

Possible Pesticide Exposure of Employees at a Government Agency

Chapter 84 of the Texas Health and Safety Code mandates that acute occupational pesticide poisoning must be reported to the Texas Department of Health (TDH). On April 15, 2001, the Texas Poison Center Network (TPCN) reported a possible occupational pesticide exposure to TDH. The report indicated that on October 19, 2000, over 100 people were exposed to chlorpyrifos (Dursban®) fumes while working at a government agency in Central Texas. Upon receiving this report, TDH began an immediate investigation of this incident.

The TDH Pesticide Exposure in Texas (PEST) Program conducts active follow up on all occupational pesticide exposures reported to TDH; priorities for a rapid response include 1) hospitalization or death, 2) exposure of more than one worker, and 4) exposures of an ongoing nature. Of particular concern are incidents that include any of the above outcomes even though the pesticide was used in accordance with label instructions. Because of the large number of people exposed in the October 2000 incident, the PEST Program began its investigation immediately upon notification. A field investigation, usually included in a PEST follow up, was not feasible because TDH learned of this exposure incident 6 months after it occurred. Instead, the PEST investigation consisted of follow-up correspondence by telephone and mail with the agency’s risk manager, representatives of the admitting hospitals, and the allegedly exposed employees.

Interview With Agency Risk Manager

During a May 14, 2001, telephone interview, the agency’s risk manager reported that employees had not been exposed to chlorpyrifos during this incident, but instead had

been exposed to several other pesticides including the following chlorophenoxy compounds: 2,4-D; mecoprop; and dicamba. Agency employees were also exposed to urea and monoammonium phosphate. The risk manager stated that on the afternoon of October 18, 2000, the maintenance department applied a “high-yield, weed & feed” fertilizer to the lawn immediately surrounding agency office buildings and watered the lawn later that same day. “Building A” had a fresh air intake vent that was located less than one foot away from the pesticide-treated lawn. Watering the lawn created pesticide fumes that were draawn through through this air duct and into the building. Employees began experiencing symptoms after they came to work in this building the next day, October 19.

The initial TPCN report stated that 18 employees were rushed to area hospitals for precautionary purposes, but the agency risk manager reported in the May interview that the number was actually 44. Emergency Medical Services (EMS) technicians collected blood pressure and pulse rates for approximately 200 additional employees who declined further treatment or transport to a hospital. The agency risk manager explained that most of the individuals who were sent to area hospitals were either asthmatic or reported having allergic symptoms. He also

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The Environmental Protection Agency defines a **pesticide** as a chemical used to prevent, destroy, or repel pests. Pests can be insects, animals, weeds, fungi, or micro-organisms such as bacteria and viruses. By this definition, an herbicide is a form of pesticide.

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reported that during the week of the incident, the pollen and mold counts had been the highest in recorded history.

Employee Questionnaires

With the risk manager's assistance, PEST Program staff distributed occupational pesticide exposure questionnaires to the 44 agency employees who were involved in the October 19 exposure; 34 individuals responded. According to the exposure report forms returned to the PEST Program, several employees reported smelling a strong chemical odor in Building A as early as 10:30 AM that Thursday morning. For precautionary purposes, this building was evacuated and local Emergency Medical Services (EMS) units were sent to the site to transport employees to area hospitals. PEST Program staff requested medical records from area hospitals and physicians for all symptomatic employees who reported seeking treatment.

Medical Record Information

Of the 44 employees who originally sought treatment, information regarding symptoms was obtained for 41: medical records were obtained for 37, and questionnaire responses provided symptom information for an additional 4. None of the symptomatic employees were actually admitted to the hospital. As mentioned above, EMS technicians

Table 1. Reported Symptoms

Symptom	Employees Reporting* No. (%)
Throat irritation	23 (56)
Nausea	22 (54)
Dizziness	20 (49)
Headache	19 (46)
Chest pain	15 (37)
Difficulty breathing	15 (37)
Eye irritation	12 (29)
Cough	9 (22)
Weakness	5 (12)
Fainting	2 (5)
Vomiting	2 (5)
Nose bleed	1 (2)

*N=41

collected blood pressure and pulse rates from approximately 200 employees who declined any further treatment or transport to area hospitals. Table 1 describes symptoms reported by the 41 employees for whom information was available.


Independent Environmental Laboratory Results

On October 20, one day after the alleged pesticide exposure incident, the agency contracted the services of a local environmental consulting firm and a safety services company. The environmental consulting firm collected multimedia samples from several areas of Building A while the safety services company conducted an indoor air quality study targeting bacteria and fungi.

