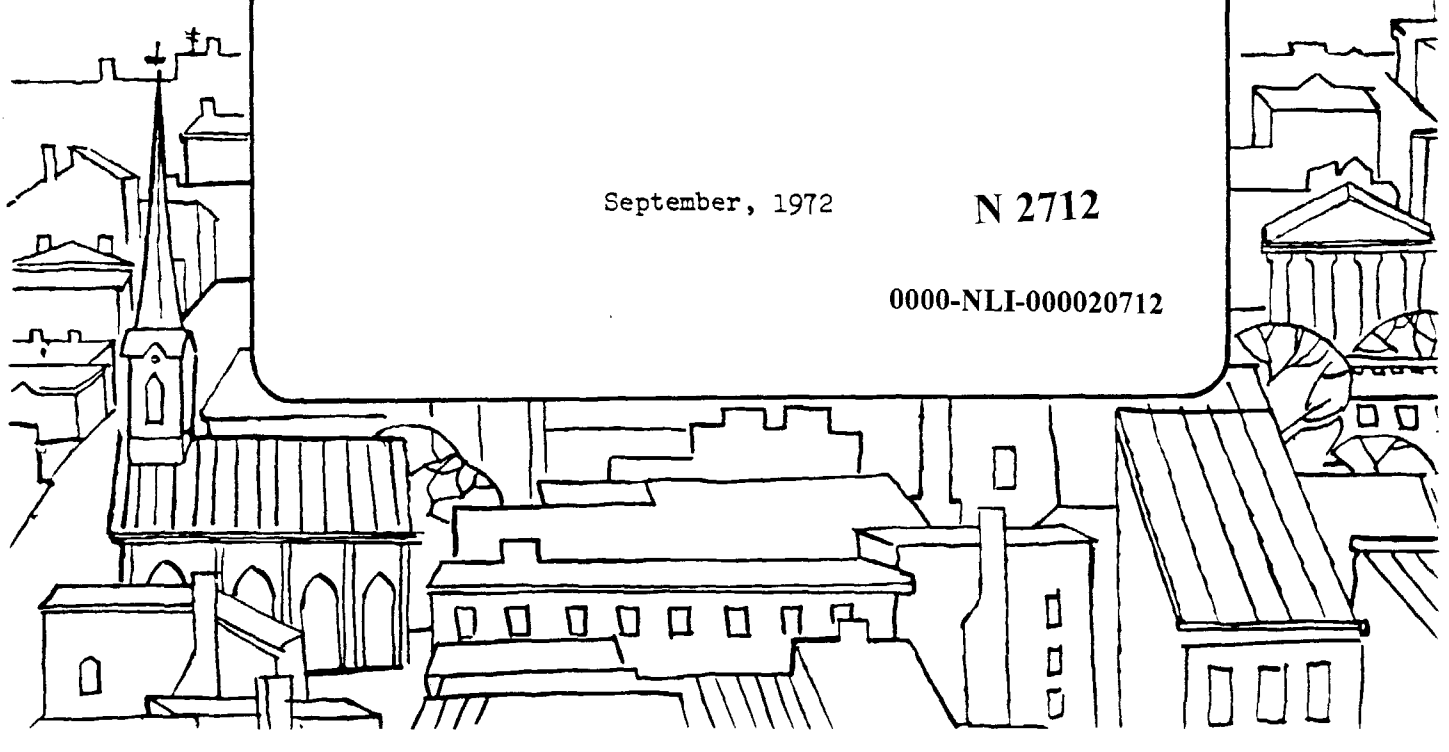
U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

PUBLIC HEALTH SERVICE

HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION

CHILDHOOD LEAD POISONING

A SUMMARY REPORT OF A SURVEY FOR UNDUE LEAD ABSORPTION AND LEAD-BASED PAINT HAZARD IN 27 CITIES



September, 1972

N 2712

0000-NLI-000020712

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DHEW Publication No. (HSM) 73-10002

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION
BUREAU OF COMMUNITY ENVIRONMENTAL MANAGEMENT
DIVISION OF COMMUNITY INJURY CONTROL
CHILDHOOD LEAD POISONING CONTROL BRANCH
CINCINNATI, OHIO 45202
SEPTEMBER, 1972

This report was formerly entitled "Childhood Lead Poisoning - A Summary Report of a Survey in 27 Cities."

