

September 10, 1956

Mr. W. G. Hazard
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Owens-Illinois
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Dear Bill:

I hasten, on return to my desk, to reply to your letter of August 14th on the reasons for our preference for analytical information on both the urine and the blood of persons whose work involves real or potential exposure to lead compounds.

There are, in fact, several reasons for our general policy. The extent of their application in the specific instance or location is variable and hence they are not always entirely applicable. I shall discuss them briefly, but adequately, I hope, and leave the decision as to what you want in your own hands. Let me say, first of all, that this is not a commercial or service laboratory that is concerned with rendering services for fees. We are prepared to contribute to industrial health for purely professional reasons, but primarily we are concerned with gathering useful information on a broad base, and this attitude dictates our general policies and conduct.

1) One reason for our use of the urine (with or without blood samples) lies in our extensive concern with problems related to the absorption or potential absorption of tetraethyl lead. The blood cannot be used in this situation since the metabolic products of tetraethyl lead in the body do not combine with the constituents of the erythrocyte. Thus the urinary lead concentration reveals the level of absorption but the blood does not.

This feature does not concern you, but we have to be on the look out continuously for situations of this type, and we cover it by adhering generally to both requirements.

2) The urinary lead concentration shifts more promptly than does the blood in response to exposure to lead. Thus we can find evidences of lead absorption in the urine some time before the blood level has changed sufficiently to indicate

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Mr. W. G. Hazard - (2) - September 10, 1956

the existence or the relative severity of the exposure. This is a very useful procedure in the investigation of the early stages of a potentially dangerous occupational situation. It is true that the extent of the actual risk is dependent upon the eventual level of absorption, and that the latter is best shown by the blood level. Nevertheless one is forewarned more effectively by the elevation of the urinary lead excretion. It follows from these facts that the average level of the urinary lead concentration (or daily output) indicates the severity of the current exposure of an individual or a group, while the average level in the blood indicates the relative extent of the total absorption of lead by an individual or group.

3) A consistently low concentration of lead in the urine, in the face of a high level in the blood, gives an indication of renal impairment, and sometimes selects out the individual who cannot safely incur further (any further) exposure to lead in the course of his occupation.

You will see, therefore, that we are not in the same situation as is Frank Patty, who is merely attempting to supply the widest measure of practical control at the least effort and cost. We are seeking to give the best medical advice obtainable to the people who come to us for such advice while, at the same time, we are gathering more and more information about more and more situations in industry. Incidentally we do a much larger volume of analytical work than Patty does, so we are not trying to add to our volume. We would never have been able to learn what we now know but for the breadth of our observations.

I am fully prepared to limit our observations on your people to those on the blood, if you so desire. Indeed, I am prepared to do this in any situation in which I can trust to the competence of the responsible people and their willingness to keep their situation under good control. I am not willing to do this in other situations in which the exposure is highly variable, inadequately controlled in part or in whole, and therefore close to, or running over into, real danger. It is for this reason that I prefer to keep our requirements fairly uniform. It is not always easy to keep the situation straight as between different industrial groups, or to explain to one why it is that we handle the situation of another in a different manner. Therefore initially I require both urine and blood samples. After I know the score in a given situation I am willing to meet the minimum requirements. Certainly in a situation that is generally safe and that is kept so by suitably designed and applied measures of environmental control in the trades that use inorganic lead compounds only, the periodic investigation of blood levels is the most satisfactory single

KE 0003719

Mr. W. G. Hazard - (3) - September 10, 1956

method of finding out just how far the lead absorption of the individuals or the group has gone. If that is all one wishes to do, that is all that need be done. Even here, as I have suggested, the information as to the current exposure, as revealed by analyses of the urine, is often very useful.

With this information at hand, you are at liberty to make your own choice. I shall be guided accordingly.

Sincerely yours,

Robert A. Kenoe, M. D.

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