Summary of the Lead Inhalation Studies During 1960

The lead oxide inhalation studies with Mr. S. Balog as the subject is being conducted in the same chamber and under the same conditions as was the case for the first two studies during 1950 to 1954 when Mr. M. Barber and Mr. F. Creech were subjects.

Lead oxide fume (lead sesqui oxide, Pb_2O_3) is produced by burning a mixture of propane, air and tetraethyl lead. The concentration of lead in the atmosphere is kept at 0.150 milligrams per cubic meter of air and the average size of the particles comprising the fume is 0.05 microns.

Samples of the fume (or dust) in the chamber are collected with an electrostatic precipitator for one hour out of each four hours that the subject is in the chamber. The samples are analyzed by the dithizone method used routinely here at the laboratory.

Once during each week a study is made to determine the amount of lead that is retained by the subject. This study consists of having the subject breathe through a mask that has two valves, one that allows air to enter and be inhaled and the other allows the exhaled air to escape. This exhaled air passes through an electrostatic precipitator tube into a Douglas bag where the total air breathed by the subject can be measured. These samples are always taken in parallel with a sample of the chamber atmosphere. The per cent retention (%Ret.) is then calculated with the following formula:

$$\%\text{Ret.} = \frac{\text{lead conc. of chamber - lead conc. of exhaled air}}{\text{lead conc. of chamber}}$$

As in the past, the following samples are analyzed for lead for each exposed subject.

1. Room concentration (daily)
2. Retention (weekly)
3. Food and fluids (daily)
4. Urine (daily)
5. Feces (daily)
6. Blood (weekly)

This study differs from the previous experiments in the following ways:

1. The subject spends three different time periods in the chamber. The exposure periods consists of 4, 8, and 10 hours. The four hour periods start at 8:30 am or 12:30 pm in a prearranged order and alternates with the 8 hour period. Ten hour exposure periods are held every four weeks. The subject spends only week days (Monday through Friday) in the chamber.

2. Blood samples are taken from the subject once every six days in order to vary the day of the week on which the blood sample is taken.

3. All data obtained from the subject are placed on punch cards and processed by the Biometric Department.