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EXPOSURE TO MERCURY IN INDUSTRY; A STATISTICAL STUDY

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Previous papers in this series^{1,2} presented data on the exposure of workers to mercury vapor and dust in the fur-felt hat industry. These papers included the clinical and laboratory findings in these workers and the general relationship between atmospheric concentration, urinary excretion, and the incidence of mercurialism.

At that time, no attempt was made to analyze these relationships statistically nor was the factor of length of exposure presented as one of the variables which was studied. It was noted, however, that there was a marked variation in urinary excretion among individuals who were similarly exposed and among individuals with and without

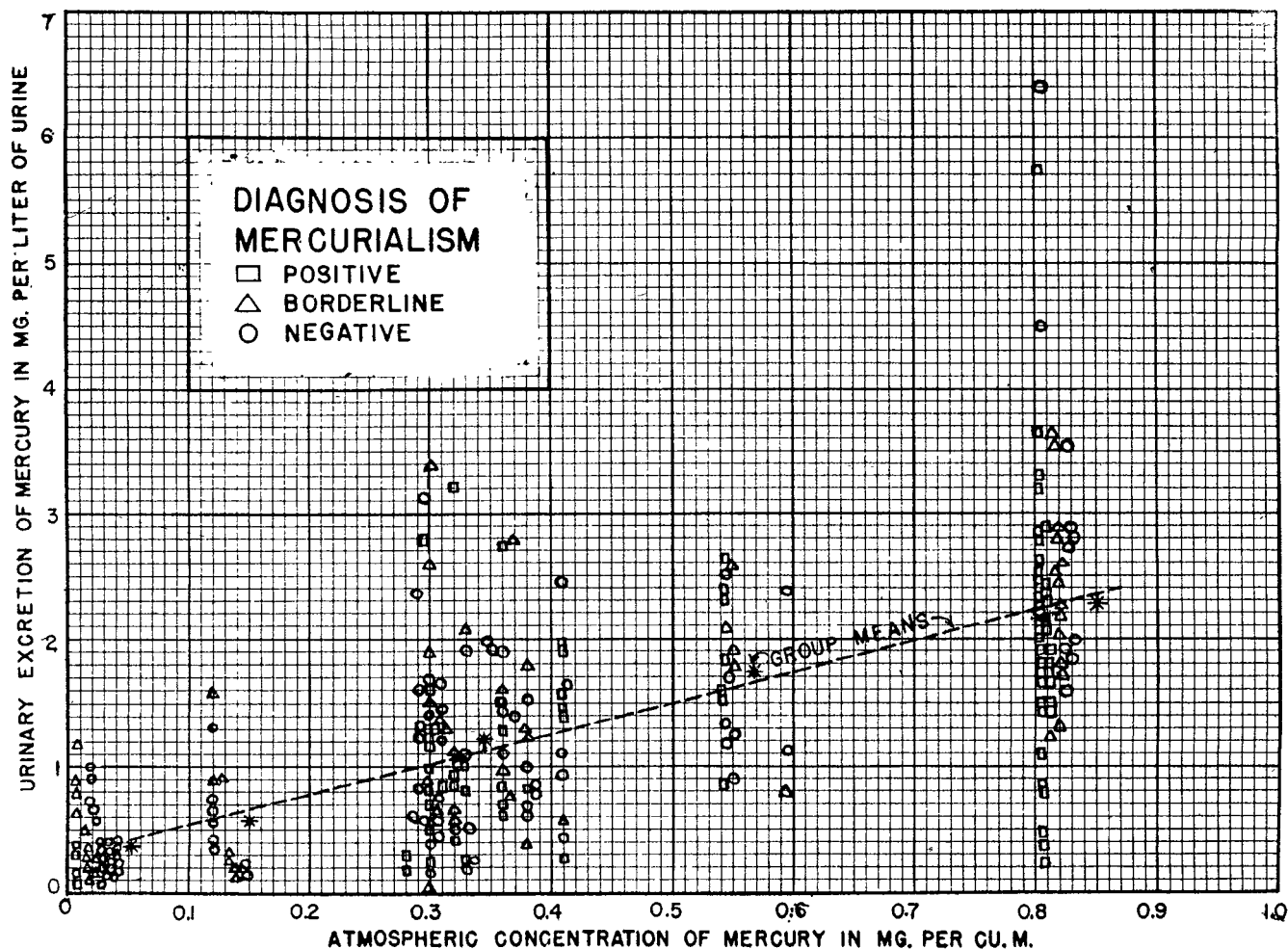


FIGURE I.

of about three years show an erratic change in individual and average excretions with passage of time.

When the individuals whose exposures could not be completely evaluated are eliminated and the data presented in Table I are recalculated, the data given in Table IA are obtained. These data are not qualitatively and but slightly quantitatively different from those obtained before these cases are eliminated.

INTENSITY OF EXPOSURE AND DIAGNOSIS

It was to be anticipated that an increase in intensity of exposure would result in an increase in the frequency of positive cases of mercurialism. A statistical analysis of these data was therefore undertaken to determine whether or not that could be proved. In this analysis, the method used was that of comparing actual with theoretical frequencies, the so-called Chi square method for test of association.

The results of this analysis are presented in Table III. The value of Chi square must be equal

to or exceed 9 for statistical significance between two groups, and values of 4 to 9 (corresponding to ratios of differences of means to standard errors of the differences of 2 to 3) may be termed borderline. It is evident from Table III that greater significance can be attributed to the differences between Groups I and II combined and Group III and between Group III and Groups IV and V combined than to the differences between adjacent groups. This is similar to the results obtained in analyzing the data relating to intensity of exposure and urinary excretion (Tables I and IA).

It may be concluded, therefore, that the incidence of positive cases of mercurialism increases with an increase in the intensity of exposure.

If the borderline cases, also presenting some signs of pathology, are combined with the positive cases of mercurialism, the correlation between exposure and diagnosis is not improved and leads to no more significant conclusions than if positives alone are counted as pathological cases.

(CONTINUED IN JUNE ISSUE)

TABLE III — INTENSITY OF EXPOSURE AND DIAGNOSIS

Exposure Group	No. in Group	% Positives	Chi Square
I	35	11.4	
II	15	0	1.86
III	98	37.8	11.25
IV	20	35.0	.02
V	63	62.0	4.33
I & II combined	50	8.0	
III	98	37.8	13.8
IV & V combined	83	55.4	6.5

OCCUPATIONAL CAUSES OF CANCER

MAY R. MAYERS, M.D.

(CONTINUED FROM APRIL ISSUE)

In conclusion, I would like to say that one cannot overlook the fact that there is a great deal of speculation, at the present time, as to possible environmental factors which may be responsible for the development of cancer, based largely upon medical case histories which are difficult to interpret or to verify. A few of the industrial carcinogens are fairly well understood. Many more, however, are suspect only; and there is urgent need of scientific verification.

It indeed, of very great interest that in industry it is possible not only to produce cancer by known occupational exposures under given circumstances, but that a typical site in the body may become involved—a site quite remote, in some instances, from the point of contact of the individual's body with the carcinogenic agent.

More intensive and more accurate, as well as more widespread knowledge of the occupational environment, is needed—particularly among students of the cancer problem. A great deal more information is also required with reference to the physiological and bio-chemical responses of individuals exposed under actual working conditions. Perhaps the greatest impediment is the extreme

fluidity of this environment—the fact that it currently changes to reflect every technological advance which is made.

It is hoped that the studies, now in progress of occupational causes of cancer, will throw new light on this subject, and indirectly perhaps contribute to a better understanding of the basic causes of cancer, in general.

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