



Abstract #300684

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Activity Number: 98
Type: Contributed
Date/Time: Monday, August 4, 2003 : 9:00 AM to 10:50 AM
Sponsor: [Section on Physical and Engineering Sciences](#)
Abstract - #300684
Title: Adjusting for the Effect of Environmental Variability in Outdoor Engineering Control Studies
Author(s): [Stanley A. Shulman](#)*+ and [R. Leroy Mickelsen](#) and [Kenneth Mead](#)
Companies: National Institute for Occupational Safety and Health and National Institute for Occupational Safety and Health and National Institute for Occupational Safety and Health
Address: 4676 Columbia Parkway, Cincinnati, OH, 45226-1922,
Keywords: [factor analysis](#) ; [measurement error](#) ; [randomized blocks](#) ; [interaction](#)
Abstract: In outdoor engineering control studies, measured analyte concentration levels change as environmental conditions change. Since the effectiveness of an engineering control varies with environmental conditions, comparisons of measurements taken with engineering controls operating versus those taken in an uncontrolled environment should adjust for these changes. However, environmental parameters are difficult to estimate. In this work, models based on factor analysis (Fuller 1987) are used to account for the effect of environmental variables. These models also describe the phenomenon that greater control efficiency tends to occur at the highest levels of the uncontrolled environment (Shulman, Mead, and Mickelsen 2002). The approach is combined with the randomized pair (uncontrolled environment determination, engineering control determination) approach that is often used. Also considered are the benefits of sampling different locations and analytes. Asphalt paving results of factor analysis models are compared with those from regressions of log ratios (controlled/uncontrolled) on uncontrolled determinations. Implications for statistical design are discussed.

- The address information is for the authors that have a + after their name.
- Authors who are presenting talks have a * after their name.

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Revised March 2003