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contents:

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CHLORDANE

In recent months, the Structural Pest Control Board, the Texas Department of Agriculture, and the Texas Department of Health have investigated several incidents involving the misapplication of chlordane to buildings and residences. Staff at TDH have received numerous requests for information about chlordane, its health effects, proper and improper uses of this pesticide, and procedures for testing and cleanup of misapplied pesticide.

Chlordane is a chlorinated hydrocarbon insecticide which was introduced for use in the United States in 1947.[1,2] It is a thick amber liquid with a chlorine-like odor. Like other chlorinated hydrocarbon pesticides, it accumulates in biological tissues and is persistent in the environment.[2] Since 1983, chlordane may only be used for subsurface application for termite control. The US Environmental Protection Agency is presently considering whether this insecticide should be registered for any use.

In Texas, Gold Crest C-100 and Termide (with heptachlor) are the most common chlordane-containing products used for termite control.[3]* The Structural Pest Control Board has approved the following application techniques: 1) **sub-slab injection**, in which a special tool or tube is inserted through holes drilled in a concrete slab to introduce the pesticide into the soil beneath the slab; 2) **trenching**, which entails excavation of soil in an area six to eight inches wide adjacent to the outside foundation wall (slab homes) or adjacent to and around all piers and pipes and along inside and outside foundation walls (crawl space home) (The treated area is then covered with a thin layer of untreated soil.); 3) **rodding**, which involves use of a rod or tool to penetrate the soil, usually about every twelve inches to provide a continuous barrier; and 4) **horizontal drilling** or rodding of exterior walls above the outside soil level but below the sill plate. Any other methods of application such as spraying in a crawl space at or above the soil line, along an exterior foundation above the soil line, around baseboards, or into air supply ducts are improper and pose potential health hazards.

Chlordane can be absorbed into the body through ingestion and inhalation and through intact skin. It predominantly affects the central nervous system.[2,4] Symptoms of acute chlordane poisoning in man include nervousness, convulsions, loss of coordination, headache, weakness, tremor, blurred vision, slurred speech, confusion, fatigue, and abdominal pain, nausea, vomiting, and diarrhea if ingested.[2,4-6] Electroencephalographic and liver function abnormalities have also been found with poisoning.[4] Health effects from chronic, low level exposure to chlordane are less understood. The International Agency for Research on Cancer (IARC) has evaluated the data on this chemical and concludes that there is sufficient evidence that chlordane causes cancer in mice (hepatocellular carcinoma).[2] Infante[7] described five cases of neuroblastoma in children associated with chlordane exposure during prenatal and postnatal development and also three cases each of aplastic anemia and acute leukemia which developed after exposure to chlordane formulations. IARC concluded from these case reports, however, that the data did not "allow an evaluation of the carcinogenicity of chlordane to humans to be made."[2] Since the IARC publication, several studies of mortality of workers employed in the manufacture of chlordane and heptachlor have been published.[8,9] Wang and MacMahon[8] found a slight excess of

*The use of trade names is for identification only and does not imply endorsement by the Texas Department of Health or other state agencies in Texas.

lung cancer deaths among chlordane workers, but this was not significantly higher (statistically) than among the US population. Shindell and Ulrich[9] completed a followup study of these workers and did not find an excess of lung cancer deaths or an excess of cancers of all sites. Both studies found a significant excess of cerebrovascular deaths among chlordane workers. The relationship of reports of adverse health outcomes in the occupational setting to outcomes resulting from home misapplications is unclear.

Possible misapplications of chlordane or any other pesticide to structures such as residences or public buildings should be reported to the Structural Pest Control Board (512/835-4066) or the Texas Department of Agriculture (800/835-5832). Clinicians treating patients for chlordane poisoning or overexposure and wanting information about patient management are encouraged to contact their local or regional poison control centers. (Texas has two certified Regional Poison Control Centers: North Central Texas Poison Center: 800/441-0040 and Texas State Poison Center: 800/392-8548). Information about the health effects of chlordane, sources of contamination in homes, and spill decontamination can be obtained by contacting the Texas Department of Health, Occupational Health Program (512/458-7254), Environmental Epidemiology Division (512/458-7268), or the General Sanitation Division (512/458-7521). Also, the National Pesticide Telecommunication Network at Texas Tech Health Sciences Center maintains a toll-free number for questions about pesticide hazards (800/858-7378).

