

September 21, 1970

D. Bryce-Smith, D.Sc.
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Dear Doctor Bryce-Smith:

Mrs. Irene R. Campbell has handed me your letter of August 5th to her, in which you raise the question of the handling of certain organic compounds of lead, notably tetraethyllead and tetramethyllead.

May I say, first of all, that I have not found any very remarkable evidence of differences between adults and children of the human species in this handling of inorganic lead. From the clinical viewpoint, the type of poisoning seen most frequently in young children differs considerably from that which is common in adults. However, the conditions and rates of exposure differ markedly in the two instances, so that the responses of the two types of organism differ also. One important difference lies certainly in the fact that the amount of lead absorbed by the young child, within a relatively short period of time, is usually considerably greater, proportional to the weight of the body, than that of the adult in industry (which provides us with most of our cases of lead poisoning in the adult). The difference, therefore, considering the various types of poisoning seen in both child and adult, is not especially remarkable. It is true, I think, however, that lead poisoning in early childhood, is a more serious matter, in relation to subsequent disability, as well as length of life, than it is in adult life. This, too, may be a matter of severity, in fairly close relationship to, magnitude of dosage.

But to get to your main questions, let me say that, so far as tetraethyl- and tetramethyl-lead are concerned, we have little information, and there is little likelihood that we shall obtain much more. Since these alkyl compounds of lead are guarded carefully against their distribution for other than commercial purposes, they are not accessible to either adults or children, other than to those of the former type, who manufacture, distribute and make use of these compounds under strict supervision. There were, at one time, in the United States, in the very preliminary period of their introduction, opportunities for access to tetraethyllead, no such opportunity has ever existed in the case of tetramethyllead. Incidentally, the two compounds differ, appreciably, in their handling in the animal and human body. The extent of the differences has not been investigated sufficiently to define these differences, and it may be, now that its use as a generally distributed antiknock compound seems likely to be discontinued, or, at least, greatly diminished, that such investigations will never be financed adequately.

There is nothing, however, at this time, in the literature, so far as I know, which reveals differences in the rate and manner of absorption into the body,

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distribution within the body, metabolic breakdown within the body, or in the nature of the initiation or course of intoxication, induced by tetraethyllead, as to differences between children (or young animals) and adults. Tetramethyllead, so far as I know, has not induced cases of intoxication in old or young human beings (only in experimental animals), and although the handling in the body seems fairly similar to that of tetraethyllead, the former compound being much more volatile and seemingly more resistant to metabolic destruction, the clinical characteristics of the intoxication (in animals) are much the same. We have seen cases of poisoning with tetraethyllead in both adults and children (accidental poisoning in children due to its very early availability).

I shall send you what little we have on the behavior of the alkyl compounds. I cannot, however, supply you with much of significance, toward answering your question, in either experimental or clinical fields.

If my responses to your letter, by either the same means as your own or by published information should create further questions (or conflicts) in your mind, I hope you will not hesitate to write further. Meanwhile, certain publications of ours on the general subject may be of interest to you.

Sincerely yours,

Robert A. Kehoe, M.D.
Professor Emeritus of
Occupational Medicine

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