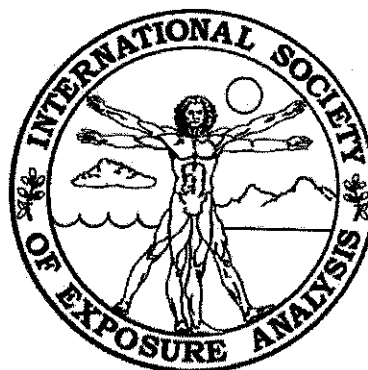


# ISEA 2005

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## ABSTRACT BOOK

**Platform R1D GIS and Exposure****Abstract R1D-5****Geocoding Positional Bias: Effect in Analyzing Spatial Distribution of Dieldrin in Blood**

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The process by which geographic information systems (GIS) link information, geocoding, is not designed to pinpoint exact address location but rather approximate address locations between street intersections. Positional inaccuracies occur in geocoding when an address is placed incorrectly along a street and when the distance from the street to the actual building is long. The purpose of this study is to explore the extent and spatial variation in these sources of positional bias in geocoded residential locations from a study on organochlorine exposure and to assess the robustness of an epidemiological model to this positional bias.

Positional bias was quantified in this study for 163 geocoded residential addresses out of a dataset containing 1,323 addresses. Conditional simulation was used to estimate the positional biases at all remaining addresses in the dataset. A new estimated residential location was created for each of the estimated positional biases, and used in a model that found a statistically significant association between blood dieldrin levels and residential distance from a potential source after adjusting for age, gender, education, smoking status and drinking water source.

The results of this paper indicate that the overall mean parameter estimates and their associated statistical significances changed minimally from the observed values accounting for the positional bias. The distribution of the t-statistics corresponding to the residential distance from the potential source parameter in the epidemiological model indicated that this parameter was significant in over 90 percent of the trials. Therefore, the epidemiological model based on geocoded address information evaluated in this paper is robust to these geocoding positional biases.

It is important that researchers acknowledge that positional inaccuracies are associated with geocoding, and take these biases into account if possible. Furthermore, before reporting significant results based on geocoded information, the sensitivity of the results to these biases should be tested.