Oral Presentation

Shift Work

0333 NIGHT SHIFT WORK AND BREAST CANCER RISK: A COMBINED ANALYSIS OF POPULATION-BASED CASE-CONTROL STUDIES WITH COMPLETE WORK HISTORIES

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In 2007, IARC classified "shift work that involves circadian disruption" as probably carcinogenic to humans. To date, the evidence that night shift work increases the risk of breast cancer remains limited, partly because exposure to night work is defined differently across studies. To overcome this limitation, we created a single harmonised dataset using a common definition of night work from 5 major population-based case-control studies on breast cancer in Australia, Canada, France, Germany, and Spain.

The dataset included 6000 breast cancer cases and 7000 population controls. Any job held during work history that included at least 3 hours between midnight and 5 am was classified as night work. Lifetime duration of night work, frequency (nights/week), and night shift length (hours) were used as the main exposure variables.

In pre-menopausal women who ever worked at night the pooled OR was 1.23 [1.03–1.47]. The OR increased to 1.75 [1.17–2.62] in premenopausal women who worked at least 3 nights/week and 1.33 [1.05–1.70] for night shifts ≥ 10 hours. The OR did not increase with the number of years of night work, but women who worked ≥ 3 nights/week for ≥ 10 years had an OR of 2.58 [1.05–6.36]. No association emerged from the data in post-menopausal women. No statistically significant heterogeneity between studies was observed.

Our results support the hypothesis that night work increases breast cancer risk, particularly in pre-menopausal women who worked at least 3 nights per week. The absence of an association in post-menopausal women needs further scrutiny.

Poster Presentation

Chemicals

0335 TNF- α GENE POLYMORPHISMS MAY BE ASSOCIATED WITH INTERACTIVE EFFECTS OF BLOOD MULTI-ELEMENTS IN METAL INDUSTRIAL WORKERS

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Chronic exposure to metals or toxic elements may contribute to many diseases. Lead (Pb), cadmium (Cd), and arsenic (As) were toxic agents in the environment. Selenium (Se), cobalt (Co), copper (Cu), and zinc (Zn) are essential trace elements for human, but they may do harm to health beyond normal concentrations. The interactions among multiple elements are complicated and remain unclear. Toxic elements may cause a threat through inflammation. Tumour necrosis factor- α (TNF- α) is an important mediator of inflammation, and several single nucleotide polymorphisms (SNPs) have been identified in the human TNF gene promoter. Our aim is to analyse how TNF- α gene polymorphisms and multi-elements interaction influence serum TNF- α level. A total of 462 metal industrial workers who have received health examination in Kaohsiung Medical University Hospital were recruited. The blood samples were sent for biochemical analyses, TNF- α genotype analyses (–238G>A, –308G>A, –857C>T, –863C>A, –1031T>C), and measurement of blood multi-elements concentrations (Pb, Cd, As, Se, Co, Cu, Zn) and serum TNF- α level. Mixed-effect models were used for analysing complex interactions of multi-elements and multiple TNF- α SNPs. All elements have positive correlation with serum TNF- α level, and the effects may be modified by TNF- α gene polymorphisms. Interactions between TNF- α gene polymorphisms and multi-elements may influence serum TNF- α level. We suggest that the workers with susceptible TNF- α genotypes which may induce higher serum TNF- α level should pay more attention to metal toxicity.

Oral Presentation

Ageing Workforce

0336 IMPACT OF JOB GROUP ON RISK OF RETIREMENT IN DENMARK 1980–2012

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Objectives Age at permanent retirement is of interest both from an occupational health perspective as an indicator of health risks and from a societal perspective, where keeping an ageing population at work is a priority. The Danish nationwide individual level database DOC*X includes labour market affiliation and job type for employed residents in Denmark in the years 1970–2012. The aim of this study is to investigate differences in retirement between job titles.

Methods Data on permanent retirement was obtained from administrative registries for the years 1980–1990 and 1994–2012. Each job title was coded by the Danish version of the International Standard Classification of Occupations (DISCO-88). We calculated mean age at retirement in years (MAR) and age-and-sex standardised retirement risk ratios (SRR) according to five year periods and DISCO-88 groups (first digit).

