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Lead Poisoning 3. Lead Contamination of Homes

By: Urban League Joint
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Lead Poisoning 3. Lead contamination of homes.

1. Background.

Previous RCSI reports of August, 1967 and December, 1967 have documented the occurrence of chronic lead poisoning in young children in the inner city. We considered it likely that these children were getting poisoned by eating peeling paint which contained lead pigments, as was found to be the case in Chicago. Other possible causes of lead poisoning (battery burning at automobile junkyards, contamination of foodstuffs with lead-containing insecticides, etc.) we thought would produce different patterns of poisoning (poisoning of adults as well as children, poisoning in a very localized area, etc.). Actually only young children seem to be poisoned; and, aside from the fact that they come nearly without exception from older homes in the inner city, there does not appear to be any geographical factor.

If our suspicion that the children are poisoned by lead-based paint is correct, we should find such paint on the inside walls of homes in the city. The paint would probably be old, since modern indoor paints are not prepared with lead pigments. Further, the poisoning would be most likely to come from deteriorated walls, with paint flaking and dropping within the reach of children.

2. Summary of results.

The RCSI and the Urban League undertook as a joint project the collection and analysis of samples of peeling paint from inner city homes. Young people collected and cataloged 112 samples of cracked and peeling paint from homes mainly in the vicinity of Atkinson, Adams, and Reynolds Streets under the supervision of the Urban League. Of the 112 samples, 27 were found by the RCSI to give positive tests for lead, demonstrating that ample opportunity exists for inner city children to get lead poisoning by eating paint indoors.

3. Methods.

Samples of cracked, peeling paint were removed from the walls of rooms and sealed in envelopes. Cataloging data were recorded on each envelope at the time the samples were taken; this information included the name of the collector; name, address, and phone number of occupant; room and color of paint; whether or not young children live in the household.

The samples were tested for lead by two methods.

(1) Treatment with a solution of sodium sulfide turns the lead-containing sample black, by producing black lead sulfide. The method is given by Wiig, Line and Flagg, Semimicro Qualitative Analysis. D. Van Nostrand, New York (1954).

(2) A sample is ashed, and the ash is spot tested with benzidine hydrochloride which gives a blue color with lead. The method is given by Mellan, I., Organic Reagents in Inorganic Analysis. Blakiston, Philadelphia (1941).

Samples were scored as containing lead only when they were positive by both tests. Some of these samples were then checked by the standard dithizone method for lead. We were deliberately conservative in using the relatively insensitive method 1 and 2 instead of the extremely sensitive dithizone method, because we wished to identify only the paint that contained medically significant amounts of lead pigment, and did not want to test for minor lead impurities present in other pigments.

The procedure is specific. Various metals might give a false positive with method 1 alone or method 2 alone, but only lead is likely to give both positive tests under the circumstances.

4. Observations.

Number of households sampled: 59
Total number of samples: 112
Number giving positive tests both with sulfide and with benzidine: 27 samples from 22 households
Percentage of paint samples containing lead: 24%
Number giving negative tests both with sulfide and with benzidine: 84

One sample gave a weak reaction with benzidine and a negative one with sulfide. It was counted as negative.

All the samples scored as positive also gave a positive reaction with dithizone, confirming the test score. Some samples scored as negative also gave a positive reaction with dithizone. These samples presumably contained only small amounts of lead.

Many of the positive reactions for lead were seen not on the surface, but only deep inside the paint chip. Lead may have originated from paint jobs done many years ago.

5. Spectrographic tests of paint samples.

The spectrographic method of detecting lead is the single most specific method of analysis: no other element can be mistaken for lead in spectrographic analysis. The procedure calls for elaborate equipment and expert operators. We were given access to this equipment in the County Public Safety Laboratory of Mr. John Temmerman, and in the Atomic Energy Project laboratory of Dr. Luville Steadman. Ten of the samples scored as positive by spot tests were also analyzed spectrographically. Lead was found to be

a major constituent (of the order of 10% by weight) of all ten samples. This is a definite confirmation of our test results.

6. Comment.

The RCSI sees three important differences between the public health problem posed by lead poisoning and that coming from water pollution. (1) In the case of lead poisoning, there is no disagreement about actual damage to individuals: the victims are known. (2) In correcting the cause of lead poisoning, there is no possible claim of extraordinary costs to the public. The expenditures involved here are the ordinary costs of maintaining a home or rental property in good repair. (3) Getting the exposed child away from the source of lead is not enough: the poisoning will persist if not treated.

One potentially poisonous sample in four tests and one hazardous household out of each two tested, indicate a serious danger to inner city children. Prompt action is needed. The families exposed to the poison can be warned. The victims, whose illness may be unrecognized, can be found and treated. The contaminated housing can be cleaned up.

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Samples were collected for this project by the following aides:

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These were coordinated by:

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