THE BCEM CHILDHOOD LEAD POISONING SURVEY

A Summary Report

The Bureau of Community Environmental Management conducted small-scale neighborhood surveys in 27 cities during the summer, fall and winter of 1971-1972 to screen young children aged 1 to 6 years who were living in pre-1949, sub-standard housing. The purpose of these surveys was to obtain some assessment of the occurrence of elevated blood lead levels in children in the specific neighborhoods of the cities surveyed and to determine the presence and availability to children of lead-based paint in their dwellings.

Only cities that were not conducting a program at the time and which represented a national geographic distribution were selected. These included cities in the Midwest, South, West, North, and East which did not have the resources, or the level of suspicion, or the technical expertise to look for childhood lead poisoning.

Each child was initially tested by a micro analytical technique capable of analyzing a small sample of blood (one-tenth of a milliliter) by Anodic Stripping Voltammetry (ASV).

The ASV technique is an electrochemical procedure in which, after acid digestion of the blood sample, the lead ion is plated by negative voltage to the electrode. By rapidly reversing the polarity, the lead is stripped off, giving a current peak proportional to the concentration.

Five to ten percent of the children randomly selected had a 10cc heparinized venipuncture drawn and analyzed by a macro atomic absorption spectroscopic or dithizone technique.

Most children who received a blood lead test also had their homes tested for the presence of leaded paint. Exterior and interior surfaces of houses were tested with a portable wall lead analyzer utilizing the X-ray fluorescence principle, so that multiple readings could be taken within a short time and without damage to the surface coatings.

Follow-up procedures were assumed by each local community. All children found with blood lead levels above 40 ug/100 ml on the initial screening test were to be retested by drawing a venous blood sample for analysis by the AAS or dithizone methods. Diagnosis and treatment, if required, were to be provided by each community.

In the 27 cities, 2309 children were tested. Fifty-one percent were black and 34% of the total were under three years of age. Elevated blood lead levels confirmed by analysis of a venous blood sample were found in at least 211, or 9.1% of the children tested, with 85% of the cities surveyed having at least one child above 40 ug/100 ml. (Tables 1 and 11)

Of the 999 dwelling units, at least one accessible interior surface was found to contain very high lead in amounts of 2 mg/cm^2 or above in 730, or 73.1% of the houses tested. A 2 mg/cm^2 reading is approximately equivalent to one that would be obtained from an interior surface with a single layer of paint with a 30% lead content. When added to the 14% of houses that had significant and potentially hazardous levels of 1 to 2 mg/cm^2, the percentage increased to 86%.

If exterior surfaces were included, over 95% of the houses tested had at least one accessible surface with hazardous amounts of lead. (Table III)

To date, as a direct result of the survey, at least 30 children have been treated by chelation. An additional 13 children are known to have been diagnosed as having lead poisoning and treated by chelation as an indirect result of the survey. These cases have been attributed to an increased level of suspicion by parents and physicians as a result of publicity associated with the survey activity in the community. Also, 30 families have had the sources of lead-based paint made unavailable to children by renovation or relocation as a direct result of the survey. The communities have been advised to continue surveillance of the other 181 children having blood lead levels above 40 ug/100 ml.

Table I

BCEM CHILDHOOD LEAD POISONING SURVEY - SUMMARY

CITIES TABULATED TO DATE	27	
STATES REPRESENTED	23	
CHILDREN SCREENED	2309	
RACE - BLACK; OTHER	1183;	1126
	51.3%	48.7%
AGE - BELOW 3 YEARS: 3 AND OVER	793;	1353
	34.3%	58.0%
ELEVATED BLOOD LEAD LEVELS (≥40 ug)	211	
CONFIRMED BY AAS OR DITHIZONE	9.1%	
NUMBER CITIES REPORTING CHILDREN ≥40 ug	23	

