Occupational Cancer-2

06B.1 USE OF ARSENICAL PESTICIDES AND RISK OF LUNG CANCER AMONG FRENCH FARMERS

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Context Exposure to inorganic arsenicals, including occupational use of pesticides, is carcinogenic to the lung (IARC group 1). However epidemiological data are scarce for agricultural exposures. This work assesses lung cancer (LC) risk, including duration-effect relationships, associated to arsenicals use in farming, by gender and histology.

Methods We linked data from two French projects: (1) the Agriculture and Cancer (AGRICAN) cohort, a large prospective cohort of farmers and people affiliated to the French agricultural insurance scheme and (2) the Pesticide Matrix (PESTIMAT), a crop-exposure matrix. Incident lung cancer cases were collected and their histological subtype ascertained from cancer registries, from enrolment (2005–2007) to December 31 st 2013. The enrolment questionnaire included items on smoking history, and the involvement in 18 different breedings/crops and specific tasks, including pesticide application, with years of beginning and end. We performed Cox models, with age as timescale, adjusted on gender, smoking, and two activities found to be protective in previous analyses – cattle breeding and corn growing. The reference group included farmers having never applied any pesticide on any crop. We assessed risks for each inorganic compound (lead, sodium, aluminum, copper and calcium arsenate) and for overall exposure.

Results Nearly 10% (n=14 359 people) of the population was potentially exposed to arsenicals, in vineyard growing before 2001, or in fruit-tree or potato growing before 1973. We observed 98 incident LC among exposed people. Only women exhibited a higher risk of LC (HR 3.14 95% CI(1.42–6.96) for exposure to any compound, n=7 exposed cases, all adenocarcinomas), but with no duration-effect relationship. Risks were significantly elevated for lead, copper and sodium arsenate.

Conclusion We found an increased risk of LC, especially adenocarcinomas, among women. At this stage, exposure assessment was broad: the use of an exposure index, based on probability, frequency and intensity of use, will help refine the analyses.

06B.2 CANCER RISK BY ORE TYPE IN A MIXED MINERS COHORT

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Background and objectives Mining may involve exposure to many carcinogens, including respirable crystalline silica (RSC),

diesel engine exhaust (DEE), nickel (Ni), chromium (Cr), radon (Rn), and arsenic (As), which vary by ore being mined. The province of Ontario, Canada has a diverse mining sector with associated exposures including gold (RSC/DEE/As/Cr), uranium (RSC/DEE/Rn), and nickel-copper (DEE/Ni), and other ores (RSC/DEE). The study aim was to examine the risk of cancer by ore type in a mixed mining cohort.

Methods From 1928–1987 workers in the Ontario minerals industry were required to undergo an annual physical examination and chest x-ray, as well as record their mining work history in order to receive certification. Data from these exams was used to create the Mining Master File (MMF) cohort. Cancers were identified through linkage of the MMF with the Ontario Cancer Registry (1964–2017). Cancer risk among miners was compared to provincial rates using Standardized Incidence Ratios (SIR); internal analyses were conducted using Poisson regression.

Results Individuals who died or were lost before 1964, had missing or invalid data, or employment of less than two weeks were excluded. Too few women (n=161) were available for analysis. In total, 61 397 men were included in the analysis. Gold miners had excesses of lung (SIR=1.30, 95% CI=1.23–1.38) and nasopharyngeal cancer (SIR=2.34, 95% CI=1.39–3.70). Uranium miners had excesses of lung (SIR=1.57, 95%CI=1.45–1.70), bladder (SIR=1.20, 95% CI=1.02–1.40), and bone (SIR=2.45, 95%CI=1.30–4.19) cancers. Nickel-copper miners had excesses of lung (SIR=1.13, 95%CI=1.08–1.19), bone (SIR=2.02, 95%CI=1.32–2.96), and sinonasal cancer (SIR=1.73, 95%CI=1.12–2.56).

Conclusions Increased risks for specific cancers were observed among people who mined many different ore types. Most of the associations were as expected, but several (e.g., bone cancers) will undergo further investigation. Future analyses will examine the impact of combined exposures among miners of multiple ore types.

06B.3 RISK OF LEUKEMIA AFTER CHRONIC EXPOSURE TO GAMMA RADIATION AMONG ONTARIO URANIUM MINERS?

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Background and objectives Increases in leukemia risk after exposure to gamma radiation have been well-demonstrated among nuclear energy workers and atomic bomb survivors. Although uranium miners are also exposed to gamma radiation, its health effects are not well characterized, and assumed to be insignificant relative to the effects of radon decay products. The objective of this study is to quantify the effects of whole-body gamma radiation exposure on the incident risk of leukemia among Ontario Uranium Miners.

Methods Based on a retrospective cohort of 28 546 uranium miners, leukemia cases were identified through record linkages with the Canadian Cancer Registry and Canadian Mortality Database. Gamma doses were estimated through dose prediction models and badge dosimeter readings collated by the National Dose Registry, blinded from case status. Person-years at risk of leukemia were stratified by exposure category,