

September 18, 1946

Dr. Laurence T. Fairhall
Chief, Chemical Section
Industrial Hygiene Division
U. S. Public Health Service
Bethesda, Maryland

Dear Doctor Fairhall:

Please accept my thanks for sending me a copy of your paper. It is certainly helpful to be able to see it in advance.

I am taking the liberty of recording my comments upon certain aspects of the situation with respect to analytical procedures, for such consideration as you may wish to give them. I do this because of my feeling that there is need for agreement among the participants in this discussion, so far as possible, as well as for fairly comprehensive coverage of the practical problems that beset some of the people who will come to this symposium for information and assistance. It will serve no useful purpose, on such an occasion, and will further confuse the situation, if I find it necessary to deal in an apparently critical vein with certain of the discussions. I hope to be able to present a brief summary which will crystallize the discussion to the practical advantage of men who will be interested primarily in the diagnosis of lead poisoning and in the means of recognizing and preventing hazardous lead exposure.

I am in substantial agreement with what you have said, and I am glad you emphasize the need for analytical accuracy and the difficulty of obtaining it. The heedless attitude in which many people have made use of various analytical methods to arrive at far-reaching and often, unjustified conclusions in individual cases and in the case of groups of workmen with hazardous lead exposure, has appalled me at times. On the other hand, I feel that you have failed, in some measure, perhaps, to give the analytical tool its just due. It represents the best, the most precise, and the most certainly valid tool for diagnostic and hygienic purposes in relation to lead exposure, and through its use the present physiological background, while admittedly incomplete, has been portrayed to great practical advantage. There is need therefore to state clearly what can be done and what, at this time, cannot. I do not refer to interpretations, on which, I realize, you are not touching, but only to procedures.

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Quite apart from analytical procedures, on which you are entitled to state your own opinions, there is the matter of the material to be analyzed. Sad and silly as it may seem, great difficulties lie in the choice and the manner of collecting samples for analysis. I believe there is no escape, at present, from the responsibility of the analyst to see that the sample supplied to him for analysis is capable of yielding a valid and useful result. At least he must be sure that the persons responsible for that side of the procedure are fully aware of the means by which samples must be obtained, and of the quantities required to yield an accurate result in relation to the accuracy and sensitivity of the analytical procedure that is to be employed. (The type or quantity of sample in relation to physiological interpretation is a wholly different problem, with which the analyst will rarely be able to deal adequately. Your example of one drop of urine is a case in point, and one which has come to my attention also. The accuracy might be (?) ever so great yet one could obtain a wholly useless and misleading result.) To conclude this phase of my comment, however, I think it would be helpful if you were to point out in fairly specific terms the need for the most meticulous care in the collection of samples of urine, blood, tissues or other materials. The ubiquity of lead is still not appreciated by many, with the result that samples collected in hospitals by the usual or routine means, or in industrial establishments by customary means, are regularly and grossly contaminated. This is the principal cause of the impossibly high results frequently given in case reports and other published articles. Obviously, also, industrial laboratories in general, and analytical laboratories of otherwise good precision within lead-using industrial establishments, can obtain sufficiently precise results only with the greatest difficulty, because of the constant danger of the contamination of samples. (We have found it necessary to exclude dust and smoke in the city air, in dealing with samples containing only a few micrograms of lead and other trace elements.)

Returning to methods and their precision, for a moment, I cannot quite believe that you distrust the results available on the lead content of human blood to the degree indicated in your remarks. Certainly these are valid results, of a fairly comprehensive type in relation to various types and severities of lead exposure. We (Cholak and his associates) have examined analytical methods with as critical an eye as anyone, and continue to look at every result (often twice checked) with care. Incidentally we have compared large blood samples with small, not a few times, but on a very extensive basis, especially in relation to the partition of lead in the blood. There is really no significant doubt as to the accuracy of the results we have published on the lead content of the blood, with the exception of the one series of results in J.A.M.A. 104:91 (1935), which were a little too high because of the method of collecting them (syringe and ordinary needle with brass hub), a mistake which we soon discovered and called attention to in later publications.

If I refer to our results, it is not to suggest that there are not other sets of data that are acceptable. It is only that our experience with the matter is considerably broader than others, and our data are more comprehensive. At the same time, we have parallel results obtained by two methods of high precision carried out by expert analysts. Therefore I speak without reservation, in the feeling that there is no present justification for skepticism as to the essential facts with reference to the normal lead concentration in the blood, its normal pattern of partition therein, and the variations in the lead concentration in the whole blood that are associated with varying intensities of lead exposure. You may not have intended to cast doubt on these points, but it seems to me that you have. If you were to create or develop that point of view, it would represent a disservice, I think, to those who are trying to find their way around in this field. Holding this opinion, I should be bound to combat, as well as possible, such an effect.

These are my only comments, which I have extended, I fear, into a discussion, in an effort to be quite clear in subject matter and purpose. I sincerely hope that this symposium will be helpful to the audience and to the readers of the published record, and I am glad to have this opportunity to assist to that end so far as I know how. I leave entirely to you the means and extent of your use of your compliance with my suggestions, and I trust you will feel free to reply or not as you may wish, without giving rise to any implication on my part of your attitude toward my wholly unsolicited advice.

Very truly yours,

RAK:rms

Robert A. Kahoe, M.D.