

Inequity in cancer incidence between occupational categories – a 45 year follow-up study of five Nordic populations

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Abstract

Objectives: Our giant Nordic Occupational Cancer (NOCCA, <http://astra.cancer.fi/NOCCA>) study covers all 15 million working-aged persons who participated in at least one of the population censuses between 1960 and 1990 in Denmark, Finland, Iceland, Norway and Sweden, and the subsequent 2.8 million incident cancer cases diagnosed in these people in a follow-up until 2005. All Nordic countries have a nation-wide registration of incident cancer cases during the entire study period.

Methods: The observed number of cancer cases in 70 diagnostic categories in each group of persons defined by country, sex, age, period and occupation was compared with the expected number calculated from the stratum-specific person years and the incidence rates for the national population. The result was presented as a standardised incidence ratio, SIR, defined as the observed number of cases divided by the expected number.

Results: For all cancers combined, the study showed a wide variation among men from an SIR of 0.79 (95% confidence interval 0.66-0.95) in domestic assistants to 1.48 (1.43-1.54) in waiters. The occupations with the highest SIRs also included workers producing beverage and tobacco, seamen and chimney sweeps. Among women, the SIRs varied from 0.58 (0.37-0.87) in seafarers to 1.27 (1.19-1.35) in tobacco workers. Low SIRs were found for farmers, gardeners and forestry workers in both genders. The variation in relative risk across occupational categories varied considerably between cancer types. For mesothelioma, there was a 20-fold variation in risk among plumbers as compared to farmers, while the variation between the lowest and highest occupation-specific incidence of cancers of colon or brain was not even two-fold.

Conclusions: The Nordic countries are known for equity and free and equal access to health care for all citizens. The present study shows that the risk of cancer, even under these circumstances, is highly dependent on the person's position in the society. These differences seem not to decrease in recent years. Direct occupational hazards – such as asbestos exposure – seem to explain only a small part of the observed variation, while indirect factors such as lifestyle changes related to longer education and decreasing physical activity become more important. Subsequent studies within the NOCCA project will focus on associations between specific work-related factors and specific cancer diseases with the aim to identify dose-response patterns. These in-depth studies utilise the Nordic Job Exposure Matrix that transforms information about occupational title histories to quantitative estimates of specific exposures. Information of non-occupational co-factors will also be available. Because risk factor information will be partly available on an individual level but partly only on an aggregate level, a methodological development targeted at better interpretation of results is an essential component of NOCCA networking.