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Subject

NIOSH-Texas City-
Investigation

The following is my interpretation of the NIOSH document "Mortality from Brain Tumor and Other Causes in a Cohort of Petrochemical Workers" by Waxweiler, R.J., Alexander, V., Leffingwell, S.S., et. al. along with a comparison of the NIOSH and UCC studies. A technical page by page review of the NIOSH study will be sent to you shortly.

(1) This study examined the mortality experience of 7595 males employed one day or more at the UCC Texas City Plant between 1941 and 1977. It's principal purpose was to determine whether there had been an increased rate of death from primary malignant brain tumors. For this disease, mortality experience was extended two years to 1979.

(2) Mortality experience was examined for white and non-white hourly male employees and white salaried male employees. In all three groups, observed deaths were substantially lower than the numbers predicted from general U.S. experience. For white hourly employees, observed deaths were significantly lower than expected for "all malignant neoplasms", "all diseases of the circulatory system", and "non malignant respiratory disease".

(3) For all male hourly employees, observed deaths were significantly lower than expected for "all malignant neoplasms" and cancer of the "buccal cavity and pharynx". For all other specific cancer sites, observed deaths were consistent with expectation, i.e. the 95% Confidence Interval of their Standardized Mortality Ratios (SMRs) included 100.

(4) Although the three individual SMRs for malignant, benign and unspecified brain tumors were not statistically elevated, the combination of these categories yields a significant SMR of 198 based on 19 observed and 9.6 expected deaths. The study reports 19 brain tumor deaths through 1977 and 22 deaths through 1979.

(5) For the combined category of "All Brain Tumors" significantly elevated SMRs were found for hourly employees with 10 or more years employment alive 15 years after hire ($SMR = 11/3.2 = 344$).

UCC 097756

(6) Pancreatic and kidney cancer mortality rates were found to increase in long term employees following a 15 year period after first hire. Differences between observed and expected were not statistically significant however due to small numbers.

(7) A slightly elevated, but not statistically significant SMR was found for leukemia in hourly male employees.

Differences Between UCC and NIOSH Results:

(1) The NIOSH study included more employees than the UCC study. The UCC study included only white males or males of undetermined race. Hispanics were considered non-white and were excluded. The UCC study also excluded six persons with missing data in vital fields. The NIOSH study cohort contained 121 additional "white" males (117 hispanics and 4 persons excluded from the UCC study for lack of data) and 889 non-white males.

(2) The NIOSH study reports 19 brain tumor deaths occurring before 1977, three among black males. The UCC study reports only 16 among its cohort of white males.

(3) The NIOSH study reported brain tumor mortality through 1979, including 4 more cases than the UCC study, which ended in 1977.

(4) For 254 persons who could not be traced and 3 others whose date of death was unknown, the NIOSH study considered vital status "alive" through 12/31/77. In the UCC study, these persons were considered lost-to-follow up on their date of termination from Texas City. The difference resulted in increased total number of person-years in the NIOSH study.

(5) UCC's disease specific SMR's are slightly higher than those of NIOSH. (See attached table) This could be attributable to two factors:

(1) the difference in person-years calculation for employees who could not be traced; or (2) differences in the base rates used to reflect U.S. mortality experience (UCC used "Monson" rates grouped by 8th Revision ICD codes and NIOSH used unpublished NIOSH rates grouped by 7th Revision ICD codes).


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Attachment
SGA/cas

UCC 097757

Comparison of SMR's for White Males
In UCC and NIOSH Study

	<u>UCC *</u>			<u>NIOSH **</u>		
	<u>O</u>	<u>E</u>	<u>SMR</u>	<u>O</u>	<u>E</u>	<u>SMR</u>
All Causes	765 +	923.8	83	771 +	995.8	77
All Malignant Neopl.	150 +	174	86	148 +	185.7	80
Circulatory Dis.	348 +	422.6	82	309 * +	411.2	75
Respiratory Dis.	26 +	45	58	25 +	47.7	52
External Causes	153 -	147	103	148 +	151.7	98

* Cohort excludes hispanics

** Cohort includes hispanics