

Power lines and health: cancer in adults

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Executive summary

Health Council of the Netherlands



In the Netherlands, a precautionary policy is in place with regard to power lines. The purpose of this policy is to avoid, as much as possible, creating new situations in which children are subjected to long-term exposure to magnetic fields with an annual average field strength above 0.4 microtesla that are generated by overhead power lines. This precautionary policy is partly based on an earlier advisory report issued by the Health Council of the Netherlands. In 2000, the Council concluded that there are indications that children who live near such power lines are at a greater risk of developing leukaemia than other children. The cause is unknown, although the magnetic fields generated by the power lines may play a role.

Three advisory reports

The State Secretary for Infrastructure and the Environment (now Infrastructure and Water Management) asked the Health Council of the

Netherlands to update the advisory report issued in 2000 and to focus not only on childhood leukaemia, but also on Alzheimer's disease and cancer in adults. The report on childhood leukaemia was published in 2018. In that report, the Health Council suggested considering an expansion of the precautionary policy to other sources of long-term exposure to magnetic fields generated by the electrical grid, such as underground power cables, transformer stations and transformer substations. The current report relates to cancer in adults. Neurodegenerative diseases are addressed in a separate report.

Working method

The Committee on Electromagnetic Fields of the Health Council has analysed the scientific data on a possible relationship between exposure to magnetic fields generated by power lines and other sources, such as transformers, and the

occurrence of various types of cancer in adults. It has mainly focused on epidemiological studies, taking into account studies on exposure in both residential areas and the workplace. In some occupational groups, the average level of exposure to magnetic fields is substantially higher than in residential areas. If magnetic fields can affect health, this will be more evident among such occupational groups. However, it should be noted that workers are a more homogeneous group than the general population, as the latter includes potentially more vulnerable groups such as children, the elderly and chronically ill people.

In most epidemiological studies, the level of exposure to magnetic fields is approximated. In residential studies, the assessment of the magnetic field strength in the home is usually based on calculations or measurements. Sometimes the distance between the home and



an overhead power line is used as a proxy for the level of exposure. In occupational studies, the level of exposure is usually reconstructed based on the employees' job history.

Epidemiological studies can show that, at certain levels of exposure, a certain illness occurs more frequently than would otherwise be expected. Such an association does not necessarily mean that exposure causes the illness, although it can be an indication for possible causation.

Conclusions

Residential studies revealed an association between the proximity of overhead power lines and an increased risk of leukaemia in adults. In occupational studies, exposure to magnetic fields above the background level was also found to be associated with an increased risk of leukaemia. The committee considers this to be suggestive of a causal relationship. These findings are in line with the conclusion from the previous Health Council report that there are

indications of an increased risk of leukaemia among children who live in the vicinity of overhead power lines for a prolonged period. With regard to the other investigated types of cancer, residential studies did not show associations between the proximity of overhead power lines and disease risk. However, the scale and quality of this research are limited. The committee therefore considers the results from the residential studies to be insufficient to infer a causal relationship between the proximity of power lines and the risk of developing these types of cancer.

Among occupational groups with substantially higher levels of exposure to magnetic fields than found in residential areas, associations have also been found for several other types of cancer than leukaemia. Associations were found between occupational exposure and the risk of developing male breast cancer, brain cancer and pancreatic cancer. The committee considers the associations found in the workplace to be suggestive of a causal

relationship between occupational exposure and these types of cancer.

In order to establish a causal relationship, additional information from experimental research (including animal studies) and mechanistic studies is necessary. The most recent reviews of such studies do not provide additional support for a causal relationship.

Recommendations

Residential studies suggest that leukaemia is more prevalent among adults who live near overhead power lines. The committee considers this to be an additional argument in support of the current policy concerning overhead power lines, which is already based on precaution due to earlier indications of a possible causal relationship between proximity to power lines and the risk of childhood leukaemia.

The committee also considers this to be an additional argument in support of the previous recommendation to consider expanding this policy to underground power cables and other



sources of long-term exposure to magnetic fields from the electrical grid, such as transformer stations and transformer substations.

The committee has found indications that occupational exposure to magnetic fields that is substantially higher than can be found in residential areas could be related to a higher risk of various types of cancer. As a precaution, it therefore recommends restricting occupational exposure to magnetic fields to as low a level as is reasonably possible.

The committee does not expect that more epidemiological research will provide greater certainty in the short term regarding the effect of exposure to magnetic fields on the risk of cancer. The committee believes that more research into possible underlying biological mechanisms would be more effective.

Due to the energy transition, there has been a substantial increase in the use of wind turbines and solar panels as a primary source of energy.

The use of electric cars and heat pumps is also on the rise. As a result of these changes in production and consumption, more electricity will need to be transported. Consequently, levels of exposure to magnetic fields in the vicinity of components of the electrical grid and in some workplaces may increase. For this reason, the committee recommends monitoring of the level of exposure to magnetic fields in residential areas and in the workplace.



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.

Most Health Council reports are prepared by multidisciplinary committees of Dutch or, sometimes, foreign experts, appointed in a personal capacity. The reports are available to the public.

This publication can be downloaded from www.healthcouncil.nl.

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