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Work-Related Pesticide-Associated Illness and Injury New Mexico, 2001 - 2006

Stephanie Moraga-McHaley, MS & Denece O. Kesler, MD
University of New Mexico HSC
Department of Internal Medicine

A pesticide is a substance or mixture of substances that is used to kill, repel, or otherwise control nuisance insects, animals, plants or fungi. As of December 2006, there were 10,342 products with 739 active ingredients registered for pesticide use in New Mexico[1]. Workers in New Mexico are at risk for a variety of acute health effects from pesticides including skin irritation, respiratory effects, and organophosphate poisoning symptoms. Since 2000 New Mexico has had over twice the rate of work-related pesticide illness and injury calls reported to poison centers than the United States as a whole (Figure 1).

The New Mexico Occupational Health Registry (NMOHR) receives data from a variety of sources, one of which is the New Mexico Poison and Drug Information Center (NMPDIC). The current report describes an analysis of calls made between January 1, 2001 to December 31, 2006 to the NMPDIC for work-related pesticide-associated illness and injury.

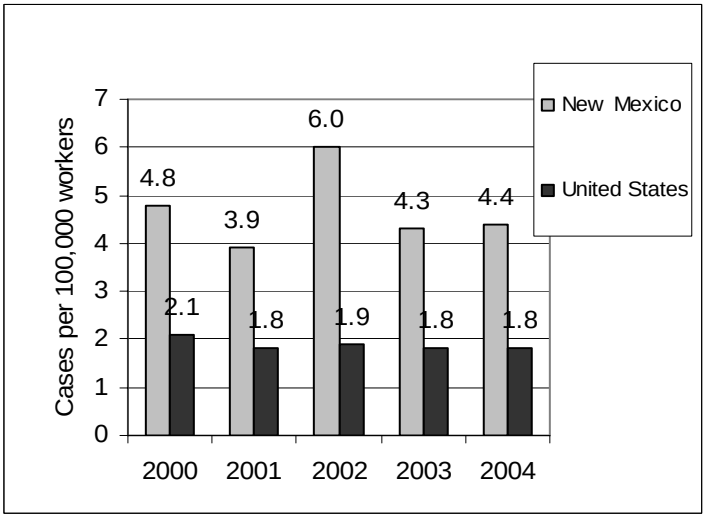

Figure 1. Rates of Work-Related Pesticide-Associated Poisonings, New Mexico and United States, 2000-2004. Source: American Association of Poison Control Centers for NIOSH SENSOR Pesticides Program. Denominator for rates from U.S. Bureau of Labor Statistics' Current Population Survey.

Methods

The data source for the current investigation is the NMPDIC Toxicall database and includes calls received by NMPDIC during 2001-2006 where the reason for exposure was coded "occupational" and/or the exposure site was "workplace" and the exposure substance was a pesticide as defined by the National Institute for Occupational Health Sentinel Event Notification System for Occupational Risks (NIOSH SENSOR) Pesticides Program. Case definition is described elsewhere[2]. Each "call" represents a single exposure event, although there may be multiple telephone contacts associated with each call.

The denominator for regional rates, obtained from the New Mexico Department of Labor Analysis Statistics and Economic Research (LASER) online data system, was the number of employed covered workers aged 16 years and older recorded in the Bureau of Labor Statistics Quarterly Census of Employment in Wages.

Results

For all substances, there were 3,095 work-related calls representing 2,769 cases with an adverse health effect to NMPDIC from 2001 - 2006. Of these calls, 5.5% were classified in the Toxicall system as pesticide-related.

