

LEAD POISONING IN SOUTH CAROLINA

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Lead poisoning in South Carolina

The experience of the Charleston Program for Lead Poisoning Detection in the years 1972-1975 and the South Carolina Childhood Lead Poisoning Control Program in the last year has demonstrated that lead poisoning is a problem of epidemic proportions in the Charleston Area and may be a serious problem in the older sections of the cities in other areas of this state. The purpose of this communication is to inform physicians of South Carolina about the activities and resources of this screening program.

LEAD POISONING

Although lead is commonly found in the environment around us, childhood lead poisoning is usually attributed to the ingestion of paint chips containing lead such as are found in the deteriorated housing of inner cities. Other sources may be airborne lead particles, dusting paint, high traffic areas, soil surrounding a house and eating or drinking from improperly fired earthenware.

The symptoms of lead poisoning are relatively non-specific but should be suspected in children living in older housing who exhibit CNS abnormalities as subtle as increased restlessness, irritability and poor attention span or as gross as seizures and acute encephalopathy. Symptoms also include recurring abdominal pain, particularly in association with constipation, loss of appetite and persistent vomiting.

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PROGRAM BACKGROUND

Childhood lead poisoning has been recognized in the old, lower income areas of the City of Charleston for many years. Seventy children in Charleston were hospitalized with the diagnosis of lead poisoning between 1960 and 1970. There were multiple admissions (114) and 11 fatal cases among these seventy. Almost all experienced severe encephalopathic symptoms. Virtually all of these children were in the recognized peak age range of 12-48 months (90%) and most were black (86%) and residents of the older peninsular area of Charleston (71%).

These data suggest that a larger group of children experienced lead exposure. Initial epidemiologic investigations of lead poisoning in Charleston in 1970 indicate that of 187 school age children screened, 11 had clearly elevated blood lead (≥ 40 ug/dl)¹ although they were all past the usual age for childhood lead poisoning. Blood lead levels of this cohort are shown in Table 1. These data suggest they had higher levels in the past and that the lower levels include children with prior abnormal levels. The eleven children with abnormal levels were all from urban residences and ten of them were black.

A subsequent 1971 Department of Health, Education and Welfare (DHEW) survey² documented the presence of a serious problem. Of 173 black children screened from an area of old deteriorating housing, 72 (41.6%) had blood lead determinations greater than 40 ug/dl.

In 1972, the City of Charleston received a three year grant to detect high risk children in the peninsular city. This grant was administered by the Medical University of South Carolina (MUSC) and by June 1975, 4,005 children had

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been screened, of which 919 (23%) were considered to be experiencing potentially hazardous lead exposure. Seven hundred children from this group continue under medical surveillance and receive treatment as required. One hundred eleven children have received chelation therapy.

The identification of such a severe problem in the City of Charleston led us to consider that other populations may also be at risk of the problems associated with lead exposure. In cooperation with the South Carolina Department of Health and Environmental Control, MUSC has now organized a statewide lead poisoning detection program.

ORGANIZATION OF THE SOUTH CAROLINA PROGRAM

MUSC is the primary grant recipient from DHEW and functions as the resource facility for primary case finding and medical management. In each municipality where screening is conducted, preliminary meetings are held with local health departments. These meetings inform health department personnel about the program and project staff learn the locations of children at high risk because of age, socioeconomic status, and conditions of housing.

Following this meeting, project personnel inspect personally the areas of high risk to confirm conditions. Subsequent to this inspection,

screening clinics or door-to-door screening of children aged 1-6 years is arranged in cooperation with the local health department. At initial patient contact there is parent education about lead poisoning. Informed consent from parents is sought and basic patient information, demographic and environmental, is obtained. Fingerstick on venipuncture blood is assayed for lead, free erythrocyte porphyrins and hematocrit. All patients are classified, evaluated, and followed according to Center for Disease Control guidelines.³ When there is evidence of elevated blood lead, the child's environment is evaluated by direct inspection including x-ray fluorescence for the presence of lead. When hazardous levels are found, further education is directed to the parents of the child to reduce the hazard or the exposure. Limiting the child's ability to reach the dangerous lead source, and sweeping and dusting of lead particles is useful initially in environmental management. Subsequently efforts are made through the homeowner or landlord to accomplish a permanent abatement of the lead hazard by removal of lead based paint, permanent coverup by wallboard, panelling, etc. Such activity is accomplished in cooperation with the local health department and building inspections office. Periodic reevaluation of the environment is aimed at elimination of the lead hazard.

TABLE I

Mean Blood Lead Values (ugm/100ml) by Residence and Race, Charleston, S. C. Children ages 6-9 years, (no. of children in parentheses), 1970.

RACE	RESIDENCE		TOTAL
	URBAN	RURAL	
White	15.1 (50)	14.7 (44)	14.9 (94)
Black	33.1 (49)	17.3 (44)	25.6 (93)
TOTAL	24.0 (99)	16.0 (88)	20.2 (187)

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SCREENING RESULTS

The first year's screening on a statewide basis has been highly productive. As indicated in Table II, yields of positive findings have been generally in excess of national averages. The Charleston Area has remained the most productive for screening, as expected, but areas of significant yield exist in other sites studied to date.

DISCUSSION

These preliminary findings of elevated blood levels in a large number of children throughout South Carolina suggest a problem with major public health implications. Screening of children in high risk environments should continue but

should be supplemented with activities to minimize lead exposure. Such activities should include (a) education of parents and property owners about the problem and (b) regulatory action designed to eliminate exposure sources. □

REFERENCES

1. Weston, William III, M.D., Sandifer, S. H., M.D., and Keil, Julian E., Dr. P.H., Medical University of South Carolina Unpublished Study, 1970.
2. Childhood Lead Poisoning — A Summary Report of a Survey in 27 Cities. DHEW Publication No. HSM 73-10002.
3. Increased Lead Absorption and Lead Poisoning in Young Children. A statement by the Center for Disease Control. DHEW #00-2629, March, 1975.

TABLE II
SUMMARY OF SOUTH CAROLINA LEAD POISONING
SCREENING ACTIVITY - July 1, 1975 - June 30, 1976

LOCATION (Number Screened)	NUMBER OF POSITIVE RESULTS*		PERCENT OF POSITIVE RESULTS**
	Class I & II	Class III & IV	
Charleston (City) (969)	242	66	31.7%
Charleston (County) (994)	132	43	17.6%
Darlington (158)	28	1	18.4%
Florence (298)	15	4	6.4%
Spartanburg (438)	42	6	11.0%
Columbia (596)	159	12	28.7%
Gaffney (128)	1	1	1.5%
Greenville (856)	160	14	20.2%
Others (19)	8	—	42.1%
TOTAL (4,456)	787	147	21%

* Positive results determined in accordance with CDC Guidelines (2)

Class I - PB 30-49, EP < 59
 Class II - PB 30-49, EP 60-109
 Class III - PB 50-79, EP 110-189
 Class IV - PB > 80, EP > 190
 (PB = Blood Lead; EP = Erythrocyte Porphyrin)

** Number of Positive Results (all classes) divided by number screened