
Executive summary

What is the background to this advisory report?

Regulations and research undergo rapid development

European regulations, legislation and research in the field of vitamins, minerals and trace elements, known as micronutrients, undergo rapid development. It is for this reason that the Minister for Health, Welfare and Sport has asked the Health Council of the Netherlands for advice on reviewing its policy in this area in the light of new scientific developments.

The aim of the new policy is to ensure that as many people as possible consume adequate quantities of micronutrients while, at the same time, minimising the risk that people exceed the safe upper level of intake. In this advisory report, the committee set up to address this issue indicates the requirements for vitamin D.

Vitamin D is essential to the body

Vitamin D can be obtained from food, but strictly speaking it is not a true vitamin. That is because between April and October it can be produced in our skin thanks to the action of sunlight (ultraviolet radiation).

The amount of vitamin D produced in the skin depends not only on exposure to daylight but also on skin colour: less vitamin D is produced in dark skins than in pale skins. Vitamin D is important for strong bones, along with calcium. Insufficient vitamin D is also associated with muscle weakness and muscle cramps. A severe deficiency leads to weak, painful bones in children and the elderly. An excessively high vitamin D intake causes excessively high blood calcium levels, which gives symptoms of poisoning such as loss of appetite, weakness, fatigue, disorientation and vomiting. If this persists, calcium is deposited around organs such as the kidneys, the urinary tract, blood vessel walls, muscles and tendons.

What are the main scientific developments?

The amount of vitamin D in the body can be measured by means of an indicator: blood serum calcidiol levels. In 2000 the Health Council established dietary reference values for vitamin D on the basis of a serum calcidiol level of 30 nmol per litre. In this advisory report the committee sets a higher target figure (at least 50 nmol per litre of blood) for women aged 50 and over and men aged 70 and over.

This conclusion is based on recent research into the effects of vitamin D and calcium on bone quality, the risk of fracture and the risk of falling in the elderly. The effects are the largest among post-menopausal women who are institutionalized. As bone loss accelerates around the menopause, the committee assumes that the higher target is appropriate for women aged 50 and over.

A good vitamin D supply is known to be important for bone quality and has recently been linked to a lower risk of many other conditions as well, such as cardiovascular disease, auto-immune diseases, infectious diseases and type 2 diabetes. However, the committee finds that the evidence for these effects is not yet strong enough to allow it to issue recommendations.

What is the position with regard to vitamin D supply?

Vitamin D deficiency occurs in all sections of the Dutch population

Inadequate vitamin D status is observed in all sections of the Dutch population. The proportion is higher at the end of winter than at the end of summer (table 1). The figures for pregnant women are probably also applicable for women who are breastfeeding. Vitamin D intake is also too low among children aged up to four who are not receiving follow-on milk or a vitamin D supplement (about four per cent of children aged one year and twelve per cent of children aged eighteen months).

Table 1 The occurrence of vitamin D deficiency among the Dutch population.

Population group	Serum calcidiol criterion	Percentage throughout the year ^a	Percentage in summer	Percentage in winter
Newborn infants with light skin	< 30 nmol/l	15		
Newborn infants with dark skin	< 30 nmol/l	65		
Children with light skin	< 30 nmol/l	5	0	
Children with dark skin	< 30 nmol/l	15-30		40
Children on a macrobiotic diet	< 30 nmol/l		10	80
Adults with light skin	< 30 nmol/l	5-10		
Adults with dark skin	< 30 nmol/l	15-60		
Pregnant women with light skin	< 30 nmol/l	5-10		
Pregnant women with dark skin	< 30 nmol/l	55-65		
Elderly people living independently	< 50 nmol/l	50	35	50
Residents of care homes	< 50 nmol/l	0-85		

^a The percentages are rounded to the nearest 5, as different cut-off points were used in the various studies.

What is the best way of improving vitamin D supply?

Provide more information about the importance of vitamin D, and make the message consistent

The committee feels that the current information is not altogether clear. It is important that the various official bodies involved in the provision of information about boosting vitamin D intake by means of supplement or diet should give the same advice.

A positive exception is the provision of advice on supplements for children aged up to four, where new actions have been taken to increase the use of supplements. Pre-conception care units and infant welfare centres could be involved in recommending additional vitamin D intake during pregnancy and while women are breastfeeding.

Underline the importance of spending at least a quarter of an hour a day out of doors

The committee recommends that people should spend at least a quarter of an hour a day out of doors to help vitamin D production in the body, while taking care to avoid sunburn. The committee feels that exposing at least the head and hands should not be emphasized in the information, because it is actually brief exposure of larger parts of the body, such as the arms and legs, that boosts vitamin D production. But this exposure only generates vitamin D between April and

October. During the winter, people rely on the physical reserve of vitamin D they have built up over the summer in combination with dietary vitamin D.

Also stress the importance of supplementing intake through diet

A healthy diet should provide enough vitamin D (and calcium) for people aged between four and 50 (women) or 70 (men) with light skin who spend enough time outdoors. All other groups need additional vitamin D from supplements.

People who do not take supplements would benefit from eating foodstuffs fortified with vitamin D, but very few such foodstuffs are currently available. And even if there were enough products on the market, their consumption would not provide all the additional vitamin D needed.

The information should contain clear recommendations for additional vitamin D

The committee believes that the currently recommended additional vitamin D levels for certain groups are too low. It advises the following targets:

- an additional 10 micrograms of vitamin D a day for:
 - children aged up to four*;
 - people aged between four and 50 (women) or 70 (men) who have dark skin, who do not spend enough time outdoors;
 - women aged up to 50 who wear a veil;
 - women who are pregnant or are breastfeeding;
 - people aged over 50 (women) or 70 (men) who have light skin and who spend enough time outdoors.
- an additional 20 micrograms of vitamin D a day for:
 - people who have osteoporosis, who live in a care home or nursing home, people aged over 50 (women) or 70 (men) who have dark skin or who do not spend enough time outdoors, and women aged over 50 who wear a veil.

The committee assumes hereby that calcium intake is adequate.**

* This advice does not apply to children consuming more than half a litre of infant formula or follow-on formula a day.

** 'Adequate' in the sense that it is at the level of the dietary reference value.

Importance of preventing excessively high vitamin D intake from supplements and/or dietary sources

The committee emphasises that it is essential for vitamin D intake to remain below the safe upper intake limit when people are taking supplements and/or eating fortified foodstuffs. Dietary supplements that contain more than the quantities of vitamin D given above in a daily ration must therefore be taken with caution. Children are at the greatest risk of exceeding this limit. The committee advises addressing this issue by registering the composition of fortified foodstuffs: at the moment it is not known precisely which foodstuffs are fortified with vitamin D and how much they contain. This information is however available for supplements.

It is also important that dietary vitamin D intake and the vitamin D status of the Dutch population as a whole and of high-risk groups in particular are monitored. Policy may be adjusted in the light of the results.

Measures can also be taken at European level

The committee thinks that vitamin D should continue to be added to margarine, low-fat margarine, and products used in baking and frying. It also recommends that the type of foodstuffs to which vitamin D can be added in Europe should be restricted to milk, milk substitutes and oil, rather than allowing it to be added to any product without restriction as is the case at present. The advantage of these products is that they are consumed in large quantities by high-risk groups. The advisory report contains proposed fortification levels for these products, which do not put children or adults at risk of excessively high intake when they are consumed in combination with supplements.