

## Non-Occupational Exposures to Pesticides for Residents of Two U.S. Cities

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While people who work with pesticide products are aware of their exposures and can take precautions to protect themselves, people are exposed to pesticides in many environments. The Non-Occupational Pesticide Exposure Study (NOPES) was designed to assess total human exposure to 32 pesticides and their degradation products in the non-occupational environment. Potential routes of exposure assessed were (1) air (personal, indoor, and outdoor), (2) tap water, (3) food, (4) dermal contact, and (5) carpet dust. However, monitoring of routes of exposure other than air was minimal because water was not considered to be a significant route of exposure and because reliable sampling and analytical methods were not available for food, dermal, or dust routes of exposure.

We studied two sites—Jacksonville, Florida (a high-use area) and Springfield/Chicopee, Massachusetts (a low-use area)—during three seasons: summer 1986 (Jacksonville only), spring 1987, and winter 1988. Groups of 49 to 72 persons, who were selected using scientific sampling methods, participated in individual sites and seasons.

Airborne concentrations of pesticide residues were generally higher in Jacksonville than in Springfield/Chicopee, as expected (because it was a low-use area). Indoor and personal air concentrations tended to be highest in summer and lowest in winter (e.g., chlorpyrifos exposures were 280 ng/m<sup>3</sup> in summer and 118 ng/m<sup>3</sup> in winter for Jacksonville residents). Indoor and personal air concentrations were generally comparable and higher than outdoor air concentrations. Inhalation exposure exceeded dietary exposure for organochlorine insecticides (nearly all of which are now banned from use in the U.S.) and for pesticides used mainly in the home; dietary exposures were greater than inhalation exposures for many of the other pesticides.

For each compound, we estimated the chronic risk of developing cancer and the acute risk of other adverse health effects as a result of airborne exposures based on the estimated average exposure level for a person spending their entire lifetime at the study site. In most cases, the inhalation risks were estimated to be negligible, with the possible exception of organochlorine insecticides, depending on assumed rates of degradation.

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