

## Exposure Assessment: Dusts, fibers and metals

### 0-23 ASBESTOS EXPOSURE IN WASTEWATER COLLECTION AND TREATMENT WORKERS: A LITERATURE REVIEW AND ANALYSIS OF FRENCH EXPOSURE DATABASES

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**Introduction** Releases from asbestos abatement activities, asbestos-cement pipes and natural sources may contaminate wastewater with asbestos fibres. However, asbestos exposures in wastewater collection and treatment (WCT) workers are insufficiently characterized.

**Objective** To identify workers at risk of asbestos exposure in the WCT sector in France.

**Methods** We conducted a search of the international literature to identify sources of asbestos exposure and risks of asbestos-related diseases in WCT workers. We also extracted measurements from occupations related to WCT activities contained in two large French administrative databases of workplace measurements (Colchic and Scola) collected since 1987.

**Results** Studies conducted in the United States in the 1990s showed detectable concentrations of asbestos fibres in sewage sludge from several cities, with residual concentrations varying between disposal methods (e.g., incineration, composting). We identified six cohort studies of sewer workers and/or treatment plant operators. Five studies reported non-significant increases of respiratory cancer incidence or mortality, and one study of French sewer workers showed increased mortality from mesothelioma. Analyses of the two databases provided 2886 measurements from 13 occupations and collected from 2003 to 2020, with 58% below the limit of detection. Ninety-fifth percentiles of asbestos concentrations by occupation were 22 f/L for sewer workers (n=135), 148 f/L for sanitary systems control technicians (n=36), and ranged between 185 to 520 f/L for pipe laying, installing, or removal occupations. Sewer cleaners (n=12) and sewer workers supervisors (n=24) had no detectable concentrations of asbestos fibres.

**Conclusion** The available literature and the reported presence of fibres in sewage sludge suggest that WCT workers are potentially exposed to asbestos at various endpoints of the wastewater collection and treatment process. While asbestos exposure levels for most workers are likely to be low, a detailed risk assessment was not possible because of a lack of quantitative measurement data.

### 0-27 SILICA EXPOSURE ESTIMATES IN ARTIFICIAL STONE BENCHTOP FABRICATION AND ADVERSE RESPIRATORY OUTCOMES

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**Introduction** Silicosis is being increasingly reported among young stonemasons in the artificial stone (AS) benchtop fabrication and installation industry.

**Objectives** To identify metrics of exposure that predict risk of work-related respiratory ill-health among these stonemasons.

**Methods** Respiratory health screening which included a job and exposure history, a chest x-ray (CXR), a respiratory health questionnaire and gas transfer testing, were offered to stonemasons in Victoria Australia.

**Results** Workers typically reported a variety of tasks, including cleaning and labouring, which made exposure assessment complex. We estimated the relative respirable crystalline silica exposure intensity of each job from the proportion of time using AS and doing dry work (work without water suppression). The average intensity of exposure for up to five jobs was calculated. Cumulative exposure was calculated as the sum of the work duration multiplied by intensity for each job. Stone bench installers and factory machinists (other than CNC operators) were the most likely to report dry work with AS, and so had a greater average intensity of exposure. Exposure intensity and cumulative exposure were associated with increased odds of an ILO CXR category of  $\geq 1$  and with dyspnoea. Exposure duration was also associated with increasing ILO CXR profusion category. In multivariate analyses of health outcomes, only job type was associated with the ILO category. For both most recent and longest duration job type, factory machinists were more likely to have a CXR ILO category  $\geq 1$  than the lowest-exposed job group.

**Conclusions** This suggests that intensity of exposure estimated from the proportion of time dry cutting and proportion of time working on AS can predict risk of adverse respiratory outcomes for workers in this industry.

### 0-64 ASSOCIATIONS OF CUMULATIVE, ALVEOLAR AND PLASMA INDIUM WITH RESPIRATORY HEALTH OUTCOMES AT AN INDIUM-TIN OXIDE MANUFACTURING FACILITY

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**Introduction** Previous epidemiologic studies have reported associations between respiratory symptoms, lung function, and biomarkers of lung disease and indices of cumulative exposure and plasma indium in indium-exposed workers. Indices of exposure at a location more proximal to the dose at target tissue might provide more precise and accurate estimates of dose-response relationships. The objective of this study was to compare exposure-response relationships for respiratory health outcomes with indices of cumulative exposure, alveolar indium, and plasma indium.

**Methods** In a study of 110 indium-tin oxide manufacturing workers, indium exposures, plasma indium, respiratory symptoms, lung function, and serum biomarkers of lung disease were measured during two surveys. Cumulative exposure was calculated by multiplying current exposures with time spent in jobs and summed across all jobs. The International Commission on Radiological Protection's Human