Brief Report

Illness Associated with Drift of Chloropicrin Soil Fumigant into a Residential Area — Kern County, California, 2003

Chloropicrin is the fourth most commonly used soil fumigant in California. Exposure to chloropicrin causes eye and respiratory tract irritation, vomiting, and diarrhea (*1*). This report describes an investigation by the California Department of Pesticide Regulation (CDPR) and the Kern County Agriculture Commissioner (KCAC) into illnesses associated with the offsite drift of chloropicrin in Kern County. A total of 165 persons experienced symptoms consistent with chloropicrin exposure. The findings underscore health risks associated with fumigants and the usefulness of procedures adopted in California to ensure both prompt identification of exposure events and timely notification of the affected public.

On October 3, 2003, an agricultural pest control service began applying 100% chloropicrin at a concentration of 80 pounds/acre to 34 acres of fallow land in Kern County. Chloropicrin was injected 17–18 inches into the soil; a weighted board was used to compact the soil, treating 18 acres. That evening, residents living one quarter mile west of the application site experienced irritant symptoms. The Kern County Fire Department (KCFD) was contacted to investigate; however, darkness, distance from the treated field, and absence of chloropicrin odor prevented firefighters from identifying the source of the irritation. Records from a weather station approximately 7 miles southeast of the application site indicated low wind speeds and stable atmospheric conditions but also that the wind direction had changed that evening, blowing from the field toward the residential dwellings.

The next day, chloropicrin was applied to the remaining 16 acres. A 60-foot, chloropicrin-free buffer was maintained around the perimeter of the field because workers noted a persistent odor when they arrived. Residents one quarter mile west and south of the field complained about irritant symptoms that evening. Residents notified KCFD; several responding firefighters experienced eye irritation. The wind had changed again that evening and begun blowing from the field toward the residential dwellings. Suspecting a pesticide release, KCFD notified KCAC. The field was recompacted, and the odor ceased.

On October 6, KCAC notified CPDR about the incident. KCAC and CDPR conducted in-person interviews at 35 households located approximately one quarter mile west and south of the field and at a day care center; additional interviews were conducted on October 15. The 35 households and day care center had a total of 172 persons present during the exposure period. Representatives from each household and the day care center were interviewed by using a standardized questionnaire (*2*). In addition, five workers involved with the fumigation were questioned informally, and KCFD records were reviewed to identify affected firefighters.

The investigation determined that 165 persons reported symptoms compatible with illness caused by chloropicrin; median age of the persons was 16 years (range: 3 months–63 years). Nearly all (99%) had irritant symptoms (e.g., eye or upper respiratory) (Table); nine (5%) received medical evaluations. Seven had persistent respiratory symptoms when interviewed 11 days after the event. Follow-up medical care was limited because most of the affected persons lacked health insurance.

Exposures were retrospectively estimated by using a standard air dispersion model (*3*). Estimated 1-hour average chloropicrin air concentrations in areas south and west of the field ranged up to 0.20 parts per million (ppm). Peak-to-mean extrapolations indicated that peak concentrations might have exceeded 1 ppm. The Occupational Safety and Health Administration permissible exposure limit and the National Institute for Occupational Safety and Health (NIOSH)-recommended exposure limit is 0.10 ppm averaged during 8 hours. However, extrapolations from animal studies suggest 0.0044 ppm as a safe level for a 1-hour environmental exposure (*4*).

According to KCAC, a possible cause of the offsite drift was failure to contain the chloropicrin adequately after application. After the incident, KCAC imposed new restrictions on chloropicrin applications, including prohibition of applications within one quarter mile of an occupied structure and mandatory use of a heavy-duty tarp or water seal for applications within one half mile of such structures.

The findings in this report are subject to at least two limitations. First, this report is limited by an imprecise estimate of reported cases. Some affected persons likely were not interviewed, leading to an underestimation. Conversely, false-positive cases cannot be excluded because some self-reported symptoms might not have been related to exposure. Second, environmental measurements were not conducted to confirm chloropicrin exposure.

Adequate chloropicrin containment measures are needed to prevent similar community outbreaks. In addition, when outbreaks occur, measures are needed to prevent the community

distress that arises when government authorities do not provide timely information regarding the emergency response and follow-up investigation findings. In 2003, CDPR developed procedures to respond to incidents involving offsite drift of pesticides (*2*). This approach might be useful in other jurisdictions where offsite pesticide drift can occur.

