The Statistics Former Student Network (SFSN) presents

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Air Pollution Forensics and Health Effects Evaluation

Abstract

Air pollution is a global environmental and public health problem. Over the past decades, extensive evidence has shown that air pollution affects cardiovascular and respiratory morbidity and mortality, adverse pregnancy outcomes, neurodevelopment, and cognitive health. For the development of effective air pollution control strategies that maximize public health benefits, it is of paramount importance to estimate health effects associated with source-specific pollution exposure. A major difficulty with achieving this goal is that the pollution sources are often unknown and source-specific pollution exposures are not directly observed; instead, they must be estimated by decomposing ambient concentrations of multiple air pollutants measured at outdoor monitoring stations by source apportionment or multivariate receptor modeling. In this talk, I will give an overview of multivariate receptor modeling along with previous statistical approaches and key challenges in source-specific exposure assessment for air pollution epidemiology. I will discuss recent developments based on spatially extended multivariate receptor modeling and health effects evaluation accounting for exposure measurement error, and also describe ongoing efforts to further improve source-specific exposure assessment by incorporating other information such as traffic variables and tree canopy data in addition to multi-site multipollutant data in Harris County, Texas.

Biography

Dr. Eun Sug Park is a Senior Research Scientist at the Texas A&M Transportation Institute (TTI). She received her PhD in statistics from Texas A&M University under the advisement of the late Clifford Spiegelman. Prior to joining TTI in 2001, she was a postdoc at the University of Washington's National Research Center for Statistics and the Environment. Her areas of research include environmental modeling and assessment of health effects of air pollution mixtures, source apportionment by multivariate receptor modeling, latent variable models and factor analysis, Bayesian hierarchical modeling and model selection, and transportation statistics. Her research has been funded by the National Institutes of Health, the Health Effects Institute, and the Federal Highway Administration. Dr. Park is a Fellow of the American Statistical Association, Elected Member of the International Statistical Institute, Member of the TRB Statistical Methods Committee, and Editor of Chemometrics and Intelligent Laboratory Systems. She was also a recipient of the H. O. Hartley Award in 2023.

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