



By Lee Lewis Husk

Researchers' Advice to Farm Workers: For Your Child's Sake, Remove Those Work Clothes!



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Do family members who work in fields sprayed with pesticides unwittingly carry contaminants home? What health hazards do these contaminants pose for children and other non-farm workers living in the home? And what can families do to protect themselves?

Linda McCauley, Ph.D., R.N., and a team of OHSU researchers have been examining pesticide exposure in agricultural families. She is the lead author of the study, "Pesticide Exposure and Self-Reported Home Hygiene," published in the *American Association of Occupational Health Nurses Journal*, March 2003 issue. Co-authors include Sarah Michaels, M.S.P.H., Louisiana Office of Public Health, New Orleans; Joan Rothlein, Ph.D., Juan Muniz, M.S., and Michael Lasarev, M.S., all of OHSU's Center for Research on Occupational and Environmental Toxicology; and Carin Ebbert, R.N., Oregon State University.

Previous studies had proved that agricultural pesticides were showing up in peoples' homes. How they got there was still unclear. "In addition to general pesticide exposure from residential use and ingestion with diet, agricultural families potentially are exposed to pesticides through drift from nearby applications and take-home exposure from farm workers," the authors write.

This National Institute of Environmental Health Sciences funded study focuses on one possible avenue of home contamination: the hygiene practices of agricultural workers.

"We began with the premise that parents who are exposed to things at work can inadvertently bring them home and expose family members," says McCauley, formerly a professor in the School of Nursing and a scientist at CROET, and now the associate dean for research in the School of Nursing, University of Pennsylvania.

Common pesticides break down readily with sunshine and rain but if left in a sheltered environment, such as a home, they don't degrade as easily. Children living in the home, therefore, are subject to a

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constant source of exposure. (A separate study proved that children living in such homes have higher levels of pesticide metabolites in their urine than do those not living in farm workers' homes.)

"Until now, we've assumed that removing shoes at the door, changing from work clothes promptly after leaving the fields, using door mats, improving vacuuming techniques and frequent mopping of hard surfaces might reduce pesticide contamination." But the authors state that no definitive study proved that hygiene practices in the home had an effect on contamination levels.

This study examined the pesticide exposures of orchard owners and operators and their families and determined the relationship between self-reported hygiene practices and the levels of organophosphates in various parts of their homes. Organophosphates, a major class of pesticides, have come under increasing scrutiny for environmental exposure and possible adverse health effects. Although symptoms of acute organophosphate exposure are well known, much less is known about low dose, chronic exposure – especially among young children and toddlers.

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The researchers recruited a convenience sample (as opposed to a random sample) of 24 fruit orchard agricultural families in Hood River, Oregon, in which at least one adult member worked in an orchard full time and there was at least one child in the home. The researchers' first goal was to measure the levels of organophosphates in house dust and then compare the levels of organophosphates found in the home, including play areas, with the hygiene practices of orchard workers.

All participants agreed to answer a questionnaire about their hygiene practices, such as whether they changed out of work shoes and clothing, and whether it took them less or more than two hours to change after arriving home. Participants also reported the types of floors in their homes and how often they were cleaned. To allow the researchers to correlate questionnaire answers with levels of contamination, study volunteers agreed to let researchers come into their homes to measure pesticide residues in dust.

The results proved that workers do, indeed, carry contaminants from the fields into their homes. "Even though the sample size was small, it is our first evidence that what a family reports that they do makes a difference in levels of pesticides found in the home," McCauley reports.

Overall, the group found the range of organophosphates to be almost two times higher in entryways than in play areas. However, the researchers found the highest level in a children's play area. "This finding is of concern because, in some instances, pesticide levels in play areas of the home equal or exceed those found in heavy traffic areas," the authors write. They also state that pesticide levels were lower on hard floor surfaces compared with carpeted areas.

"This may be the first study to correlate pesticide levels in homes and the self-reported hygiene behaviors of agricultural workers," says McCauley. However, she says that there seems to be great variability of pesticide residues in homes. "We also found that just



Nancy Findholt Finds Rural Life and Practice to Her Liking

By Lee Lewis Husk

If it hadn't been for her father's career and her own desire to get an education, Nancy Findholt, Ph.D., R.N., might have spent her entire life in the country. Registered nurse and university professor, childhood-suburbanite-turned-rural citizen, she readily admits that her passions – both professional and personal – intersect in the country. "I'm comfortable in a rural setting and with rural people," says Findholt.

A career in nursing and a husband who shares her love of rural life have allowed her to reside in the small town of Cove, 15 miles outside of La Grande, and to devote herself to making life a little easier for country people. She says that despite the benefits of country living, rural people are disadvantaged in many ways. "They are older, poorer and less educated than their urban counterparts." She also says that their occupations, such as agriculture and forestry, are often hazardous. On top of that, she says that the rural health care system is in a well-known crisis. "My mission is to try to adjust the imbalance."

One thing that has concerned her is the lack of health services for rural school children. As an assistant professor of nursing at OHSU's School of Nursing, La Grande campus, she created a school health program – the Health Network for Rural Schools – that makes health care available to students in five isolated school districts through an itinerant staff of nurses, nurse practitioners, mental health counselors, and family resource coordinators. This program, which began in 1997, is a unique model that has drawn attention in Oregon and was recently recognized by the National Rural Health Association for its outstanding contributions to rural health.

Now that this program is on solid ground, Findholt is turning her energies in a new direction. While recently earning a doctoral degree from the OHSU School of Nursing, Findholt developed a strong interest in community-based participatory research. "I think that working in partnership with community members is perfect for addressing rural health disparities. Rural people are independent and self-reliant, and they don't want health professionals telling them how to solve their problems. As researchers, we need to take time to listen to them and to build trust."

As for OHSU, she says, "I love the fact that I'm associated with a major university and, yet, I don't have to live in a big city. I feel that I have an ideal job."

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She says that it is important to continue studying various aspects of residues in homes because of the potential harmful effects on children. "Children are vulnerable developmentally. Some studies have linked everything from learning problems to cancer and immune diseases to pesticides. This research may lead to simple ways we can teach families to protect their children and themselves from unnecessary exposure."

The researchers state that worker training about pesticide safety should include a discussion of the potential to carry home pesticide residues on workers' clothing and shoes. "Measures can be taken, such as removing work shoes at the door, changing promptly out of work clothes and showering and washing work clothes separately from other laundry," they advise.

The group provided a last cautionary note. "The homes in this sample were not crowded, and laundry facilities were available in each home. Unfortunately, this is not the case with seasonal and migrant farm worker families. Special consideration is needed for farm worker families living in congested housing and lacking shower and laundry facilities. Employers need to recognize that the housing characteristics provided to these workers may increase the risk of pesticide exposure to these workers and their families."

McCauley L.A., et al. (2003). Pesticide exposure and self-reported home hygiene practices in agricultural families. *American Association of Occupational Health Nurses Journal*, 51(3):113-119.