Schneider, K. & Herforth, A. "Software tools for practical application of human nutrient requirements in food-based social science research."

Supplement 1
Nutrient Requirements from the Dietary Reference Intakes (2006, 2011, 2019)

Contact: kate.schneider@tufts.edu

Notes:

Supplement 1 contains all the nutrient requirements for all age and sex groups from the Dietary Reference Intakes (IOM 2006, 2011, 2019).

Supplement 1 contains 11 datasets and this notes document.

File Name	Description
1_NutrientRequirements_Notes	Notes
1_NutrientRequirements_Definitions	Definitions of Nutrient Requirements contained in the Dietary Reference Intakes (IOM 2006, 2011, 2019)
1_NutrientRequirements_UnitsNotes	Units and other notes
1_NutrientRequirements_ReferenceValues	Reference age, weight and height values used in the DRIs
1_NutrientRequirements_Energy	Energy requirements calculating Estimated Energy Requirement Equation for reference anthropometry in 1_NutrientRequirements_ReferenceValues
1_NutrientRequirements_MicronutrientsEAR	Micronutrients Estimated Average Requirement (EAR)
1_NutrientRequirements_MicronutrientsRDA	Micronutrients Recommended Daily Allowance (RDA)
1_NutrientRequirements_MicronutrientsUL	Micronutrients Upper Level (UL)
1_NutrientRequirements_MacronutrientsEAR	Macronutrients EAR
1_NutrientRequirements_MacronutrientsRDA	Macronutrients RDA
1_NutrientRequirements_MacronutrientsAMDR	Macronutrients Acceptable Macronutrient Distribution Range (AMDR)
1_NutrientRequirements_ProbIronInadequacy	Probability of Iron Inadequacy

Sources:

Institute of Medicine of the National Academies. 2006. Dietary Reference Intakes: the essential guide to nutrient requirements J. J. Otten, J. P. Hellwig, and L. D. Meyers, eds. Washington, DC: National Academies Press.
Institute of Medicine Food and Nutrition Board. Dietary Reference Intakes for Calcium and Vitamin D. Washington (DC): National Academies Press (US); 2011.
Institute of Medicine Food and Nutrition Board. Dietary Reference Intakes for Sodium and Potassium. Washington (DC): National Academies Press (US); 2019.

Institute of Medicine of the National Academies, and National Research Council. 2009. Weight gain during pregnancy: Reexamining the guidelines K. M. Rasmussen and A. L. Yaktine, eds. Washington, DC: The National Academies Press.
National Academies of Sciences, Engineering, and Medicine. 2019. Dietary Reference Intakes for Sodium and Potassium. https://doi.org/10.17226/25353.

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Specific Notes

Item	Explanation / Note
Protein	EARs are based on grams per day per kg body weight, by age and sex. Reference Values reported in 1_NutrientRequirements_ReferenceValues) have been used.
Energy	Energy required at each level of physical activity is specific to age, height, weight, sex and physical activity level. Reference Values reported in sheet 2) have been used.
Physical activity levels	Mean PAL per category (per the value specified in the DRI documentation) has been used in EER equation for each age-sex group at each level of activity. Physical activity levels are specifed below, rural agricultural populations are assumed to be have the active level of physical activity.
Children 3 years old	For all nutrient requirements except energy, children are grouped into ages 1-3. For energy, children are grouped into 12-35 months and then 3-8 year olds by sex. For this reason, there are 3 age-sex groups for ages 1-3 (groups 3,4,5) to accurately calculate the energy needs of 3 year olds.
Needs during continued breastfeeding	Children 6-23 are recommended by the WHO to continue breastfeeding in addition to consuming complementary foods. The percent of requirements, per nutrient, required from foods are provided in Supplement 2.
Pregnant and lactating women	Protein requirements for pregnant and lactating women are not provided in the DRIs and have not been included here. Energy requirements during pregnancy and lactation are specific to the trimester/post-partum duration. The reference weights are for healthy weight women at the onset of pregnancy and assume the midpoint weight gain range (13.25kg) over total pregnancy (pg. 254 in the reference below). The reference weight during lactation assumes women return to the prepregnancy weight. All other nutrient requirements for pregnant and lactating women have been included as listed in the DRIs. These values are taken from **Table 7-3 (pg. 254) in Rasmussen KM, Yaktine AL (Ed.) (2009).**
Infants 0-6 months	Infants in this age range should be consuming only breastmilk or infant formula and therefore no energy requirements are calculated. Any nutrient requirements specified are assumed to come from breastmilk.

References weights and heights	References weights and heights are from the DRIs Table 1. As stated there, since there is no evidence that weight should change with age, the reference value for the 19-30 age group applies to all adult age groups. For the energy calculation, the reference age used for the calculation is the midpoint between the upper and lower bounds in the age range. All reference weights and heights are consistent with those in 1_NutrientRequirements_ReferenceValues.
Brief description of excluded nutrients.	Micronutrients for which there is no EAR (and therefore no RDA) and for which there is only an AI, have been excluded from the analysis. In addition, 3 nutrients with an EAR have been excluded. 1) Iodine is not commonly measured in food composition tables. 2) Vitamin D has insufficient evidence for the percent of requirements that must be sourced by the diet since the body synthesizes some vitamin D. 3) Molybdenum is not commonly measured in food composition tables and deficiency in otherwise healthy individuals has never been observed in humans (it is widespread in the food system and needed in only trace amounts). For macronutrients, fiber within total carbohydrates has been excluded due to having only an AI. Total fat has no EAR or RDA, and essential fatty acids (omega-3 and omega-6) have been excluded due to having only an AI. For further information and references, see the accompanying paper.
Calcium	The requirements are not specified in the same units across the EAR/RDA and UL in the DRIs. The calcium UL has been converted from grams to mg in this spreadsheet to be consistent with the EAR and RDA.
Copper	The copper EAR, RDA, and UL are defined in micrograms (mcg) in the DRIs, however copper is measured in milligrams (mg) in food composition tables. The requirements have been converted to mg for use in food-based analyses.
Iron	The nutrient requirement for iron is total dietary iron and assumes a bioavailability of 18%, consistent with a mixed North American diet. Iron requirements are not normally distributed, consult the "P(Inadequacy) Iron" tab to evaluate the adequacy of an observed intake.
Sodium	The IOM recently released a Chronic Disease Risk Reduction upper limit for sodium. It has been included in the UL tab for simplicity, however it differs from a UL because the evidence base refers to risk of chronic disease rather than symptoms of toxicological adverse effects which define a UL. For sodium, the CDRR is the intake above which intake reduction is expected to reduce chronic disease risk, within an apparently healthy population.
Zinc	The nutrient requirement for zinc is total dietary zinc and is set based on diets that have favorable bioavailability.

Physical Activity Level Definitions according to IOM

Level	Description
Sedentary	Typical daily living activities in a modern, developed context (e.g. household tasks, minimal walking)
Low Active	Typical daily living activities plus 30-60 minutes of daily moderate activity (moderate = walking at a 5-7 km/h pace)
Active	Typcial daily living activities plus at least 60 minutes of daily moderate activity
Very Active	Typcial daily living activities plus at least 60 minutes of daily moderate activity, plus an additional 50 minutes of vigorous or 120 minutes of moderate activity