JSM 2012 Session Abstracts

Wed, 8/1/2012, 2:00 PM - 3:50 PM

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Are Fine Particulates Killing Californians? — Invited Papers

Section on Risk Analysis , Section on Survey Research Methods , Section on Statistics and the Environment , Section for Statistical Programmers and Analysts , Section on Statistics in Epidemiology

Organizer(s): Michael E Ginevan, M.E. Ginevan & Associates

Chair(s): Michael E Ginevan, M.E. Ginevan & Associates

2:05 PM Particulate Matter is Not Killing Californians — **James E. Enstrom, University of California at Los Angeles**

2:25 PM A Closer Look at Air Pollution-Mortality Relationships for California Members of the American Cancer Society Cohort — **Frederick W. Lipfert, Environmental Consultant** ; S. Stanley Young, National Institute of Statistical Sciences

2:45 PM Assessing Variable Importance in an Environmental Observational Study — **S. Stanley Young, National Institute of Statistical Sciences** ; Jesse Q. Xia, National Institute of Statistical Sciences

3:05 PM Improving the Scientific Advice Provided by the Clean Air Scientific Advisory PM Subcommittee — **Robert F. Phalen, University of California at Irvine**

3:25 PM **Discussant:** Michael E Ginevan, M.E. Ginevan & Associates

3:45 PM **Floor Discussion**

01	Particulate Matter is Not Killing Californians
Author(s):	James E. Enstrom*+
Companies:	University of California at Los Angeles
Address:	BOX 951772, A1-295 CHS, Los Angeles, CA, 90095-1772,
Keywords:	epidemiology ; particulate matter ; mortality ; causality ; statistics ; California
Abstract:	There is now overwhelming epidemiologic evidence that particulate matter (PM), both fine particulate matter (PM2.5) and course particulate matter (PM10), is not related to total mortality in California. I will examine all the long-term PM epidemiologic cohort studies in California, and discuss the ways the findings from these studies have be used and/or ignored. I will discuss the limitations of these studies: lack of access to key databases; the ecological fallacy; failure to consider other pollutants; failure to satisfy causality criteria; and failure to consider other competing health risks. Also, ethical issues underlying much of PM2.5 epidemiology will be discussed. I will make a strong case that PM2.5 is not killing Californians and that there is not a scientific or public health basis for the many of the existing and proposed regulations designed to reduce PM levels in California. Finally, I will make the case that PM health effects and regulations must be put into perspective with other factors that influence health in California, given the low age-adjusted total death rate in this state.

02	A Closer Look at Air Pollution-Mortality Relationships for California Members of the American Cancer Society Cohort
Author(s):	Frederick W. Lipfert*+ and S. Stanley Young
Companies:	Environmental Consultant and National Institute of Statistical Sciences
Address:	23 Carll Court, Northport, NY, 11768,
Keywords:	meta-analysis ; significance levels ; collinearity ; air pollution
Abstract:	Estimates of public health benefits attributed to cleaner air are largely based on studies of spatial differences in long-term mortality rates. However, such studies tend to suffer from lack of specificity, such as uncertain exposures and neglected confounders and co-pollutants. Here we use meta-analyses to re-examine the results of Jerrett et al. (2011), comprising 992 estimates of long-term mortality-air pollution relationships among California members of a national cohort, with follow-up from 1982 to 2000. These risk estimates include strong and significant positive (harmful) spatial relationships for heart disease and strong and significant negative (beneficial) relationships for other causes including cancer, thus raising questions of causality and credibility. Excess risk estimates for all-cause deaths were essentially randomly distributed around zero. Relative model fits were not compared by Jerrett et al., thus precluding identification of the "best" models on this basis. However, only a selected few of these 992 estimates are emphasized in the Jerrett report. By considering the results as a whole, we find major differences among these relationships according to the regression model selected and methods of estimating exposures, none of which specifically considered latency periods. Strong correlations among the various pollutants considered make it difficult to define any "true" relationships; we found no significant differences among their risk estimates. Relation-ships with deaths from all causes should be the basis for air pollution control policies and, in a study of this regulatory importance, it is important to discuss both positive and negative findings and to consider the entire suite of results rather than a few that happen to conform to a priori regulatory objectives and were apparently selected for that reason.

03	Assessing Variable Importance in an Environmental Observational Study
Author(s):	S. Stanley Young*+ and Jesse Q. Xia
Companies:	National Institute of Statistical Sciences and National Institute of Statistical Sciences
Address:	P.O. Box 14006, Research Triangle Park, NC, , USA
Keywords:	variable importance ; PM 2.5 ; geographic variation ; effect estimates ; air pollution
Abstract:	In environmental observational studies, often authors do not address the relative importance of variables under consideration, choosing instead to concentrate on specific claims of significance. Yet good policy decisions require knowledge of the magnitude of relevant effects. In this paper we examine data on the relationship between air quality and mortality in the United States. The analysis uses two methods for determining variable importance, regression analysis and recursive partitioning, showing how this puts predictor variables into a context

that supports better environmental policy-making. In particular, using both regression and recursive partitioning, we are able to confirm a spatial interaction with the air quality variable PM2.5, a critical variable in this application domain. We also determine the relative importance of this variable in comparison to others used in air pollution research. We show that there is no association between PM2.5 and mortality west of Chicago and that where there is an association between decreased PM2.5 and increase longevity, it is much less important than other variables such as income and smoking. Our findings point to somewhat different policy recommendations from those developed by previous researchers.

04

Improving the Scientific Advice Provided by the Clean Air Scientific Advisory PM Subcommittee

Author(s): Robert F. Phalen*+

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Keywords: PM standards ; CASAC-PM ; PM risk assessment ; PM composition ; public health

Abstract: The U.S. EPA's Clean Air Scientific Advisory Committee's subcommittee on Particulate Matter (CASAC-PM) advises the EPA Administrator on setting National Ambient Air Quality Standards. Although the Committee and staff are qualified and dedicated, the process could be improved in the interest of the public good.

The current EPA focus is too narrow. Isolating individual pollutants, not considering PM composition, ignoring health tradeoffs, and imposing national standards, are problematic. This focus may lead to overregulation of some technologies, industries, and regions.

The Risk Assessment process should be changed from a focus on individual PM mass fractions to a focus on the health-related consequences of PM standards. The public must live with all of the consequences of new standards, including unintended adverse consequences.

The process is linear without opportunities to discuss compliance feasibility, economic hardships, or unintended health effects that vary regionally. Such limited advice can mislead the EPA Administrator and the public with respect to the adequacy of the scientific advice provided by CASAC.

Although the CASAC-PM scientific advisory process is efficient and consistent with EPA's mandate, it is flawed.