

Occupational Cancer-1

01C.1 KEY FEATURES OF THE NEW PREAMBLE TO IARC MONOGRAPHS

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Background The Preamble to the IARC Monographs describes the objective and scope of the programme, general principles and procedures, and scientific review and evaluations. Since 1971, the Preamble has been updated periodically. In 2018 IARC convened an Advisory Group (AG) to Recommend an Update to the Preamble.

Methods In advance of the meeting IARC engaged with Governing Council members, WHO and senior IARC staff. In order to take into account scientific input from all stakeholders in a comprehensive and transparent way, IARC solicited online submission of scientific comments and presentations at a scientific webinar. Starting in September, the Advisory Group began to discuss the public comments and draft updates to the Preamble, working in subgroups. The AG then participated in a 3 day meeting held on 12–14 November 2018 in Lyon, France.

Results The updated Preamble confirms additional commitments to principles of scientific rigour, impartial evaluation, transparency, and consistency. Advancements in methods of systematic review provide a basis for enhancing transparency through more specific guidance to Working Group members. Specifically, reviews of exposure assessment quality will be integrated with human cancer studies and mechanistic data. The critical role of informed judgement by experts is an integral component of the Monograph evaluation process and reliance on standardized checklists would be counterproductive; the informativeness of each study will be explicitly considered in future Monographs. The key characteristics of carcinogens provide a framework for organizing mechanistic evidence and assessing its strength. The overall evaluation draws on the mechanistic, animal bioassay, and human evidence in a more integrated fashion. The AG recommended clarification regarding the distinction between Group 2A and Group 2B.

Conclusions This new Preamble will enable IARC to take advantage of the scientific and procedural advances and strengthens the transparent method for the identification of carcinogenic hazards, the first step in cancer prevention.

01C.2 ABSTRACT WITHDRAWN

01C.3 NIGHTSHIFT WORK AND RISK OF LYMPHOMA SUBTYPES

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Introduction In 2010, the International Agency for Research on Cancer (IARC) classified 'Shiftwork that involves circadian disruption' as a probable human carcinogen (group 2A), based on limited evidence from epidemiological studies and sufficient evidence from experimental animal studies. The epidemiological results were consistent for breast cancer. More recent publications suggested an increase in risk for ovarian and endometrial cancer, prostate cancer, and colorectal cancer.

Sleep deprivation is common in shift workers, and it leads to disruption of the transcription of genes implicated in the regulation of the immune response.

Objectives As depression of the immune system is a known risk factor for lymphomas, we explored the association between risk of lymphoma subtypes and nightshift work with a case-control study design.

Materials and methods Based on the lifetime occupational history available for 323 cases and 463 controls who participated in a case-control study on lymphoma etiology conducted in Sardinia (Italy) in 1998–2006, expert occupational physicians assessed nightshift work for each job entry of each study subject. We calculated risk of major lymphoma subtypes, namely diffuse large B cell lymphoma, follicular lymphoma, chronic lymphocytic leukemia, multiple myeloma and Hodgkin lymphoma, associated with cumulative days of nightshift work with unconditional logistic regression, adjusting by age, gender, and education.

Results None of the lymphoma subtypes we investigated showed an association with lifetime cumulative days of nightshift work. Contrary to our expectation, risk of all lymphomas combined tended to decrease with cumulative days of nightshift work.

Conclusions Further studies are warranted to investigate in more detail whether sleep deprivation resulting from nightshift work might be implicated in lymphomagenesis. Future investigations should include information on the chronotype of study subjects, the specific shift rotation schedule applied in each workplace, usual hours of sleep per day, and occurrence of daytime sleepiness.

01C.4 CANCER INCIDENCE AMONG LEAD-EXPOSED WORKERS IN TWO COUNTRIES

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Introduction Inorganic lead is considered a probable carcinogen by IARC (brain, lung, and stomach).

Methods We conducted internal analyses via Cox regression of cancer incidence in two cohorts of lead-exposed workers with blood lead data (Finland, UK), including almost 30 000 workers (20 752 in Finland and 9122 in the UK) and over 10 000 incident cancers. Our exposure metric was maximum annual blood lead (BL) test.

