

TO: ALL EMPLOYEES/CONTRACTORS

FROM: H. Garrison
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Interoffice
Communication

SUBJECT: VCM MORTALITY STUDY UPDATE (WONG STUDY)

VISTA

A study entitled "An Industry-wide Epidemiology Study of Vinyl Chloride Workers, 1942 - 1982" was published recently in the American Journal of Industrial Medicine. The Vinyl Chloride Monomer (VCM) Panel of the Chemical Manufacturers Association (CMA) sponsored the study, which was conducted by a group led by Dr. Otto Wong. The authors prematurely published the study without submitting it to the CMA for review before publication. Therefore, the CMA did not have an opportunity to provide additional information that helps put the study and its apparent findings into perspective.

The Wong study updates the 1973 Tabershaw-Cooper Associates mortality data from December 31, 1972 to December 31, 1982 (now covering 1942 - 1982). The group studied consisted of 10,173 men (1973 study - 8,349 workers) who had worked at least one year in jobs involving exposure to VCM prior to January 1, 1973. These men were employed at 37 plants (1973 study - 34 plants) in the U.S. belonging to 17 companies. A total of 1,536 members of the group studied were identified as having died. Death certificates were not available on 6% of the decedents and their cause of death was coded as unknown. The observed deaths (or mortality), by cause, was compared with the expected deaths based on the U.S. mortality rates, standardized for age, race and calendar time.

Briefly, the Wong study indicated the following:

- A statistically significant lower overall death rate in comparison with the U.S. national mortality experience.
- Deaths from cancer of all sites combined was slightly (not statistically significant) higher than the U.S. experience [359 observed versus 341.7 expected].
- A statistically significant higher mortality due to cancer of the liver and biliary tract [37 observed versus 5.8 expected].
- A statistically significant higher mortality due to cancer of the brain and other central nervous system (CNS) [23 observed versus 12.8 expected].
- A statistically significant excess of emphysema/chronic obstructive pulmonary disease (COPD) [41 observed versus 22.8 expected].

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Other information regarding analyses by length of exposure, latency (long latency or dormant periods following initial exposure are usually required for chronic diseases to develop), age at first exposure, calendar year of first exposure and type of products were detailed in the report. Some of the findings:

- Only for cancer of the liver was there felt to be a "clear and obvious" latency (dormant period before cancer was detected).
- For cancer of the brain and other CNS, there was no obvious trend by latency, and no latency period was found to be statistically significant.
- Of the 37 plants, 11 produced only VCM (1214 workers); 18 produced only PVC (6949 workers); 3 produced both and the remaining 5 plants produced other forms of vinyl chloride.
- Only one liver cancer death (not statistically significant) was observed among the VCM plant employees, but 31 were observed in the PVC plants (versus 4.5 expected).
- There were only two brain/CNS cancer deaths observed among the VCM plant employees (compared to 0.9 expected --- not statistically significant), but there were 16 at the PVC plants (compared to 9.5 expected).
- Similarly, there was only one emphysema/COPD death among the VCM plant employees, but there was a total of 29 among the PVC plant employees (compared to 17.8 expected).
- A total of 15 angiosarcoma cases were identified based on death certificate information only. Two PVC plants (3533 employees) contributed all but one of these cases. This could indicate a difference in exposure from the other plants or a difference in local diagnostic practices.
- Twelve of the 23 cases of brain and other CNS cancer came from the two PVC plants with the largest number of angiosarcoma cases.

In summary, the enlarged study reportedly confirms an excess of angiosarcoma of the liver cases as well as a statistically significant excess of tumors of the brain and other CNS and deaths due to emphysema/COPD. However, there were several factors that

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limit the ability to clearly correlate VCM exposure with the excess mortalities due to brain/CNS tumors and/or emphysema/COPD:

- The small number of cases
- The lack of appropriate exposure data
- The absence of smoking history of the group studied
- The unknown vital status of 7.9% of the group
- The unavailability of death certificates for 6% of the deaths identified
- The inherent problems associated with death certificates (ie., diagnostic accuracy)
- The lack of histologic (or tissue) information of the cell type of the cancers

In addition, important information was omitted in the discussion of two of the findings of the Wong study. One issue involves the study's attempts to link an apparent excess of cancers of the brain and other CNS to exposure to VCM. The report does not take into account that this apparent excess may be due in whole or part to diagnostic bias; that is, that the cases received more attention because the patient received better care, was located closer to quality care facilities, had better insurance coverage, or otherwise was monitored more closely. The VCM Panel believes that diagnostic bias may play an important role in the increased number of cases of brain and CNS cancers reported in the study.

The second issue is the Wong study's reported mortality rate for emphysema/COPD. Another study conducted by Sir Richard Doll suggests that emphysema is not an effect of vinyl chloride exposure. The CMA VCM Panel considers Doll's study to be more authoritative.

The CMA VCM Panel, which includes Vista and seven other U.S. VCM/PVC producers, discussed its concerns with Dr. Wong in a conference call on June 5, 1992. The panel is writing a letter outlining its concerns to the editor of the American Journal of Industrial Medicine. Dr. Wong agreed to respond to the letter.

Vista will continue monitoring this issue and will keep employees informed about important and relevant developments. If you have any questions or concerns or would like more information about the Wong study, please let me know, and I will attempt to provide an appropriate response.



H. Garrison
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