

Oral Presentation

Methodology

0137 **EXPOSURE-LAG-RESPONSE IN OCCUPATIONAL EPIDEMIOLOGY: APPLICATION OF DISTRIBUTED NON-LINEAR LAG MODELS IN A COHORT OF DIATOMACEOUS EARTH WORKERS EXPOSED TO CRYSTALLINE SILICA**

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Occupational exposures extending over a long working life can have complex relationships with health outcomes, as timing, duration, and intensity of exposure are all potentially relevant. Simple measures of cumulative, or average intensity of exposure typically considered in occupational studies may not fully capture these relationships. We applied distributed non-linear lag models to examine the association of crystalline silica exposures with mortality from lung cancer and non-malignant respiratory disease. We fitted Cox proportional hazard models for each cause of interest to data from a cohort study of 2342 California diatomaceous earth workers exposed to crystalline silica. Our models combined various functions for exposure-response and lag-response including linear, piecewise constant and spline functions. Models with a spline function for exposure-response and a constant term for the lag-response appeared to have the best fit for lung cancer, while models with spline functions for both exposure-response and lag-response had the best fit for non-malignant respiratory disease. Hazard ratios (HR) from these best fitting models corresponding to average daily exposures of 275 µg/m³ during lag years 11–40 prior to the age of observed cases were 1.96 (95% confidence interval (CI) 0.95–4.06) and 2.01 (95% CI: 1.02–3.97) for the two outcomes respectively. HRs from simple models with linear exposure-response and constant lag-response terms for the same exposure scenario were 1.15 (95% CI: 0.88–1.49) and 1.21 (95% CI: 1.01–1.44) respectively. Occupational studies of longitudinal cohorts with detailed exposure histories could benefit from methods allowing for non-linearities and the disentanglement of intensity, duration and timing of exposure.

Oral Presentation

Risk Assessment

0138 **POOLED URANIUM MINERS ANALYSIS: GOALS AND CHALLENGES**

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Epidemiological studies of uranium miners helped to establish radon as a human carcinogen. However, radon remains a leading occupational cause of cancer mortality, and many workers are exposed to radon at levels at which excess risk of lung cancer has been observed in occupational cohort studies. Prior pooled studies of underground miners provided important quantitative estimates of radon-associated lung cancer risk. Recently, efforts have been undertaken to strengthen uranium miner studies to address contemporary occupational safety concerns. New cohorts of underground miners have been enumerated, existing cohorts have been expanded, and follow-up of the major cohorts of miners has been extended substantially. An international collaborative study has been undertaken to combine information from many of the world's most informative cohort studies of uranium miners; the combined study cohort encompasses more than 1 00 000 miners. This talk will describe the major themes of this project, the goals of the collaborators and the challenges that we have encountered to date. We will describe similarities and differences between findings from these key cohorts and identify some major gaps in current knowledge about radon's effects on human health. Finally, we will discuss how international collaborative studies can strengthen our understanding of risks associated with occupational and environmental radon exposures.