



INTERNAL
CORRESPONDENCE

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To (Name) NOTE TO FILE

Date June 17, 1982

Division

Originating Dept.

Location

Area

Area

Copy to

Subject NIOSH Case Control Draft -
Texas City

The following is a brief report on the NIOSH draft paper "A Case-Control Study of Brain Cancers in a Texas City, Texas Chemical Plant" by Leffingwell, S.S., Waxweiler, RLJ., Glenn, D.H., Alexander, V., and Ludwig, H.R. Recent communication with Leffingwell has indicated that this draft contains errors in the chemical exposure counts and no firm date could be given for completion of the final draft.

--The study examined several possible occupational as well as non-occupational risk factors among 17 glioma-type brain cancer cases. Six other cases (4 meningiomas, one metastatic brain cancer, and one negative autopsy) were not included. The purpose was to examine if cases possessed a higher frequency of possible risk factors than a matched group of controls.

--Six controls per case were matched on sex, race, and year of birth $\pm$ 3 years. The control's date first employed was before the case's date first employed, (but not more than 3 years before) and the date last employed was after the case's date last employed. Most controls were living, but cancer deaths were excluded among controls.

--Analyses were performed which examined each of the following possible risk factors:

- job category
- department assignment
- chemical exposures (maintenance treated as (a) exposed and (b) unknown)
- length of chemical exposure
- department group
- residential location

--The proportion of cases exposed to carbon dioxide (no latency, maintenance exposed) and sulfuric acid (15+ latency, maintenance excluded) were statistically elevated. CO₂ was dismissed as a spurious result, and sulfuric acid was dismissed because high exposures to it seemed remote. (i.e. present only in closed systems)

--Vinyl acetate, ethylene, and styrene proportions were elevated among cases, though not significantly. These chemicals along with vinyl chloride were analyzed by length of exposure and the mean length of exposure among cases and controls did not vary significantly for any chemical.

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--Department groups where the proportion of "case-years" exceeded the proportion of "control years" were plotted on a map of the plant and no clusters were found.

--When job classifications and department assignments were examined, more than four cases were classified as "operators", and were assigned to the "maintenance" department. However, a larger proportion of controls were operators and had worked in maintenance.

--The highest association found in the paper was the excess proportion of cases residing in LaMarque. Simultaneous adjustment for LaMarque residence and chemical exposure showed that the former is the stronger risk factor. This association peaked in the late 1950's and early 60's. Most cases resided in southwestern LaMarque, and only one in a company subdivision in LaMarque.

--Other hypotheses for the cluster that were mentioned in the report follow:

- a) a chemical dump in LaMarque.
- b) a generalized risk in the 1940's and 50's as compared to the present.
- c) a mosquito-borne virus from Highland Bayou in LaMarque or mosquito control insecticide.
- d) diagnostic sensitivity bias.

The data from this study could not support or disprove these hypotheses.

In summary, I feel the study was well-done by an investigator who realizes the limitations and strengths of the data. An exhaustive effort was made to identify risk factors associated with the 17 gliomas, resulting in largely negative conclusions. The strongest associations observed were of non-occupational origin.

A. L. Schotten

ADDENDUM

Differences between UCC and NIOSH results:

- (1) The UCC study included two definitions of cases: all (21) and gliomas (17) while the NIOSH study looked at gliomas (17) only.
- (2) NIOSH used matched controls so that matching factors (date first employed, length of employment, age, etc.) could not be compared among cases and controls. The UCC study used 2 sets of controls (one set eliminated cancer deaths) and two levels of pay status.
- (3) NIOSH used statistical analyses appropriate for matched controls while the UCC study used unmatched statistical analyses. The proportion of cases exposed to CO2 and sulfuric acid were statistically elevated in the NIOSH study, while only ethylene come close to significance in the UCC study.
- (4) The UCC study examined more demographic variables (ie., length of employment, age at hire, age at death, year of hire, year of death, race, and payroll status) while the NIOSH study examined department groups, departments, job category and residence. Both studies analyzed chemical exposures.

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