Table II

SELECTED DATA ON CHILDREN SCREENED AND WITH

CONFIRMED ELEVATED BLOOD LEADS BY CITY

CITY	NUMBER SCREENED	NUMBER ASV ≥ 40 ug	NUMBER AAS TOTAL[1]	NUMBER AAS ≥ 40 ug	AAS ≥ 40 ug % CONFIRMED	RACE BLACK	RACE OTHER	AGE ≤ 3	AGE ≥ 3
Chester, Pa	58	14	1	1	1.7	55	3	14	44
Des Moines, Iowa	64	16	4	3	4.7	22	42	30	34
San Antonio, Tex.	57	4	2	0	0	8	49	21	36
Trenton, N. J.	52	11	6	3	5.8	29	23	27	22
Nashua, N. H.	92	25	17	5	5.4	3	89	42	50
Denver, Col.	73	9	12	4	5.5	24	49	31	42
Nashville, Tenn.	95	5	12	1	1.0	58	37	34	61
Pasadena, Ca.	46	25	27	1	2.0	17	29	20	25
Toledo, Ohio	118	15	17	4	3.4	50	68	43	68
Sacramento, Ca.	78	12	14	6	7.7	11	67	40	37
Portland, Ore.	82	3	6	1	1.2	34	48	40	40
Wilmington, Del.	89	40	41	24	27.0	79	10	32	56
Spokane, Wash.	75	0	--	--	--	0	75	--	--
Lexington, Ky.	66	13	12	3	4.5	34	32	24	42

SELECTED DATA ON CHILDREN SCREENED AND WITH

CONFIRMED ELEVATED BLOOD LEADS BY CITY (CONTINUED)

CITY	NUMBER SCREENED	NUMBER ASV ≥ 40 ug	NUMBER AAS TOTAL[1]	NUMBER AAS ≥ 40 ug	AAS ≥ 40 ug % CONFIRMED	RACE BLACK	RACE OTHER	AGE ≤ 3	AGE ≥ 3
Indianapolis, Ind.	73	15	3	1	1.3	71	2	32	41
Binghampton, N. Y.	53	5	25	5	9.4	16	37	24	29
Stamford, Conn.	72	19	19	7	9.7	55	17	18	52
Salt Lake City, Utah	64	1	--	0	0	0	64	--	--
Flint, Mich.	86	22	26	9	10.5	75	11	26	58
Wichita, Kan.	116	5	4	1	0.9	69	47	38	78
Tulsa, Okla.	93	18	38	13	14.0	61	32	26	67
Pensacola, Fla.	95	10	20	7	7.4	73	22	20	75
Dayton, Ohio	56	4	7	1	1.8	25	31	27	29
Hoboken, N. J.	170	22	15	8	4.7	8	162	72	98
Charleston, S. C.	173	35	204	72	41.6	168	5	49	122
Albuquerque, N. M.	81	0	--	0	--	16	65	19	61
Harrisburg, Pa.	132	36	152	31	23.5	122	10	44	86
TOTAL	2309	384	782	211	9.1	1183	1126	793	1353

[1]Includes 5-10% random sampling plus followups reported by cities plus some dual samples taken in Charleston and Harrisburg

Table III

HOMES WITH POTENTIALLY HAZARDOUS LEAD CONCENTRATIONS
(AT LEAST ONE ACCESSIBLE INTERIOR SURFACE
$\geq$ 2 MG/CM^2 by X-R-F ANALYSIS)

CITY	HOMES TESTED	WITH SURFACE $\geq$ 2 MG/CM^2	PERCENT
Indianapolis	43	38	88.4
Wichita	29	14	48.3
Portland	37	34	91.9
Lexington	19	15	78.9
Nashua	60	33	55.0
Denver	52	48	92.3
Des Moines	22	18	81.8
Charleston	39	26	66.7
Dayton	30	22	73.3
Nashville	58	43	74.1
San Antonio	31	16	51.6
Chester	39	29	74.4
Binghampton	24	19	79.2
Albuquerque	15	11	73.3
Trenton	37	30	81.1
Toledo	60	54	90.0
Pensacola	33	16	48.5
Pasadena	49	37	75.5
Sacramento	37	21	56.8
Wilmington	25	16	84.0
Salt Lake City	36	27	75.0
Hoboken	20	20	100.0
Spokane	42	35	83.3
Stamford	32	25	78.1
Flint	30	18	60.0
Harrisburg	51	40	78.4
Tulsa	49	25	51.0
TOTALS	999	730	73.1

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