

## STUDY

Intake of various micronutrients insufficient

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# Well fed, but not well nourished

*Do Dutch people take in sufficient vitamins and minerals? This question was the focus of PhD student Julia Bird's research at Wageningen University & Research based on the National Food Consumption Survey 2012-2016.<sup>1</sup> The research results provide cause for concern. A large portion of the Dutch population gets fewer micronutrients than the recommended amounts.*

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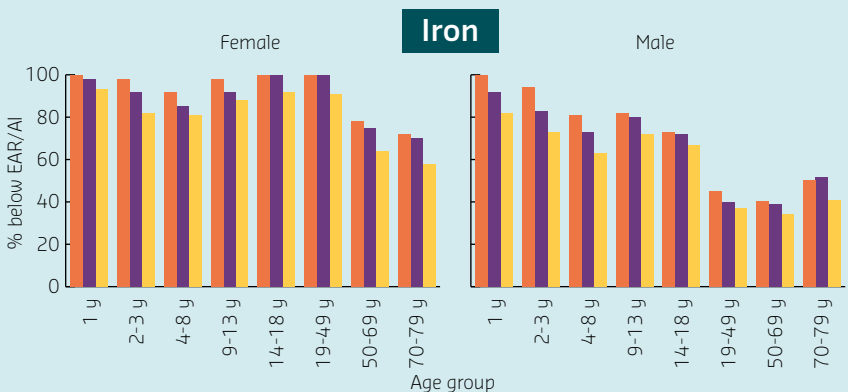
**A**lthough there is no food shortage – rather a food surplus – in the Western world, this is no guarantee that everyone takes in sufficient vitamins and minerals. Too often, many people eat highly processed foods that contain little or no vitamins and minerals that are naturally present in staple foods. Figures show that few people in the Netherlands eat according to the Dutch dietary guidelines (2015).<sup>2</sup> About a quarter of adults eat more than 200 grams of vegetables daily, but the recommendation of the Netherlands Nutrition Centre is even higher: more than 250 grams of vegetables per day. With fruit, things are even worse: less than one in five eat more than 200 grams a day. So it is not surprising that the intake of certain vitamins and minerals is low among several at-risk groups in the Netherlands and other European countries.<sup>3-5</sup> Incidentally, a chronically excessive intake of vitamins and minerals is not desirable either. That problem may arise with product fortification and supplementation.<sup>6</sup>

### New analyses

The intake of minerals and vitamins in the Netherlands was studied by PhD student Julia Bird of Wageningen University & Research and published in the European Journal of Nutrition. Bird and two other researchers investigated the intake of vitamins and minerals based on the National Food Consumption Survey (NFCS) 2012-2016.<sup>1</sup> This is the penultimate NFCS, because the most recent NFCS 2019-2021 was not yet available. It was not published until late 2023.

Bird's study looked at the percentage of participants by gender and age group who did not meet the "estimated average requirement" (EAR) or "adequate intake" (AI) and exceeded the "tolerable upper intake level" (UL) (see box). Because the margin between the EAR/AI and the UL is small, for folic acid and vitamins D and E there is a low risk of exceeding the UL. For calcium, iron, zinc, vitamins A, there is a high risk of exceeding the UL. Other vitamins and minerals were not considered. For the sources of vitamins and minerals, three groups were distinguished:

1. Non-fortified foods (staple foods)
2. Staple foods + fortified foods
3. Staple foods + fortified foods + dietary supplements



### Results

For the results, the percentage of participants who did not meet the estimated average requirement (EAR) for a micronutrient was first considered. The following graphs show the percentage below the EAR for each micronutrient by age group in women (left) and men.

#### Iron

The study shows that among girls/women between the ages of 1 and 49, about 80-100% did not meet the average requirement (EAR) for iron. Among women between the ages of 50 and 79, this was about 60-80%. Among boys/men between the ages of 1 and 18, about 65-100% did not meet the EAR. Men between 19 and 69 years of age scored the least poorly; 40% of them did not reach the EAR. The tolerable upper intake level (UL) was exceeded in 1% of men between 70 and 79 years of age. In women between the ages of 19 and 49 and men between 50 and 69, this was 0.5%. Staple and fortified foods did not contribute to exceeding the UL. Dietary supplements had limited impact on reducing the percentage of participants who did not meet the EAR. ➔

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### Zinc

About 50% of the participants did not meet the average zinc requirement. In participants between the ages of 19 and 69, fortified foods and dietary supplements contributed significantly to zinc intake. Consequently, the percentage in that age range that did not meet the EAR was also lower. Among children between 1 and 8 years of age, 10% exceeded the UL.

