MEMORANDUM

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
NATIONAL INSTITUTES OF HEALTH - NIEHS
P. O. Box 12233, Research Triangle Park, NC 27709

TO : Dr. David P. Rall
Chairman, DHEW Committee to Coordinate Toxicology
and Related Programs

DATE: July 21, 1976

FROM : Dr. Hans Falk HF
Chairman, Committee on Human Health Consequences Due to Lead Exposure
from Automotive Emissions

SUBJECT: Comments on the committee report

1. A discussion of economic and other consequences resulting from the phase out of lead in gasoline has not been included because the committee was not charged to address these issues, but rather to focus on health consequences due to lead exposure.

2. Aside from very general comments about the chemical nature of exhaust emissions from alternative antiknock compounds of fuel composition changes if lead is removed from gasoline, there is not enough information available to evaluate the health consequences of these replacements for lead. The major themes running throughout this report are not only the evaluation of the health consequences of lead exhaust emissions, but also a descriptive outline of the types of information required to make a public health analysis of substitutes or replacements for lead. In addition, a framework for evaluating and analyzing this information is presented so that the public health impact of these replacements can be determined. Such an evaluation at this time should be classified as a best-judgment based on experience with lead exhaust emissions.

3. Several studies have attempted to compute the contribution of airborne lead -- more particularly for this report, that derived from vehicular emissions -- to the lead concentration of human blood. In one of the best studies, the computed value was that an airborne increase of 1 μg Pb/m^3 would raise the lead concentration of whole blood by 1μg/100 ml (1). The study is referred to in this report. It is unwarranted, however, to try to use this value to accurately compute the total intake from vehicular sources or the degree of hazard to human health for the following reasons, which were considered and are referenced in this report.

a. The above exposure-accumulation factor does not include the amounts "mouthed" by children directly or via their hands (2,3,4).

b. Exposure to lead contributes to body accumulation of the lead in soft and hard tissues (5).

c. Lead in the storage sites can be mobilized by physiological factors and dietary components (6,7) and by inadvertent or intentional chelation effects (8,9). These could contribute to sporadic toxicologic responses. Chelation therapy in young humans and young rats is also more difficult and more variable in response than in adults (9).

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d. In most cases, blood lead concentrations have not been assayed relative to "reference values" and not at all relative to "discrimination values." The more usually quoted "normal values" are fraught with confusion (10) that make the interpretation difficult at the upper end of the "normal range."

e. Investigators are still trying to distinguish, for the lower levels of lead exposure, which biochemical changes are more or less appropriate sentinals for imminent or delayed hazards. For example, erythrocyte δ-aminolevulinic acid dehydrase may be too sensitive and too nonspecific at the lower levels of inhibition of its activity (11) while free erythrocyte protoporphyrin (FEP) seems to be considerably more meaningful with regard to nonacute situations (7,8).

f. Few potential biochemical markers are available at present to signal effects on the nervous system (12).

For these multiple reasons, it is advisable to minimize exposure to lead from this demonstrated, more limited source of constant exposure as it is from other sources of higher but more sporadic exposure as in paint and pottery glaze.

4. This report is derived entirely from published reports in the literature and all references are stated in the bibliography following each chapter. The committee members' freedom to express their points of view in responding to the suggested changes is appreciated.

Attachments

REFERENCES

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