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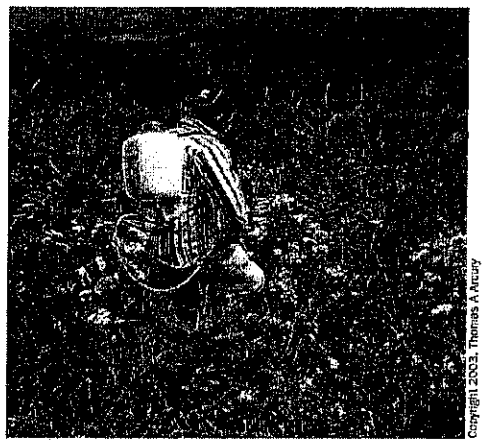
Pesticide exposure is an occupational and environmental health risk for farmworkers. In North Carolina, USA, more than 100 000 mostly Mexican natives, who are now permanent residents of North Carolina or who migrate to the state annually, work on farms. These workers engage in agricultural work for parts of the year, which supplies most of their annual income. Many such workers and their families live in dilapidated rented housing with antiquated heating systems, ill-fitting windows and doors, and old septic systems. Often these houses are surrounded by agricultural fields.



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Pesticide spraying, North Carolina, USA

Pesticides—insecticides, herbicides, and fungicides—are used on the crops on which migrants typically work in North Carolina—tobacco, vegetables, fruits, and Christmas trees (figure). In an average year, 950 million tonnes of these chemicals are applied across the USA.[1] A decade ago, the US Environmental Protection Agency issued the Worker Protection Standard (WPS), setting standards for industrial hygiene related to agricultural pesticides. WPS was intended to protect workers and their families. However, the US Government Accounting Office[1] found that WPS has been ineffective.

In 1996, Fernando, Lupe (pseudonyms), and their four children moved from the Mexican state of Oaxaca to rural North Carolina to find agricultural work. As part of a 10-year research programme to reduce pesticide exposure in farmworkers in North Carolina, 2001, we obtained wipe samples from the floors of Fernando's home and his youngest child's toys and hands. We detected two agricultural pesticides in their home: oxyfluorfen and chlorpyrifos. Five pesticides typically used in homes were found: carbaryl, 4,4′-DDT (dichlorodiphenyltrichloroethane), cis-permethrin, trans-permethrin, and propoxur. The origins of these agricultural and residential pesticides are unclear. Urine samples from Fernando, Lupe, and two of the children were tested for six organophosphate metabolites. Organophosphates are the most widely used and among the most toxic agricultural insecticides. National reference data are available for 1999–2000 for organophosphate metabolites in the total population aged 6–59 years.[2] All tested members of Fernando's family were above the 50th percentile for at least five of the six metabolites by comparison with reference values. Fernando was above the 90th percentile for three of the metabolites, as was his 6-year-old child; his 10-year-old child was above the 90th percentile for one.

Fernando and his family are typical of the farmworker families in our study. Agricultural and residential pesticides are in their homes; pesticide metabolites are in their bodies. Workers and their spouses have little knowledge about pesticide exposure, and they seldom have sufficient information about their exposure or procedures to reduce their exposure. The only official safety training most farmworkers receive is based on the WPS, which gives scant attention to residential exposure.

Although the symptoms of pesticide exposure are well known, we are only now discovering its short-term and long-term health effects. Adults can experience neurological deficits, increased risk of cancer, reproductive problems, and Parkinson's disease. Additional effects for children include birth defects and developmental delay.

Health-care access is limited for many immigrant farmworkers and their families—often they are undocumented. If migrant workers have documents, they seldom have health insurance. In many parts of the USA, few health providers speak Spanish, and falling county budgets have restricted services available at public-health departments. The US Health Resources and Services Administration funds clinics for migrant farmworkers, but these are under-resourced. There are 15 such clinics in North Carolina, but none are close to where Fernando and his family live. Health-care providers seldom receive training in the recognition and treatment of pesticide exposure, though efforts to address these deficits are being implemented.[3]

Advocates for social justice should help farmworker families reduce their exposure to pesticides at home as well as at work. Farmworkers need access to safe housing located away from agricultural fields, with adequate bathing facilities and laundry equipment to remove pesticides from work clothes. Workers need sufficient clothes to wear clean work clothes daily. Occupational hygiene procedures should be changed to ensure that all farmworkers receive the full pesticide safety training required by the US Environmental Protection Agency, and that all can shower and change into clean clothes at work. Agricultural practices must change so that pesticides applied to fields do not enter homes. These changes, including the manner in which pesticides are applied, the toxicity of pesticides, and hygiene practices, are essential if these workers and their families are to attain health.

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