### AI instead of EAR

For calcium and vitamin A, the average requirement (EAR) could not be determined for all age groups. For those age groups, the adequate intake (AI) was used. However, the AI meets the needs of almost everyone instead of half of individuals, as the EAR does. In Bird's publication, the results show in a bar graph for each age group the percentage that did not meet the EAR or AI. Here it is not clear at which age category the EAR applies and at which the AI applies. However, since the AI will always be higher than the EAR, the percentage of participants failing to meet the AI will always be greater than the percentage failing to meet the EAR.

### Calcium

Nearly 50% of participants younger than 9 years of age did not meet the EAR or AI for calcium. Of the participants between the ages of 9 and 18 and 70 and 79 years, this was more than 75%. Intake of fortified foods and dietary supplements was low for calcium and did not help meet the EAR or AI. Less than 0.5% of participants exceeded the UL.

### Vitamin A

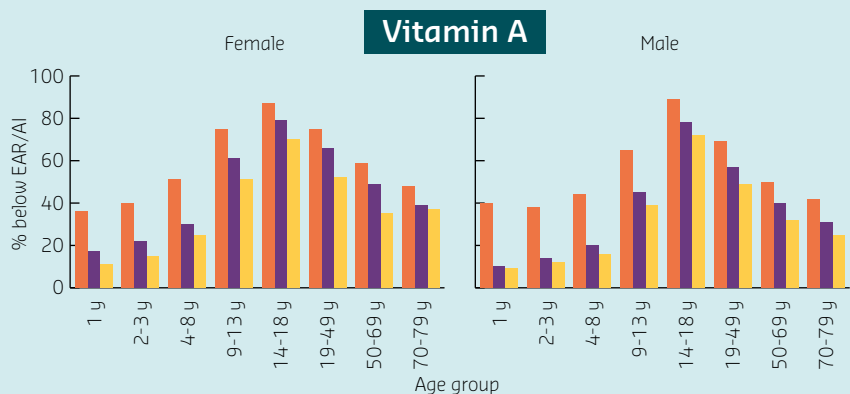
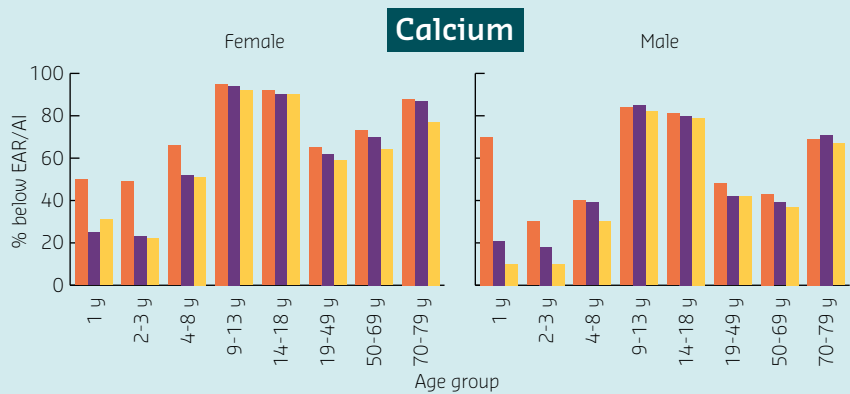
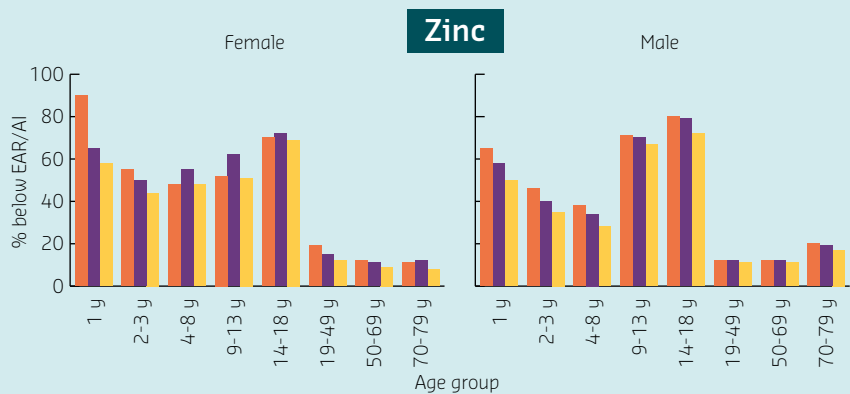
More than 50% of participants between the ages of 9 and 49 did not reach the EAR or AI of vitamin A. Despite a modest effect of fortified foods and dietary supplements on nutrient intake, the percentage of participants who did not meet the EAR or AI decreased in most age groups. About 10% of boys and 5% of girls between the

ages of 1 and 3 exceeded the UL. Both staple and fortified foods and dietary supplements contributed to this.

