

Cadmium and inorganic cadmium compounds

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Executive summary

Health Council of the Netherlands



In 2013, the Health Council of the Netherlands published an advisory report on occupational exposure to cadmium and inorganic cadmium compounds. In this advisory report, the Dutch Expert Committee on Occupational Safety (DECOS) supported the recommendations that were derived by the Scientific Committee on Occupational Exposure Limits (SCOEL) in 2010. In 2017, the SCOEL derived a new advisory value. The Committee has evaluated this value and concludes that it is scientifically insufficiently substantiated. The Committee therefore recommends the State Secretary to maintain the previous advisory values.

Cadmium and inorganic cadmium compounds and health risks

Cadmium and inorganic cadmium compounds are harmful to health. Occupational exposure to cadmium in the air can lead to adverse health effects. After inhalation, the substance accumulates in the body and can subsequently damage, amongst others, kidneys and bones. Also, the ingestion of cadmium-contaminated

food and smoking contributes to the exposure. In addition, inhaling cadmium in the workplace can lead to emphysema and possibly lung cancer.

Advisory values of SCOEL 2010

The SCOEL recommended in 2010 to maintain a biological limit value to protect against kidney damage due to exposure to cadmium (both occupational as well as non-occupational). The SCOEL recommended a value of 2 microgram (μg) cadmium per gram creatinine in the urine. In addition, the SCOEL recommended a health-based advisory value for occupational exposure in air to specifically protect against adverse effects of the lung. The SCOEL based this value on the *respirable fraction*, which means the fraction of the substance in air that can penetrate into the alveoli. The advisory value derived by SCOEL is 4 microgram (μg) cadmium per cubic metre (m^3) air. Both advisory values should be used combined.

In 2013, the Health Council of the Netherlands published an advisory letter on occupational

exposure to cadmium and inorganic cadmium compounds. The Committee concluded that the advisory values proposed by the SCOEL in 2010 were scientifically sufficiently substantiated.

Advisory values of SCOEL 2017

In 2017, the SCOEL again drafted an advisory report on cadmium and its inorganic compounds. In this report, the SCOEL proposed a health-based advisory value of 1 μg cadmium per m^3 air. That value relates to the *inhalable fraction*, which is the fraction of the substance in air that can be inhaled through the nose and/or mouth. According to the SCOEL, this value protects also against adverse effects on the kidneys and therefore does not have to be applied in combination with the earlier proposed biological limit value.

In addition, the SCOEL concluded that a skin notation is not warranted.

Evaluation of the DECOS

The DECOS of the Health Council of the Netherlands has evaluated the new SCOEL



health-based advisory value of 1 µg cadmium/m³ (inhalable fraction) for cadmium and inorganic cadmium compounds. This Committee concludes that this value is scientifically insufficiently substantiated. The studies used by the SCOEL for derivation are poorly mutually comparable and have methodological limitations. For instance, damage to the kidneys is defined in different ways, in several studies it is not clear which fraction of cadmium in air was measured, and the number of individuals examined is very limited. The Committee emphasizes that the previous recommendation (a biological limit value in combination with an advisory value in air) takes into account that people can also be exposed non-occupationally

to cadmium. This is important as cadmium accumulates in the body.

The Committee notes that there is no indication for a substantial contribution of dermal uptake to systemic exposure to cadmium, and therefore supports the conclusion of the SCOEL that a skin notation is not warranted.

Recommendation to the State Secretary

The Committee recommends to maintain the previous recommendation of the Health Council of the Netherlands, which consists of a biological limit value in the urine of 2 µg cadmium/g creatinine combined with a health-based advisory value in air of 4 µg cadmium/m³ (respirable fraction).



The Health Council of the Netherlands, established in 1902, is an independent scientific advisory body. Its remit is “to advise the government and Parliament on the current level of knowledge with respect to public health issues and health (services) research...” (Section 22, Health Act).

The Health Council receives most requests for advice from the Ministers of Health, Welfare and Sport, Infrastructure and Water Management, Social Affairs and Employment, and Agriculture, Nature and Food Quality. The Council can publish advisory reports on its own initiative. It usually does this in order to ask attention for developments or trends that are thought to be relevant to government policy.

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