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Oral or Poster Presentation

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Job-exposure matrix for historical exposure to rubber dust, rubber fumes, and nitrosamines in the British rubber industry

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In 1982 IARC concluded that there was sufficient evidence for a causal association between occupational exposures in the rubber manufacturing industry and urinary bladder cancer and leukaemia. To enable evaluations of exposure-response associations in a cohort of men age 35+ employed in the British rubber industry in 1967 with a 49-year mortality followup (N=40,867), we created a quantitative historical job-exposure matrix (JEM) covering the period 1915-2000 based on personal and area measurements previously collated within the EU-EXASRUB project for rubber dust (N=4,187), rubber fumes (N=3,852), and n-Nitrosamines (N=10,215). These data were modelled by job function using linear mixed-effects models with sample year and industry sector as explanatory factors and a random factory intercept.

Variations in exposure levels over time between compounds and department were observed. For example, rubber dust exposures ranged from -8.8%/yr (crude materials and mixing, $p<0.001$) to +0.5%/yr (curing, $p=0.01$) while rubber fumes exposures declined between -8.3%/yr (crude materials and mixing, $p<.001$) and -0.2%/yr (finishing, assembly, and miscellaneous, $p=.218$).

JEM-estimates were linked to all cohort members for each year worked to calculate average annual and lifetime cumulative exposures (AAE, LCE), thereby allowing quantitative evaluation of exposure-response associations between 50-year occupational exposure and cancer mortality. AAE rubber dust exposures ranged between 0.3 mg/m^3 (curing) and 36.3 mg/m^3 (crude materials and mixing). Rubber fumes exposures range between 0.3 mg/m^3 (finishing, assembly, and miscellaneous) and 5.4 mg/m^3 (crude materials and mixing). LCE trends mirrored AAE results.

JEM-estimates will allow for quantitative exposure-response association assessments between long-term occupational exposure and cancer mortality.

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