents.

[b] Estimated percentage of the population with a requirement within 20% of the population-weighted EAR.

[c] Estimated proportion of the population with a requirement within 30% of the population-weighted EAR.

[d] Excludes EARs for pregnant and lactating women.

[e] Estimated proportion of the population with a requirement within 20% of the highest EAR.

[f] Estimated proportion of the population with a requirement within 30% of the highest EAR.

TABLE B-2 Illustrative Calculations of Population-Weighted Estimated Average Requirements (EARs) for Persons 4 Years of Age and Older Using 2006 Canadian Population Figures and of the Highest EAR for Each Nutrient (Nonweighted)

Nutrient[a]	Median Weighted EAR	Percent Within 20%[b]	Percent Within 30%[c]	Highest EAR[d]	Percent Within 20%[e]	Percent Within 30%[f]
Vitamin A (μg RAE)	533	55	73	630	52	72
Vitamin C (mg)	64	67	82	75	61	82
Vitamin E (mg α-tocopherol)	12	85	92	12	85	92
Thiamin (mg)	0.9	81	92	1.0	80	90
Riboflavin (mg)	1.0	75	90	1.1	68	88
Niacin (mg)	11	72	87	12	72	87
Vitamin B_6 (mg)	1.1	70	85	1.4	53	79
Folate (μg DFE)	315	86	93	330	85	92
Vitamin B_{12} (μg)	2.0	85	92	2.0	85	92
Copper (μg)	686	86	93	700	86	93
Iodine (μg)	93	86	96	95	86	95
Iron (mg)	6.1	61	78	8.1	38	63
Magnesium (mg)	288	62	81	350	54	77
Molybdenum (μg)	33	85	93	34	86	93
Phosphorus (mg)	587	77	83	1,055	13	14
Selenium (μg)	44	86	93	45	86	93
Zinc (mg)	7.5	62	80	9.4	49	76

NOTE: Population subgroup proportions for this table were computed using the Statistics Canada national population projections (Statistics Canada, 2003). The source data are aggregated; group definitions differ slightly from the EAR guidelines.

[a] RAE = retinol activity equivalents, DFE = dietary folate equivalents.

[b] Estimated proportion of the population with a requirement within 20% of the population-weighted EAR.

[c] Estimated proportion of the population with a requirement within 30% of the population-weighted EAR.

[d] Excludes EARs for pregnant and lactating women.

[e] Estimated proportion of the population with a requirement within 20% of the highest EAR.

[f] Estimated proportion of the population with a requirement within 30% of the highest EAR.

TABLE B-3 Illustrative Calculations of Population-Weighted Adequate Intakes (AIs) Based on U.S. Census Bureau Data from 2001 and 2005

Nutrient	Toddlers[a]	General Population[b]	Pregnant Women[c]	Lactating Women[d]
Biotin (μg)	8	28	30	35
Calcium (mg)	500	1,091	1,011	1,011
Choline (mg)	200	460	450	550
Chromium (μg)	11	27	30	45
Fluoride (mg)	0.7	3	3	3
Linoleic Acid (g)	7	13	13	13
α-Linoleic Acid (g)	0.7	1.3	1.4	1.3
Manganese (mg)	1.2	2.0	2.0	2.6
Pantothenic acid (mg)	2.0	5	6	7
Vitamin D (μg)	5	7	5	5
Vitamin K (μg)	30	95	89	89

[a] AIs for toddlers ages 1–3 y in the United States (IOM, 2002a). No weighting was done for this group.
[b] Based on U.S. Census Bureau estimates of the general population of the United States in 2005 ages 4 y and above (Population Projections Program, 2000).
[c] Based on U.S. Census Bureau estimates of the population of pregnant women in the United States in 2001 (Population Projections Program, 2000).
[d] In the absence of specific data on the ages of lactating women, these values are based on National Vital Statistics System estimates of the population of pregnant women in the United States in 2001 (Ventura et al., 2003).

TABLE B-4 Acceptable Macronutrient Distribution Ranges (AMDRs) for the General Population 4 Years of Age and Older

	Range (% of energy)		
Macronutrient	Low	Average	High
Fat[a]	21	28	35
Linoleic acid	5.0	7.5	10.0
α-Linolenic acid	0.6	0.9	1.2
Carbohydrate[b]	45	55	65

[a] The AMDR for total fat is comprised of population-weighted values that were computed based on U.S. Census Bureau estimates of the U.S. population in 2005 (Population Projections Program, 2000).
[b] No weighting was done for this group.