Results The combined cohort had a median maximum blood lead of 29 ug/dl, a mean first year BL test of 1977, and was 87% male. Forty-seven percent had more than 1 BL test. Significant ($p < 0.05$) positive trends, using the log of each

worker's maximum BL, were found for brain cancer (malignant and benign combined), Hodgkins's lymphoma, lung cancer, and rectal cancer, while significant negative trends were found for colon cancer and melanoma. A borderline significant positive trend ($0.05 \leq p \leq 0.10$) was found for esophageal cancer. Significant interactions by country were found only for lung cancer, with Finland showing a strong positive trend and the UK showing only a modest trend. However, in general trends were marked in Finland and weak or inconsistent in the UK.

Conclusions We found strong positive incidence trends with increasing blood lead level, for several outcomes in internal analysis. Two of these, lung and brain cancer, were a priori suspected sites. Two of these outcomes are associated with smoking (lung and esophageal cancer), for which we had no data; however, we had no a priori reason to believe smoking differed between workers with different BL levels.

01C.5 ASSESSMENT AND ASSIGNMENT OF EXPOSURE TO ASBESTOS FOR AN INDUSTRIAL COHORT OF CHRYSOTILE MINERS AND PROCESSORS

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Introduction Historical dust concentrations are available for an occupational cohort study of workers active for 12 months or more between 1975 and 2010 in a chrysotile mine and processing factories in Asbest, Russian Federation. Their occupational histories were ascertained back to as early as the 1930s. A cohort specific job-exposure matrix (JEM) to estimate exposure to asbestos dust and fibre was elaborated.

Methods Almost 1 00 000 recorded dust concentrations were used to develop an asbestos dust JEM and previously derived conversion factors were applied to estimate an asbestos fibre JEM. Where dust concentrations were not available, linear mixed models were used to impute missing data. Both JEMs were applied to the occupational histories of over 30 000 individual workers (over 35% female workers) based on job title and year worked.

Results Assigned exposures varied over time with higher levels in the earlier years of activity. Approximately 97% of 2 00 000 person-years in the factories and 89% of 3 15 000 person-years in the mine had exposure assigned based on actual measurements. The median cumulative dust exposure for the exposed cohort was almost 50 mg/m³-years, with women slightly lower than men. The median cumulative fibre exposure for was 37 fibres/cm³-years for both men and women.

Discussion and conclusion A key strength of this study is the availability of high-quality measurement data covering workers' occupational histories. The dust and fibre JEMs enable estimation of annual profession-specific exposure levels that will form the basis of quantitative exposure estimates in the study and consequently quantitative exposure-response analyses.

01C.6 IS ADJUSTMENT FOR SMOKING NEEDED IN A COHORT STUDY OF CANCER MORTALITY AMONG CHRYSOTILE ASBESTOS FACTORY AND MINE WORKERS?

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Introduction A retrospective cohort study of 35 840 employees is currently being conducted in a chrysotile mine and its processing facilities in Asbest, the Russian Federation. The primary aim is to quantify exposure-response relationships for cancers potentially associated with chrysotile exposure. Some of those cancers are also tobacco-related; however individual-level information on tobacco use is not available for the full cohort. To address this gap, a cross-sectional study of current and retired workers from JSC Uralasbest was conducted to assess the relationship between smoking status and workers' exposure to chrysotile.

Methods Self-administered questionnaires were completed by current workers during meetings organized by occupational safety specialists. Retired workers filled in questionnaires during Veterans' meetings or were interviewed via telephone or at home. Estimates of exposure to chrysotile were available for 999 current and 3795 retired workers who were linked to the cohort study.

Results Among the 7451 respondents (n=3698 men and n=3753 women), 66% of men and 9% of women were ever-smokers. Smoking prevalence was stable across birth decades in men, but increased from <10% in women born before 1960 to 30% in women born after 1980. Among ever-smokers, men smoked more cigarettes per day than women. The smoking prevalence was similar in exposed and non-exposed men, and did not increase with exposure category. The greatest difference in the proportion of smokers among women was observed between non-exposed (4%) and all exposed categories combined (7.5%), whereas there was little variation across categories of exposure (7%–8%). Overall, the self-reported smoking prevalence may have been underestimated, especially in the older age categories due to survivor bias.

Conclusion While no adjustments for smoking among men appear necessary in the future analyses, including smoking propensity by birth cohort for women may be useful.