

# HEALTH SAFETY REPORT

From the Director of Health and Safety  
Lead Industries Association, Inc.  
292 Madison Ave.  
New York 17, N. Y.



Look Ahead with Lead

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LEAD HYGIENE AND  
SAFETY BULLETIN  
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To Members of the Lead Industries Association, Inc.:

## STUDY OF BIO-TESTING METHODS FOR LEAD

At the present time there are four methods generally used for testing lead absorption in humans. These are quantitative blood lead, quantitative urine lead, urinary coproporphyrin and urinary delta-aminolevulinic acid. These methods are used with more or less success by many industries, health departments, hospitals, clinical labs, etc. In an effort to provide scientific evaluation of these methods, the U.S. Public Health Service, in cooperation with the Ohio State Department of Health, performed these four tests on a total of 966 Ohio children aged from 18 to 36 months. The reason for testing this age group is that this group commonly reports a higher percentage of childhood poisonings in many large cities than does any other age group.

The design of the study merely envisioned a crosscheck of each of the four test methods and was not concerned in this phase with whether or not the subjects actually had been poisoned. Using the blood lead level as a standard, all other tests were correlated with this test in an attempt to determine relative significance of the other tests and relative accuracy of the results. The upper limits of normal for the four biochemical tests were as follows: blood lead, .06 mg./100 gms. of blood; urine lead, .08 mg./l of urine; urinary coproporphyrin, 50 microgram/100 ml. of urine; and urinary delta-aminolevulinic acid, 0.6 mg./100 ml. of urine.

Since this study appears to be the most rigidly controlled and extensive thus far reported, the results obtained are of very great interest to our industry even though the test subjects were not adults. I may say here, parenthetically, that the results recorded in this study parallel those which we find in the automobile industry and indicate the reason for the use of the blood lead determination exclusively in this industry.

In brief, the study results showed that neither the urinary lead value, the urinary coproporphyrin or the urinary delta-aminolevulinic acid value correlated with the blood lead value. For example, 4.5% of the blood lead determinations were positive, while 9.5% of the urinary lead determinations were positive; however, the positive individuals did not coincide. In other

words, those who were positive for the blood lead method were not the same as those who were positive with the urine lead method. Although the percentage of positives varies with the method being correlated, the results of the study as far as the other test methods are concerned is the same in that there is practically no correlation.

Among the interesting conclusions reached by the authors are the following:

Using the techniques here employed, the concentrations in a casual urine specimen of delta-aminolevulinic acid, lead, and coproporphyrin cannot be relied upon for screening purposes to predict blood-lead concentration;

Blood obtained by venipuncture in the age groups studied, while requiring personnel skilled in the procedure, is a workable technique and is acceptable to the great majority of parents;

The obtaining of the urine specimens in this group is difficult and the reliability of a single specimen is doubtful.

We think you will find this to be a most interesting study and suggest that you obtain a copy of the complete paper from the U.S. Department of Health, Education and Welfare, Public Health Service, Division of Accident Prevention, Bureau of State Services, Washington 25, D. C. Ask for the July-August 1963 Bulletin of the National Clearinghouse for Poison Control Centers, entitled "Lead Poisoning Screening Test Study".

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