

BEFORE THE
ENVIRONMENTAL PROTECTION AGENCY
TESTIMONY OF DR. JAMES L. McNEIL
ON THE PROPOSED NATIONAL AMBIENT AIR
QUALITY STANDARD FOR LEAD
DOCKET OAQPS 77-1

February 16, 1978

My name is James L. McNeil. I have been asked to testify today by the Lead Industries Association. I am a practicing pediatrician in El Paso, Texas. These remarks respond to EPA's statement in the Notice of Proposed Rulemaking inviting comments on whether what is known or anticipated about EP elevation or other sub-clinical effects has sufficient implications to warrant a role in determining the level of the air quality standard for lead. My studies and work with children with increased lead absorption convince me that EP elevation alone is not an adverse health effect and that the standard EPA has proposed, designed to prevent EP elevation, is unduly restrictive.

My evaluation of EPA's conclusions about elevated EP's health significance is based to a large degree on the results of my own study of children with increased lead absorption living in the Smeltertown section of El Paso near a lead smelter. This epidemiological and clinical study included the population

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EPA suggests is the critically sensitive population: children ages 1 to 5. On the basis of this study, it is my opinion that EP elevation at blood lead levels under 40 mcg% does not represent an adverse health effect.

The children of El Paso Smeltertown provided an opportunity to evaluate the effects of prolonged increased lead absorption. The pattern of lead absorption in Smeltertown indicated a rapid rise in blood lead values in late infancy and early childhood. By age of 4 to 5 years almost 100 percent of the children had values in excess of 40 mcg%. During the remainder of childhood there was a gradual reduction of blood lead values even though the children continued to reside in the same area.

One hundred and thirty-eight (138) Smeltertown children participated in a controlled, blind study for the effects of prolonged increased lead absorption. One hundred and one (101) children had blood lead values greater than 40 mcg% with a mean FEP value of 186 mcg%. Forty-three (43) children had blood lead values greater than 60 mcg% with a mean FEP value of 262 mcg%. Ninety (90) percent of the children had lived in the area for more than two years. Fifty-three (53) percent of the total group and 97 percent of the high risk group had lived in the area from birth to three years of age. For the total group the average length of residence in Smeltertown was seven years per child.

One hundred and thirty-eight (138) Smeltertown children were pair-matched and evaluated against control children with no known increased exposure to environmental lead. Each child's evaluation included a medical history questionnaire, physical and neurological examinations, laboratory tests of blood and urine, X-ray of the right hand, nerve conduction test, psychometric evaluation and a school performance rating by teachers.

The data were then grouped for statistical analysis. These groups included the total study group, the data from children less than eight years of age and five groups based on blood lead levels: over 40 mcg%, less than 40 mcg%, 40 to 49, 50 to 59 and greater than 60 mcg%.

In addition, an effort to group data from children at greater risk was made by using five different parameters of lead exposure:

- (1) blood lead levels greater than 60 mcg%,
- (2) FEP levels greater than 180 mcg%,
- (3) residence in the area from birth to three years of age.
- (4) a minimum of two years residence in the area and
- (5) any X-ray evidence of lead exposure.

Forty-four (44) children with four of the five parameters positive constituted a high risk group. Thirty-one (31)

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additional children with three or more positive parameters were combined with the forty-four (44) high risk children to constitute a moderate risk group of seventy-five (75). The remainder (63) constituted a lower risk group. Statistical evaluation of these groups included an independent t-test, a correlated paired t-test and a two-way analysis of variance for residence against age and blood lead value compared to age.

The findings of the El Paso study bear directly on the key issue in this proceeding, namely the significance to public health of FEP elevation in a critically susceptible group of children.

Hemoglobin is an available easily measured blood component related to heme synthesis. Our study showed no clinically significant impairment of heme synthesis in the Smeltertown children. Hemoglobin values in the study children ranged from 10.3 grams to 16.2 grams compared to the control children's range of 10.5 grams to 16.8 grams. Mean hemoglobin values dropped slightly with increasing lead levels. Children with less than 40 mcg% of lead and FEP of 104 mcg% had mean hemoglobin values of 13.89 grams. Children in the 40-49 mcg lead group with FEP of 156 mcg had mean hemoglobin levels of 13.84 grams. The 50 to 59 mcg group with 205 mcg FEP had hemoglobin of 13.66 while that group with mean blood lead

greater than 60 mcg and FEP 262 had hemoglobin value of 13.05.

The only statistically significant difference found (.05 level) was in the over 40 mcg% group as compared with their controls and 40 to 49 mcg% group as compared with their controls. However, none of the values by themselves could be considered clinically significant anemia. Moreover, physical and neurological examination as well as nerve conduction tests failed to show any central nervous system deficiencies or peripheral neuropathies. Groups of Smeltertown children were compared with their control groups based on a battery of psychological tests. Again, no significant differences were revealed.

Psychometric evaluation was designed to test forty-three (43) of the fifty-three (53) basic learning abilities identified by Vallet in the evaluation of learning disabilities. It also covered Conners' six major categories of brain function used in discrimination of minimal brain damage.

The children under six years of age were tested for general intelligence with the McCarthy Scales which had been normed including Spanish surnamed children, and the Barry Development Tests of Visual Motor Integration. Children over six years were tested with Wechsler Intelligence Scale for

Children, Peabody Test of picture vocabulary, Wide Range Achievement Test, Wepman Test of Auditory Discrimination, Oseretsky Test of Motor Development, Bender Gestalt with Koppitz scoring of Visual Motor Age, Draw-A-Person Test, Frostig Developmental Test of Visual Perception and the California Test of Personality. There were no statistically significant differences between the study children and the controls in either total scores or on the subsections of the tests. In the California Test of Personality, no significant differences were found in the major areas of personal adjustment; however, subtests indicated that the Smeltertown children exhibited a higher anti-social tendency and poorer school relations. We believe, however, that these differences were not lead-related, but were probably related to the Smeltertown children's historical geographic isolation, the closing of their school, adverse news media exposure, and forced displacement from their homesteads. In the teacher-rating scale, on the other hand, there were no significant differences in the grade point average, class rating or activity scores.

In conclusion, our study of children (including those in the most critically susceptible category) with prolonged, increased lead absorption failed to demonstrate that FEP elevation is either pivotal or significant for health. Furthermore, the study failed to demonstrate any adverse health effects at blood levels below 40 mcg%. We

could not even demonstrate significant health effects
in the deliberately selected high risk group.