TABLE B-5 Illustrative Calculations of Population-Weighted Estimated Average Requirements (EARs) and of the Highest EAR for Nutrients for Pregnant Women in the United States

Nutrient[a]	Median Weighted EAR	Percent Within 20%[b]	Percent Within 30%[c]	Highest EAR	Percent Within 20%[d]	Percent Within 30%[e]
Vitamin A (μg RAE)	549	68	87	550	68	87
Vitamin C (mg)	70	95	99.7	70	95	99.7
Vitamin E (mg α-tocopherol)	12	95	99.7	12	95	99.7
Thiamin (mg)	1.2	95	99.7	1.2	95	99.7
Riboflavin (mg)	1.2	95	99.7	1.2	95	99.7
Niacin (mg)	14	82	95	14	82	95
Vitamin B_6 (mg)	1.6	95	100	1.6	95	100
Folate (μg DFE)	520	95	99.7	520	95	99.7
Vitamin B_{12} (μg)	2.2	95	99.7	2.2	95	99.7
Copper (μg)	799	95	99.7	800	95	99.7
Iodine (μg)	160	95	99.7	160	95	99.7
Iron (mg)	22	95	99.7	23	94	99.6
Magnesium (mg)	295	94	99	335	81	98
Molybdenum (μg)	40	95	99.7	40	95	99.7
Phosphorus (mg)	583	92	96	1,055	3.6	4.1
Selenium (μg)	49	95	99.7	49	95	99.7
Zinc (mg)	9.5	95	99.6	10.5	88	99

NOTE: Computations are based on 2001 estimates (Ventura et al., 2003) of the number of pregnant women comprised of three age groups: 18 y, 19–30 y, 31–50 y.

[a] RAE = retinol activity equivalents, DFE = dietary folate equivalents.

[b] Estimated proportion of the population with a requirement within 20% of the population-weighted EAR.

[c] Estimated proportion of the population with a requirement within 30% of the population-weighted EAR.

[d] Estimated proportion of the population with a requirement within 20% of the highest EAR.

[e] Estimated proportion of the population with a requirement within 30% of the highest EAR.

TABLE B-6 Illustrative Calculations of Population-Weighted Estimated Average Requirements (EARs) and of Highest EAR for Nutrients for Lactating Women in the United States

Nutrient[a]	Median Weighted EAR	Percent Within 20%[b]	Percent Within 30%[c]	Highest EAR	Percent Within 20%[d]	Percent Within 30%[e]
Vitamin A (μg RAE)	899	68	87	900	68	87
Vitamin C (mg)	100	95	99.7	100	95	99.7
Vitamin E (mg α-tocopherol)	16	95	99.7	16	95	99.7
Thiamin (mg)	1.2	95	99.7	1.2	95	99.7
Riboflavin (mg)	1.3	95	99.7	1.3	95	99.7
Niacin (mg)	13	82	95	13	82	95
Vitamin B_6 (mg)	1.7	95	100	1.7	95	100
Folate (μg DFE)	450	95	99.7	450	95	99.7
Vitamin B_{12} (μg)	2.4	95	99.7	2.4	95	99.7
Copper (μg)	999	95	99.7	1,000	95	99.7
Iodine (μg)	209	95	99.7	209	95	99.7
Iron (mg)	6.5	95	99.7	7.0	92	99
Magnesium (mg)	260	94	99	300	77	97
Molybdenum (μg)	36	95	99.7	36	95	99.7
Phosphorus (mg)	583	92	96	1,055	3.6	4.1
Selenium (μg)	59	95	99.7	59	95	99.7
Zinc (mg)	10.4	95	99.7	10.9	94	99.6

NOTE: Computations are based on approximation. Proportion of lactating women for each age group was assumed to be the same as the proportion of pregnant women (proportion of births stratified by mother's age in three age groups: 18 y, 19–30 y, 31–50 y) using data from Ventura and colleagues (2003).

[a] RAE = retinol activity equivalents, DFE = dietary folate equivalents.

[b] Estimated proportion of the population with a requirement within 20% of the population-weighted EAR.

[c] Estimated proportion of the population with a requirement within 30% of the population-weighted EAR.

[d] Estimated proportion of the population with a requirement within 20% of the highest EAR.

[e] Estimated proportion of the population with a requirement within 30% of the highest EAR.