INTRODUCTION

While the association between exposure to ambient fine particulate matter mass (PM2.5) and human mortality is well established, the most responsible particle types/sources are not yet certain. In May 2003, the U.S. Environmental Protection Agency’s Particle Matter Centers Program sponsored the “Workshop on the Source Apportionment of PM Health Effects”. The goal was to evaluate the consistency of the various source apportionment methods in assessing source contributions to daily PM2.5 mass-mortality associations. Nine research institutions, using varying methods, participated in the estimation of source apportionments of PM2.5 mass samples collected in Washington, DC and Phoenix, AZ. Apportionments were evaluated for their respective associations with mortality using Poisson regressions, allowing a comparative assessment of the extent to which variations in the apportionments contributed to variability in the source-specific mortality results. The results of this workshop have been summarized in a series of papers.1-4

SOURCE APPORTIONMENT

Multiple groups (Table 1) have analyzed particulate composition data sets from Washington, DC and Phoenix, AZ. Similar source profiles were extracted from these data sets by the investigators/methods) and traffic (median estimate = 13.2% per 5th-to-95th percentile increment at lag 1 day among nine investigators/methods). For total mortality, the associations were consistent across methods for sources that had strong associations with PM2.5 mass. The cardiovascular source category had a median estimate of 16.0% per 5th-to-95th percentile increment at lag 0 day among eight investigators/methods). The largest cardiovascular source category was secondary sulfate (median estimate = 16.0% per 5th-to-95th percentile increment at lag 0 day among eight investigations). The base model controlled for extreme temperatures, relative humidity, day of week, and time trends using natural spline functions.

Overall, although these intercomparisons suggest areas where further research is needed (e.g., better division of traffic emissions between diesel and gasoline vehicles), they provide support the contention that PM2.5 mass source apportionment results are consistent across users and methods.