The number of calls described in the current analysis is 176. The annual number of calls ranged from a low of 25 in 2001 to a high of 38 in 2002 (annual mean number of calls =29). July is the month when pesticide calls are most frequently reported. July had 16.5% of calls reported across the 6 years. April was the month with the second highest amount of calls (13%), followed by June (12.5%) and May (11.4%). Calls di-

PESTICIDE	Freq.	Percent
organophosphate	32	16.2
pyrethroid	26	13.2
unknown insecticide	22	11.2
other herbicide	16	8.1
carbamate only (alone)	12	6.1
glyphosate	10	5.1
pyrethrin	10	5.1
naphthalene moth repellant	8	4.1
pyrethrins only (inactive)	8	4.1
other insecticide	7	3.6
aluminum phosphide fumigant	7	3.6
triazine herbicide	7	3.6
chlorophenoxy herbicide	5	2.5
ALL OTHERS	27	13.7
TOTAL	**197**	**100.0**

Table. Pesticide subtypes associated with work-related calls, New Mexico, 2001 - 2006 (N = 176 calls). Source: NMPDIC.

minish as the seasonal temperature drops. January and December had the fewest number of calls with 4 and 3 calls respectively.

There were 164 calls where the exposure was due to one pesticide, 8 with two pesticide exposures, and 4 cases with exposure to three pesticides or more.

The table above presents the pesticide subtype by frequency and percent. Insecticides, dominated by organophosphates, are the most frequently reported pesticides with 63% of all calls being insecticide-related. Herbicides are the second most frequent pesticide type reported in 21.3% of the calls. Repellants, such as naphthalene and DEET were reported in 6.6% of exposures, then fungicides (4.6%), fumigants (3.6%) and rodenticides (1.0%).

Of the affected workers where an age was recorded (72%), cases ranged from 16 to 75 years, with a mean age of 37 years. Age was estimated for 7% of cases and was unknown in 21% of cases. Workers in the 20-29 year-old age group were most frequently reported (N=35), while those aged 60 years and older had the fewest calls (N=7).

Males comprised 60% of cases, with females comprising the remaining 40%. Males (N=64) and females (N=58) were nearly equally exposed to insecticides (52% vs. 47%). There was a distinct gender difference in the exposure to herbicides. Males (N=33) were much more likely to be exposed to herbicides than females (N=9) (79% vs. 21%). This pattern held for fumigants, fungicides, and repellants, although the numbers of total exposed in each category were small. Males and females were equally exposed to rodenticides with one exposure each.

There are no defined fields in the Toxicall database to capture industry and occupation, so the narrative portions of calls were reviewed in an attempt to determine the occupations and industries associated with the cases. Fifty-seven percent of cases could be coded to an industry and 44% to an occupation. The most frequent industry sector reported was Public Administration (10.8%) followed by Administrative, Support, Waste Management, and Remediation Services (9.7%), Retail Trade (8.0%), Agriculture, Forestry, Fishing and Hunting (6.3%), and Health Care and Social Assistance Services and Accommodation and Food Services with 5.0% each. The most frequently reported occupation groups were Building, Grounds Cleaning, and Maintenance (11.8%), followed by Office and Administrative Support (8.4%), Protective Service Occupations (5.6%) then Construction and Extraction Occupations (3.4%).

A single route of exposure was reported in 136, or 77% of cases with the most common route being inhalation (56% of single-route cases), followed by dermal (18%), ocular (15%) then ingestion (10%). The route of exposure was unknown for only 1% of calls. The most common combination of exposure routes was inhalation and dermal which was reported in 74% of the cases with more than one route of exposure.

Poison information specialists at the NMPDIC assign a medical outcome to cases depending on the severity of the health effect and the ability for follow-up. The outcome for the largest percentage of cases was "minimal effects" (40%) followed by "not followed, minimal effects possible"(38%), "unable to follow, judged as potentially toxic" (13%) and "moderate effect" (9%). An outcome resulting in a "major effect" was observed in less than 1% of cases. There were no

deaths due to pesticide exposure on the job reported to the NMPDIC during the six-year period.

The rate of calls varied by region. The Southwest region, including Las Cruces, had the highest rate with 4.7/100,000 workers, followed by the Central region (including Albuquerque), with an annual average rate of 3.9 calls per 100,000 workers, then the Eastern region with 3.0/100,000 workers. The Northern region had the lowest rate at 2.4/100,000 workers[3] (see back page, Figure 2.)

