kidney cancer in job-specific subgroups including mixing and blending, bonding and cementing, and labouring. Workers in the plastics product fabricating industry had modestly elevated rates of pancreatic and brain and nervous system cancer.

Conclusions Elevated rates of lung and breast cancer among females are consistent with other studies of women in plastics and rubber manufacturing and warrant further attention in Ontario. Results for digestive and other cancers are broadly consistent with exposure to known or suspected carcinogens in these industries and suggest new sites of potential concern.

0-272 EXPOSURE TO CARBAMATE INSECTICIDES AND RISKS OF NON-HODGKIN LYMPHOMAS IN THE FRENCH AGRICULTURE AND CANCER COHORT (AGRICAN)

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10.1136/OEM-2021-EPI.18

Introduction Existing epidemiological studies have suggested a positive association between agricultural exposure to carbamates and risks of non-Hodgkin's lymphomas (NHL); however, the association remains inconclusive with most studies lacking statistical power to examine specific carbamates and subtypes of NHL.

Objectives We estimated the associations between carbamate insecticides and the risks of NHL overall and three major histological subtypes, multiple myeloma (MM), chronic lymphocytic leukaemia/small lymphocytic lymphoma (CLL-SLL), and diffuse large B-cell lymphoma (DLBCL) in the French prospective Agriculture and Cancer cohort (AGRICAN).

Methods At enrolment (2005–2007), participants completed a questionnaire on lifetime occupational history of agricultural practices, lifestyle habits, and medical history and were followed up until 2015 through linkage to the cancer registries. Information on pesticide use for different agricultural activities (crops, animals, barns, seeds) was crossed with the French crop-exposure matrix, PESTIMAT, enabling us to assess exposure to 19 specific carbamates (e.g., carbaryl, carbofuran) by type of activity. We estimated hazard ratios (HRs) with 95% confidence intervals (CIs) for NHL overall and its subtypes in relation to activity-specific exposure to carbamates (ever/never, duration) by fitting multivariate Cox proportional hazards models with age as the time scale. Non-users of pesticides were chosen as the reference group.

Results During the follow-up (median=8.9 years), 533 incident cases of NHL (MM=125, CLL-SLL=134, DLBCL=72) were diagnosed. Ever use of carbaryl on animals (HR=1.84, 95% CI=1.05–3.24) or barns (HR=1.86, 95% CI=1.06–3.27) were significantly associated with an increased risk of MM, but not for crops (HR=1.24, 95% CI=0.70–2.19). No significant trend by exposure duration were observed. None of the other carbamate insecticides were significantly associated with the risk of MM, CLL, DLBCL or NHL overall.

Conclusion Use of carbaryl on livestock production may lead to an increased risk of MM. Studies on activity-specific exposure pathways and levels are warranted to better understand the observed association.

0-276 DIESEL EXHAUST EXPOSURE AND SOMATIC MUTATIONS IN BLADDER TUMORS

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10.1136/OEM-2021-EPI.19

Introduction Occupational diesel exhaust exposure has been linked to increased bladder cancer risk in epidemiologic studies, but few explore mechanistic links.

Objectives We examined the relationship between diesel exhaust exposure and somatic mutations and mutational signatures in bladder tumors.

Methods Targeted sequencing was conducted in bladder tumors from the New England Bladder Cancer Study (NEBCS), a population-based case-control study. Using data on 797 cases and 1,418 controls, two-stage polytomous logistic regression was used to calculate odds ratios (ORs) and 95% confidence intervals (CIs) to evaluate etiologic heterogeneity between bladder cancer subtypes and quantitative estimates of respirable elemental carbon. Poisson regression was used to evaluate associations between REC and mutational signatures including those from nitro-polycyclic aromatic hydrocarbons (nitro-PAHs) in the NEBCS and in publicly available whole-genome sequencing bladder cancer dataset from The Cancer Genome Atlas Project (TCGA) (N=412).

Results We observed significant heterogeneity in the diesel-bladder cancer risk relationship, with a strong positive association predominantly among cases with high-grade, non-muscle invasive TP53-mutated tumors compared to controls (ORTertile3vsUnexposed = 4.8, 95% CI=2.2,10.5; p-trend T mutations at CpG dinucleotides (Relative Risk (RR)=1.47, 95% CI=1.38,1.57). In muscle-invasive tumors, we also observed a positive association between diesel exposure and the diesel-associated nitro-PAH signatures of 1,6-dintropyrene (RR=1.93, 95% CI=1.28,2.92) and 3-nitrobenzoic acid (RR=1.97, 95% CI=1.33,2.92) in pooled analyses of NEBCS and TCGA.

Conclusion The relationship between diesel exhaust and bladder cancer was heterogeneous based on the presence of TP53 mutations in tumors. Assessing the impact of diesel exhaust exposure at CpG dinucleotides and any resultant transcriptional changes in bladder tumors may be valuable considering the wealth of data linking particulate exposures to altered DNA methylation. Future studies that can identify nitro-PAH signatures in tumors are of interest to support the findings generated here.

0-324 INCIDENCE OF POTENTIALLY EXPOSURE-RELATED CANCER SITES AMONG NORWEGIAN FIREFIGHTERS: 58 YEARS OF FOLLOW-UP

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10.1136/OEM-2021-EPI.20

Introduction Firefighters are exposed to a variety of known and suspected carcinogens through their work, and previous studies have found elevated risk for a number of cancer sites among firefighters.