### Conclusions

Representative data on dietary intake across all age groups in the Netherlands shows that intake of calcium, iron, zinc and vitamin A are lower than recommended in much of an apparently well-nourished

population. This was most often demonstrated in adolescents (9-18 years old) and women. Fortified foods and dietary supplements made only modest contributions to intake. The authors state in their study that their research findings can be used for and by policymakers to develop nutrition strategies that increase vitamin and mineral intake.





## 5 questions for researcher Julia Bird

### 1. What prompted this study?

"We had a few reasons to do this study. The National Food Consumption Survey (NFCS) is a very comprehensive dataset about the Dutch diet. First of all, we wanted to make that available to food scientists, dieticians and other people interested in dietary intake in the Netherlands. In addition, we wanted to build on work by others who have published NFCS data. What our research adds is that we looked at nutrients from food, fortified foods and dietary supplements. That contributes to the overall picture of dietary intake."

### 2. How much micronutrients do we get through food and supplements?

"With a balanced and healthy diet, we could get everything from our food. But this research shows that there are deficiencies for many nutrients. The cause may be that it is difficult to get everything from food (such as vitamin D). But it may also be that certain groups need a lot – for example, for a growth spurt – have less appetite, or don't eat according to the Wheel of Five. In people who are lactose intolerant, there is a greater chance of calcium deficiency."

### 3. What micronutrients do we get too little of?

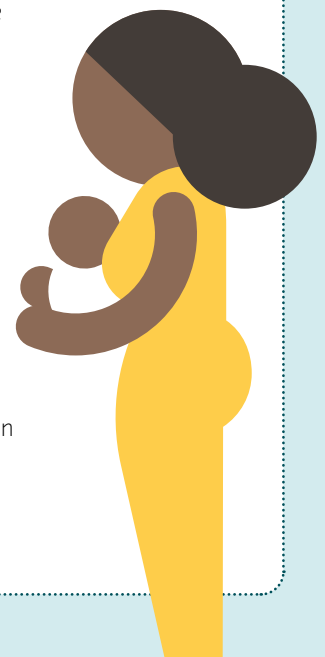
"Intake of vitamin D, calcium, folic acid and iron was too low in all age groups. In women – especially young women – it is difficult to get enough iron. Folic acid is mainly found in dark leafy vegetables and legumes. More of these should be eaten in the Netherlands. As for calcium, the Dutch diet generally contains plenty of dairy products, but we still see deficiencies. Apparently, not everyone has dairy in the refrigerator. But there are few other calcium-rich sources. The tolerable upper limit for zinc and vitamin A was exceeded by staple foods alone. Toddlers were most likely to exceed the tolerable upper limit for zinc, preformed vitamin A, vitamin B6 and folic acid. Dietary supplements caused further excess."

### 4. According to your research, what are the at-risk groups?

"Our study showed that teenagers and women between the ages of 19 and 49 are the ones at increased risk of nutrient deficiencies. Adolescents naturally grow fast and require relatively more nutrients per body weight for healthy growth. They also more often than average do not eat according to the Wheel of Five, do not like what is cooked at home, prefer to buy their own fast food or other unhealthy products. Elderly people often have less appetite, so they eat less, with the result that they get fewer nutrients. In our study, this does not show up; elderly people do not have more deficiencies than other groups."

### 5. What are possible consequences of insufficient micronutrient intake?

"That depends on which micronutrients are deficient. A long-term deficiency of vitamin D and calcium can affect growth in children. In the elderly, it affects the maintenance of strong bones and muscles, which can lead to falls and bone fractures. Folic acid is especially important for women who want to get pregnant; it supports the baby's growth in the first few weeks and reduces the risk of a birth defect. And in women who lose a lot of blood during menstruation, anemia can develop, making them feel tired and sick more often. For the vegetarian group, there are some nutrients where the risk of deficiencies is greater. These are nutrients that are found in large amounts or only in animal products, such as iron, zinc, omega-3 fatty acids, calcium, vitamin D, vitamin B12, protein and iodine."



## References

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