Discussion

NIOSH recommends that states with limited resources establish a passive surveillance system using poison control center (PCC) data to determine the incidence of occupational pesticide illness and injury[2]. In this report, the NMOHR has used PCC data to characterize the nature of work-related pesticide cases for New Mexico.

Pesticide illness and injury has been a notifiable condition in New Mexico since 2000, however calls from physicians to the NMOHR are rare. PCC data can help, but the Toxicall data system is designed to assess and make treatment recommendations during possible poisonings, not to collect occupational health surveillance data.

In 2006, the NMOHR brought together the NMPDIC, NM Department of Health and NM Department of Agriculture Bureau of Pesticide Management to discuss a partnership for response to occupational pesticide poisonings. A working relationship between the 4 entities was established with information and educational sharing as well as plans to notify all appropriate agencies with cases of work-related pesticide poisoning. Better intervention efforts could be possible if more complete information regarding events was available from the NMPDIC but modifications to capture occupational data are restricted at this time due to resource limitations.

Recently, the reporting of all blood levels of acetylcholinesterase was added to the list of Notifiable Conditions reportable to the Epidemiology and Response Division of the NM Department of Health[4]. Monitoring with laboratory testing can indicate recent exposure to organophosphate and carbamate pesticides. In some states, cholinesterase monitoring is required for certain classifications of workers, such as agricultural pesticide applicators, who have the potential to come in contact with cholinesterase-inhibiting pesticides[5].

To report a pesticide-related illness or injury contact the New Mexico Occupational Health Registry at 505-272-4572 or the New Mexico Department of Health at 1-800-432-4404 or 505-827-0006. For medical and emergency information about pesticides, contact the New Mexico Poison and Drug Information Center at 1-800-222-1222.

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The New Mexico Epidemiology Report

C. Mack Sewell, Dr.P.H., M.S.
State Epidemiologist

Michael G. Landen, M.D., M.P.H.
Deputy State Epidemiologist & Editor

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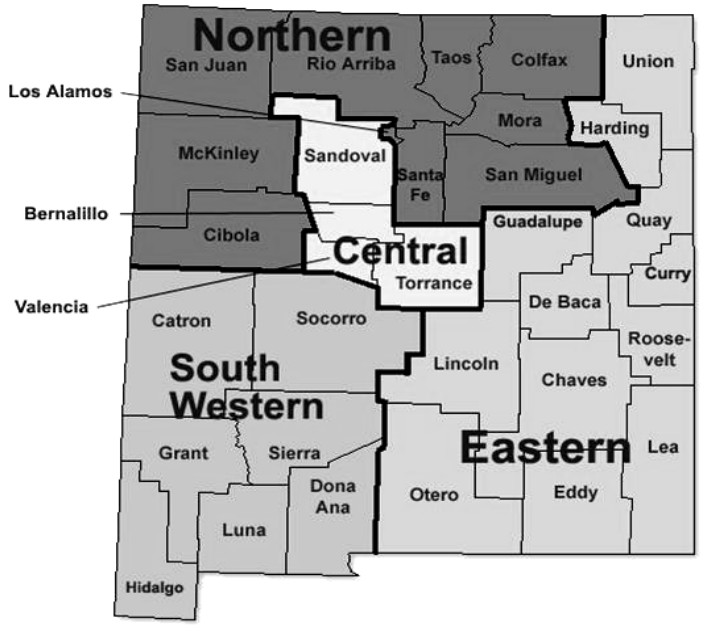

- **Southwestern = 4.7/100,000**
- **Central = 3.9/100,000**
- **Eastern = 3.0/100,000**
- **Northern = 2.4/100,000**

Figure 2. Average Annual Work-related Poison Center Call Rates for Pesticides per 100,000 Covered Workers over 16 Years of Age[3], New Mexico, 2001 –2006