Objectives The aim was to examine cancer incidence among Norwegian firefighters in sites with established associations to known carcinogenic occupational exposures. This included sites within the respiratory, urinary, and lympho-haematopoietic systems, as well as the skin and all sites combined.

Methods A newly established historical cohort of 3881 Norwegian firefighters who worked within the period 1950–2018 was linked to the Cancer Registry of Norway for incident cancers occurring in the period 1960–2018. We calculated standardized incidence ratios (SIR) with rates for the national male population as reference, and stratified SIR analyses by period of first employment, duration of employment, and time since first employment.

Results Elevated risk was seen for all sites combined (SIR 1.15, 95% confidence interval 1.07–1.23). Elevated risk of urinary tract cancer was observed among firefighters who began working before 1950, and with observation ≥ 40 years since first employment. With ≥ 40 years since first employment, risks of mesothelioma and laryngeal cancer were also elevated.

Conclusions Our patterns of increased incidence in cancer sites somewhat differs from observations in other studies, which may reflect that firefighting is a complex exposure that differs between countries, and that exposures have likely changed alongside changing fire contents, firefighting techniques, and equipment. However, our observed associations between firefighting and urinary tract cancer, laryngeal cancer, and mesothelioma have been observed in some studies previously, and may be related to carcinogenic occupational exposures. Differences in risk by period of employment potentially reflect improved quality and use of personal protective equipment, while stratification by time since first employment suggests that some cancers may have yet to develop among more recently employed firefighters.

0-392 EARLY DETECTION OF PROSTATE CANCER IN FIREFIGHTERS – A REGISTER-BASED STUDY OF PROGNOSTIC FACTORS AND SURVIVAL

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10.1136/OEM-2021-EPI.21

Introduction Meta-analyses have shown firefighters to have increased prostate cancer (PCa) incidence compared to the general population. Firefighters are exposed to many occupational carcinogens, but no chemical agent is considered an established risk factor for PCa. Increased diagnostic intensity through regular health check-ups has been suggested as an explanation for increased PCa risk among firefighters.

Objectives To examine age at diagnosis, prognostic factors and survival of PCa in Norwegian firefighters and three other occupations undergoing occupational health check-ups, and comparing with PCa cases in the general population.

Methods All PCa cases diagnosed 1960–2017 were extracted from the Cancer Registry of Norway. Firefighters, military employees, pilots and police officers were identified through occupational data from Statistics Norway. Age at diagnosis, clinical stage, prostate-specific antigen (PSA), Gleason score, performance status and overall and PCa-specific survival in

cases in these occupations were compared with cases in the general population.

Results Firefighters were significantly younger at PCa diagnosis than cases in the general population in the periods 1960–1993 (mean difference 2.1 years) and 2007–2017 (mean difference 4.3 years). At diagnosis, firefighters had significantly lower PSA values, Gleason scores and performance status scores than the general population. Firefighters diagnosed 2007–2017 had lower risk of all-cause death compared to the general population (crude hazard ratio (HR) 0.71 (0.53–0.95)). No difference was found after adjusting for age at diagnosis (HR 1.03 (0.77–1.37)). Cases in the other three occupations generally also had lower age at diagnosis, better prognostic factors and better crude overall survival than cases in the general population.

Conclusion Younger age and better prognostic factors at PCa diagnosis among firefighters and other occupations with requirements for health check-ups compared with cases in the general population may indicate an increased diagnostic intensity, likely contributing to elevated PCa incidence in such occupations.

Cardiovascular

0-110 OCCUPATION AND INCIDENT STROKE IN A U.S. GENERAL POPULATION COHORT 45 YEARS OF AGE OR OLDER (REGARDS STUDY)

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10.1136/OEM-2021-EPI.22

Objective To identify occupational groups with greater risk of stroke within a cohort of older adults in the United States.

Methods Participants with occupational history data were selected from the REasons for Geographic and Racial Differences in Stroke (REGARDS) study (n=17,333) - a population-based prospective cohort of black and white men and women aged ≥ 45 years enrolled between 2003 and 2007. Self-reported occupational data were collected between 2011 and 2013. Participants were contacted every 6 months by telephone for self- or proxy-reported strokes later adjudicated by medical records through October 2018. Analyses focused on participants with a coded occupation who were employed in their longest held job prior to enrollment (n=15,016). Modified Poisson regression analyses were performed to estimate the relative risk (RR) for each two-digit Standard Occupational Classification (SOC) (2010 version) compared to all other occupation groups combined to highlight occupation groups at greatest risk of stroke.

Results We observed 735 strokes (5%) during 15 years of follow-up. Results showed that participants employed in 'food preparation and serving' (22 cases; 8%), 'sales' (69 cases; 7%), and 'production' occupations (80 cases; 6%) experienced a greater occurrence of stroke, compared with all other occupational groups combined. These associations were robust to adjustment for Framingham stroke risk score (that includes age, sex, smoking status), race, region, and BMI with adjusted RRs 1.5 (95% CI, 1.0, 2.3), 1.4 (95% CI, 1.1, 1.7) and 1.2 (95% CI, 1.0, 1.5), respectively. Findings may be biased by