The environmental consulting firm focused its efforts on acquiring data on any changes from routine business operations in Building A, the air handling systems, and the collection of samples for chemical analyses. Tests conducted included the following:

- Tests on air filters for the affected areas
- Passive diffusion air tests for volatile organic compounds
- Wipe tests of desktops and carpet samples from affected areas
- Soil tests of lawns treated with the weed & feed compound outside Building A
- Water tests of cooling tower water and industrial wastewater for the primary industrial source upstream of the agency and from the manhole in the sewer trunk closest to the office buildings
- Medical tests to assess herbicide exposure for 2 employees transported to an area hospital

Preliminary results of the environmental laboratory's investigation indicated that the application of weed & feed compounds, the operation of the back-up air compressor, and the overheating of a pipe used in the air conditioning system

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were the only relevant deviations from normal operations on the day employees reported that their symptoms began. Several employees complained of a "burnt plastic" smell. Laboratory staff could not determine whether this odor came from an overheated pipe, operation of the back-up air compressor, or the application of the weed & feed compound. None of the samples collected by the environmental consulting firm detected herbicide residue. However, possible indicators of weed & feed compounds were detected in air samples collected from the affected areas. The investigation conducted by the environmental consulting firm concluded that the application rates and method of application practiced by the agency's facilities maintenance personnel were appropriate. The firm concluded that the most feasible explanation for the employees' symptoms appeared to be short-term exposure to phthalates and hydrocarbons, possibly due to an overheated section of pipe in the air conditioning system. The firm also concluded that this exposure, combined with the possible short-term exposure to the weed & feed compound and the high counts of outdoor air pollens and molds, may have exacerbated the incident.

The safety services company hired by the agency performed a microbial indoor air quality investigation of all affected areas inside Building A. The company's investigation concluded that microbial contamination was not the initial cause of the October 19, 2000, incident. Instead, the company determined that it was possible that the occupants in Building A were affected by the combination of the overall elevated outdoor mold levels, changing of the air handling system filters while the system was on, and outdoor fertilizer application.

Representatives from the Texas Department of Health (TDH) Indoor Air Quality Branch evaluated and concurred with the results and recommendations provided by both the environmental

consulting firm and the safety services company. Indoor Air Quality Branch staff determined that the events of October 19, 2000, appeared to have been caused by several structural and environmental factors.

Chemical Information

The material safety data sheet (MSDS) for the weed & feed compound used lists several ingredient components including urea, monoammonium phosphate, mecoprop, dicamba, and dimethylamine salts of 2,4-D. Although there were no positive tests for herbicides, possible indicators of weed & feed compounds were detected in air samples collected from affected areas by a local environmental consulting firm. Below are brief descriptions of the chemicals that may have been involved in the exposure.

2,4-D is a chlorophenoxy compound classified by the Environmental Protection Agency as a general use pesticide, toxicity class III. This herbicide is used to control many types of broadleaf weeds and aquatic vegetation in cultivated agriculture, pasture, and rangeland applications; forest management; and use in homes and gardens. 2,4-D is slightly toxic orally, but highly toxic by eye exposure. Symptoms of acute exposure may include coughing; burning sensations in the nasopharynx, eyes, and chest; dizziness; and temporary loss of muscle coordination. Other symptoms include fatigue, weakness, headache, chest pains, and nausea. High levels of exposure may lead to inflammation of nerve endings with muscular effects.

Dicamba is a chlorophenoxy compound that is EPA classified as a toxicity class III herbicide and is considered slightly toxic. This compound is used to control annual and perennial broadleaf weeds in grain crops and grasslands. It can also be used to control weeds in pastures, rangeland, and noncrop areas such as fence rows and roadways.

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Dicamba canisters bear the signal word 'Warning' due to its irritating and corrosive effect on skin and eyes. Symptoms of dicamba poisoning include shortness of breath, vomiting, muscle weakness, slowed heart rate, loss of appetite, incontinence, and cyanosis. Inhalation of dicamba can cause irritation of the linings of nasal passages and lungs and may result in temporary voice loss.

Mecoprop is a chlorophenoxy compound classified as EPA toxicity class III and is considered slightly toxic. Mecoprop is used as an herbicide on ornamental and sport turfs; for forest site preparation; and on drainage ditch banks for control of broadleaf weeds such as clovers, chickweed, lambsquarters, ivy, plantain, and others. Products that contain mecoprop bear the signal word 'Caution' because this chemical can cause loss of appetite, nausea, vomiting, depression, general tenseness, and muscle weakness. Additional symptoms associated with mecoprop may include headache; unconsciousness; and irritation of the eyes, nasal passages, throat, and skin. Prolonged or repeated exposure to mecoprop may lead to rash, sensitivity, or other allergic reactions.