TABLE. Number* and percentage of persons with acute chloropicrin-related illness, by selected characteristics — Kern County, California, October 2003

Characteristic	No.	(%)
Age group (yrs)		
0–5	22	(13)
6–9	17	(10)
10–14	23	(14)
15–19	15	(9)
20–29	18	(11)
30–39	21	(13)
40–64	26	(16)
Unknown	23	(14)
Sex		
Female	77	(47)
Male	88	(53)
Severity†		
Low	163	(99)
Moderate	2	(1)
Date of exposure		
October 3	9	(6)
October 4	135	(82)
Both dates	22	(14)
Occupation		
Firefighter	9	(6)
Applicator/Grower	4	(2)
Day care worker	2	(1)
Nonoccupational (community resident)	150	(91)
Symptoms		
Eye	164	(99)
Lacrimation	125	(82)
Pain/Burning	89	(54)
Skin (pruritis or rash)	3	(2)
Gastrointestinal	77	(47)
Vomiting	37	(22)
Nausea	35	(21)
Abdominal pain	10	(6)
Diarrhea	5	(3)
Hematochezia	1	(1)
Respiratory	85	(51)
Cough	53	(32)
Dyspnea	27	(16)
Upper respiratory irritation	22	(13)
Chest pain	8	(5)
Asthma exacerbation	6	(4)
Neurologic	40	(24)
Headache	39	(25)
Dizziness	1	(1)
Fatigue	1	(1)

* N = 165.
† Using CDCs severity index for use in state-based surveillance of acute pesticide-related illness and injury. Available at http://www.cdc.gov/niosh/topics/pesticides/pdfs/pest-sevindexv6.pdf.

Reported by: *MA O'Malley, MD, Univ of California, Davis; S Edmiston, D Richmond, M Ibarra, T Barry, M Smith, California Dept of Pesticide Regulation. GM Calvert, MD, Div of Surveillance, Hazard Evaluations and Field Studies, National Institute for Occupational Safety and Health, CDC.*

References

1. Prentiss AM. Chemicals in War: A Treatise on Chemical Warfare. New York, New York: McGraw-Hill, 1937.
2. California Department of Pesticide Regulation. Responding to non-occupational pesticide use-related exposure episodes. Sacramento, California: California Department of Pesticide Regulation, 2003. Available at http://www.cdpr.ca.gov/docs/enfcmpli/penfltrs/penf2003/2003044.htm.
3. U.S. Environmental Protection Agency. User's Guide for the Industrial Source Complex (ISC3) Dispersion Models for Use in the Multimedia, Multipathway and Multireceptor Risk Assessment (3MRA) for HWIRR99, Volume II: Description of Model Algorithms. Washington, DC: U.S. Environmental Protection Agency, 1999. Available at http://www.epa.gov/epaoswer/hazwaste/id/hwirwste/pdf/risk/reports/s0528.pdf.
4. Alexeeff GV, Budroe JD, Collins JF, et al. Air Toxics Hot Spots Program Risk Assessment Guidelines. Part I. The Determination of Acute Reference Exposure Levels for Airborne Toxicants. Sacramento, California: California Office of Environmental Health Hazard Assessment, 1999. Available at http://oehha.ca.gov/air/pdf/acuterel.pdf.

West Nile Virus Activity — United States, August 11–17, 2004

During August 11–17, a total of 194 cases of human West Nile virus (WNV) illness were reported from 17 states (Alabama, Arizona, California, Colorado, Florida, Illinois, Louisiana, Maryland, Minnesota, Mississippi, Missouri, New Mexico, Ohio, South Dakota, Texas, Utah, and Virginia).

During 2004, a total of 27 states have reported 689 cases of human WNV illness to CDC through ArboNET (Table, Figure). Of these, 291 (42%) cases were reported from Arizona. A total of 386 (56%) of the 689 cases occurred in males; the median age of patients was 50 years (range: 1 month–99 years). Illness onset ranged from April 23 to August 12; a total of 20 cases were fatal.

A total of 55 presumptive West Nile viremic blood donors (PVDs) have been reported to ArboNET in 2004. Of these, 33 (60%) were reported from Arizona, eight from California, three each from Florida, New Mexico, and South Dakota, two from Colorado, and one each from Iowa, Missouri, and Wisconsin. Of the 55 PVDs, two persons aged 66 and 69 years subsequently had neuroinvasive illness, and 11 persons (median age: 55 years [range: 22–73 years]) subsequently had West Nile fever.

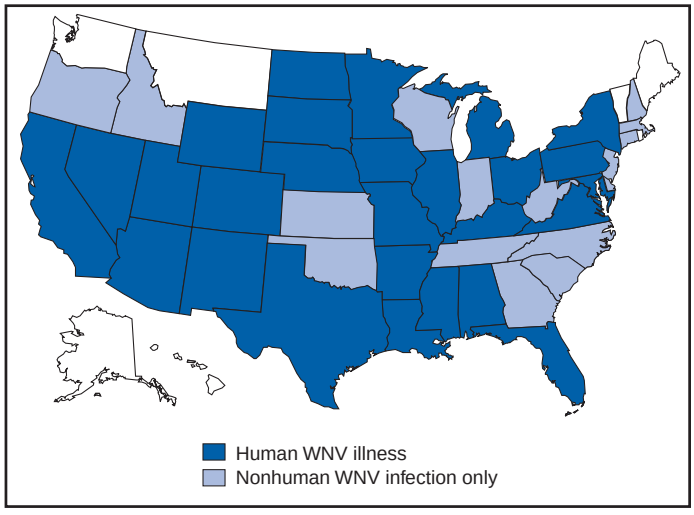
In addition, during 2004, a total of 2,530 dead corvids and 441 other dead birds with WNV infection have been

