

MALIGNANT LYMPHOMAS AMONG RUBBER
AND TIRE INDUSTRY WORKERS:
A CASE-CONTROL ANALYSIS WITHIN A COHORT STUDY

Occupational Health Studies Group
School of Public Health
University of North Carolina
Chapel Hill, North Carolina

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EXECUTIVE SUMMARY

An earlier study of leukemia deaths had given evidence that lymphatic leukemia was associated, in one of the companies, with solvent exposure jobs, while each company had some elevation of mortality rates for deaths from neoplasms of lymphatic and hematopoietic tissue, compared with those for the general U.S. population. This report presents the findings of an epidemiologic study of malignant lymphomas among workers in four major rubber and tire manufacturing companies. The main objective of the study was to investigate the hypothesis that workers in jobs involving exposure to solvents were at increased risk of developing lymphoma.

The results of a case-control study of malignant lymphomas showed that associations were found between histories of working in areas with potential solvent exposure and deaths attributed to lymphomas. The associations detected were strongest between histories consistent with high solvent exposure and fatal lymphosarcoma.

When solvent OT's were analyzed individually, Tire Building showed the strongest association with all lymphomas combined and lymphosarcoma in particular. Considering the large number of people working in Tire Building special attention should be paid to minimizing exposures to solvents in this work area.

Of particular importance is the finding that refinement of potential exposure data in Company A leads to stronger associations between past potential benzene exposure and lymphosarcomas.

The results presented suggest that having worked in certain potential solvent exposure areas in the rubber and tire manufacturing process increased the risk of developing lymphosarcomas and "other lymphomas." Potential direct benzene exposure in the past seems to have been a major factor.

This report will be followed by a more extensive set of analyses which will include tests of latency and dose response functions.

6.3.2 Relative risk estimates for solvent exposure assessment scheme, based on product utilization information

The more refined solvent exposure scheme is to date only available for Company A. OR's were calculated for all 60 lymphoma and leukemia cases and the respective subentities. The hypothesis that refined exposure data lead to stronger associations between solvent exposure and lymphomas is fully supported. The strongest association was found for potential benzene exposure >5 years and lymphosarcoma, revealing an OR of 12.0 (95%C.I. 2.86, 50.37; $p < 0.005$) (Table 11).

6.3.3 Dose-response relationship

The associations found between solvent exposure and lymphomas were consistently stronger for High Solvent Groups compared to Medium and Low Solvent Groups. A scoring system combining intensity of exposure with duration of exposure is currently being developed to test for a dose-response relationship between solvent exposure and lymphomas; latency analyses also are underway.

7. Discussion

The results of a case-control study of malignant lymphomas in four plants of four major rubber and tire manufacturing companies have been presented. Briefly summarized overall findings of the present study are given in Table 12. Associations were found between histories of working in areas with potential solvent exposure and deaths attributed to lymphomas. The associations detected were strongest between histories consistent with High solvent exposure and fatal lymphosarcoma.

When solvent OT's were analyzed individually, Tire Building showed the strongest association with all lymphomas combined and lymphosarcoma in particular. Considering the large number of people working in Tire Building special attention should be paid to minimizing exposures to solvents in this work area.

Of particular importance is the finding that refinement of potential exposure data in Company A leads to stronger associations between past potential benzene exposure and lymphosarcomas. Clear dose-response relationships between solvent exposure OTG's and lymphomas were not found. However stronger associations are always present in High Solvent Group compared to Medium and Low Solvent Group.

The results presented suggest that having worked in certain potential solvent exposure areas in the rubber and tire manufacturing process increased the risk of developing lymphosarcomas and "other lymphomas." Potential direct benzene exposure in the past seems to have been a major factor. The associations found are **similar** to those for lymphatic leukemia. Besides studies on Swedish and American chemists and **American** aluminum reduction plant workers this is one of the few epidemiologic studies on chemical **lymphomogenesis**; it supports the view that certain lymphomas may be occupationally induced, and identifies potential benzene exposure as a particular hazard.