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## Executive summary

Health Council of the Netherlands. Towards an adequate intake of vitamin A. The Hague: Health Council of the Netherlands, 2008; publication no. 2008/26

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### Background to this advisory report

Regulations and research undergo rapid development

European legislation, regulations and research in the field of vitamins, minerals and trace elements, known as micronutrients, undergo rapid development. That is why the Minister for Health, Welfare and Sport has asked the Health Council of the Netherlands for advice in connection with a review of policy in this area.

The aim of the 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, a specially appointed committee indicates what is necessary in the case of vitamin A.

Vitamin A is essential for the body

Vitamin A is a fat-soluble vitamin that is important for sight at low light levels, for reproduction, the immune system, growth and development. Too much vitamin A can cause problems in the functioning of the liver and, in the case of pregnant women, in foetal development. That is why pregnant women should avoid liver, liver products and supplements containing vitamin A.

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There are various sources of vitamin A

Only foodstuffs of animal origin contain vitamin A: liver and liver products contain large amounts. It is also added to margarine, low-fat margarine and products used for baking and frying (except oils), in the same proportions as are naturally found in butter. The body can also produce vitamin A itself from provitamin A carotenoids. The main sources of these provitamins are dark green leafy vegetables and some yellow and orange varieties of fruits and vegetables. Dairy fat and egg yolk also contain these substances.

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### **What are the main scientific developments?**

A high intake of beta carotene from supplements increases the risk of lung cancer among certain groups

Experimental research has shown that the use of supplements containing at least 20 milligrams of beta carotene a day increases the risk of lung cancer in smokers and asbestos workers.

A high vitamin A intake may be associated with a greater risk of osteoporosis

Observational research indicates that a high intake of vitamin A from foodstuffs and supplements may be associated with a greater risk of osteoporosis.

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### **What is the situation with regard to vitamin A intake?**

It appears that both excessively high and excessively low vitamin A intake occur

Data on vitamin A intake reveals that 20 to 30 per cent of the Dutch population may have an excessively low vitamin A intake. On the other hand, almost 10 per cent of children aged two or three may have an excessively high intake, consuming up to 600 microgram retinol activity equivalents (RAE) too much of vitamin A. This excessively high intake is related mainly to consumption of large amounts of liver, liver products and supplements containing vitamin A. Further research is needed to ascertain whether this poses a real problem.

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### **How can vitamin A intake be improved?**

A good, varied diet provides enough vitamin A

A good, varied diet provides enough vitamin A without exposing people to the risk of excessively high intake. The latter point is not true in the case of women who are pregnant or who plan to conceive: the committee is of the opinion that these groups should still be advised to avoid liver, liver products and dietary supplements containing vitamin A during pregnancy in order to reduce the risk of congenital abnormalities in the child.

Smokers should be advised against taking supplements with high doses of beta carotene

Smokers and asbestos workers should be advised (besides the advice to give up smoking) to avoid taking supplements containing 20 milligrams of beta carotene or more a day.

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### **What other aspects need to be investigated?**

Research into whether an excessively low intake of vitamin A really causes vitamin A deficiency

The committee recommends that research using stable isotopes be conducted into the vitamin A status of people who do not consume margarine, low-fat margarine or non-oil products used for baking and frying. The results of this research should indicate whether vitamin A intake is really inadequate in these individuals.

Research into whether an excessively high intake of vitamin A among children is really a problem

In order to ascertain whether excessively high vitamin A intake among young children is really a problem, research should be conducted into the link between vitamin A intake and the activity of liver enzymes in the blood, the children's vitamin A status and the extent of vitamin A accumulation in the liver.

Research as to whether an excessively high intake of vitamin A increases the risk of osteoporosis

The committee believes that further research is needed into the indications that high vitamin A intake is associated with lower bone density and a greater risk of bone fracture.

Evaluate the dietary reference values for vitamin A

The dietary reference values and safe upper levels of intake for vitamin A were drawn up in 1989. In this advisory report the committee has moved on from these values, using instead dietary reference values based on those established by the American Institute of Medicine, in which Dutch growth curves have been incorporated. It has also used the safe upper levels of intake established by the EU Scientific Committee on Food.