calendar period of employment, and attained age at risk. Poisson regression was used to model the risk (RR) of incident leukemia at increasing levels of cumulative gamma radiation exposure, adjusting for calendar period and attained age.

Results Between 1969 and 2005, 116 incident cases of leukemia were identified. On average, these miners were employed for 4.4 years with a mean cumulative dose of 5.25 millisieverts (mSv). With exposure lagged by 2 years, preliminary analyses showed that when compared to the referent group (0 mSv), those with >30 mSv of cumulative gamma dose had a non-statistically significant increase in the risk of leukemia diagnosis (RR=2.04, 95% CI: 0.93, 4.51) with increasing, linear trend ($p=0.08$).

Conclusions Although our results did not show a statistically significant relationship between gamma radiation and leukemia incidence, it is likely due to low statistical power. Future work may include pooling the Ontario Uranium Miners cohort with other similar cohorts to better quantify the potential associated risks.

06B.4 LARYNGEAL CANCER RISKS IN WORKERS EXPOSED TO LUNG CARCINOGENS: EXPOSURE-EFFECT ANALYSES USING A QUANTITATIVE JOB EXPOSURE MATRIX

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10.1136/OEM-2019-EPI.145

Background Various occupational agents are suspected risk factors for laryngeal cancer. However, individual studies are often inadequate to investigate how such exposures relate to this relatively rare outcome. Important limitations include small sample sizes, lack of detail on exposure, and inadequate adjustment for confounders.

Methods This study applied quantitative estimates via SYN-JEM for four established occupational lung carcinogens to case-control data from five (Western European and Latin American) studies within the International Head and Neck Cancer Epidemiology Consortium. Participant job histories for $n=2256$ laryngeal cancer cases and $n=7857$ controls recruited from 1989–2007 were linked with quantitative SYN-JEM estimates via ISCO-68 codes. Logistic regression models were applied to assess the effects of occupational exposure to asbestos, respirable crystalline silica (RCS), chromium-VI, and nickel on laryngeal cancer risk while controlling for tobacco and alcohol consumption.

Results Increased ORs were observed for all agents evaluated. In males, a positive exposure-effect relationship was observed with duration of RCS exposure (p -value for trend <0.01). Relatively strong effects were also observed in the highest categories of career-cumulative chromium-VI exposure (>90thile: OR=2.21, 95% CI=1.13–4.33) and career-average exposure (>90thile: OR=2.96, 95% CI=1.51–5.79), and in the highest category of career-cumulative nickel/chromium-VI combined exposure (>90thile: OR=1.51, 95% CI=1.01–2.26). These relationships weakened in analyses restricted to blue collar workers but interpretations remained unchanged.

Conclusions These results support causal links between exposure to known lung carcinogens and laryngeal cancer. Measures to reduce such exposures in workplaces could decrease the risk of both laryngeal and lung cancers.

06B.5 VARIATION IN NORDIC WORK-RELATED CANCER RISKS AFTER ADJUSTMENT FOR ALCOHOL AND TOBACCO

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10.1136/OEM-2019-EPI.146

Background Consumption of alcohol and tobacco strongly increases risk of cancer of the tongue, mouth, pharynx, larynx, and oesophagus, and are established risk factors also for cancer of the liver, colon, and rectum. It is well documented that these habits are unequally distributed among occupational groups. Most occupational cohort studies do not have information on these potentially important confounders, and may therefore be prone to bias.

Aim The aim of the study was to calculate standardized incidence ratios (SIRs) adjusted for alcohol and tobacco by occupation, and to compare to the unadjusted SIRs.

Material and methods The study is based on the Nordic Occupational Cancer (NOCCA) database.

We used confirmatory factor analysis models where the unobserved pattern of alcohol and tobacco consumption were considered a latent common factor, and the potential occupational variation on each cancer type latent site specific factors. Results were used to compute adjusted expected numbers of cancer from the reference rates and to calculate adjusted SIRs for the relevant cancer sites for each occupation.

Results Changes of risk estimates from significantly high to significantly low and vice versa were seen. Among Nordic farmers, unadjusted SIRs for cancer of the mouth and oesophagus were 0.56 (95% confidence interval [CI] 0.51–0.61) and 0.67 (CI 0.63–0.70), respectively. After adjustment, estimates changed to 1.10 (CI 1.01–1.21) and 1.16 (CI 1.10–1.22). Unadjusted SIR for pharynx cancer among wood workers was 0.83 (CI 0.75–0.91), adjusted SIR was 1.14 (CI 1.03–1.25). For larynx cancer, results in the opposite direction were seen: unadjusted SIR for economically inactive was 1.38 (CI 1.31–1.46) while the adjusted SIR was 0.91 (CI 0.86–0.96).

Conclusion Adjustment for the latent indicators of alcohol and tobacco consumption changed risk estimates for several occupations, and may guide in the identification of true risk factors and preventive strategies.

06B.6 OCCUPATIONAL RADIATION EXPOSURE AND THE RISK OF CANCER AND CARDIOVASCULAR DISEASES AMONG MEDICAL RADIATION WORKERS

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10.1136/OEM-2019-EPI.147

Background Medical radiation workers occupy the largest group of radiation workers and the numbers are rapidly