Urea is an herbicide used in agriculture and for lawn and garden weed control. Urea derivatives can cause irritation to the respiratory tract, including cough and shortness of breath; nausea; vomiting; diarrhea; headache; confusion; and eye and skin irritation. Chronic exposure to urea may cause protein metabolism disturbances, moderate emphysema, and chronic weight loss.

Conclusions and Recommendations

The investigation of this incident raised several key issues. First, there was a possibility that fumes from application of an herbicide/pesticide compound may have seeped through ventilation systems of the nearby building, resulting in several workers developing symptoms. Second, TDH PEST Program,

whose staff conducts active surveillance and follow up on all acute occupational pesticide exposures, was not notified about this incident by any of the multiple parties involved. Rather, staff found out about this incident while conducting a medical records search for another investigation more than 6 months after the October 19, 2000, incident occurred.

The results of the investigations conducted by a local environmental consulting firm, a safety services company, and the TDH Indoor Air Quality Branch indicate that the combined effects of the weed & feed application, the overheated pipe in the air handling system, and unusually high pollen and mold counts were probable contributors to the adverse health effects that employees experienced during the October 2000 incident.

PEST staff concluded that the agency's risk management and supervisory staff took appropriate actions in evacuating the contaminated building and in seeking immediate medical treatment for all staff. The following recommendations to reduce potential future health threats of this nature are summarized from the PEST report made to the agency involved in the October 2000 incident. Other agencies/businesses in similar circumstances may find many of these suggestions to be useful.

Prior to pesticide applications, management should

- Notify pesticide applicators of any air ventilation systems located close to areas that will be treated and request that pesticides are not applied in these areas.
- Notify employees of future pest control treatment, including the product to be applied. In the event that chemical fumes do seep through ventilation systems, prior notification will help alert employees who may have allergies or multiple chemical sensitivities, as well as those who may develop symptoms afterwards.

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When employees report exposure to unknown substances or fumes, management should

- Take immediate action to evaluate all potentially contaminated areas.
- Take immediate action to seek precautionary medical treatment for all exposed employees.

After incidents of possible pesticide exposure, management should

- Inform all employees of chemicals that were applied, potential health effects they may experience, and resources for obtaining additional information or medical assistance if necessary.
- Notify TDH PEST Program staff immediately.

To comply with the Texas Health and Safety Code, an involved party should report any pesticide exposure.

Immediate notification enables PEST

Program staff to conduct appropriate investigation and to provide and collect urgent information including chemical toxicity, health and symptom information, and exposure information. TDH PEST Program staff will send informational letters and brochures to management from each agency and health care facility involved in an exposure incident to remind them of acute occupational pesticide exposure reporting requirements. Toll free numbers and additional resource contact information will be made available in the event of a similar future event.



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For additional information or questions regarding this report contact PEST Program staff at 800/588-1248 or 512/458-7269.

Texas Poison Control Network

The Texas Poison Center Network (TPCN) was established in 1993 through Senate Bill 773, which mandated 6 regional poison centers to provide emergency treatment information and public and professional education regarding poisonings or toxic exposures. The Commission on State Emergency Communications (CSEC) is the funding and administrative agency responsible for overseeing the TPCN telecommunications infrastructure. The Texas Department of Health (TDH) is responsible for disseminating grant funds to each of the 6 centers and for conducting and disseminating epidemiologic analyses of the data collected and reported by the centers.

The network provides a 24/7 toll-free poison emergency telephone number resource for all Texas citizens. By dialing 800/222-1222, Texans have access to a toxicology referral service staffed by specially trained physicians, pharmacists, and nurses.

State-of-the-art telephone circuitry ensures that calls are answered promptly, without busy signals. Telecommunication access to 911 databases across the state allows for immediate call conferencing between the poison victim, 911 operators, and poison center personnel. Additionally, network educators work with

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Table 1. Texas Poison Center Network Contacts: 2001

<u>Contacts</u>	<u>Quarterly</u>				<u>Total</u>
Exposures	36,539	40,781	41,136	38,209	156,649
Nonexposures	83	131	112	140	466
Managed on site	26,000	29,222	29,245	27,543	112,010
Managed in HCF	10,181	11,216	11,648	10,304	43,349
Other	322	311	243	269	1,145
Refused referral	654	728	705	684	2771
Unknown	36	49	92	102	279
Information only	20,418	19,737	19,120	19,769	79,044

schools, health care facilities, industries, and families to educate communities about the dangers of unintentional poisonings and methods of prevention.

