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**Cohort Mortality Study of Four Chromate Production Facilities,  
1958 - 1998: INTERIM REPORT**

Applied Epidemiology, Inc.  
October 25, 2001

This is a brief update on the four-plant mortality study. At this point, all analyses are complete, and all but the discussion section of the final report has been drafted. A complete draft for review and comment will be distributed to the sponsor and AEI's review panel by the end of November. Additional detail is provided below.

**Data Acquisition**

As reported in July, all expected data corrections and verifications had been received. However, in September, additional cause of death information was obtained from the German Berufsgenossenschaften (in response to a request made about a year earlier), including confirmation of one additional lung cancer death. Although many of the statistical analyses had been run as of that date, we decided to re-run all analyses, incorporating the latest information and corrections. Any additional information regarding missing cause of death information received after today can no longer be incorporated.

**Exposure Reconstruction**

Two discrete job exposure matrices (JEMs) were constructed, one representing geometric mean exposure within each cell of the JEM, defined by work area / calendar time period. Because the vast majority of individual level data available were urinary values, the air-exposure data were converted into urine equivalents (described in previous interim report). For sparse or empty cells we developed and employed an algorithm that used a running average based on data from surrounding years within the same work area. The second matrix, containing the same cell definitions, represented the occurrence of "peak" exposures. All exposure measurements greater than or equal to 40 µg/L urine (Germany) or 50 µg/m<sup>3</sup> air (U.S.) were defined as peak exposures, and based on the magnitude and frequency of peak exposures occurring within cells of the JEM, a peak score was assigned. For sparse or empty cells we used an algorithm similar to that for the geometric mean concentrations. Both geometric means and peak scores were summed according to individual work histories on a time-dependent basis, with and without lagging.

**Data Analysis**

Standardized mortality ratio (SMR) analyses were completed for the entire cohort for all causes of death (92 categories) using state and national mortality reference rates. Several additional SMR analyses were conducted for lung cancer deaths stratified by length of employment, time since first

employed, cumulative exposure, and cumulative peak exposure. Additional analyses were completed incorporating 10- and 20-year lagging of the respective exposure indices.

Multivariate analyses were completed using Cox Proportional Hazards regression ("survival analysis") regression, evaluating the relationship between lung cancer and exposure measures, accounting, where possible, for age, smoking and other potential confounders. For some multivariate analyses, individual-level peak data could be used.

### **Final Report**

The final report and supporting documentation (which will be provided separate from the report) are substantially complete, with the exception of the discussion section. A complete draft of the final report is expected to be available within approximately four to five weeks, at which time it will be distributed to IHF and to AEI's expert advisory panel. Comments and questions will be welcomed from all reviewers, and addressed in a final draft.

Two manuscripts are anticipated for submission to peer-reviewed journals: the first on the study methodology, emphasizing the exposure assessment; and the second on the lung cancer mortality results, focusing on the lung cancer analyses. Abstracts for presentation of study results at appropriate scientific meetings (such as ICOH) will be submitted according to scheduled deadlines.