

U.S. Environmental Protection Agency Scientific Advisory Board
Libby Amphibole Asbestos Review Panel

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3.2.3. Carcinogenicity of Libby Amphibole Asbestos: (page 21)

3. An occupational cohort of workers from Libby, MT exposed to Libby Amphibole asbestos (i.e., the Libby worker cohort) was selected as the basis for the derivation of the inhalation unit risk (IUR). Please comment on whether the selection of this study population is scientifically supported and clearly described. If a different study population is recommended as the basis for the IUR, please identify this study and provide scientific support for this choice.

The selection of the Libby cohort is scientifically supported and clearly described. It appears to be the best cohort available for cancer outcomes. This cohort has been thoroughly studied previously, had detailed work histories with a job exposure matrix available, had elevated asbestos exposure, had a wide range of measurements of asbestos exposure (covering a two order range of magnitude), was large, and had cancer mortality data available. An important limitation of this cohort is the limited smoking information available, especially given that smoking is an important risk factor for lung cancer (but not mesothelioma) and also may have a synergistic effect with asbestos exposure. Also outcomes are based on death certificates, which could undercount endpoints.

Libby amphibole asbestos is the only possible source of the asbestos measured in the air samples (i.e. no other sources of asbestos at the mine and associated facilities). It should be noted, however, that this study population may not be representative of the larger population since most of its members are white males, exposed as adults, and contains more cigarette smokers than the larger population. If a residential study is ever completed, that includes a larger proportion of women, other races, and those exposed as children becomes available, the derivation of the IUR should be revisited. Additionally, it is noted that the endpoints are based on cancer mortality on death certificates. While this could lead to an undercounting of actual cases of lung cancer, it seems less likely that lung cancer in a heavily asbestos exposed population would either be missed on a death certificate or would significantly undercount incidence, more so than in the comparison population. Mesothelioma cases might not have been fully accounted for using death certificates, as mesothelioma did not have a distinct ICD code prior to ICD-10, implemented in 1999. However, death certificates were manually reviewed, as noted, and possible under ascertainment of mesothelioma cases was addressed in the modeling. The section is clearly written.

Use of the sub-cohort post 1959 seems reasonable due to the lack of exposure information in many of the earlier workers. 706 out of 991 workers hired before 1960 had

all department and job assignments listed as unknown. Thus, it would seem highly problematic to include these workers in the model. However, that leaves 285 workers with at least some information. Possibly some additional analysis could be done on that group. However, of the 991 workers, 811 had at least one job with an unknown job assignment.

It would be informative to calculate an overall Standardized Mortality Ratio (SMR) for the two cohorts for lung cancer. Comparison should be made to both Montana and U.S. data. The later cohort also had lower levels of exposure to asbestos, which would be closer to the lower levels found in the environment.

4. Mortality from lung tumors and mesothelioma in the Libby worker cohort was selected to serve as the basis for the derivation of the IUR. Please comment on whether this selection is scientifically supported and clearly described. If a different health endpoint is recommended for deriving the IUR, please identify this endpoint and provide scientific support for this choice.

Use of the endpoints lung cancer and mesothelioma are entirely appropriate for derivation of the IUR. They are scientifically supported and clearly described. Mesothelioma is specific to asbestos, eliminating the potential for confounding. While it is possible to consider an alternative model focused on mesothelioma alone to derive the IUR, the number of deaths from mesotheliomas is small and this would likely understate the overall cancer risk. The issues regarding smoking should be summarized with greater clarity.

Since determining the cancer outcome from mortality rather than incidence data may have resulted in an undercount of both cancer outcomes, the discussion would benefit from more detail on how use of incidence data could impact the derived IUR. In addition, the mesothelioma outcome may be underrepresented because the cohort has been followed for 25-46 years and lag times from exposure to detectable disease onset range from 15 to > 60 year. Mesothelioma also may have been underreported on death certificates. Under represented outcomes could lead to an underestimated IUR. While there is sufficient information for derivation of the IUR, revisiting derivation of the IUR after additional follow up is warranted.” It was recommended at the meeting that additional follow-up of both the occupationally and environmentally exposed populations would be most helpful.

It would also have been useful to know the other major categories of mortality in this cohort. This could include the numbers of COPD, cardiovascular, colorectal cancer, and other cancer deaths. The report mentions laryngeal (n = 2) and ovarian (n = 0) cancer deaths in the text. Reference to Tables 5-6 and 5-8.

It would be helpful to have a clearer comparison of the Libby asbestos findings with other asbestos cancer risk assessments / reviews, including the earlier EPA assessment in 1986. Have non-US agencies /groups attempted similar quantitative risk assessments? This could be summarized more clearly.

An overall summary set of Tables or Figures describing the major cohorts (Libby workers, community, Marysville plant), and the studies / exposure info associated with each would be helpful for the review process.