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TOXIC SHOCK SYNDROME

In 1986, 18 individuals met the CDC case definition for toxic shock syndrome (TSS) and were reported to the Bureau of Epidemiology, a 33% decrease from the 27 cases reported in 1985. Ten cases were reported from Public Health Region 5; three, from PHR 10; two, from PHR 3; and one each from PHRs 6, 8, and 9. Fifteen cases (83.3%) were female; three (16.7%) were male. Seventeen (94.4%) were white, and one was a 10-year-old Hispanic male.

Ten (55.6%) of the 18 cases were associated with menstruation. Nine of these were known to be using tampons at the onset of illness. The tenth individual denied tampon usage, and blood and vaginal cultures were negative for *Staphylococcus aureus*. The eight non-menstrual cases and described in Table 1. Cases ranged in age from 10-66 years (mean 25.5 years). The ten menstrually associated cases ranged in age from 15-37 years (mean 20.8 years). The eight non-menstrual cases ranged in age from 10-66 years (mean 31.5).

Organ systems involved were: gastrointestinal (100%), mucous membrane (94.4%), muscular (77.8%), renal (50%), central nervous system (50%), hepatic (38.9%), and hematologic (16.7%). In addition to the involvement of three or more organ systems, cases also had fever ($\geq$102 F, $\geq$38.9 C), hypotension (systolic blood pressure $\leq$90 mm Hg, syncope, or orthostatic hypotension), and a rash with subsequent desquamation.

S. aureus was isolated from 14 (77.8%) of the 1986 TSS cases. *S. aureus* resistant to all antibiotics but vancomycin was isolated from the vagina of one case. This 37-year-old patient had no history of recent hospitalization or medical procedures. She was menstruating when admitted to the hospital three days following onset of symptoms. The patient reportedly had been using tampons, but was not wearing one when admitted. She presented with fever (103.0°F); a fine, macular rash on her abdomen; blood pressure 50/0 mm Hg; vomiting, diarrhea, and abdominal pain; myalgia; conjunctival and vaginal hyperemia; vaginal discharge; disorientation; and seizures. Her chest roentgenogram showed a mild increase in lung markings, but no definite infiltrates. Laboratory data and electrocardiogram indicated severe renal, hepatic, hematologic, and cardiac involvement. Blood, urine, and cerebral spinal fluid cultures were negative for *S. aureus* and other pathogens. On the second day of admission, the patient experienced a fatal cardiac arrest. This case was the only reported death in 1986 due to TSS.

Physicians and laboratories are requested to submit pure-culture isolates for all TSS patients to the TDH Bureau of Laboratories. Labels should state "*S. aureus* for TSS studies" and the source of the isolate.

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Table 1.

Events associated with and characteristics of non-tampon associated toxic shock syndrome cases in Texas, 1986

Number of Cases	Associated Event	Age	Sex
4	**Focal Infections**		
	Septic olecranon bursa	66	M
	Lesion (back)	62	F
	Pustular psoriasis	32	F
	Muscle abscess	12	M
1	**Cesarean Section**	25	F
1	**Contraceptive Sponge**	19	F
2	**None Identified**	26	F
		10	M

VIRAL ISOLATES FOR JUNE 1987

Virus	County of Residence of Patient(s) (Number of Isolates)
Adenovirus	Dallas (2), Jefferson (1)
Cytomegalovirus	Bell (1), Bexar (2), Dallas (18), Galveston (3), Tarrant (2)
Coxsackie A9	Bell (2), Bexar (1), Galveston (2)
Echovirus 7	Harris (1), Galveston (2)
Echovirus 9	Harris (1)
Echovirus 11	Williamson (1)
Echovirus 18	Galveston (1)
Rotavirus	Bexar (3), Dallas (3)
Varicella/Zoster	Bell (2), Dallas (2), Galveston (1)
Chlamydia trachomatis	Bell (2), Bexar (6), Dallas (2), Harris (57), Henderson (1), Travis (4), Webb (1)

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