Results The number of employed persons varied between 2.0 and 2.7 million yearly, whereof job title was identified for around 75%.

MAR was substantially higher among persons with non-manual compared to manual jobs (men: 64.6 versus 61.6 years) and (women: 63.3 versus 60.8 years). In 2011–2012 SRR was between 0.44 and 1.55 for women and 0.40 and 1.12 for men. Manual jobs had consistently increased SSR throughout the study period, but the relative difference between manual and non-manual jobs increased from 2.0 in the early 1980'ties to 5.4 in the mid-1990'ties and decreased to 1.9 in the latest years.

Conclusion Manual jobs have an increased standardised retirement risk and a lower mean age of retirement compared to non-manual jobs.

Oral Presentation

Exposure Assessment

0337 MODELLING OF OCCUPATIONAL EXPOSURE TO INHALABLE NICKEL

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Objectives Exposure to nickel (Ni) is widely distributed in the production and processing of steel or alloys. We compiled concentrations of inhalable Ni together with information about the duration of the measurement, analytical method, and workplace characteristics in the MEGA database.

Methods This analysis was based on 8052 personal measurements of inhalable Ni collected between 1990 and 2009. Mixed-effects models were applied to the log-transformed Ni concentrations with imputed non-detects to assess the geometric means (GMs) of exposure to Ni in the various occupational settings adjusted by duration of sampling and calendar year.

Results Most of measurements (38%) were collected in welders, which we further detailed by welding technique. Major predictor of the concentration was the technique and material in welding-related tasks. Highest exposure levels were

estimated for welding materials of high Ni content with gas metal arc welding (48 µg/m³; 95% CI 32–72 µg/m³) and shielded metal arc welding (37 µg/m³; 95% CI 24–57 µg/m³). Furthermore, high GMs were estimated in metal sprayers (33 µg/m³), in the manufacture of batteries (27 µg/m³) and in forging-press operators (25 µg/m³). We did not observe time trends of exposure to Ni in this period.

Conclusion Ni concentrations varied considerably between occupations and were influenced by process and Ni content of consumables in welders. In order to assess exposure to Ni in community-based studies, supplemental information on job tasks, processes and materials is essential in addition to job titles.

Oral Presentation

Cancer

0339 OCCUPATION AND RISK OF PROSTATE CANCER IN A NATIONAL POPULATION-BASED COHORT STUDY: THE CANADIAN CENSUS HEALTH AND ENVIRONMENT COHORT

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Prostate cancer is one of the most commonly diagnosed cancers in men and further evidence is needed on preventable risk factors. This study investigated the relationship between prostate cancer risk and occupation using a large Canadian cohort.

The Canadian Census Health and Environment Cohort was established by linking the 1991 Canadian Census Cohort to the Canadian Cancer Database (1969–2010), Canadian Mortality Database (1991–2011) and the Tax Summary Files (1981–2011). A total of 37 695 prostate cancer cases were identified based on age at diagnosis. Cox proportional hazards models were used to estimate hazards ratios (HR) and 95% confidence intervals (CI).

Overall, age standardised prostate cancer rates were observed to be highest in white collar workers and lowest in construction/transportation workers. In men aged 50–74 years, elevated risks were observed in agriculture management (HR=1.11, 95% CI 1.06–1.17), farm work (HR=1.12, 95% CI 1.02–1.23), firefighting (HR=1.16, 95% CI 1.00–1.35), military (HR=1.14, 95% CI 1.00–1.32), police (HR=1.28, 95% CI 1.14–1.42), senior management (HR=1.09, 95% CI 1.02–1.17), office (HR=1.16, 95% CI 1.08–1.24), and finance (HR=1.08, 95% CI 1.03–1.13). Similar findings were observed in men aged 25–49 years, with additional elevated risks in office management (HR=1.19, 95% CI 1.11–1.27) and education (HR=1.05, 95% CI 1.00–1.11). Decreased risks were observed in construction and transportation occupations in both age groups.

Findings across agriculture and protective services were consistent with previous studies. Some findings, particularly