September 26, 1960

Harold Jacobziner, M.D.
Assistant Commissioner
Maternal and Child Health
Department of Health
125 Worth Street
New York 13, N.Y.

Dear Doctor Jacobziner:

I assume from the first sentence of your letter of September 21, that you refer to a method of analysis for lead in the urine of children. If this assumption is incorrect, what I say further will be somewhat irrelevant, but I shall try to make it apply, even if you are speaking of the coproporphyrin content of the urine as an indication of lead absorption, or perhaps, of lead poisoning. The two are quite different.

I must advise you that in my opinion, based on our experience for many years, I would not rely upon the results of the determination of lead in the urine of small children, especially female children, for the detection of abnormal lead absorption. It is not easy to obtain representative and uncontaminated samples of the urine of small boys and it is nearly impossible to obtain uncontaminated samples from small girls. The variability in the rate of the urinary output of lead in the urine is such that many errors will result from the interpretation of the results of the analysis of samples of urine of small volume, while samples of considerable volume (composited numerous voidings) cannot be collected in any ordinary manner without gross contamination with lead. Moreover, the sick child often excretes lead poorly in the urine, and so the results are least useful when they are most needed. For these and other reasons, I would not use samples of urine to indicate the likelihood of significant exposure to, and absorption of, lead in the small child, but would always prefer to sample and analyse the blood. It is much easier to obtain such samples than is usually believed.

I would not attempt to use any shortcut method in the analysis of the blood. Poor results are worse than none, in that they are misleading. This hygienic problem in the case of children is serious as to life and subsequent health after survival, and it deserves the best method we can apply, within, of course, the realm of practicability.

I must point out (I hope I shall not appear to be precious but the point is highly important) that the analyses of blood or urine for lead content

is not a test for "lead poisoning", but rather for the determination of the significance of the absorption of lead in relation to the risk - not the actuality - of illness. The point of significance is very sharply defined, in the case of the blood, but not in that of the urine. Any concentration of lead in excess of 80 micrograms in 100 grams of whole blood is indicative of a dangerous degree of absorption of lead. Any concentration near but under 80 micrograms (as determined, of course, by methods of high precision) is approaching danger, but is not actually dangerous, provided the source of the absorption which is being appraised has been continued without interruption by a significant period of freedom from exposure.

I am sending a booklet on methods of analysis for lead, prepared in this Laboratory for issuance by the A.P.H.A., and I enclose a reprint of a method of analysis of the urine for coproporphyrin.

There is no relationship between the concentration of coproporphyrin in the urine and the concentration of lead in the urine or the blood. There is, in fact, little quantitative correlation at any time, but an elevation of the coproporphyrin concentration in the urine to abnormal levels, if it is due to lead absorption (this is not always the case), is indicative of lead intoxication, and the blood lead is likely to be at any point above 80 micrograms per 100 grams.

I'm afraid that what I have said will not please or satisfy you. In the interest of a reasonable brevity I have had to make flat statements which you may not be prepared to accept. On the other hand, this is not the place, even if I had the time (which I have not), to go into detail or to substantiate my statements with confirmatory data. You are confronted here, however, with a difficult problem, and in my view you will only make trouble for yourself and others, and confuse the issues, by undertaking to use an easy short cut for the purposes of case finding. It is better to use a sound method and cover less ground, than it is to try to cover a wide field with a poor method. It is a bit like using a sieve with a very large mesh to catch finely divided particles of a valuable substance.

Sincerely Yours,

Robert A. Kehoe, M. D.

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Enclosures:

THE CITY OF NEW YORK
DEPARTMENT OF HEALTH

ASSISTANT COMMISSIONER
Maternal and Child Health

125 WORTH STREET
NEW YORK 13, N. Y.

TEL. WORTH 4-3800

September 21, 1960

Dr. Robert A. Kehoe
Kettering Laboratories
Cincinnati, Ohio

Dear Dr. Kehoe:

We are very interested in a rapid and reliable screening test for the detection of lead poisoning in children, particularly in high-risk areas.

I would greatly appreciate it if you could inform us of the method of choice among the several urinary corporphyrin tests. Which do you find the most reliable?

Could you also give the literature reference, if published, and the various important details? We also would like to know what is the lowest blood level the corporphyrin test would detect in your laboratories?

Sincerely yours,

Harold Jacobziner, M.D.
Assistant Commissioner

HJ:pmb