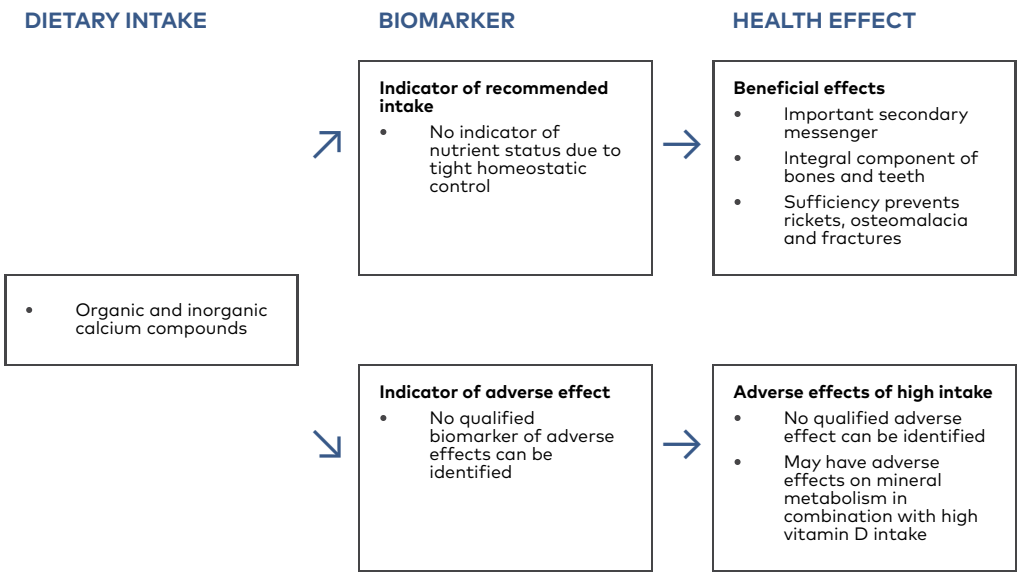
Calcium



	Females	Males
AR (mg/d)	750	750
RI (mg/d)	950	950

For more information about the health effects, please refer to the background paper by Kirsti Uusi-Rasi and Jóhanna E. Torfadóttir (Uusi-Rasi & Torfadóttir, 2023).

Dietary sources and intake. Calcium (Ca) is present in foods as calcium salts which are water-soluble, with a few exceptions. Most foods contain calcium but usually not in high concentrations. There are large differences in the bioavailability of calcium from foods and it is generally low from vegetables. Most of the dietary calcium intake is provided by milk and dairy products in the Nordic and Baltic countries. Other good food sources include cruciferous vegetables (e.g. kale, broccoli), and calcium-fortified foods. The average calcium intake ranges from 550 to 1200 mg/d (Lemming & Pitsi, 2022).

Main functions. Most (99%) of total body calcium is found in bones and teeth as calcium hydroxyapatite ($Ca_{10}[PO_4]_6[OH]_2$), where it has a structural role. In soft tissues and body fluids calcium (< 1%) serves as an essential regulator of several body functions, such as muscle contraction, the functioning of the nervous system, and blood clotting.

Interaction with other nutrients. Calcium intake can reduce the absorption of other divalent cations such as iron, zinc and copper. Calcium is regulated by the intake of vitamin D.

Indicator for recommended intake. Urinary and faecal calcium excretion combined with estimated losses in skin, and sweat reflect body saturation and may be used as an indicator for setting AR. Balance studies have provided an estimation of AR (Uusi-Rasi & Torfadóttir, 2023).

Main data gaps. There lacks data on the efficacy of calcium with or without vitamin D on extra skeletal health outcomes. In terms of a whole diet, more prospective research is needed to clarify the impact of plant-based diets on bone health (Newberry et al., 2014; Uusi-Rasi et al., 2013; Uusi-Rasi & Torfadóttir, 2023).

Deficiency and risk groups. Clinical signs of deficiency include osteopenia, osteoporosis, and fractures. Groups with no or low intake of dairy products, such as vegans, are at risk of deficiency if not consuming fortified foods or supplements. Risk groups for calcium deficiency include children, adolescents and young adults accumulating calcium in bones, postmenopausal women, and people of all ages following a diet, e.g., vegan, with no rich calcium and/or vitamin D sources (Lemming & Pitsi, 2022; Uusi-Rasi et al., 2013; Uusi-Rasi & Torfadóttir, 2023).

Dietary reference values. The AR and RI are based on data from balance studies and on epidemiological and clinical studies on the role of calcium in maintaining a healthy skeleton. For children and adolescents, the AR is derived using factorial approach based on estimates of calcium retention in the skeleton during growth in addition to the requirement for losses, adjusted for the percentage of absorption (EFSA, 2015e; Nordic Council of Ministers, 2014) (see Appendix 5). For children aged 11–14 and 15–17 years, the AR was first calculated separately for each sex and age group, and then averaged for a combined AR and RI for both females and males 11–17 years of age. The recommended intake for adolescents is partly extended to young adults (18-24 years), acknowledging that some bone mass is still accreted (EFSA, 2015e). The foetal need for calcium is met by maternal physiological changes. AR at age ≥25 years is set to 750 mg/day (females and males). RI is set to 950 mg/day (females and males). The values are based on EFSA (EFSA, 2015e). The UL for calcium for adults is based on evidence from intervention studies in which calcium intakes of 2500 mg/d were tolerated without adverse effects (EFSA, 2012b). UL for calcium is 2,500 mg/d.