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Editor
The New England Journal of Medicine
10 Shattuck Street
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Dear Sir:

We wish to submit the attached comments for publication in the Correspondence section of the New England Journal of Medicine.

Yours very truly,

John M. Pierrard

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Engineering Fellow
Environmental Activities

JMP/er
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N33819

To the Editor:

In their recent article[1] on chronological trends in blood lead levels Annest et al state that "the most likely explanation for the fall in blood lead levels is a reduction in the lead content of gasoline". Based on analyses we did using the same NHANESII data, and employing a number of different models and assumptions, we see no evidence that gasoline lead exposure is the most likely cause of the decrease in U.S. blood lead levels. Our analysis indicates that site-specific gasoline lead exposure accounts for only 0.5 to 1 ug/dl of the observed ~5 ug/dl decrease, which is consistent with the observed national average air lead decrease (0.3 ug/m3)[2], and the well-documented blood lead response to air lead change (range 1 to 2 ug/dl per ug/m3)[3]. Changing demographics of the sampled sites can account for most of the four year decrease, about 3 ug/dl. The remaining unexplained portion of the decrease may be due to improved sample handling during the course of the study, effectiveness of numerous government programs to reduce lead intake, or other unquantified causes.

Our initial methodology[4] and subsequent modifications utilizing a split plot analysis of covariance model[5] first adjusted blood lead levels for "within" and "between" sampling site demographic descriptors, and also for a site-specific gasoline lead exposure variable. We then regressed the residuals of the adjusted blood lead levels on time to evaluate the time trend contributions. Our results consistently showed that over 50% of the apparent trend was accounted for by changing site demographics and less than 20% was attributable to gasoline lead exposure.

Our site-specific measure of gasoline lead exposure density (tonnes/mi^2/quarter) was computed from data on lead and gasoline use and site county population and land area, based on the correlation between population and gasoline use[6]. Annest et al used the total national gasoline lead use which reflects the overall trend, but does not account for the widely different exposures observed at the 64 sites in the study.

The apparent explanatory power of total national gasoline lead use as employed by Annest et al seems to be an artifact arising from confounding among the true exposure to gasoline lead, differential site demographics, and other unquantified time-related effects on blood lead.

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