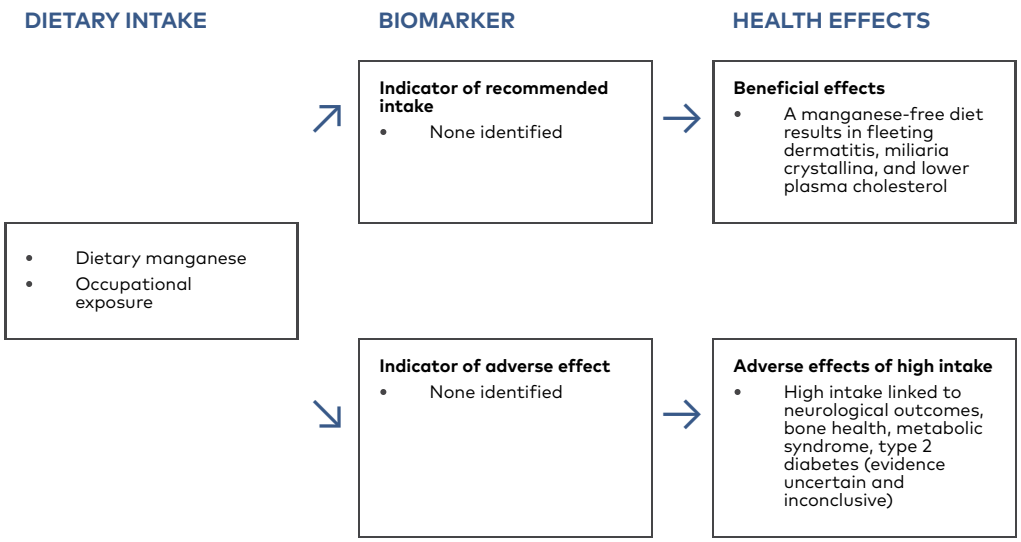
Manganese



	Females	Males
Provisional AR (mg/d)	2.4	2.4
AI (mg/d)	3	3

For more information about the health effects, please refer to the background paper by Maria Kippler and Agneta Oskarsson (Kippler & Oskarsson, 2023).

Dietary sources and intake. Manganese is ubiquitous (including occupational exposure), but main dietary sources are cereal-based products, nuts, chocolate, shellfish, pulses, fruits, and beverages (coffee, tea, alcoholic beverages, drinking water). Intake in Nordic populations is typically around 4 mg/d, but ranges from 3 to 7 mg/d. With an average milk intake of 0.8 L/day, the mean intake of exclusively breast fed infants up to 6 months of age would range between 2.4 and 24 µg/day (Kippler & Oskarsson, 2023).

Main functions. Manganese is an essential trace element for mammals. It is found in all tissues and is involved in synthesis and activation of enzymes and is a cofactor for metalloenzymes. Additionally, it is required for normal metabolism of proteins, amino acids, lipids, and carbohydrates. Manganese is important for maintenance of mitochondria by scavenging free radicals. It is further involved in reproduction, bone formation, immune function, regulation of blood glucose and cellular energy, digestion, and in blood clotting.

Indicator for recommended intake. No indicator was identified for setting any DRV. Under experimental conditions (depletion-repletion studies), a manganese-free diet results in fleeting dermatitis, miliaria crystallina, and lower plasma cholesterol, which normalizes during repletion.

Main data gaps. Biomarkers of intake and status are lacking. There is limited information concerning the relationship between manganese intake or status and health-related endpoints or disease prevention, especially high exposure levels and neurodevelopment in infants, children, and adolescents. There are no studies from the Nordic or Baltic countries (Kippler & Oskarsson, 2023).

Deficiency and risk groups. Deficiency is not characterized in the general population. No specific risk groups are established.

Dietary reference values. IOM (IOM, 2001) and EFSA (EFSA, 2013d) provided age and sex-specific AI values from approximately 0.003 mg/d before 6 months age to approximately 2–3 mg/d in adulthood. AI is set to 3 mg/day (adult females and males). A provisional AR is set to 2.4 mg/day (adult females and males). The values are based on AI from observed dietary intake values from EFSA (EFSA, 2013d). Not sufficient data to derive UL.