

## Acute Illnesses Associated With Pesticide Exposure at Schools

**Conclusions: Pesticide exposure at schools produces acute illnesses among school employees and students. To prevent pesticide-related illnesses at schools, implementation of integrated pest management programs in schools, practices to reduce pesticide drift, and adoption of pesticide spray buffer zones around schools are recommended.**

- Walter A. Alarcon, MD
- Geoffrey M. Calvert, MD
- Jerome M. Blondell, PhD
- Louise N. Mehler, MD
- Jennifer Sievert, BS
- Maria Propeck, BS
- Dorothy S. Tibbetts, MPH, MS
- Alan Becker, MPH
- Michelle Lackovic, MPH
- Shannon B. Soileau, MS
- Rupali Das, MD
- John Beckman, BS
- Dorilee P. Male, BS
- Catherine L. Thomsen, MPH
- Martha Stanbury, MSPH

EXPOSURE TO PESTICIDES IN THE school environment is a health risk facing children and school employees. Despite efforts of several organizations and laws in several states to reduce pesticide use at and around schools,<sup>1</sup> pesticides continue to be used in schools.<sup>2</sup>

Another source of pesticide exposure at schools is from pesticides used on farmland contiguous to school facilities. However, as a result of the work of the US Environmental Protection Agency (EPA), advocacy groups, universities, state regulators, the pest control industry, and others, and laws or strong voluntary programs in several states, pesticide use has been reduced in some school districts.<sup>3</sup>

Currently, there are no specific federal requirements on limiting pesticide exposures at schools.

Context Pesticides continue to be used on school property, and some schools are at risk of pesticide drift exposure from neighboring farms, which leads to pesticide exposure among students and school employees. However, information on the magnitude of illnesses and risk factors associated with these pesticide exposures is not available.

Objective To estimate the magnitude of and associated risk factors for pesticide related illnesses at schools. Design, Setting, and Participants Analysis of surveillance data from 1998 to 2002 of 2593 persons with acute pesticide-related illnesses associated with exposure at schools. Nationwide information on pesticide-related illnesses is routinely collected by 3 national pesticide surveillance systems: the National Institute for Occupational Safety and Health's Sentinel Event Notification System for Occupational Risks pesticides program, the California Department of Pesticide Regulation, and the Toxic Exposure Surveillance System.

Main Outcome Measures Incidence rates and severity of acute pesticide-related illnesses.

Results Incidence rates for 1998-2002 were 7.4 cases per million children and 27.3 cases per million school employee full-time equivalents. The incidence rates among children increased significantly from 1998 to 2002. Illness of high severity was found in 3 cases (0.1%), moderate severity in 275 cases (11%), and low severity in 2315 cases (89%). Most illnesses were associated with insecticides (n=895, 35%), disinfectants (n=830, 32%), repellents (n=335, 13%), or herbicides (n=279, 11%). Among 406 cases with detailed information on the source of pesticide exposure, 281 (69%) were associated with pesticides used at schools and 125 (31%) were associated with pesticide drift exposure from farmland.

**Conclusions Pesticide exposure at schools produces acute illnesses among school employees and students. To prevent pesticide-related illnesses at schools, implementation of integrated pest management programs in schools, practices to reduce pesticide drift, and adoption of pesticide spray buffer zones around schools are recommended.**

**Under the Federal Insecticide, Fungicide, and Rodenticide Act, pesticides must be registered:**

**Author Affiliations:**

- **National Institute for Occupational Safety and Health US Centers for Disease Control and Prevention Cincinnati, Ohio (Drs Alarcon and Calvert);**
- **Office of Pesticide Programs, US Environmental Protection Agency, Washington, DC (Dr Blondell);**

- Department of Pesticide Regulation California Environmental Protection Agency, Sacramento (Dr Mehler);
- Environmental and Injury Epidemiology and Toxicology Branch, Texas Department of State Health Services, Austin (Mss Sievert and Propeck);
- Pesticides and Surveillance Section, Washington Department of Health, Olympia (Ms Tibbetts);
- Bureau of Community Environmental Health, Florida Department of Health, Tallahassee(Mr Becker);
- Section of Environmental Epidemiology and Toxicology, Louisiana Department of Health and Hospitals, New Orleans (Mss Lackovic and Soileau);
- Occupational Health Branch, California Department of Health Services, Oakland (Dr Das); Public Health Institute, Oakland, Calif (Mr Beckman);
- Bureau of Occupational Health, New York State Department of Health, Troy (Ms Male);
- Environmental and Occupational Epidemiology, Oregon Department of Human Services–Health Services, Portland (Ms Thomsen); and
- Division of Environmental and Occupational Epidemiology, Michigan Department of Community Health, Lansing (Ms Stanbury).
- Corresponding Author: Walter A. Alarcon, MD, National Institute for Occupational Safety and Health, 4676 Columbia Pkwy, Mail Stop R-17, Cincinnati,OH 45226 ([walarcon@cdc.gov](mailto:walarcon@cdc.gov)).

JAMA. 2005;294:455-465 [www.jama.com](http://www.jama.com)

©2005 American Medical Association. All rights reserved. (Reprinted) JAMA, July 27, 2005—

Vol 294, No. 4 455