

DEPARTMENT OF PUBLIC HEALTH

BERKELEY



July 17, 1964

Dr. J. J. Landis;
Chairman, Working Group on Lead Contamination
Department of Health, Education, and Welfare
Public Health Service
1476 Columbia Parkway
Cincinnati 26, Ohio

Sir:

I have read over the third draft of the Three-City Study and first want to commend you and your associates on this very complex and important work which appears to be moving very well.

I do have a few comments on page 20. The treatment of the question of body burden is somewhat incomplete in my opinion and I would suggest the addition of two paragraphs (I am sending copies of this letter to Dr. Kehoe and Dr. Horton in order to expedite their reactions, if any, to these comments). Most of the experimental work on uptake and excretion of lead has been carried out with inorganic lead compounds. The relationship of lead alkyls to the total body burden is not as thoroughly investigated. This is because a very small proportion of the individuals with an important lead exposure have been exposed to significant amounts of these organic lead compounds (for discussion of the collection and concentration of atmospheric samples of lead alkyls, see pages 79 and 80 and Table VI - B-3 on page 81). From animal experimentation and the relatively rare occupational exposures in man it is likely that lead levels in the brain and central nervous system may to some extent reflect the exposure to lead alkyls. It is also thought that urinary lead levels may reflect changes, if of sufficient magnitude, in lead alkyl exposure and that blood lead levels are relatively less sensitive.

There has been a very modest amount of work on lead concentrations in the various organs in the body compared to the study of blood lead levels. It is a convenient working hypothesis that blood lead levels reflect approximately the magnitude of the body burden of lead. It would be desirable to have additional data on lead concentration in the organs of persons with varying degrees of exposure to atmospheric lead in order to provide further tests of this assumption."

On page 22, line 14, the sentence starting "No evidence..." uses the phrase "the body burden of lead" in a way which suggests that the concentration of lead in several organs of the body have been tested extensively. As I read the preceding material I have the impression that it refers to experimental exposure, but it could refer to occupational exposure as well.

KE

00004700

July 17, 1964

IN ORDER TO CLARIFY WHAT MIGHT BE THOUGHT OF AS AN AMBIGUITY I WOULD SUGGEST A SUBSTITUTE FOR THE SENTENCE TO WHICH ATTENTION HAS BEEN DRAWN AS FOLLOWS: "From the many observations of the blood lead level and its trends, and from the relatively scanty observations of lead concentrations in various organs of the body, there is no reason to think that uniform exposures at modest levels over a long period of time lead to a progressive increase in storage of lead in the body."

In the section on Lead Intoxication the comments concerning blood abnormalities indicate that blood abnormalities do not occur unless intoxication occurs. I believe this view is at variance with previous statements of Dr. Kahoe who said in effect "The earliest findings of a biochemical reaction to lead exposure are interference with the maturation of hemoglobin and red cells and these may be detected by increased urinary porphyrins." (This is a paraphrase but I believe that the essence of the statement is correct). In view of this statement I would suggest the addition to this section of an Item 6, with a section heading Biochemical Criteria of Exposure. It is thought that the earliest reaction to an undesirable exposure to lead would be the increase in the body burden of lead in the various organs of the body. Since it is nearly impossible to determine this in a systematic fashion among large numbers of people, it is not easy to use such a criterion at the present time for practical purposes.

Probably the next change which might be detectable would be a mild interference with hematopoiesis which would be reflected in an increase in the urinary porphyrins.

"As an indicator related to the body burden of lead we have chosen in this study to examine blood lead levels and also to examine urinary lead excretion. We did not feel that the lead exposures likely to be encountered in this study would have led to alterations in hemoglobin metabolism and for this reason porphyrins were not examined."

The section on Biological Studies has been much improved and this obviously represents a substantial effort. I find it objectionable in Table VI - C-1 and VI - C-2 to present the distribution of all of the subjects examined in 1956 and all of the subjects examined in 1963 because the types of subjects examined on these two occasions, as the table does indicate, is substantially different. The subjects in 1963 include 176 post office employees and City Health Department employees whose mean blood lead levels are the two lowest in the table. The inclusion of them, I believe, creates the false impression that there has been a diminution in the body burden of lead in the population of Cincinnati between 1956 and 1963. The addition of all these "apples and oranges" in different proportions cannot contribute anything of consequence. I therefore request that the final two columns in these two tables be deleted.

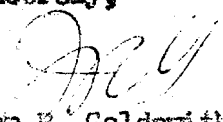
Though the comment is trivial, Tables VI - C-12, 13, and 14, do not contain the column heading indicating that the left hand series of three columns refers to blood, and the right hand series to urine. These column headings should be added.

July 17, 1964

It would be appreciated if acknowledgement could be included to the following individuals who assisted in our phase of the study. Dr. Martin Shearn, Director of Medical Education, Kaiser Foundation Hospital and Clinic, Oakland; Dr. Frederick A. Scharles, Medical Director, Southern California Permanente Program; Dr. William Rothrock, Medical Director of the Hughes Aircraft Corporation; and Dr. Morris Grover, Health Officer, Pasadena City Health Department.

I hope that these comments will be helpful.

Sincerely,


John R. Goldsmith, M.D., Head
Air Pollution Medical Studies

RG:rw-f

cc: Mr. John Maza
Dr. Robert Horton
Dr. Robert Kehoe

KE

0004710