In 1997, EPA relied heavily on two cohort studies, the Six-City study and the ACS study that reported associations of fine PM and sulfate with cardiopulmonary deaths. In a careful re-analysis of these two studies a Health Effects Institute (HEI)-sponsored team replicated the results that show an increased risk in the range of 7 to 14% for all-cause mortality and 12 to 19% for cardiopulmonary mortality associated with a 10 µg/m³ increase in PM2.5. However, the re-analysis also showed that 1) the increased risk was cardiovascular not respiratory, 2) one gaseous pollutant, SO2, had a strong association with mortality, 3) when SO2 was included in the model the PM all-cause mortality association was materially reduced and became non-significant, 4) the increased mortality was experienced in the portion of the cohort that had a high school education or less, and 5) there was a significant spatial heterogeneity in the association, with no effect seen in western U.S. cities. All these additional findings raise questions concerning the interpretation of the PM2.5 associations as a universally applicable chronic PM health effect caused by generic PM2.5.

9 Grant, L.; EPA Staff Presentation to CASAC, July 23, 2001; Key Revisions and Scientific Issues for Second External Review Draft of Air Quality Criteria for Particulate Matter; Slide 46 indicates an excess risk from 10 µg/m³ PM2.5 in the ACS cohort of +29% in the Industrial Midwest, +25% in the Southeast, +14% in the Northeast, and -9% in the West (West is a combination of cities in the Northwest, Southwest, Upper Midwest, and Southern California. NMMAPS geographic regions).