REVIEW OF PIRKLE et al. PAPER ON BLOOD LEAD, BLOOD PRESSURE, AND CARDIOVASCULAR RISK ASSESSMENT

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1. SUMMARY

This paper provides a meticulous study of the association between blood presure and blood lead. There is little question that blood lead is significantly related to high blood pressure in a white male adult population, even after adjusting for a large number of dietary input factors, demographic and life-style variables. There does not appear to be any plausible alternative explanations that have not been explored using available data. (see below, however). Pirkle et al. then use the relation between blood pressure and probability of adverse outcome in a 10-year interval (derived from The Pooling Project and Framingham Study), and their relationship of blood lead to blood pressure, to predict the effects of different blood lead levels on population risk of stroke, myocardial infarction, and death. This theoretical method of risk assessment is acceptable, even though its predictions cannot yet be observationally confirmed. Because of the large potential impact of changes in blood lead levels on risk of cardiovascular diseases, this method deserves serious consideration.

2. COMMENTS

A. INTERACTIONS OF LEAD WITH OTHER FACTORS

Pirkle et al. maintain that they do not wish to use their studies to model the effects of other dietary components etc. on blood pressure. While sympathetic to this cautious approach, I don't think it's appropriate for interactions of lead with dietary components and other covariates. The interaction terms help to identify population subgroups with excess risk of high blood pressure. The tremendous stability of the overall regression coefficient of blood pressure on blood lead, even with the interaction terms included, shows that these interaction terms do not completely "explain" the role of lead in high blood pressure.

B. ALTERNATIVE EXPLANATIONS

It is always possible that some other variable might account for the lead regression, but, it would have to be distributed, and no such variables are obvious to me. Dr. Wedeen noted that kidney function variables such as creatinine or uric acid are either uncorrelated with lead, or if correlated with lead then will serve mainly to identify some of the mechanisms relating blood pressure to lead.

C. BIOLOGICAL MECHANISMS

Plausible biological mechanisms exist by which increased lead leads to increased blood pressure, e.g., Webb et. al. It is not yet proven that rat experiments can be extrapolated to man. But it is very proable that the relation of blood pressure and lead in man is causal, and I would proceed on the basis that future research will establish the mechanisms.

(The following is not part of the review of the paper)

3. RECOMMENDATIONS FOR ADDITIONAL RESEARCH
   A. Experimental studies in man at PbB 30ug/dl with controlled diet and activity.
   B. Same for higher animals, e.g., monkeys.
   C. Additional population studies.
   C. Followup studies on NHANES II subjects.