There are thousands of potentially lethal substances in homes and workplaces, because poisons can be present in almost anything—such as prescription drugs, over-the-counter medications, houseplants, household products, insects, and fertilizer. TPCN provides citizens with expert medical advice on how best to deal with this array of substances. It also designs programs to prevent exposure to toxic substances.

During 2001, TPCN received over 235,000 calls (Table 1). Many calls were requests to receive information about a variety of topics related to poisons, including toxicity information for particular substances; information and identification of legal and illegal drugs; and medical treatment information. Most of the calls, however, concerned potentially toxic exposures.

The majority of the exposures were to children younger than 6 years of age (Table 2). Most of these childhood poisonings are from substances commonly found in or around the home—such as plants, cosmetics, and household cleaning substances.

Most exposures reported to TPCN are unintentional, resulting from an improper use of the substance. However, accidental exposures also include such things as inadvertently exceeding the dosage of a medication. As the average age of the population nationwide increases, medication mistakes among the elderly is a growing concern.

The Texas Poison Center Network provides a tremendous community service to the citizens of Texas by saving lives and health care dollars. Twenty-eight percent of the patients using the network in 2001 received treatment at a health care facility (Table 2). An estimated 1 of every 4 of these patients require hospitalization in a critical care, general, or psychiatric unit.

Nearly three fourths of the people calling the poison center about an exposure were treated on site, generally at home or work. This professional medical care eliminated costly 911 or ambulance dispatch, or emergency room and office visits. It is estimated that every dollar invested in poison centers saves \$6 to \$9 in health care costs.

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Table 2. Confirmed Human Exposures, By Age: 2001

Managed	Quarterly				Total
On Site					
≤5	17,857	18,470	18,578	18,434	73,339
6-12	1,930	2,281	2,124	1,882	8,217
13-19	1,045	1,234	1,256	1,112	4,647
≥20	5,093	7,160	7,180	5,965	25,398
Age unknown	75	77	107	150	409
In HCF					
≤5	2,576	2,493	2,768	2,499	10,336
6-12	361	400	395	305	1,461
13-19	1,877	2,041	1,855	1,821	7,594
≥20	5,270	6,198	6,551	5,584	23,603
Age unknown	97	84	79	95	355
Other					
≤5	52	46	42	37	117
6-12	104	105	31	57	297
13-19	65	63	58	63	249
≥20	99	96	110	110	415
Age unknown	2	1	2	2	7
Unknown					
≤5	12	14	20	25	71
6-12	2	1	5	7	15
13-19	5	4	11	13	33
≥20	14	27	52	54	147
Age unknown	3	3	4	3	13

National Poison Prevention Week — March 17-23, 2002

The American Association of Poison Control Centers is sponsoring a national campaign to raise awareness about poison prevention and publicize the new hotline for poison emergencies and advice. The Texas Poison Control Center has joined this national effort to promote the new toll-free, 24/7 hotline, 800/222-1222, which connects the caller to specially trained nurses, pharmacists, and physicians at the closest local poison control facility. Poison treatment and control experts immediately respond to emergencies and answer poison-related questions about medications, household products, and other potentially dangerous substances. The 800/POISON-1 number, for use only in Texas, will continue to function as it did prior to establishment of the new national hotline number.

The national awareness campaign includes radio and print public service announcements, stickers, magnets, brochures, and posters. *A new national Website has been developed to provide poison prevention information:* www.1-800-222-1222.info

To obtain information regarding Texas efforts go to www.poisoncontrol.org.

For further information about poison prevention efforts in Texas contact Judy Whitfield at 512/458-7268; judy.whitfield@tdh.state.tx.us.



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November 2001 Satellite Course on Biological and Chemical Warfare and Terrorism Now Available

This course presents an overview of biological agents and describes the major chemical agents that potentially would be used. It also discusses the management of a biological or chemical warfare or terrorist event and describes the roles of the first responders, public health personnel, and medical personnel.

The Texas Department of Health Audiovisual Library offers a videotape set of this 12-hour course for loan or duplication. *For further information on obtaining the videotape set, contact Kelli Kennedy at 512/458-7260; kelli.kennedy@tdh.state.tx.us. Refer to tape #VC7425.*

The Webcast of the course is also available online at www.swankhealth.com. Real Player, Quicktime, or Windows Media player is required to view the archived Webcast.

This educational activity offers continuing education credits for a variety of professionals. *For further information regarding registration and receiving continuing education credits for this course, contact Christina Rogers at 512/458-7111, X3171; christina.rogers@tdh.state.tx.us.*