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OCCUPATIONAL EXPOSURE TO BENZENE AND RISK OF NON-LYMPHOID LEUKEMIA

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Our aim was to investigate relations between specific occupational exposures to benzene and mortality from non-lymphoid leukemia. A matched case-control study was conducted using New Jersey death certificates for the years 1979-1986. Cases were 1038 white males aged 16 years or older at death who died of non-lymphoid leukemia. Controls were 1693 white males matched on date of death, age, and county of residence, who died of other malignant neoplasms. Exposure was defined as occupational and industry as recorded on the death certificate and coded using 1990 Census classifications. Results showed no increased risk of mortality from non-lymphoid leukemia associated with gas station employment (OR 1.6, 95% CI 0.4-6.4) or work as an automobile mechanic (OR 0.6, 95% CI 0.30-1.4), although there were few numbers of exposed individuals. Future studies are needed to clarify positive relations found with trucking service employment (OR 1.7, 95% CI 1.0-2.8) and work as a bus and/or truck mechanic (OR 4.1, 95% CI 0.9-8.5).

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ESTIMATION OF EXPECTED UTILITY GAINED OR LOST OF AN INDIVIDUAL OR A POPULATION BY QUALITY ADJUSTED SURVIVAL TIME

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Using quality-adjusted life year (QALY) as a common unit, we have developed methods to estimate the utility gained or lost of an individual or a population. By combining data from a life table and data of the corresponding health-related quality of life (HRQL) from a cross sectional survey, we can compute the quality-adjusted survival time (QAST) of a particular population. The difference of QASTs from an average healthy person and an average patient of a specific illness is the expected utility loss of a population attributed to the illness in the time period. Similarly, the number of new cases which a prevention program can reduce, multiplied with the expected utility loss per patient is the total expected utility gained from the program. A general equation is proposed to compute the total expected utility gained from a prevention program for multiple illnesses. A hypothetical example of helmet enforcement in Taipei city for half a year was used to demonstrate the estimation. The limitations and possible applications of these methods for comparative environmental health risk assessment, policy planning and evaluation of health services are also discussed.

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UNCERTAINTY ANALYSIS OF HEALTH RISKS OF CHLOROFORM IN DRINKING WATER USING MONTE-CARLO SIMULATION

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Most water supplies in Korea utilize chlorine to desinfect drinking water, and chloroform is formed during the process. Chloroform is known as a probable human carcinogen. The range of health risks of chloroform, instead of a point estimate, was determined using Monte-Carlo simulation by the Crystal Ball software program. In addition, the total risk was evaluated by integrating multiple pathway exposures. The exposure pathways included all plausible uptake routes such as direct ingestion, dermal contact while showering and bathing, and inhalation of emissions from indoor appliances. Sensitivity analysis was also performed to determine the input parameters which contributed most to the variances. Data about chloroform concentrations in drinking water in several regions of Korea from 1987 to 1994 were integrated. The distribution of chloroform concentrations was extremely skewed to the right, and therefore, the empirical distribution was used for simulation. Water use patterns of Korean people, such as daily water intake, were surveyed and used as input parameters. The total risk of chloroform at the 50th percentile and 95th percentile were estimated to be 4.42×10^{-6} and 5.62×10^{-4}, respectively. When considering multiple pathway exposure, the median value of risk was 20 times higher than that from only one ingestion route. Inhalation exposure was revealed to be the predominant pathway. Also, the inhalation rate per body weight, and the chloroform concentration in drinking water were found to be significant contributing factors to risk in the sensitivity analysis.

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PREDICTION OF HEALTH EFFECTS CAUSED BY AIRCRAFT NOISE AROUND SCHIPHOL AIRPORT

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Because of a planned expansion of Schiphol Airport, an Environmental Impact Assessment was made in 1993, including a Health Impact Assessment (HIA). The risk of health effects due to aircraft noise was estimated by evaluating current noise levels and the available body of scientific evidence on health effects from noise. Based on model calculations of noise exposure, causal inference and exposure-response relations derived from the literature, the extent of annoyance, hypertension, and sleep disturbance caused by aircraft noise was calculated.
In 1991, around 113 000 people, in a total population of around 2 million people, are estimated to be extremely annoyed by aircraft noise in areas with aircraft noise levels >20 Kosten Units (Ke; ≈ 45 dB(A) $L_{Aeq,24h}$). In the area >35 Ke (≈ 60 dB(A) $L_{Aeq,24h}$) about 110 000 people are estimated to be extremely annoyed. Based on a relative risk of 1.3, around 1500 extra cases of hypertension (on a total of 162 000 hypertensives, ≥20 years of age) are expected in areas with increased aircraft noise levels of more than 40-45 Ke (≈ 65 dB(A) $L_{Aeq,24h}$), in 1991. The estimated number of people with subjective sleep disturbance living in areas with nighttime equivalent aircraft noise levels of at least 20 and 27 dB(A) is 100 000 and 13 000 respectively, in 1990.
The results of this HIA should be interpreted with care due to the uncertainties involved. Firstly, there are only limited data about the actual noise exposure and exposure-response relations. Only a few exposure-response relations reported in the literature proved to be suitable for a quantitative HIA. Secondly, most studies were carried out at high noise levels, often under laboratory conditions. The extrapolation of effects to the lower exposure levels to which the general population is exposed, therefore has a large margin of uncertainty.

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