

THE CHILDREN'S HOSPITAL RESEARCH FOUNDATION

CINCINNATI, OHIO

December 20, 1939.

DEPARTMENT OF PEDIATRICS
COLLEGE OF MEDICINE
UNIVERSITY OF CINCINNATI

Dr. Robert Kehoe,
Mettering Laboratory,
Medical College,
Eben and Bethesda Aves.,
Cincinnati, Ohio.

Dear Bob,

In the next edition of my book I would like
to say the following if it is correct:

"It is probable that values of more than 30 micromilligrams
of lead per liter of urine and more than 24 micromilligrams
per 100 cc. of blood indicate lead poisoning; some would
hold that lower figures were significant. Lead in the
blood can also be determined spectrographically."

The reference which I had for this was Kehoe, J.A.M.A., 1938,
104, 31.

Would you be good enough to tell me whether this
is correct and whether there is a better reference which I
might give?

Thanks beforehand, and Merry Christmas.

As always,

AGM:R

A. Graeme Mitchell, M.D.

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December 27, 1939

Dr. A. Graeme Mitchell
The Children's Hospital Research Foundation
Cincinnati, Ohio

Dear Graeme:

I have looked in vain for the source of the statement attributed to me in your letter of December 20th. Someone has misquoted me and I cannot put my finger on whom it was. Not that the figures are so much in error for they are not far from the mean values, but rather that I have exercised the greatest care in not attributing unduly great significance to the analytical information on patients. In any case there is no such statement in my article in the J.A.M.A. or in any other paper which I have written.

Perhaps I had better give you the facts and let you choose what you wish to say, and since there is no publication which gives these facts in my name, (there is an article in press which gives part of it) you can best refer to my statement as a personal communication. If this does not suit you, let me know and I'll give you such references as I can.

The normal values for the human blood have been obtained for the most part on adults, although in our experience there is little difference in the case of children after the change from an all-milk diet. These values range from 10 to 50 micromilligrams per 100 grams of whole blood, with rare values up to 80 micromilligrams per 100 grams. The mean approximates 30 micromilligrams per 100 grams of whole blood. The range of normal values is just as important as the mean value and should be noted in all cases, in my opinion. Abnormal values range from the normal up to 400 micromilligrams per 100 grams, dependent upon the extent of absorption of lead compounds. Any value in excess of 80 micromilligrams per 100 grams of whole blood is definitely abnormal if the technique of handling samples is sufficiently rigid. Such concentrations of lead may or may not be associated with symptoms of intoxication, and are properly to be regarded as an evidence of increased lead absorption but not necessarily of lead intoxication. The higher the lead concentration, the more probable it is that intoxication is actually present. There is, however, no definite level of lead concentration which, in and of itself, can be said to demonstrate the existence of lead

intoxication. We have seen severe and fatal lead encephalopathy in children with from 200 to 300 micromilligrams of lead per 100 grams of whole blood.

The normal range of urinary lead concentration is from 10 to 100 micromilligrams per liter, with a mean value of approximately 30 micromilligrams per liter. Consistently maintained values in excess of 50 micromilligrams of lead per liter of urine in an individual, (numerous repeated analyses) are indicative of abnormal lead intake from some source, but are not hygienically or diagnostically significant unless they are in excess of 100 micromilligrams per liter. Values in excess of 150 micromilligrams of blood per liter are suggestive of plumbism but are not necessarily associated with symptoms or signs of illness. Here, again, elevated values mean only that abnormal lead absorption has occurred, and the higher the elevation, the greater the absorption.

To summarize, briefly, lead concentrations in excess of 80 micromilligrams per 100 grams of whole blood and in excess of 100 micromilligrams per liter of urine, when demonstrated by analytical methods of high accuracy comparable to ours, are indicative of recent abnormal lead exposure and absorption, and are compatible with the diagnosis of lead intoxication. The higher these values run, the greater has been the absorption of lead and the greater is their diagnostic significance. One should make the diagnosis from the clinical picture, however, employing the analytical data as evidence only of the occurrence and severity of the lead exposure.

As to analytical methods, those which have demonstrated their adequacy for these purposes have made use either of the spectrograph or of some modification of the "dithizone" technique.

I hope these paragraphs give you what you want. If not, let me know.

Faithfully,

RAK:18

Robert A. Kehoe, M.D.