children's paraoccupational exposure to chlorpyrifos or 2,4-Dichlorophenoxyacetic Acid (2,4-D) in a study of farm families who used one of these pesticides as part of their usual practice.

Methods The sample included 34 applicators applying 2,4-D (n=53 children) or chlorpyrifos (n=50 children). Sequential 24 hour urine samples were collected on the day preceding application through the third day after application of chlorpyrifos or 2,4-D. Maximum post-application urine concentrations of 3,5,6-trichloropyridinol (TCP), a chlorpyrifos metabolite, and 2,4-D (log-transformed) were used to examine the association of children's exposure with applicator exposure using mixed model regression including a random intercept for farm to account for correlation. The final adjusted model included children's age, gender, and presence during the application as covariates. Separate models were fit based on children's presence or absence during the application.

Results Adjusted models revealed positive associations between children's exposure with applicators' exposure (TCP: $\beta=0.257$; 95% CI=0.052, 0.462; 2,4-D: $\beta=0.593$, 95% CI=0.364, 0.822). The association persisted among children who were absent during the application process (TCP: $\beta=0.218$, 95% CI=-0.029, 0.466; 2,4-D: $\beta=0.547$, 95% CI=0.283, 0.811).

Conclusions Specific pesticide exposure pathways to children living on farms are difficult to identify, but these data indicate that applicator exposure is associated with exposures to their children absent any known direct exposure to the children. Applicators protecting themselves from exposures may also protect their children.

Oral Presentation

Cancer

0321

ASSOCIATION BETWEEN OCCUPATIONAL EXPOSURE TO ASBESTOS AND CHOLANGIOCARCINOMA: A POPULATION-BASED NESTED CASE-CONTROL STUDY

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Objective To investigate the association between occupational exposure to asbestos and the risk of cholangiocarcinoma (CC) using data from the Nordic Occupational Cancer (NOCCA) cohort.

Methods We conducted a nested case-control study of 1458 intrahepatic CC (ICC) and 3972 extrahepatic (ECC) cholangiocarcinoma cases registered among subjects born 1920 or later in Finland, Iceland, Norway and Sweden. Five population controls were individually matched by birth year, gender, and country to each case. We applied the NOCCA job exposure matrix to job titles from national population censuses

(1960, 1970, 1980/81, and 1990) to estimate the cumulative exposure to asbestos. We estimated odds ratios (OR) and 95% confidence intervals (CI) by conditional logistic regression models adjusted by printing industry work.

Results The risk of ICC was increased among workers with high cumulative exposure to asbestos: never exposed, OR=1.0 (reference category); 0.1–4.9 f/ml * years, OR=1.1 (95%CI 0.9–1.3); 5.0–9.9 f/ml * years, OR=1.3 (95%CI 0.9–2.1); 10.0–14.9 f/ml * years, OR=1.6 (95%CI 1.0–2.5); ≥ 15.0 f/ml * years, OR 1.7 (95%CI 1.1–2.6). We did not observe an association between cumulative asbestos exposure and ECC.

Conclusions Our study supports the hypothesis that occupational exposure to asbestos is a risk factor for ICC, while we did not observe evidence of an association between exposure to asbestos and ECC. Further studies, such as pooled analysis of asbestos cohorts, are necessary to assess the strength of the association between asbestos and ICC and clarify the observed differences between ICC and ECC.

Oral Presentation

Cancer

0322

CANCER INCIDENCE IN FIREFIGHTERS IN SWEDEN – PRELIMINARY FINDINGS FROM AN UPDATED COHORT STUDY

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Objectives Firefighters are potentially exposed to carcinogens during work, such as benzene, benzo(a)pyrene, arsenic, asbestos and silica dust. There are previous studies indicating an increased cancer risk among firefighters. The aim was to study risk of cancer in Swedish firefighters.

Methods We updated a previous cohort study of firefighters in Stockholm, comprising 1 080 men who worked at least 1 year as a firefighter during 1931–1983. They were followed regarding cancer incidence (in the National Cancer Register) from 1958–2012, adding 26 years of follow-up compared to the previous study. We also updated the information of employment duration, by annual records at the fire stations. We calculated standardised incidence ratios (SIR) with the male population in Stockholm as reference.

Results The overall cancer incidence was low (SIR=0.81, 95% CI=0.71–0.91), but there was a trend of increasing cancer incidence with increasing employment duration ($p=0.03$). There was an increased incidence of stomach cancer (SIR=1.89, 95% CI=1.25–2.75). The risk was significantly low for prostate cancer (SIR=0.68, 95% CI=0.52–0.87) and for malignant melanoma of the skin (SIR=0.30, 95% CI=0.06–0.88).

Conclusions We found no increased cancer incidence overall in Swedish firefighters, although the increasing incidence with increasing work duration indicates a possible carcinogenic effect of exposures at work. The cause of the increased incidence of stomach cancer is uncertain but could possibly be due to exposure to asbestos or silica dust, although this is quite speculative.