TABLE. Number of human cases of West Nile virus (WNV) illness, by state — United States, 2004*

State	Neuroinvasive disease†	West Nile fever§	Other clinical/ unspecified¶	Total reported to CDC**	Deaths
Alabama	4	0	0	**4**	0
Arizona	112	31	148	**291**	3
Arkansas	1	2	0	**3**	0
California	64	74	24	**162**	5
Colorado	18	104	0	**122**	1
Florida	9	3	0	**12**	1
Illinois	3	2	1	**6**	0
Iowa	1	2	0	**3**	1
Kentucky	0	1	0	**1**	0
Louisiana	10	0	0	**10**	5
Maryland	0	1	0	**1**	0
Michigan	1	0	0	**1**	0
Minnesota	4	3	0	**7**	0
Mississippi	3	1	1	**5**	1
Missouri	2	1	1	**4**	0
Nebraska	0	1	0	**1**	0
Nevada	2	0	0	**2**	0
New Mexico	5	12	1	**18**	0
New York	2	1	0	**3**	0
North Dakota	0	2	0	**2**	0
Ohio	2	0	0	**2**	1
Pennsylvania	1	0	0	**1**	0
South Dakota	2	13	0	**15**	0
Texas	4	1	0	**5**	2
Utah	2	2	0	**4**	0
Virginia	0	0	1	**1**	0
Wyoming	1	2	0	**3**	0
Total	**253**	**259**	**177**	**689**	**20**

* As of August 17, 2004.
† Cases with neurologic manifestations (i.e., West Nile meningitis, West Nile encephalitis, and West Nile myelitis).
§ Cases with no evidence of neuroinvasion.
¶ Illnesses for which sufficient clinical information was not provided.
** Total number of cases of human WNV illness reported to CDC through ArboNet by state and local health departments.

FIGURE. Areas reporting West Nile virus (WNV) activity — United States, 2004*



* As of 3 a.m., Mountain Standard Time, August 17, 2004.

MMWR™
Morbidity and Mortality Weekly Report
Weekly August 20, 2004 / Vol. 53 / No. 32

HIV Transmission Among Black College Student and Non-Student Men Who Have Sex With Men — North Carolina, 2003

In the United States, young black men who have sex with men (MSM) and reside in urban settings have high rates of infection with human immunodeficiency virus (HIV), with incidence and prevalence as high as 14% and 32%, respectively (*1–4*). Few epidemiologic and behavioral studies have been conducted in this population, and even fewer data are available for black MSM from non-urban areas of the southern United States. In November 2002, the North Carolina Department of Health (NCDOH) identified two cases of acute HIV infection among non-Hispanic black male college students. A retrospective review of all men aged 18–30 years with HIV diagnosed during January 2000–May 2003 indicated an increase in HIV case reports in male college students, from two cases in 2000 to 56 during January 2001–May 2003 (*5*). Of these 56, a total of 49 (88%) were black, and nearly all were MSM, including some men who had sex with both men and women. In August 2003, NCDOH invited CDC to assist with an epidemiologic investigation of young HIV-positive black MSM in North Carolina. This report summarizes the results of that investigation, which indicated that black MSM college students and non-students in North Carolina had high rates of HIV risk behaviors, underscoring the need for enhanced HIV-prevention programs in these populations.

NCDOH surveillance data from 1998–2002 for newly reported HIV infections and North Carolina census data were reviewed (*6*); age- and race-specific HIV rates were calculated. A case-control study was conducted to identify behavioral risk factors for HIV infection in young black MSM. Cases were defined as those occurring in HIV-positive college students who had HIV diagnosed during 2001–2003, were black MSM aged 18–30 years, and were North Carolina residents. Two groups of HIV-negative controls were enrolled in the study (i.e., college students and non-students), all of whom also were black MSM aged 18–30 years who lived in North Carolina. Face-to-face interviews were conducted to obtain epidemiologic and behavioral information. Sexual behaviors were reported for the 12-month period preceding either the date of diagnosis for HIV-positive college students or the date of interview for HIV-negative college students and non-students.

To complement quantitative information collected by questionnaire, all participants were asked to share insights about why high-risk sexual behavior was occurring among young black MSM. In addition, three discussion groups were convened with approximately 60 black male and female students from 11 colleges in North Carolina to discern perceived barriers to sexual risk reduction and to elicit suggestions for prevention programs targeting college students.

During 1998–2002, rates of newly reported HIV infection in North Carolina were higher in black men in all age groups compared with white men overall (Figure). Among black men aged 18–24 years, a statistically significant increase was observed during this period, from 65 per 100,000 population in 1998 to 92 in 2002 ($p<0.01$).

Of the 49 HIV-positive black male college students who had been identified previously by the NCDOH HIV surveillance system, 17 (35%) were recruited for the study; 24 could

INSIDE

DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION