SUMMARY OF RESULTS FROM THE CALIFORNIA PESTICIDE ILLNESS SURVEILLANCE PROGRAM
- 2006 -

HS-1872

California Environmental Protection Agency
Department of Pesticide Regulation
Worker Health and Safety Branch
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Executive Summary

The California Department of Pesticide Regulation's Pesticide Illness Surveillance Program (PISP) summary for 2006 reflects a sharp decline in the number of pesticide- related illness reports. In response, DPR scrutinized its illness reporting process to determine if data was overlooked in 2006. While no specific problem could be identified, DPR took action to improve data collection methods while redirecting outreach efforts to maximize compliance with statutorily mandated reporting requirements. Those efforts have already shown results. Lower statistics notwithstanding, the 2006 summary continued to capture a wide range of pesticide illnesses.

Some 680 cases were identified in 2006, the lowest number since PISP records were computerized in 1982. That compares to more than 1,300 cases in 2005 and more than 1,200 in 2004. The overall decline is related to a reduction in cases identified through workers' compensation documents, which historically provided DPR with most referrals for occupational cases. In response, DPR staff and Department of Public Health partners revisited workers' compensation case review procedures, and identified more cases among 2007 records.

The Department has made strong efforts to enhance reporting: In 2006, DPR restarted a project that was a major contributor to PISP statistics before it lapsed in 2002 when federal funding ran out. Under that project, the California Poison Control System contracted to report pesticide-related illnesses to DPR on behalf of physicians who consulted the system. Several hundred case referrals came through this mechanism annually. In October 2006, the collaborative effort was renewed with DPR funding. An increase in reports from the poison control system is expected in the 2007 summary.

DPR is also expanding direct outreach efforts to Spanish-speaking workers. A current project focuses on working with specially trained peer educators known as "promotoras de la salud" ("promoters of health") to improve pesticide safety among farm workers and their families.

Promotoras act as liaisons between residents and health and social services providers. Promotoras have great credibility in the disadvantaged communities they serve, since they are members of these communities themselves. Eventually, DPR hopes to coordinate with promotora programs throughout the State to provide pesticide safety information to farm workers and their families.

Other recent outreach efforts by DPR include a statewide toll free phone number (1-87-PestLine) to help direct pesticide illness complaints to County Agricultural Commissioners more quickly.

Despite the one-year downturn, PISP data continue to provide valuable support for DPR initiatives aimed at preventing pesticide injuries, particularly in the occupational sector. Strong demand for the data also continues from both industry and environmental advocates, as well as from state agencies and the federal government.

Pesticide Illness Surveillance Program – 2006

Background on the Reporting System

The California pesticide safety program, which the Department of Pesticide Regulation (DPR) administers, is widely regarded as the most stringent in the nation. Mandatory reporting of pesticide[1] illnesses has been part of this comprehensive program since 1971. It is the oldest and largest program of its kind in the nation, and provides data to regulators, advocates, industry, and individual citizens.

The U.S. Environmental Protection Agency (U.S. EPA) and the National Institute for Occupational Safety and Health (NIOSH) have encouraged other states to develop programs similar to California's. Through NIOSH's Sentinel Event Notification System for Occupational Risk (SENSOR), they now partially support programs in the states of Iowa, Michigan, New York, Texas, and Washington. SENSOR also provides technical assistance to the states of Arizona, Florida, Louisiana, New Mexico, North Carolina, and Oregon. In addition, it supports pesticide-related work by the Occupational Health Branch of the California Department of Public Health, which coordinates with DPR's Worker Health & Safety (WHS) Branch. U.S. EPA continues to rely heavily on California data for evidence of pesticide adverse effects because of the large size and long historical perspective of the database.

DPR scientists participate in the national working group on pesticide illness surveillance that NIOSH convened to develop standards for information collection. DPR's 1998 expansion of the Pesticide Illness Surveillance Program (PISP) database incorporated several features from the NIOSH standards. These upgrades have been applied to all data collected from 1992 through the

[1] "Pesticide" is used to describe many substances that control pests. Pests may be insects, fungi, weeds, rodents, nematodes, algae, viruses, or bacteria -- almost any living organisms that cause damage or economic loss, or transmit or produce disease. Therefore, pesticides include herbicides, fungicides, insecticides, rodenticides, and disinfectants, as well as insect growth regulators. In California, adjuvants are also subject to the regulations that control pesticides. Adjuvants are substances added to enhance the efficacy of a pesticide, and include emulsifiers, spreaders, and wetting and dispersing agents.

present. Data earlier than 1992 have not been revised to incorporate the 1998 database upgrades, and will be presented only when historical perspective is important.

Excessive exposure to pesticides may cause illness by various mechanisms, and the surveillance program attempts to monitor all of them. Every pesticide active ingredient has a mechanism of action by which it controls its target pests. Pesticide products may have other potentially harmful properties in addition to the qualities designed to control pests. PISP collects information on any adverse effects from any component of pesticide products, including the active ingredients, inert ingredients, impurities, and breakdown products. DPR has a mission to mitigate any pesticide exposure that compromises health or safety. This responsibility applies to health effects from products that act as irritants or as allergens, through their smells or by causing fires or explosions, as well to classical toxic effects.

Sources of Illness Information

Under a statute enacted in 1971 and amended in 1977 (now codified as Health and Safety Code section 105200), California physicians are required to report any suspected case of pesticide-related illness or injury (whether it occurred on a farm, in a home, or in any other situation) by telephone to the local health officer within 24 hours of examining the patient. Each California county has a health officer with broad responsibility for safeguarding public health, and a few cities have chosen to have their own health officers. These officials may investigate pesticide incidents to whatever extent they find useful. The law only requires them to inform the county agricultural commissioner (CAC), to complete a pesticide illness report (PIR), and to distribute copies of the PIR to the Office of Environmental Health Hazard Assessment (OEHHA), the Department of Industrial Relations (DIR), and DPR.

DPR strives to ensure that the PISP captures the majority of significant illness incidents and records them in its database. To identify pesticide cases that may go unreported by doctors, DPR has negotiated a memorandum of understanding with DIR and the California Department of Public Health, under which scientists review Doctor’s First Reports of Occupational Illness and Injury (DFROIIs, documents that California's Labor Code requires workers' compensation claims

payers to forward to DIR). Scientists select for investigation any DFROII that mentions a pesticide, or pesticides in general, as a possible cause of injury. Reports that mention unspecified chemicals are also investigated if the setting is one in which pesticide use is likely. From 1983 through 1998, DFROII review identified the majority of the cases investigated.

From 1999 through 2002, the California Poison Control System (CPCS) facilitated pesticide illness reporting. Funds from U.S. EPA supported development of an enhanced system of poison control facilitation, which operated from mid-2001 through November 2002. Cooperation with CPCS identified hundreds of symptomatic exposures that otherwise would have escaped detection, but the State's fiscal crisis prevented continuation of the contract after federal funding ended. Improved financial status allowed DPR to renew its contract with CPCS in 2006. Poison control facilitation of illness reporting resumed in October 2006. DPR also continues to cooperate with OEHHA in efforts to provide the public and the health care community with information on pesticide safety and public health surveillance.

The agricultural commissioners of the counties where exposures occurred investigate all identified incidents, whether or not they involved agriculture. They attempt to locate and interview all the people with knowledge of the pesticide exposure event, and also review relevant records. Their investigations determine how exposure occurred, characterize the subsequent illnesses, and determine whether pesticide users complied fully with safety requirements. DPR provides instructions, training, and technical support for conducting investigations. These instructions include directions for when and how to collect samples of foliage, clothing, or surface residues to document environmental exposures. As part of the technical support, DPR contracts with a specialized laboratory to analyze the samples.

WHS worked with DPR's Enforcement Branch to develop and present training for CACs in 2006. The training covered DPR's expectations of the CACs in conducting pesticide episode investigations, including pesticide illness investigations. Sessions were presented in ten locations throughout California. Training content was designed to feature updates to the Pesticide Use

Enforcement Program Standards, Volume 5, Investigation Procedures Manual, a revised edition of which was distributed late in 2005.

The CACs prepare reports describing the circumstances in which pesticide exposure may have occurred and any other relevant aspects of the case. When appropriate, they request authorization from the affected people to include relevant portions of their medical records with the report. Medical record authorizations comply with the Health Insurance Portability and Accountability Act (HIPAA) and always include commitments to maintain confidentiality. When investigations identify affected people not previously reported by other mechanisms, those people are identified in the investigation report and recorded in the PISP database. DPR scientists evaluate the physicians' reports and all the information the CACs have gathered. They then classify incidents according to the circumstances of pesticide exposure.

DPR evaluators undertake a complex evaluation of medical records and investigation reports to determine the likelihood that a pesticide exposure caused the incident. Standards for the determination are described in the PISP program brochure, “Preventing Pesticide Illness,” which can be viewed or downloaded from the DPR Web site at http://www.cdpr.ca.gov/docs/whs/pisp/brochure.pdf.

Purpose of Pesticide Illness Surveillance

DPR maintains its surveillance of human health effects of pesticide exposure in order to evaluate the circumstances of pesticide exposures that result in illness. DPR scientists regularly consult the PISP database to evaluate the effectiveness of DPR's pesticide safety regulatory programs and assess the need for changes. In high-risk situations, DPR may implement additional California restrictions on pesticide use. For example, taking illness data into consideration, DPR may adjust the restricted entry interval following pesticide application, specify buffer zones or other application conditions, or require pesticide handlers to use protective equipment that meets certain standards.

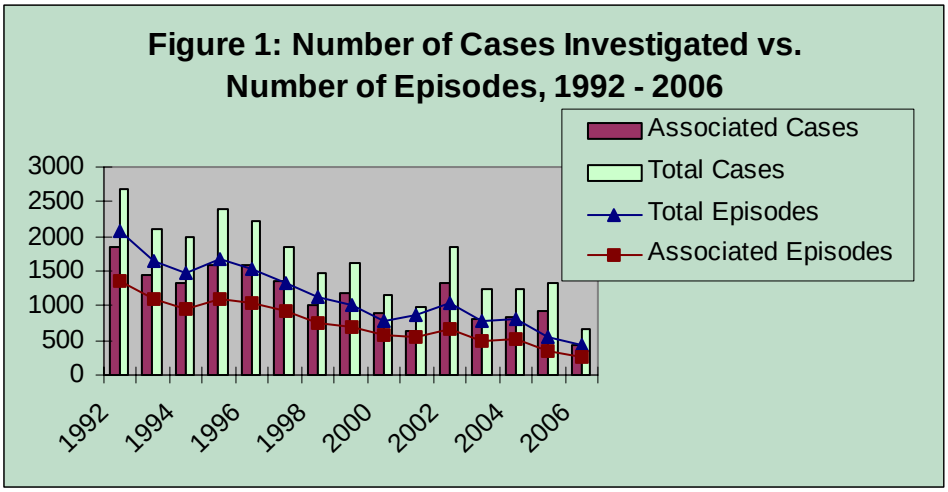
During 2006, WHS finalized a review of PISP data on illnesses attributed to exposure to pesticide residue in treated structures (Verder-Carlos, 2006) and published a review of pyrethroid effects recorded in PISP illness investigations (Spencer and O'Malley, 2006). Illness data were also incorporated into finalized exposure assessments for carbofuran and sulfuryl fluoride.

In some instances, changes to pesticide labels provide the most appropriate mitigation measures. DPR cooperates with U.S. EPA to develop appropriate instructions for users throughout the country. If an illness incident results from illegal practices, state and county enforcement staff take appropriate action to deter future incidents.

2006 Numeric Results – Totals

In 2006, DPR and CACs investigated 681 cases (see Figure 1). This is the smallest number of cases identified by the PISP since records were computerized in 1982. Although reasons for the drop are not all obvious, DPR scientists have identified areas for potential improvement and have taken action. Staff scientists continue to explore potential explanations and supplementary sources of case identification.

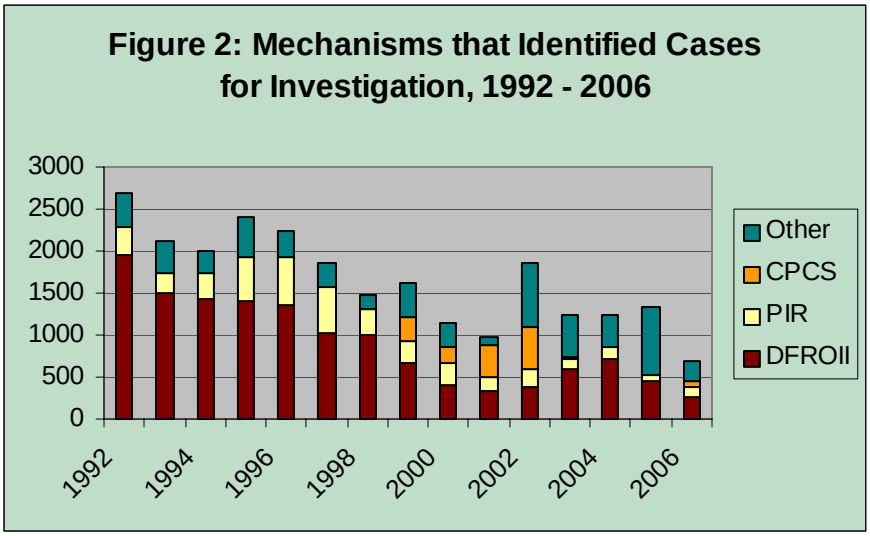
Compared to usual year-to-year variation, this year's drop is substantial: The 2006 case total falls two standard deviations below the average annual total of the previous six years (2000 – 2005 mean = 1296, S.D. = 300). In most years, the several case identification paths have compensated for one another. In 2006, all of the sources provided fewer cases than average. DFROII retrievals showed the largest drop (see Figure 2). The other sources, though reduced in volume, identified case totals within one standard deviation of their averages.



A case is the Pesticide Illness Surveillance Program representation of a person whose health problems may relate to pesticide exposure.
An episode is an event in which a single source appears to have exposed one or more people (cases) to pesticides.
Associated cases are those evaluated as definitely, probably, or possibly related to pesticide exposure. A definite relationship indicates that both physical and medical evidence document exposure and consequent health effects. A probable relationship indicates that limited or circumstantial evidence supports a relationship to pesticide exposure. A possible relationship indicates that evidence neither supports nor contradicts a relationship
Associated episodes are those in which at least one case was evaluated as associated.

The reduction in volume was more pronounced for non-agricultural than agricultural cases, for cases related to herbicides and antimicrobials than for those related to other types of pesticides, and for cases that affected mixer/loaders and applicators (both agricultural and non-agricultural) than for those that affected people who did not handle pesticides.

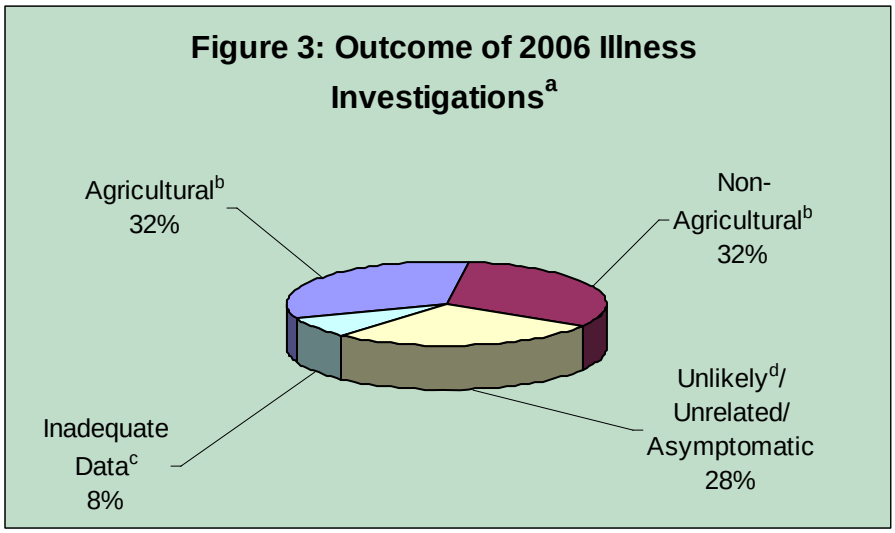
Although case findings for 2007 appear to have returned to pre-2006 levels, in response to the unexpected drop in 2006 case reports, DPR is pursuing the possibility of obtaining direct access to electronic workers' compensation data. Direct access to this data will significantly improve the reliability and consistency of information relative to occupational exposures. To implement this data exchange, DPR must first pursue legislative approval.



DFROII – Doctor's First Report of Occupational Illnesses and Injury (Workers' Compensation document).
PIR – Pesticide Illness Report (physician reporting in compliance with Health and Safety Code105200).
CPCS – California Poison Control System (facilitated physician reporting).
Other – All other methods of case identification. Including citizen complaints, contacts by emergency responders, and news reports.

Figure 2 also shows increasing case identification outside of the usual PIR and DFROII-based pathways in recent years. Since PIRs and DFROIIs come only from medical care providers, they cannot be filed unless the affected people consult doctors. In recent years, episodes in which pesticides escape into populated areas have become more prominent. Many people may incur low-level exposures in such events, but few may seek medical care. Such episodes come to the CACs' attention via emergency response contacts, news reports, or direct citizen complaints. CACs also locate some additional cases in the course of investigating reported illnesses.

Of the 681 cases investigated, DPR found that pesticide exposure had been at least a possible contributing factor to 438 (64 %). Evidence established an unlikely or unrelated relationship to pesticide exposure for 187 (28 %) of the 681 cases assigned for investigation, including 75 individuals (11 %) who denied experiencing health effects. Lack of information prevented evaluation of 56 (8 %) (Figure 3).



[a] Total cases investigated = 681.
[b] *Agricultural* and *Nonagricultural* refer to the intended use of the pesticide.
[c] *Inadequate* means that there was not enough data available or reported to determine if pesticides were involved in the case.
[d] *Unlikely/Unrelated/Asymptomatic* refers to cases determined as unlikely related or unrelated to pesticide exposure or the exposed person did not develop symptoms.

Occupational exposures (those that occurred while the affected people were at work) accounted for 332 (76 %) of the 438 pesticide-associated cases from 2006. Occupational exposures typically predominate among the cases PISP collects, reflecting the importance of DFROIIs (workers' compensation documents) for identifying cases.

Of the 438 cases recognized as definitely, probably, or possibly related to pesticide exposure, 222 (51 %) involved use of pesticides for agricultural purposes (i.e., intended to contribute to production of an agricultural commodity, including livestock) and the remaining 216 (49 %) involved pesticide exposure in other situations, such as structural, sanitation, or home garden use, in the manufacturing process, or during storage.

Evidence established a definite relationship to pesticide exposure for 49 (11 %) of the 438 definite, probable, and possible cases. Another 305 (69 %) were classified as probable, with 84 (19 %) entered as possible (Table 1). Tabular summaries presenting different aspects of the data

are available through DPR's Web site at http://www.cdpr.ca.gov/docs/whs/currpisp.htm, or by contacting the WHS Branch.

Table 1: Relationship Evaluation of 2006 Illness Investigations

Relationship	Agricultural[a]	Non-Agricultural	Relation to Agriculture Unknown or Not Applicable	Total
Definite[b]	7	42	0	49
Probable[c]	167	138	0	305
Possible[d]	48	36	0	84
subtotal	222	216	0	438
Unlikely[e]	8	15	1	24
Asymptomatic[f]	63	12	0	75
Unrelated[g]	0	0	88	88
Not Applicable[h]	6	44	6	56
Total	299	287	95	681

[a] Agricultural cases are those that implicate exposure to pesticides intended to contribute to the production of agricultural commodities.
[b] High degree of correlation between pattern of exposure and resulting symptomatology. Requires both physical evidence of exposure and medical evidence of consequent ill health to support the conclusions.
[c] Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.
[d] Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.
[e] A correlation cannot be ruled out absolutely. Medical and/or physical evidence suggest a cause other than pesticide exposure.
[f] Exposure occurred, but did not result in illness/injury.
[g] Definite evidence of cause other than pesticide exposure, including exposures to chemicals other than pesticides.
[h] Relationship cannot be established because the necessary information is either unavailable or not provided.

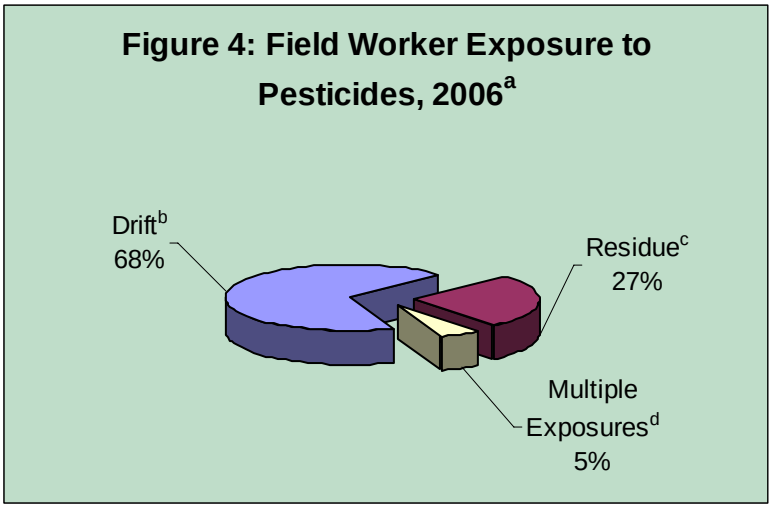
When DPR receives the illness investigative reports, staffers seek to determine whether compliance violations are involved, but this can be difficult. Enforcement actions are often still under consideration when illness reports are prepared. Based on the information available at the time of evaluation, WHS scientists concluded that factors already prohibited by pesticide labels and safety regulations contributed to 197 (45 %) of the 438 cases evaluated as definitely, probably, or possibly related to pesticide exposure. This is typical of recent years, although in 2005 a massive drift episode raised the percentage of cases with violations to 68%. The 2006

total includes 108 people affected by apparent violations during or following agricultural uses of pesticides. In the other 114 cases connected to agricultural pesticide use (51 %), WH&S scientists did not identify violations that contributed to exposure. Further evaluation of these cases will determine if additional safety requirements are needed. In circumstances other than agricultural use, evaluators determined that violations contributed to 89 (41 %) of the 216 definite, probable or possible cases.

Agricultural Field Worker Incidents

In 2006, 94 cases of field worker illness or injury were evaluated as definitely, probably or possibly related to pesticide exposure (Figure 4). Twenty-five of them (27 %) were exposed to pesticide residue in 20 separate episodes, and 64 (68 %) were exposed to drift in nine distinct episodes. The other five affected field workers were involved in three episodes in which they may have been exposed to residue, drift, or both.

Three of the 25 residue exposures were evaluated as probably related to reported health effects; the other 22 field worker residue exposures were evaluated as possibly related. WHS helped to investigate a Kern County residue episode (Spencer, 2006): Two crew members reported rashes when they arrived for their second day pruning a young almond orchard. Two other members of the crew then reported other symptoms, and five crew members requested precautionary evaluation. The day before pruning began, the trees had been treated with abamectin (a miticide with a 12-hour reentry interval); and the ground had been sprayed with herbicides (glufosinate, glyphosate, and oxyfluorfen) the previous month. Herbicide-treated plants would have died before the crew entered the orchard, so leaf samples were tested only for abamectin and propargite. Records did not indicate that the orchard had been treated with propargite (another miticide); but propargite has been associated repeatedly with skin irritation, while skin irritation has not been a prominent feature of abamectin exposure. Analysis of the samples detected no propargite, however; and abamectin residue levels were comparable to those found in previous studies on other crops. The symptomatic workers were recorded as possibly having been affected by abamectin exposure.



[a] Total field worker cases associated with pesticide exposure = 94.
[b] Drift refers to field worker cases associated with exposure to drift from a pesticide application.
[c] Residue refers to field worker cases associated with exposure to residue of previously applied pesticides.
[d] Multiple Exposures refers to contact with pesticides through two or more mechanism.

Restricted entry interval violations contributed to five field workers' exposure to residue. Three of the five, including two evaluated as probably affected by pesticide residue, were exposed in a Monterey County episode in which premature removal of posting signs also contributed to their exposure. Non-contributory violations such as delay in submitting use reports were identified in nine other cases of field worker residue exposure.

Drift exposure probably caused or contributed to symptoms experienced by 58 field workers, and was a possible factor in six field worker cases. The largest episode occurred in Sacramento County, where 23 apple harvesters developed symptoms when they smelled the odor of an aerial disulfoton application to asparagus one-quarter to one-half mile away. The workers were taken to a hospital for evaluation. WHS scientists took a dozen samples of apple foliage and arranged with the hospital to collect urine samples from the four most severely affected workers (Yanga and Hernandez, 2006). Analysis of the leaf samples detected no disulfoton, but found trace amounts of a breakdown product, disulfoton sulfone, in half the samples. No disulfoton metabolites were detected in any of the four urine samples. The workers reported primarily

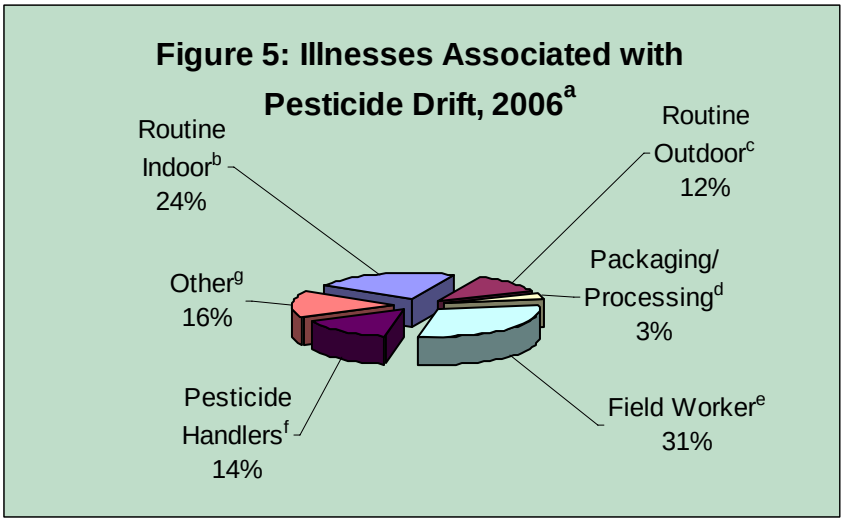
nausea, headaches, and eye and respiratory irritation. These are credible reactions to the odor of disulfoton, so 21 of the 23 cases were evaluated as probably related and two as possibly related. Another 25 workers denied experiencing any symptoms. Investigators cited the applicator for insufficient caution in applying the pesticide, and the CAC proposed a penalty of $9,000. As of February 29, 2008 a hearing on the penalty is pending.

In a Kern County episode, a cloud of pesticide dust enveloped 19 of 44 grape harvesters. Investigators took samples of foliage and clothing, which confirmed pesticide drift. The CAC fined the applicator $14,000 for applying the pesticide in conflict with its label directions. Pesticide exposure was evaluated as probably related to the symptoms of 18 of the 19 symptomatic workers. One worker's symptoms were evaluated as possibly related.

Seven other drift episodes each affected one to seven field workers. Investigators identified violations in each of the episodes, but found that they had not contributed to exposure in three drift episodes.

Drift Exposure

The PISP defines drift exposure as exposure to pesticide "spray, mist, fumes, or odor carried from the target site by air." This definition differs from the definition used for enforcement of regulations in that the PISP definition includes the offsite movement of pesticides after they have been deposited at the target site, so long as the application remains in progress. It also includes exposures of pesticide handlers in which air movement carried the pesticide and caused exposure. In 2006, DPR recorded a total of 208 individuals who reported symptoms evaluated as definitely, probably, or possibly related to exposure to drift (Figure 5) in 62 separate episodes, including nine episodes that affected 64 field workers. Agricultural pesticide use was found responsible for 52 % of the episodes and 79 % of the affected people (32 episodes, 164 cases). Non-agricultural exposure situations accounted for 30 episodes in which 44 people (including 20 pesticide handlers) experienced effects evaluated as definitely, probably, or possibly related to airborne pesticide exposure.



[a] Total drift cases for 2006 = 208.
[b] Routine Indoor includes people in offices and businesses, residential structures, etc. (occupational and non-occupational) who were not handling pesticides.
[c] Routine Outdoor includes people outdoors (occupational and non-occupational) with little expectation of contacting pesticides (e.g., gardeners not handling pesticides, residents).
[d] Packaging/Processing includes people involved in processing harvested crops.
[e] Field Workers are people working in agricultural fields at the time of drift exposure.
[f] Handlers include people mixing, loading and applying pesticides, repairing pesticide equipment and flagging for aerial application.
[g] Other/Unknown – Any other type of activity or unknown activity.

In three episodes, field fumigants moved off site and apparently elicited symptoms in two applicators, six emergency responders, and 53 nearby residents and business occupants. These 61 cases were all evaluated as probably related to the exposure. Three other agricultural fumigant drift episodes affected a total of four people, including three agricultural inspectors present during the fumigations. Chloropicrin was implicated in all the agricultural fumigant episodes, some of which involved methyl bromide or 1,3-dichloropropene in addition. Overall, drift exposure was evaluated as definitely, probably, or possibly related to health effects reported by 64 field workers, seven workers processing harvested produce, 49 people engaged in routine indoor activities when exposed, 25 people engaged in routine outdoor activities, six emergency responders, and 27 people involved in activities not adequately described by any of the defined categories. Additionally, 30 pesticide handlers were definitely, probably, or possibly affected by

airborne exposure to the pesticides they handled. Such exposures are recorded as drift. Of the 30 pesticide handlers exposed via drift, 10 worked in agriculture.

Morbidity and Mortality

Among the 354 cases evaluated as definitely or probably related to pesticide exposure, 11 people were admitted to hospitals and 66 lost time from work. Of the 84 possible cases, two reported hospitalization and 20 lost work time. Six of the hospitalized people apparently ingested pesticide intentionally. Three other people were hospitalized for unintentional pesticide ingestion. Those cases (and two others) are described in the final segment of this report.

DPR and CACs investigated three deaths in 2006. Pesticides were identified in each, although in each case substantial uncertainty remains about the pesticides' significance.

In one case, an aerial applicator died in a crash while applying methomyl, a carbamate insecticide capable of causing acute toxicity and impairing performance. He had made routine voice contact with a co-worker, however, just seconds before the crash. PISP scientists concluded that pesticide toxicity was unlikely to have contributed to the fatal accident.

Another fatal case was that of an abused child who arrived at a hospital not breathing and with no pulse. He was said to have drunk some pine oil sanitizer. Laboratory test results were consistent with such an ingestion, but indicated a smaller amount than would ordinarily be expected to kill. Under the circumstances, PISP scientists could not determine whether pesticide ingestion was likely to have contributed to the child's death.

The third fatality was that of a man found unconscious and unresponsive in the quarters he occupied on the property of relatives. His condition was first noticed by a family friend and property caretaker who was applying an insecticide to the grounds. After his death, investigators found bromethalin-containing rat bait in his room. Toxicity of some sort was suspected throughout his 17-day hospitalization, but no toxicant was identified. The coroner could not

assign a cause of death, and PISP scientists could not classify this case with respect to pesticide exposure.

Examples of the Importance of Safe Pesticide Practices

DPR learned of two children and three adults who unintentionally ingested pesticides in 2006. Such episodes could easily be avoided if people would store pesticides securely. The following case reports illustrate inappropriate storage practices:

In one Orange County case, a grandfather stored a red colored insecticide concentrate in a drinking bottle. He left the bottle in a tool chest, planning to dilute it later to spray for ants. His four-year-old grandson found the bottle and drank from it. Family members suggested that the child may have mistaken the red liquid for a flavored drink. The child recovered after three days of hospital treatment. The investigator retrieved the pesticide from the hospital. Laboratory analysis detected 0.37 % sulfotep and 44.28 % chlorpyrifos, both organophosphate insecticides. A teaspoonful of the mixture could have been a lethal dose for a child.

Another Orange County family had done missionary work in Africa, and maintained contact with African friends. When they complained of a raccoon problem, one of those friends sent them a black, granular pesticide. The wife mixed it with meat as a bait for the raccoons. The raccoons did not eat it, so she labeled it and froze it. Some time later, her husband unthinkingly cooked and ate the poisoned meat. He became seriously ill, and drove himself to the hospital. He received treatment for three days, and told the investigator that he felt well after discharge. This case illustrates a second error in judgment, as the man could have caused a collision by driving while intoxicated. For that reason, DPR requires employers to provide transportation to a medical facility for employees who may have symptoms of pesticide poisoning. Fortunately, this man survived both his mistakes. The investigator took the remaining pesticide and had it analyzed. It proved to consist of nine percent aldicarb, a highly toxic carbamate insecticide that is sometimes misused as a rodenticide. One teaspoonful of those black granules contains enough pesticide to kill five healthy adults.

In Los Angeles County, a woman put some insecticide into a soft drink bottle and gave it to her sister to take home. The sister left the bottle on a table, where her husband and four-year-old daughter shared a drink from it. They recognized their mistake and made themselves vomit before going to an emergency room. The specific pesticide involved was not identified. Some liquid pesticides pose a risk to the lungs if removed from the stomach by vomiting. Pesticide labels provide instructions that let people know whether they can safely rid themselves of ingested contents by vomiting. These people did not have a labeled container. They took a chance; but fortunately, they had no further problems from their pesticide exposure.

Another Los Angeles County case occurred on the job: A restaurant employee set his water bottle on a table next to a bottle of sanitizer. After mopping floors for a while, he took a drink and swallowed several ounces before realizing he was drinking sanitizer. He followed company policy for first aid, and was taken to a hospital where he spent four days for treatment of burns to his mouth and throat. He told the investigator that he recovered fully. The restaurant management assured the investigator that they had changed storage procedures to avoid any reoccurrence.

Mistakes like these can occur any time pesticides are not stored securely. People who decide to use and keep pesticides must also take responsibility for safe storage.

References

Spencer, J. 2006. Summary of WHS Involvement in 16-KER-06. California Environmental Protection Agency, Department of Pesticide Regulation, Worker Health and Safety Branch. Memo No. HSM-06009

Spencer, J. and O'Malley, M. 2006. Pyrethroid Illnesses in California, 1996 – 2002. Reviews of Environmental Contamination and Toxicology 186:57 – 72.

Verder-Carlos, M. 2006. A Review of Non-Handler Illnesses Associated with Structural Pesticide Applications, 1996-2001. California Environmental Protection Agency, Department of Pesticide Regulation, Worker Health and Safety Branch. Report No. HS-1854

Yanga, N. and B. Hernandez 2006. Project 0605 (Priority Investigation 25-SAC-06), Possible Drift, Disulfoton. California Environmental Protection Agency, Department of Pesticide Regulation, Worker Health and Safety Branch. Memo No. HSM-06012

Summary of Illness/Injury Incidents
Reported in California as Potentially Related to Pesticide Exposure
Summarized Statewide and by County of Occurrence[1]
2006

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
TOTALS							
Definite	49	33	3	0	13	7	42
Probable	305	53	187	15	50	167	138
Possible	84	3	18	32	31	48	36
Unlikely	24	1	3	10	10	8	15
Asymptomatic	75	4	56	5	10	63	12
Unrelated	88	0	0	0	0	0	0
Insufficient	3	0	0	0	0	0	0
Unavailable	53	0	0	0	0	0	0
OVERALL[5]	**681**	**94**	**267**	**62**	**114**	**293**	**243**
COUNTY[6]							
ALAMEDA							
Probable	3	2	0	1	0	0	3
Possible	3	0	0	2	1	0	3
Unrelated	4	0	0	0	0	0	0
AMADOR							
Probable	1	0	0	1	0	0	1
BUTTE							
Probable	1	1	0	0	0	0	1
Possible	1	0	1	0	0	1	0
Unavailable	3	0	0	0	0	0	0
COLUSA							
Probable	1	1	0	0	0	0	1
Unrelated	1	0	0	0	0	0	0
CONTRA COSTA							
Probable	6	1	5	0	0	0	6
Unrelated	1	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0
DEL NORTE							

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
Probable	3	2	0	0	1	0	3
Possible	1	0	0	0	1	1	0
Unrelated	1	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0
EL DORADO							
Probable	18	0	0	0	18	0	18
Unrelated	1	0	0	0	0	0	0
FRESNO							
Definite	5	3	0	0	2	0	5
Probable	10	5	3	1	1	5	5
Possible	9	1	0	2	6	8	1
Unlikely	4	0	0	3	1	3	1
Asymptomatic	1	0	0	0	1	0	1
Unrelated	4	0	0	0	0	0	0
Unavailable	5	0	0	0	0	0	0
HUMBOLDT							
Probable	1	1	0	0	0	0	1
IMPERIAL							
Definite	1	0	0	0	1	0	1
Probable	3	2	1	0	0	2	1
Possible	1	0	0	1	0	1	0
Asymptomatic	1	1	0	0	0	1	0
KERN							
Definite	3	3	0	0	0	1	2
Probable	22	3	18	1	0	19	3
Possible	9	1	1	6	1	9	0
Unlikely	2	0	0	1	1	1	0
Asymptomatic	30	0	25	5	0	30	0
Unrelated	1	0	0	0	0	0	0
Unavailable	2	0	0	0	0	0	0
KINGS							
Definite	1	1	0	0	0	1	0
Probable	1	0	1	0	0	1	0
Unrelated	1	0	0	0	0	0	0

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
LOS ANGELES							
Definite	11	7	1	0	3	0	11
Probable	29	8	11	1	9	0	29
Possible	10	0	1	1	8	0	10
Unlikely	2	0	0	2	0	0	2
Asymptomatic	2	0	0	0	2	0	2
Unrelated	12	0	0	0	0	0	0
Insufficient	1	0	0	0	0	0	0
Unavailable	7	0	0	0	0	0	0
MADERA							
Probable	12	0	10	1	1	10	2
Unlikely	2	0	0	1	1	2	0
Asymptomatic	2	0	1	0	1	1	1
Unrelated	2	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0
MARIN							
Definite	2	2	0	0	0	0	2
Unavailable	1	0	0	0	0	0	0
MENDOCINO							
Probable	2	0	0	0	2	2	0
MERCED							
Probable	15	3	12	0	0	14	1
Possible	3	0	0	1	2	2	1
Unrelated	2	0	0	0	0	0	0
MONTEREY							
Probable	10	1	6	3	0	9	1
Possible	4	0	2	2	0	4	0
Unlikely	1	0	1	0	0	1	0
Asymptomatic	3	0	2	0	1	2	1
Unrelated	2	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0
NAPA							
Probable	1	0	0	1	0	0	1
ORANGE							

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
Definite	3	1	0	0	2	1	2
Probable	2	1	0	0	1	0	2
Possible	3	0	1	2	0	0	3
Unlikely	1	0	0	0	1	0	1
Asymptomatic	1	0	0	0	1	0	1
Unrelated	1	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0
PLACER							
Unrelated	1	0	0	0	0	0	0
RIVERSIDE							
Definite	2	1	0	0	1	0	2
Probable	5	2	1	0	2	0	5
Possible	3	0	0	1	2	0	3
Unrelated	11	0	0	0	0	0	0
Insufficient	1	0	0	0	0	0	0
Unavailable	9	0	0	0	0	0	0
SACRAMENTO							
Probable	25	1	22	0	2	22	3
Possible	4	0	2	1	1	2	2
Unlikely	3	0	0	2	1	1	2
Asymptomatic	25	0	25	0	0	25	0
Unrelated	3	0	0	0	0	0	0
Unavailable	4	0	0	0	0	0	0
SAN BENITO							
Unavailable	1	0	0	0	0	0	0
SAN BERNARDINO							
Definite	2	2	0	0	0	0	2
Probable	58	5	52	0	1	51	7
Possible	2	1	1	0	0	0	2
Unlikely	1	0	0	1	0	0	1
Asymptomatic	2	0	0	0	2	0	2
Unrelated	2	0	0	0	0	0	0
Unavailable	2	0	0	0	0	0	0
SAN DIEGO							

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
Definite	4	2	0	0	2	0	4
Probable	7	2	3	1	1	1	6
Possible	7	0	2	3	2	4	3
Unlikely	1	0	0	0	1	0	1
Asymptomatic	1	0	0	0	1	0	1
Unrelated	9	0	0	0	0	0	0
Unavailable	3	0	0	0	0	0	0
SAN FRANCISCO							
Definite	1	1	0	0	0	0	1
Probable	3	0	3	0	0	0	3
Unrelated	2	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0
SAN JOAQUIN							
Definite	2	1	1	0	0	0	2
Probable	6	3	2	1	0	1	5
Possible	6	0	0	1	5	3	3
Unlikely	1	0	0	0	1	0	1
Asymptomatic	3	2	0	0	1	1	2
Unrelated	3	0	0	0	0	0	0
Unavailable	3	0	0	0	0	0	0
SAN LUIS OBISPO							
Unrelated	2	0	0	0	0	0	0
SAN MATEO							
Probable	6	2	1	0	3	0	6
Possible	1	0	0	1	0	0	1
Unlikely	1	0	1	0	0	0	1
SANTA BARBARA							
Definite	4	2	1	0	1	2	2
Probable	9	0	9	0	0	9	0
Possible	1	0	0	1	0	1	0
Unlikely	1	0	0	0	1	0	1
Unrelated	3	0	0	0	0	0	0
Unavailable	2	0	0	0	0	0	0
SANTA CLARA							

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
Definite	3	3	0	0	0	0	3
Probable	6	4	0	0	2	0	6
Possible	3	0	0	2	1	0	3
Unlikely	1	0	1	0	0	0	1
Unrelated	10	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0
SANTA CRUZ							
Possible	1	0	1	0	0	0	1
SISKIYOU							
Unrelated	1	0	0	0	0	0	0
SOLANO							
Unrelated	2	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0
SONOMA							
Definite	1	0	0	0	1	1	0
Probable	2	0	0	2	0	0	2
Possible	2	0	0	2	0	2	0
Unlikely	2	0	0	0	2	0	2
Unrelated	1	0	0	0	0	0	0
STANISLAUS							
Definite	2	2	0	0	0	1	1
Probable	14	1	9	1	3	5	9
Asymptomatic	1	1	0	0	0	0	1
Unrelated	1	0	0	0	0	0	0
Unavailable	2	0	0	0	0	0	0
TEHAMA							
Unlikely	1	1	0	0	0	0	1
TULARE							
Definite	1	1	0	0	0	0	1
Probable	9	0	8	0	1	9	0
Possible	4	0	1	2	1	4	0
Unrelated	4	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0
VENTURA							

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
Definite	1	1	0	0	0	0	1
Probable	8	1	7	0	0	7	1
Possible	6	0	5	1	0	6	0
Asymptomatic	3	0	3	0	0	3	0
Insufficient	1	0	0	0	0	0	0
YOLO							
Probable	6	1	3	0	2	0	6

1. **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program. The term "potentially related to pesticide exposure" refers to all cases reported to the program, some of which were later determined to be unrelated to pesticide exposure.

2. **Relationship:** Degree of correlation between pesticide exposure and resulting symptomatology.

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

Unlikely : A correlation cannot be ruled out absolutely. Medical and/or physical evidence suggest a cause other than pesticide exposure.

Indirect : Pesticide exposure is not responsible, but pesticide regulations or product label requirements contributed in some way, (e.g. heat stress while wearing chemical resistant clothing).

Asymptomatic : Exposure occurred, but did not result in illness/injury. Cholinesterase depression without symptoms falls in this category.

Unrelated : Definite evidence of cause other than pesticide exposure including exposures to chemicals other than pesticides. Since there is no exposure to pesticides, there are no entries under "Type of Exposure" or "Intended Use."

Insufficient : The available information is inadequate to make an informed judgment on the relationship between pesticide exposure and the reported symptomatology. For submitted investigations, the investigator failed to make an adequate attempt to obtain the necessary information. Since a relationship to pesticide exposure cannot be

determined, there are no entries under "Type of Exposure" or "Intended Use."

Unavailable : The available information is inadequate to make an informed judgement on the relationship between pesticide exposure and the reported symptomatology. For submitted investigations, the investigator made an adequate attempt to collect the necessary information, but was not able to do so (e.g., none of the parties concerned could be contacted). There usually needs to be more effort than to say the employee is not available for interview; other parties can often supply useful information. Since a relationship to pesticide exposure cannot be determined, there are no entries under "Type of Exposure" or "Intended Use."

3. **Type of Exposure:** Characterization of how an individual came in contact with a pesticide.

Direct Contact : An appreciable amount of pesticide contacted the individual's body surface. This includes: 1) sprays or squirts from application equipment; 2) leaks or spills whether or not related to the application; and 3) deliberate immersion (as when cleaning implements in a basin with antimicrobials). This excludes drift exposures.

Drift : Spray, mist, fumes, or odor carried from the target site by air. Drift must be related to an application or mix/load activity.

Residue : The part of a pesticide that remains in the environment for a period of time following an application or drift. This includes odor after the completion of an application.

Other/Unknown : Any of the following: 1) ingestion; 2) multiple routes of exposure; 3) residue from a spill; 4) exposure to smoke or pyrolitic products from a fire where pesticides are burning; 5) route of exposure is not known.

4. **Intended Use:** Agricultural/Non-Agricultural - Indicates whether the pesticide(s) were intended to contribute to the production of agricultural commodities.

Agricultural : The pesticide(s) were intended to contribute to the production of agricultural commodities, including livestock. This includes: 1) agricultural research facilities, 2) handling of raw agricultural commodities in packing houses, 3) drift from agricultural applications into non-agricultural areas, and 4) transportation and storage of pesticides on farm lands. It excludes forestry operations, although they are classified as agricultural for regulatory purposes. It also excludes manufacture, transportation, and storage of pesticides prior to arrival at the site of agricultural production.

Non-Agricultural : The pesticide(s) were not intended to contribute to the production of agricultural commodities. This includes: 1) residential pesticide uses, 2) structural pest control, 3) rights-of-way, 4) parks, 5) landscaped urban areas, and 6) manufacture, transportation and storage of pesticides except on farm lands.

5. This total includes one case in which the intended use could not be established as either agricultural or nonagricultural.

6. **County:** Individual counties in California where the incident occurred. If a county is not listed, there were no reported illnesses for that county for the year.

Whom to Contact:

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Worker Health and Safety Branch
Phone: (916) 445-4222.
Physical address: 1001 I St., Sacramento CA 95814-2828.
Mailing address: P.O. Box 4015, Sacramento, CA 95812-4015
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About the Pesticide Illness Surveillance Program Data

Pesticide-related illnesses have been tracked within the state of California for more than 50 years. The California Environmental Protection Agency, Department of Pesticide Regulation (DPR) maintains a surveillance program which records human health effects of pesticide exposure. The Pesticide Illness Surveillance Program (PISP) documents information on adverse effects from pesticide products, whether elicited by the active ingredients, inert ingredients, impurities, or breakdown products. This program maintains a database, which is utilized for evaluating the circumstances of pesticide exposures resulting in illness. This database is consulted regularly by staff who evaluate(s) the effectiveness of the DPR pesticide safety programs and recommend changes when appropriate.

Cases Reported in California[1] with Documented[2] Pesticide Exposure Summarized by the Type of Illness and the Type of Pesticides 2006

Type of Illness[3]	Antimicrobials[4]		Cholinesterase Inhibitors[4]		Other Pesticides[4]		Total
	Occupational[5]	Non-Occupational[5]	Occupational[5]	Non-Occupational[5]	Occupational[5]	Non-Occupational[5]	
Systemic							
Systemic with Respiratory and Topical Effects	13	2	4	1	18	2	**40**
Systemic with Respiratory Effects	11	12	3	4	26	4	**60**
Systemic with Topical Effects	5	0	2	0	7	6	**20**
Systemic Only	5	2	19	3	23	13	**65**
Respiratory							
Respiratory with Topical Effects	15	0	3	2	26	4	**50**
Respiratory Only	7	7	6	7	9	8	**44**
Topical							
Eye Only	49	0	1	0	32	24	**106**
Skin Only	17	0	3	1	19	3	**43**
Eye and Skin	6	1	1	0	2	0	**10**
Asymptomatic							
Asymptomatic	1	0	26	1	37	10	**75**
TOTAL	**129**	**24**	**68**	**19**	**199**	**74**	**513**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program.

[2] **Documented Pesticide Exposure:** Includes cases classified as definitely, probably, or possibly related to pesticide exposure as well as documented

pesticide exposure that did not result in symptomatology.

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Type of Illness:** Categorization of the type of symptoms experienced.

Systemic : Any health effects not limited to the respiratory, skin and/or eye. Cases involving multiple illness symptom types including systemic symptoms are included in the systemic category.

Respiratory : Health effects involving any part of the respiratory tree.

Topical : Health effects involving only the eyes and/or skin. This excludes outward physical signs (miosis and lacrimation) related to effects on internal bodily systems. These signs are classified under 'Systemic.'

Asymptomatic : Exposure occurred, but did not result in illness/injury. Cholinesterase depression without symptoms falls in this category.

[4] **Type of Pesticide:** Type of pesticide based on functional class.

Antimicrobials : Pesticides used to kill or inactivate microbiological organisms (bacteria, viruses, etc.).

Cholinesterase Inhibitors : Pesticides known to inhibit the function of the cholinesterase enzyme.

Other Pesticides : Any pesticide that is not an antimicrobial or cholinesterase-inhibiting pesticide.

[5] **Occupational or Non-Occupational:** The relationship between the illness/injury and the individual's work

Occupational : Work related. The individual was on the job at the time of the incident. This includes both paid employees and volunteers working in similar capacity to paid employees.

Non-Occupational : Not work related. The individual was not on the job at the time of the incident. This category includes individuals on

the way to or from work (before the start or after the end of their workday).

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Illnesses and Injuries Reported in California[1] Associated With[2] Pesticide Exposure Summarized by the Type of Activity and Type of Exposure 2006

Occupational[3]

Type of Activity[4]	Type of Exposure[5]								
	Drift	**Residue**	**Direct Spray/ Squirt**	**Spill/ Other Direct**	**Ingestion**	**Multiple**	**Other**	**Unknown**	**Total**
Mixer/Loader	7	0	6	19	0	0	1	3	36
Applicator	19	0	6	27	0	1	4	23	80
Mechanical	0	0	2	2	0	0	0	0	4
Packaging/Processing	7	3	0	0	0	0	0	0	10
Field Worker	64	25	0	0	0	5	0	0	94
Routine Indoor	36	9	0	3	2	0	0	1	51
Routine Outdoor	12	0	0	0	0	0	1	0	13
Manufacturing/Formulation	0	0	0	1	0	0	0	0	1
Transport/Storage/Disposal	0	0	0	4	0	1	4	0	9
Emergency Response	6	0	0	0	0	0	0	0	6
Other	10	4	1	7	1	0	3	2	28
Total Occupational Cases	***161***	***41***	***15***	***63***	***3***	***7***	***13***	***29***	***332***

Non-Occupational[3]

Type of Activity[4]	Type of Exposure[5]								
	Drift	**Residue**	**Direct Spray/ Squirt**	**Spill/ Other Direct**	**Ingestion**	**Multiple**	**Other**	**Unknown**	**Total**
Applicator	4	0	3	3	0	0	2	0	12
Routine Indoor	13	4	1	0	6	3	1	0	28
Routine Outdoor	13	2	0	3	1	0	16	0	35
Other	17	0	0	1	9	0	1	0	28
Unknown	0	0	0	0	2	0	0	1	3
Total Non-Occupational Cases	***47***	***6***	***4***	***7***	***18***	***3***	***20***	***1***	***106***
Total Occupational/ Non-Occupational	**208**	**47**	**19**	**70**	**21**	**10**	**33**	**30**	**438**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program.

[2] **Associated With:** Includes cases classified as definitely, probably or possibly related to pesticide exposure

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Occupational Status:** Occupational or Non-Occupational

Occupational	: Work related. The individual was on the job at the time of the incident. This includes both paid employees and volunteers working in similar capacity to paid employees.
Non-Occupational	: Not work related. The individual was not on the job at the time of the incident. This category includes individuals on the way to or from work (before the start or after the end of their workday).

[4] **Type of Activity:** Activity of the injured individual at the time of exposure

Mixer/Loader	: Mixes and/or loads pesticides. This includes: (1) removing a pesticide from its original container, (2) transferring the pesticide to a mixing or holding tank, (3) mixing pesticides prior to application, (4) driving a nurse rig, or (5) transferring the pesticide from a mix/holding tank or nurse rig to an application tank.
Applicator	: Applies pesticides by any method or conducts activities considered ancillary to the application (e.g., cleans spray nozzles in the field).
Flagger	: Flags for an aerial application, either fixed-winged or helicopter.
Mechanical	: Maintains (e.g. cleans, repairs or conducts maintenance) pesticide contaminated equipment used to mix, load or apply pesticides as well as the protective equipment used by individuals involved in such activities. This excludes the following: 1) maintenance performed by applicators on their equipment incidental to the application; 2) maintenance performed by mixer/loaders on their equipment incidental to mixing and loading; 3) decontamination by HAZMAT teams.
Packaging/Processing	: Handles (packs, processes or retails agricultural commodities from the packing house to the final market place. Field packing of agricultural commodities is classified as FIELD WORKER.
Field Worker	: Works in an agricultural field performing tasks such as advising, scouting, harvesting, thinning, irrigating, driving tractor (except as part of an application), field packing, conducting cultural work in a greenhouse, etc. Researchers performing similar tasks in an agricultural field are also included.
Routine Indoor	: Conducts activities in an indoor environment with minimal expectation for exposure to pesticides. This includes people in offices and businesses, residential structures, etc. who are not handling pesticides.
Routine Outdoor	: Conducts activities in an outdoor environment with minimal expectation for exposure to pesticides. This excludes field workers in agricultural fields. This includes gardeners who are not handling pesticides.

Manufacturing and Formulation	:	Manufactures, processes or packages pesticides. This includes "mixing" if it is done in a plant for application elsewhere.
Transport/ Storage/ Disposal	:	Transports or stores pesticides between packaging and preparation for use. This includes shipping, warehousing and retailing as well as storage by the end-user prior to preparation for use. Disposal of unused pesticides is also included in this activity. This excludes driving a nurse rig to an application site.
Emergency Response	:	Emergency Response Personnel (Police, fire, ambulance and HAZMAT personnel) responding to a fire, spill, accident or any other pesticide incident in the line of duty.
Other	:	Activity is not adequately described by any other activity category. This includes but is not limited to: 1) being inside a vehicle; 2) dog groomers not handling pesticides; 3) individuals handling pesticide treated wood; 4) two or more activities with potential for pesticide exposure.
Unknown	:	Activity is not known

[5] **Type of Exposure:** Characterization of how an individual came in contact with a pesticide.

Drift	:	Spray, mist, fumes, or odor carried from the target site by air. Drift must be related to an application or mix/load activity.
Residue	:	The part of a pesticide that remains in the environment for a period of time following an application or drift. This includes odor after the completion of an application.
Direct Spray/Squirt	:	Material propelled by the application or mix/load equipment. Contact with the material can be by direct projection or ricochet. This includes exposure of mechanics working on application or mix/load equipment when the material is forced out by pressure.
Spill/Other Direct	:	Any of the following: 1) Contact made during an application or mixing/loading operation where the material is not propelled by the equipment; 2) Expected direct contact during use (e.g. washing dishes in a disinfectant solution); 3) Leaks, spills, etc. not related to an application.
Ingestion	:	Intentional or unintentional oral ingestion.
Multiple	:	Contact with pesticides occurred through two or more mechanisms.
Other	:	Other known route of exposure not included in other exposure categories. This includes, but not limited to: 1) Residue from a

spill and 2) Exposure to smoke or pyrolitic products from a fire where pesticides are burning.

Unknown : Route of exposure is not known.

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Illnesses and Injuries Reported by California Physicians[1] Associated With[2] Pesticide Exposure Summarized by Pesticide(s) and Type of Illness 2006

Pesticide[3]	Systemic/ Respiratory[4]		Topical[4]		TOTAL	
	Definite/ Probable	Possible	Definite/ Probable	Possible	Definite/ Probable	Possible
Organophosphates						
Chlorpyrifos	3	1	0	1	3	2
Diazinon	1	0	0	0	1	0
Disulfoton	22	2	0	0	22	2
Malathion	0	1	1	0	1	1
N-Methyl Carbamates						
Aldicarb	1	0	0	0	1	0
Carbaryl	3	0	0	0	3	0
Methomyl	1	0	0	0	1	0
Pyrethrins and Pyrethroids						
Bifenthrin	0	1	0	0	0	1
Cyfluthrin	1	0	0	0	1	0
Cypermethrin	2	1	0	1	2	2
Esfenvalerate	0	1	0	0	0	1
Lambda-Cyhalothrin	5	0	1	1	6	1
Permethrin	0	1	0	0	0	1
Other Pesticides						
Aluminum Phosphide	1	0	0	0	1	0
Brodifacoum	1	0	0	0	1	0
Bt (Berliner) Kurstaki Serotype 3a, 3b	0	0	0	1	0	1
Bt Kurstaki Strain Sa-11	0	0	0	1	0	1
Calcium Hydroxide	0	0	1	0	1	0
Calcium Hypochlorite	1	0	0	0	1	0
Chlorfenapyr	1	0	0	0	1	0
Chlorine	1	1	0	0	1	1
Chloropicrin	23	0	28	0	51	0
Chlorothalonil	0	1	0	0	0	1
Copper Sulfate	0	0	1	0	1	0
Cyanuric Acid	3	0	3	0	6	0
Ethephon	0	0	1	0	1	0
Fosetyl-al	0	1	0	0	0	1
Glutaraldehyde	3	0	2	1	5	1
Glyphosate	0	0	4	1	4	1
Hydrogen Chloride	0	0	1	0	1	0

Pesticide[3]	Systemic/ Respiratory[4]		Topical[4]		TOTAL	
	Definite/ Probable	Possible	Definite/ Probable	Possible	Definite/ Probable	Possible
Hydrogen Peroxide	0	0	1	0	1	0
Imidacloprid	0	0	0	1	0	1
Iprodione	0	0	1	0	1	0
Isopropyl Alcohol	0	0	1	0	1	0
Isothiazoline Disinfectants	1	0	1	0	2	0
Lime-sulfur	0	0	1	0	1	0
Maneb	3	0	0	0	3	0
Methyl Bromide	2	0	0	0	2	0
Metolachlor	0	0	1	0	1	0
Myclobutanil	0	1	0	0	0	1
Oil of Lemon Eucalyptus	0	0	1	0	1	0
Oxyfluorfen	1	0	0	0	1	0
Ozone	3	0	0	0	3	0
Paclobutrazol	0	0	1	0	1	0
Peroxyacetic Acid	2	0	0	0	2	0
Phenolic Disinfectants	0	0	2	1	2	1
Pine Oil	0	0	1	0	1	0
Potassium Phosphite	1	0	0	0	1	0
Quaternary Ammonia	2	2	19	1	21	3
Sodium Carbonate	0	0	1	0	1	0
Sodium Hypochlorite	23	1	18	3	41	4
Sulfur	4	6	3	1	7	7
Sulfur Dioxide	2	0	0	0	2	0
Sulfuryl Fluoride	0	4	0	0	0	4
Thiram	1	0	0	0	1	0
Trifluralin	0	0	0	1	0	1
Ziram	1	0	0	0	1	0
Combinations of Antimicrobials	30	1	14	1	44	2
Combinations of Fumigants	6	0	8	0	14	0
Combinations of Fungicides	26	2	1	2	27	4
Combinations of Herbicides	3	3	1	1	4	4
Combinations of Insecticides Including ChE Inhibitor(s)	4	3	0	0	4	3
Combinations of Insecticides Without ChE Inhibitor(s)	9	8	6	2	15	10
Miscellaneous Combinations	19	11	5	7	24	18
Unknown Antimicrobials	2	1	0	1	2	2
Unknown Insecticides	3	1	0	0	3	1
Unknown Pesticides	3	0	0	0	3	0
TOTAL	**224**	**55**	**130**	**29**	**354**	**84**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program.

[2] **Associated With:** Includes cases classified as definitely, probably or possibly related to pesticide exposure

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Type of Pesticide:** Pesticides listed on this table are grouped according to frequent inquiries received by DPR. Other pesticides are then listed in alphabetical order.

[4] **Type of Illness:** Categorization of the type of symptoms experienced.

Systemic : Any health effects not limited to the skin and/or eye. Cases involving multiple illness symptom types including systemic symptoms are included in the systemic category.

Respiratory : Health effects involving any part of the respiratory tree.

Topical : Health effects involving only the eyes and/or skin. This excludes outward physical signs (miosis and lacrimation) related to effects on internal bodily systems. These signs are classified under 'Systemic.'

Whom to Contact:

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About the Pesticide Illness Surveillance Program Data

Pesticide-related illnesses have been tracked within the state of California for more than 50 years. The California Environmental Protection Agency, Department of Pesticide Regulation (DPR) maintains a surveillance program which records human health effects of pesticide exposure. The Pesticide Illness Surveillance Program (PISP) documents information on adverse effects from pesticide products, whether elicited by the active ingredients, inert ingredients, impurities, or breakdown products. This program maintains a database, which is utilized for evaluating the circumstances of pesticide exposures resulting in illness. This database is consulted regularly by staff who evaluate(s) the effectiveness of the DPR pesticide safety programs and recommend changes when appropriate.

Summary of Cases Reported by California[1] as Associated With[2] Pesticide Exposure Summarized by Occupational Status and by Location of the Incident 2006

Incident Setting[3]	Occupational Exposures[4]		Non-Occupational Exposures[4]		TOTAL	TOTAL
	Definite/ Probable[2]	Possible[2]	Definite/ Probable[2]	Possible[2]	Definite/ Probable[2]	Possible[2]
Farm	84	37	1	1	**85**	**38**
Nursery	7	6	0	0	**7**	**6**
Livestock Production Facility	3	0	0	0	**3**	**0**
Crop/Livestock Processing Facility	17	0	0	0	**17**	**0**
Animal Premise (Veterinary Hospital, Kennels, not Livestock)	14	1	0	0	**14**	**1**
Single Family Home	1	1	50	10	**51**	**11**
Multi-unit Housing	4	0	5	3	**9**	**3**
Residential Institution	0	1	0	0	**0**	**1**
School	7	0	0	0	**7**	**0**
Prison	3	0	0	0	**3**	**0**
Hospital/Medical	26	4	5	0	**31**	**4**
Pesticide Manufacturing Facility	1	0	0	0	**1**	**0**
Industrial or Other Manufacturing Facility	21	0	0	0	**21**	**0**
Office/Business	15	1	0	0	**15**	**1**
Retail Establishment	8	3	0	0	**8**	**3**
Service Establishment	28	6	0	3	**28**	**9**
Wholesale Establishment	1	1	0	0	**1**	**1**
Road/Rail Or Utility Right Of Way	3	0	5	0	**8**	**0**
Park	3	0	16	0	**19**	**0**
Golf Course	2	0	0	0	**2**	**0**
Landscape, Other	1	0	0	0	**1**	**0**
Other (Telephone Poles, Fences, Etc)	15	3	0	0	**15**	**3**
Unknown	2	2	6	1	**8**	**3**
TOTAL	**266**	**66**	**88**	**18**	**354**	**84**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness and Surveillance Program.

[2] **Associated With:** Includes cases classified as definitely, probably or possibly related to pesticide exposure

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Incident Setting:** Location where the incident occurred. The location may not coincide with the application site.

Farm	: Areas where agricultural crops are grown. This excludes the following: 1) nurseries and greenhouses which are classified under NURSERY; 2) livestock and poultry farms; and 3) forestry operations.
Nursery	: Facilities (including greenhouses) growing and selling plants, bulbs, seeds, etc. This includes the production of seedlings for transplanting into agricultural fields or forests.
Livestock Production Facility	: Ranches, dairies, feedlots, egg production facilities, hatcheries and other establishments involved in keeping, grazing or feeding livestock or poultry for the sale of them or their products. This includes veterinary services provided for livestock.
Crop/Livestock Processing Facility	: Facilities involved in packing, manufacturing or processing foods or beverages for human consumption and feed products for animals and fowl. This includes facilities that sort, grade and pack fresh fruits and vegetables.
Animal Premise (Veterinary Hospital, Kennels, Not Livestock)	: Veterinary services, animal kennels**,** animal control facilities, dog grooming facilities and other services provided for companion animals. This excludes livestock.
Single Family Home	: The house and other structures on property intended for use by a single family. This includes swimming pools, but excludes landscaped areas on the property.
Multi-Unit Housing	: Apartments and multi-plexes and other buildings on property. This includes swimming pools, but excludes landscaped areas on the property.
Labor Housing	: Lodging facility or residence provided for the labor force.
Residential Institution	: Dormitories, nursing homes, homeless shelters and similar facilities.
School	: Establishments that provide academic or technical instruction. This includes daycare centers.
Prison	: Establishments for the confinement and correction of offenders as ordered by

courts of law. This includes California youth authority facilities.

Hospital / Medical	: Establishments that provide medical, surgical and other health services to people. This includes offices and clinics of doctors and dentists, hospitals, medical and dental laboratories, kidney dialysis centers and other health related facilities.
Pesticide Manufacturing Facility	: Facilities engaged in manufacture and/or formulation of pesticides.
Industrial Or Other Manufacturing Facility	: Facilities involved in the mechanical or chemical transformations of materials or substances into new products. This excludes: 1) facilities engaged in manufacture or formulation of pesticides; and 2) facilities engaged in treatment of wood to protect against pest damage.
Wood Treatment	: Establishments involved in the treatment of wood with preservatives to protect against pest damage.
Office/Business	: Commercial establishments including public and private business offices. This excludes retail establishments and service establishments.
Retail Establishment	: Businesses engaged in selling merchandise for personal or household consumption and providing services related to the products. This excludes restaurants which are classified under service establishment.
Service Establishment	: Establishments engaged in providing services to individuals, businesses and government. This includes restaurants, laundries, etc. This excludes medical service establishments.
Wholesale Establishment	: Establishments involved in the distribution of merchandise to retail establishments or other wholesale establishments. This excludes "wholesalers" who sell directly to the public.
Road/Rail Or Utility Right Of Way	: Roads, rails or utilities and adjacent right-of-way areas. This includes aqueducts, manholes, landscaped median strips and vehicles moving along roadways.
Park	: An area of public land set aside for recreation. This includes public swimming pool facilities**.** This excludes private recreational facilities such as amusement parks, physical fitness facilities, etc. which are classified under SERVICE ESTABLISHMENT.
Golf Course	: Land used for playing or practicing golf, including putting greens and driving ranges. This excludes miniature golf courses.
Landscape, Lawn	: Landscaped lawns. This excludes lawn areas in the following locations: 1) road/rail or utility right-of-ways; 2) parks; and 3) golf courses.
Landscape, Other	: Landscaped ornamental shrub and tree areas. This excludes ornamental shrub and tree areas in the following locations: 1) road/rail or utility right-of-ways; 2) parks; and 3) golf courses.
Other	: Location of exposure occurred at a site not adequately described in any other

incident setting category. This includes, but is not limited to, telephone poles, fences, water supply systems and wastewater treatment plants.

Unknown : The location of the incident is unknown.

[4] **Occupational Status:** Occupational or Non-Occupational

Occupational : Work related. The individual was on the job at the time of the incident. This includes both paid employees and volunteers working in similar capacity to paid employees.

Non-Occupational : Not work related. The individual was not on the job at the time of the incident. This category includes individuals on the way to or from work (before the start or after the end of their workday).

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Summary of Cases Reported in California[1] as Associated With[2] Pesticide Exposure Summarized by Gender, Age Distribution, by Type of Pesticide and by Type of Use
2006

Agricultural Use Pesticide Exposure Incidents[3]

Age Group	Pesticides other than Antimicrobial Pesticides[4]			Antimicrobial Pesticides[4]			TOTAL
	Male	Female	Unknown	Male	Female	Unknown	
0 - 9	2	1	3	0	0	0	**6**
10 - 14	0	1	0	0	0	0	**1**
15 - 19	3	4	0	0	0	0	**7**
20 - 29	34	11	0	0	0	0	**45**
30 - 39	22	12	0	1	0	0	**35**
40 - 49	22	12	0	0	0	0	**34**
50 - 59	10	3	0	3	0	0	**16**
60 - 69	7	3	0	0	0	0	**10**
70 +	1	0	0	0	0	0	**1**
Unknown	42	25	0	0	0	0	**67**
TOTAL	**143**	**72**	**3**	**4**	**0**	**0**	**222**

Non-Agricultural Use Pesticide Exposure Incidents

Age Group	Pesticides other than Antimicrobial Pesticides			Antimicrobial Pesticides			TOTAL
	Male	Female	Unknown	Male	Female	Unknown	
0 - 9	7	2	0	7	3	0	**19**
10 - 14	2	0	0	3	1	0	**6**
15 - 19	1	2	0	4	9	0	**16**
20 - 29	12	2	0	11	17	0	**42**
30 - 39	4	2	0	10	21	0	**37**
40 - 49	7	6	0	13	14	0	**40**
50 - 59	5	2	0	13	9	0	**29**
60 - 69	2	4	0	2	1	0	**9**
70 +	2	3	0	1	0	0	**6**
Unknown	2	1	0	5	4	0	**12**
TOTAL	**44**	**24**	**0**	**69**	**79**	**0**	**216**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness and Surveillance Program.

[2] **Associated With:** Includes cases classified as definitely, probably or possibly related to pesticide exposure

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Intended Use:** Agricultural/Non-Agricultural - Indicates whether the suspected pesticide(s) is intended to contribute to the production of agricultural commodities.

Agricultural : The pesticide(s) were intended to contribute to the production of agricultural commodities, including livestock. This includes: 1) agricultural research facilities, 2) handling of raw agricultural commodities in packing houses, 3) drift from agricultural applications into non-agricultural areas, and 4) transportation and storage of pesticides on farm lands. It excludes forestry operations, although they are classified as agricultural for regulatory purposes. It also excludes manufacture, transportation, and storage of pesticides prior to arrival at the site of agricultural production.

Non-Agricultural : The pesticide(s) were not intended to contribute to the production of agricultural commodities. This includes: 1) residential pesticide uses, 2) structural pest control, 3) rights-of-way, 4) parks, 5) landscaped urban areas, and 6) manufacture, transportation and storage of pesticides except on farm lands.

[4] **Antimicrobial :** Pesticides used to kill or inactivate microbiological organisms (bacteria, viruses, etc.).

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Illnesses and Injuries of Application Workers Reported by California Physicians[1] Associated With[2] Pesticide Exposure Summarized by the Type of Equipment, Type of Activity and Occupational Status 2006

Occupational[3]

Type of Equipment[4]	Type of Activity[5]				
	Mixer/ Loader	Applicator	Flagger	Mechanic	Total
Fixed Wing Aircraft	2	0	0	0	**2**
Ground, Other or Unspecified	3	3	0	0	**6**
Ground Boom, Other or Unspecified	1	2	0	0	**3**
Ground, Boom Below/Behind	1	4	0	1	**6**
Over-the-vine Boom	0	1	0	0	**1**
Airblast Sprayers	1	5	0	0	**6**
Shank Injection with Tarps	0	2	0	0	**2**
Hand, Other or Unspecified	1	3	0	0	**4**
Pressurized Hose-line Sprayers	0	5	0	0	**5**
Hand Pump Sprayer	0	1	0	0	**1**
Back Pack Sprayer	1	2	0	0	**3**
Unpressurized Hand-held Spray Equipment	2	5	0	0	**7**
Aerosol Can	0	1	0	0	**1**
Tarp	0	1	0	0	**1**
Automatic Equipment, Other or Unspecified	1	0	0	1	**2**
Automatic Equipment, Chlorinators	3	0	0	2	**5**
Sprinkler Irrigation Equipment	0	1	0	0	**1**
Manual Application Methods, Other or Unspecified	3	7	0	0	**10**
Immersion Equipment	7	4	0	0	**11**
Implements with Handles	0	5	0	0	**5**
Implements without Handles	1	9	0	0	**10**
Manual Placement	1	7	0	0	**8**
Unknown	8	12	0	0	**20**
Total Occupational Cases	**36**	**80**	**0**	**4**	**120**

Non-Occupational[3]

Type of Equipment[4]	Type of Activity[5]				
	Mixer/ Loader	**Applicator**	**Flagger**	**Mechanic**	**Total**
Unpressurized Hand-held Spray Equipment	0	1	0	0	**1**
Aerosol Can	0	2	0	0	**2**
Foggers	0	3	0	0	**3**
Manual Application Methods, Other or Unspecified	0	4	0	0	**4**
Implements with Handles	0	1	0	0	**1**
Manual Placement	0	1	0	0	**1**
Total Non-Occupational Cases	**0**	**12**	**0**	**0**	**12**
Total Occupational and Non-Occupational Cases	**36**	**92**	**0**	**4**	**132**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program.

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Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Occupational Status:** Occupational or Non-Occupational

Occupational : Work related. The individual was on the job at the time of the incident. This includes both paid employees and volunteers working in similar capacity to paid employees.

Non-Occupational : Not work related. The individual was not on the job at the time of the incident. This category includes individuals on the way to or from work (before the start or after the end of their workday).

[4] **Type of Activity:** Activity of the injured individual at the time of exposure

Mixer/Loader	:	Mixes and/or loads pesticides. This includes: (1) removing a pesticide from its original container, (2) transferring the pesticide to a mixing or holding tank, (3) mixing pesticides prior to application, (4) driving a nurse rig, or (5) transferring the pesticide from a mix/holding tank or nurse rig to an application tank.
Applicator	:	Applies pesticides by any method or conducts activities considered ancillary to the application (e.g., cleans spray nozzles in the field).
Flagger	:	Flags for an aerial application, either fixed-winged or helicopter.
Mechanical	:	Maintains (e.g. cleans, repairs or conducts maintenance) pesticide contaminated equipment used to mix, load or apply pesticides as well as the protective equipment used by individuals involved in such activities. This excludes the following: 1) maintenance performed by applicators on their equipment incidental to the application; 2) maintenance performed by mixer/loaders on their equipment incidental to mixing and loading; 3) decontamination by HAZMAT teams.

[5] **Type of Equipment Used:** Defines the type of application equipment regardless of who performed the application. If the type of equipment is not represented on the table, there were no cases involving that type of equipment for the year of the report.

Fixed Wing Aircraft	:	Fixed wing aircraft.
Helicopter	:	Helicopter.
Air, Other Or Unspecified	:	Aerial application equipment, other or unspecified. This includes two or more types of aerial application equipment and excludes fixed wing aircraft and helicopters.
Over-The-Vine Boom	:	Ground operated equipment with the arms of the spray boom extending over the tops of grapevines.
Electrostatic Sprayer	:	Ground operated equipment designed to impart an electrical charge to the pesticide particles. The electrostatic designation for ground application equipment overrides any other type of equipment it is used with.
Airblast Sprayers	:	Ground application equipment with a pump that delivers spray into an air stream created by a large fan at the back of the spray equipment.
Power Dusters	:	Ground application equipment used to apply dust formulated pesticides.
Shank Injection Without Tarps	:	Ground application equipment that uses a shank or other piece of equipment to directly apply a pesticide into the soil except when a tarp is placed over the soil, which is classified under shank injection with tarps. This also excludes surface applied pesticides that are subsequently incorporated into the soil by a cultivator.
Shank Injection With Tarps	:	Ground application equipment that uses a shank or other piece of equipment to directly apply a pesticide into the soil. A tarp is placed over the soil to restrict the pesticide to the application site.

Ground, Other Or Unspecified	: Ground application equipment, unknown or unspecified. This includes two or more types of ground application
Ground Boom, Other Or Unspecified	: Ground application equipment with a spray boom. The following are excluded: 1) Ground Boom Below/Behind, 2) Over-The-Vine Boom, and 3) Electrostatic Sprayer.
Ground Boom Below/Behind	: Ground application equipment with a spray boom located below or behind the equipment operator with the spray nozzles pointed downward.
Pressurized Hose-Line Sprayers	: Hand-held spray equipment attached by a long hose to a power-pressurized tank. This excludes hose-end sprayers, which are classified under hand, other or unspecified.
Hand Pump Sprayer	: Hand-held compressed air sprayer with small volume tanks (1 to 5 gallons). This excludes backpack sprayers.
Hand-Held Dusters	: Hand-held application equipment for granules or dust. This includes belly grinders, bellows, squeeze bulbs, etc.
Back Pack Sprayer	: Compressed air sprayer where the tank is worn on the back of the applicator.
Unpressurized Hand-Held Spray Equipment	: Hand-held spray bottles (usually plastic) with built-in finger triggers.
Aerosol Can	: Disposable pressurized cans designed for intermittent use. The pesticide is propelled out of the can by an inert compressed gas propellant. This excludes foggers.
Foggers	: Disposable pressurized cans designed for the total release of the contents in a single use. The pesticide is propelled out of the can by an inert compressed gas propellant.
Aerosol/Fog Generating Equipment	: Refillable application equipment designed to disperse pesticide as a small airborne droplet, either in confined spaces or outdoor areas. These include truck-mounted equipment for outdoor use, hand-carried portable units and wall mounted electric units that are found in dairies, restaurants, etc.
Hand, Other Or Unspecified	: Hand-held application equipment, other or unspecified. The equipment must propel the pesticide from a reservoir. This includes 1) hose-end sprayers, and 2) two or more types of hand-held application equipment. This excludes hand-held equipment already specified above.
Chamber	: An enclosed, sealed chamber designed specifically for fumigating or sterilizing the contents of the chamber.
Tarp	: Tarp placed over a commodity or structure and designed to restrict a fumigant to the application site.
Automatic Equipment, Chlorinators	: Chlorination units that automatically inject chlorine into water for disinfection purposes. This includes chlorinators for swimming pools, packing houses and food processing plants.
Drip Irrigation Equipment	: Chemigation through drip irrigation equipment.
Sprinkler Irrigation Equipment	: Chemigation through sprinkler irrigation equipment.

Automatic Equipment, Other Or Unspecified	:	Equipment that automatically injects the pesticide to the target area. This includes equipment attached to milking machinery, dishwashers, etc. This excludes equipment already described above.
Immersion Equipment	:	Tanks, trays, sinks, etc. used for the dipping of animals, produce, bulbs, medical equipment, dishes, pots and pans, etc.
Implements With Handles	:	Mops, brushes, and other implements with handles.
Implements Without Handles	:	Cloths, towels, rags, sponges and other implements without handles.
Manual Placement	:	Manual placement of a pesticide directly to a target site. This includes bait stations, hand tossed pellets, and direct pouring of a pesticide onto a target surface from a container (such as pouring liquid chlorine directly into swimming pool water). This excludes the placement of fumigation pellet packs in chambers and under tarps.
Manual Application Methods, Other Or Unspecified	:	Manual application methods, other or unspecified. The pesticide is not propelled by any type of equipment. This includes two or more types of manual application methods. This excludes manual application method already described above.
Other	:	Any application methodology not described above. This includes two or more types of application equipment not elsewhere specified.
Unknown	:	The type of application equipment is not known.
Not Applicable	:	No application equipment is involved.

Whom to Contact:

California Department of Pesticide Regulation
Worker Health and Safety Branch
Phone: (916) 445-4222.
Physical address: 1001 I St., Sacramento CA 95814-2828.
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About the Pesticide Illness Surveillance Program Data

Pesticide-related illnesses have been tracked within the state of California for more than 50 years. The California Environmental Protection Agency, Department of Pesticide Regulation (DPR) maintains a surveillance program which records human health effects of pesticide exposure. The Pesticide Illness Surveillance Program (PISP) documents information on adverse effects from pesticide products, whether elicited by the active ingredients, inert ingredients, impurities, or breakdown products. This program maintains a database, which is utilized for evaluating the circumstances of pesticide exposures resulting in illness. This database is consulted regularly by staff who evaluate(s) the effectiveness of the DPR pesticide safety programs and recommend changes when appropriate.

Hospitalization and Disability Associated with Illnesses/Injuries *Definitely or Probably Related* to Pesticide Exposure in California[1,2], Summarized by Occupational Status and Activity 2006

Occupational[3]

Activity[4]	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown[5]	No. Cases	%	Unknown[6]
Mixer/Loader	34	0	0	0	8	23.5	0
Applicator	59	2	3.4	0	15	25.4	3
Mechanical	4	0	0	0	1	25	0
Packaging/Processing	10	0	0	0	0	0	0
Field Worker	63	0	0	0	28	44.4	3
Routine Indoor	48	0	0	0	2	4.2	0
Routine Outdoor	11	0	0	0	0	0	0
Manufacturing/Formulation	1	0	0	0	1	100	0
Transport/Storage/Disposal	8	0	0	0	1	12.5	1
Emergency Response	6	0	0	0	0	0	0
Other	22	1	4.5	0	5	22.7	2
Total Occupational	**266**	**3**	**1.1**	**0**	**61**	**22.9**	**9**

Non- Occupational[3]

Activity[4]	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown[5]	No. Cases	%	Unknown[6]
Applicator	12	1	8.3	0	1	8.3	2
Routine Indoor	21	1	4.8	0	1	4.8	1
Routine Outdoor	29	1	3.4	0	0	0	13
Other	25	4	16	0	2	8	9
Unknown	1	1	100	0	1	100	0
Total Non-Occupational	**88**	**8**	**9.1**	**0**	**5**	**5.7**	**25**
TOTAL CASES	**354**	**11**	**3.1**	**0**	**66**	**18.6**	**34**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program.

[2] **Relationship:** Degree of correlation between pesticide exposure and resulting symptomatology.

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological

samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

[3] **Occupational Status:** Occupational or Non-Occupational

Occupational	: Work related. The individual was on the job at the time of the incident. This includes both paid employees and volunteers working in similar capacity to paid employees.
Non-Occupational	: Not work related. The individual was not on the job at the time of the incident. This category includes individuals on the way to or from work (before the start or after the end of their workday).

[4] **Type of Activity:** Activity of the individual at the time of exposure.

Mixer/Loader	: Mixes and/or loads pesticides. This includes: (1) removing a pesticide from its original container, (2) transferring the pesticide to a mixing or holding tank, (3) mixing pesticides prior to application, (4) driving a nurse rig, or (5) transferring the pesticide from a mix/holding tank or nurse rig to an application tank.
Applicator	: Applies pesticides by any method or conducts activities considered ancillary to the application (e.g., cleans spray nozzles in the field).
Flagger	: Flags for an aerial application, either fixed-winged or helicopter.
Mechanical	: Maintains (e.g. cleans, repairs or conducts maintenance) pesticide contaminated equipment used to mix, load or apply pesticides as well as the protective equipment used by individuals involved in such activities. This excludes the following: 1) maintenance performed by applicators on their equipment incidental to the application; 2) maintenance performed by mixer/loaders on their equipment incidental to mixing and loading; 3) decontamination by HAZMAT teams.
Packaging and Processing	: Handles (packs, processes or retails agricultural commodities from the packing house to the final market place. Field packing of agricultural commodities is classified as FIELD WORKER.
Field Worker	: Works in an agricultural field performing tasks such as advising, scouting, harvesting, thinning, irrigating, driving tractor (except as part of an application), field packing, conducting cultural work in a greenhouse, etc. Researchers performing similar tasks in an agricultural field are also included.
Routine Indoor	: Conducts activities in an indoor environment with minimal expectation for exposure to pesticides. This includes people in offices and businesses, residential structures, etc. who are not handling pesticides.
Manufacturing and Formulation	: Manufactures, processes or packages pesticides. This includes “mixing” if it is done in a plant for application elsewhere.
Transport/ Storage/ Disposal	: Transports or stores pesticides between packaging and preparation for use. This includes shipping, warehousing and retailing as well as storage by the end-user prior to preparation for use. Disposal of unused pesticides is also included in this activity. This excludes driving a nurse rig to an application site.
Emergency Response	: Emergency Response Personnel (Police, fire, ambulance and HAZMAT personnel)

responding to a fire, spill, accident or any other pesticide incident in the line of duty.

Other	:	Activity is not adequately described by any other activity category. This includes but is not limited to: 1) being inside a vehicle; 2) dog groomers not handling pesticides; 3) individuals handling pesticide treated wood; 4) two or more activities with potential for pesticide exposure.
Unknown	:	Activity is not known

[5] **Hospitalization Unknown:** Investigation did not specify whether hospitalization occurred or not.

[6] **Disability Unknown:** Investigation did not specify whether disability occurred or not.

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Hospitalization and Disability Associated with Illnesses/Injuries *Possibly Related* to Pesticide Exposure in California[1,2], Summarized by Occupational Status and Activity 2006

Occupational[3]

Activity[4]	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown[5]	No. Cases	%	Unknown[6]
Mixer/Loader	2	0	0	0	2	100	0
Applicator	21	0	0	0	6	28.6	2
Field Worker	31	0	0	0	6	19.4	1
Routine Indoor	3	0	0	0	1	33.3	0
Routine Outdoor	2	0	0	0	0	0	0
Transport/Storage/Disposal	1	0	0	0	0	0	0
Other	6	0	0	0	3	50	0
Total Occupational	**66**	**0**	**0**	**0**	**18**	**27.3**	**3**

Non- Occupational[3]

Activity	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown[5]	No. Cases	%	Unknown[6]
Routine Indoor	7	0	0	0	1	14.3	2
Routine Outdoor	6	0	0	0	0	0	0
Other	3	1	33.3	0	0	0	1
Unknown	2	1	50	0	1	50	0
Total Non-Occupational	**18**	**2**	**11.1**	**0**	**2**	**11.1**	**3**
Total Cases	**84**	**2**	**2.4**	**0**	**20**	**23.8**	**6**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program.

[2] **Relationship:** Degree of correlation between pesticide exposure and resulting symptomatology.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Occupational Status:** Occupational or Non-Occupational

Occupational : Work related. The individual was on the job at the time of the incident. This includes both paid employees and volunteers working in similar capacity to paid employees.

Non-Occupational : Not work related. The individual was not on the job at the time of the incident. This category includes individuals on the way to or from work (before the start or after the end of their workday).

[4] **Type of Activity:** Activity of the individual at the time of exposure.

Mixer/Loader	:	Mixes and/or loads pesticides. This includes: (1) removing a pesticide from its original container, (2) transferring the pesticide to a mixing or holding tank, (3) mixing pesticides prior to application, (4) driving a nurse rig, or (5) transferring the pesticide from a mix/holding tank or nurse rig to an application tank.
Applicator	:	Applies pesticides by any method or conducts activities considered ancillary to the application (e.g., cleans spray nozzles in the field).
Flagger	:	Flags for an aerial application, either fixed-winged or helicopter.
Mechanical	:	Maintains (e.g. cleans, repairs or conducts maintenance) pesticide contaminated equipment used to mix, load or apply pesticides as well as the protective equipment used by individuals involved in such activities. This excludes the following: 1) maintenance performed by applicators on their equipment incidental to the application; 2) maintenance performed by mixer/loaders on their equipment incidental to mixing and loading; 3) decontamination by HAZMAT teams.
Packaging and Processing	:	Handles (packs, processes or retails agricultural commodities from the packing house to the final market place. Field packing of agricultural commodities is classified as FIELD WORKER.
Field Worker	:	Works in an agricultural field performing tasks such as advising, scouting, harvesting, thinning, irrigating, driving tractor (except as part of an application), field packing, conducting cultural work in a greenhouse, etc. Researchers performing similar tasks in an agricultural field are also included.
Routine Indoor	:	Conducts activities in an indoor environment with minimal expectation for exposure to pesticides. This includes people in offices and businesses, residential structures, etc. who are not handling pesticides.
Manufacturing and Formulation	:	Manufactures, processes or packages pesticides. This includes “mixing” if it is done in a plant for application elsewhere.
Transport/ Storage/ Disposal	:	Transports or stores pesticides between packaging and preparation for use. This includes shipping, warehousing and retailing as well as storage by the end-user prior to preparation for use. Disposal of unused pesticides is also included in this activity. This excludes driving a nurse rig to an application site.
Emergency Response	:	Emergency Response Personnel (Police, fire, ambulance and HAZMAT personnel) responding to a fire, spill, accident or any other pesticide incident in the line of duty.
Other	:	Activity is not adequately described by any other activity category. This includes but is not limited to: 1) being inside a vehicle; 2) dog groomers not handling pesticides; 3) individuals handling pesticide treated wood; 4) two or more activities with potential for pesticide exposure.
Unknown	:	Activity is not known

[5] **Hospitalization Unknown:** Investigation did not specify whether hospitalization occurred or not.

[6] **Disability Unknown:** Investigation did not specify whether disability occurred or not.

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Agricultural Drift Cases Reported in California[1] Associated With[2] Pesticide Exposure Summarized by Application Sites 2006

Application Site[3]	Number of Cases[4]	Number of Incidents[5]
BERRIES		
Strawberries	7	1
CITRUS		
Citrus (Other or Unspecified)	1	1
Oranges	5	3
CUCURBITS		
Cantaloupes	1	1
Cucurbits (Other or Unspecified)	5	1
FORAGE CROP		
Alfalfa	2	2
FRUITING VEGETABLE		
Tomatoes	1	1
GRAPES		
Grapes	29	4
LEAFY/STEM VEGETABLE		
Lettuce	9	1
NON-CROP		
Soil	66	7
NUT TREES		
Almonds	5	3
Walnuts	4	2
ORNAMENTAL		
Ornamental Plants (Other or Unspecified)	2	1
OTHER VEGETABLE		
Asparagus (Spears, Ferns, Etc.)	24	1
PREMISES		
Animal Husbandry Premises	1	1
Dairy Farm Milk Handling Facilities & Equipment	1	1
SEED/POD VEGETABLE		
Peas	1	1
TOTAL	**164**	**32**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness and Surveillance Program.

[2] **Associated With:** Includes cases classified as definitely, probably or possibly related to pesticide exposure

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Application Sites:** Site of the pesticide application. For crops, this includes applications at the growing site and to the commodity while being packed for sale. For incidents involving drift, the intended application site is listed.

[4] **Cases by Incidents:** Indicates the number of individuals exposed in one incident of agricultural drift.

[5] **Incidents:** Indicates the number of episodes where agricultural pesticide drift occurred based on the application site.

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Agricultural Drift Cases[1] Reported by California Physicians as Associated With[2] Pesticide Exposure Summarized by the Activity of the Exposed Person and by the Type of Application Equipment Used
2006

Type of Application Equipment Used [3]	Type of Activity [4]				TOTAL
	Routine Indoor	Routine Outdoor	Field Worker	Other	
Fixed Wing Aircraft	0	0	24	5	**29**
Helicopter	0	5	0	0	**5**
Ground, Other or Unspecified	0	0	1	2	**3**
Ground Boom, Other or Unspecified	0	0	7	1	**8**
Ground, Boom Below/Behind	0	9	0	1	**10**
Over-the-vine Boom	0	0	6	0	**6**
Airblast Sprayers	2	1	2	5	**10**
Power Dusters	0	0	22	0	**22**
Shank Injection without Tarps	0	0	0	1	**1**
Shank Injection with Tarps	38	5	0	21	**64**
Hand, Other or Unspecified	0	0	2	0	**2**
Pressurized Hose-line Sprayers	0	0	0	2	**2**
Unknown	0	0	0	2	**2**
TOTAL	**40**	**20**	**64**	**40**	**164**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program

[2] **Associated With:** Includes cases classified as definitely, probably or possibly related to pesticide exposure

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Type of Equipment Used:** Defines the type of application equipment regardless of who performed the application. If the type of equipment is not represented on the table, there were no cases involving that type of equipment for the year of the report.

Fixed Wing Aircraft : Fixed wing aircraft.

Helicopter : Helicopter.

Air, Other Or : Aerial application equipment, other or unspecified. This includes two or more types of aerial

Unspecified		application equipment and excludes fixed wing aircraft and helicopters.
Over-The-Vine Boom	:	Ground operated equipment with the arms of the spray boom extending over the tops of grapevines.
Electrostatic Sprayer	:	Ground operated equipment designed to impart an electrical charge to the pesticide particles. The electrostatic designation for ground application equipment overrides any other type of equipment it is used with.
Airblast Sprayers	:	Ground application equipment with a pump that delivers spray into an air stream created by a large fan at the back of the spray equipment.
Power Dusters	:	Ground application equipment used to apply dust formulated pesticides.
Shank Injection Without Tarps	:	Ground application equipment that uses a shank or other piece of equipment to directly apply a pesticide into the soil except when a tarp is placed over the soil, which is classified under shank injection with tarps. This also excludes surface applied pesticides that are subsequently incorporated into the soil by a cultivator.
Shank Injection With Tarps	:	Ground application equipment that uses a shank or other piece of equipment to directly apply a pesticide into the soil. A tarp is placed over the soil to restrict the pesticide to the application site.
Ground, Other Or Unspecified	:	Ground application equipment, unknown or unspecified. This includes two or more types of ground application equipment
Ground Boom, Other Or Unspecified	:	Ground application equipment with a spray boom. The following are excluded: 1) Ground Boom Below/Behind, 2) Over-The-Vine Boom, and 3) Electrostatic Sprayer.
Ground Boom Below/Behind	:	Ground application equipment with a spray boom located below or behind the equipment operator with the spray nozzles pointed downward.
Pressurized Hose-Line Sprayers	:	Hand-held spray equipment attached by a long hose to a power-pressurized tank. This excludes hose-end sprayers, which are classified under hand, other or unspecified.
Hand Pump Sprayer	:	Hand-held compressed air sprayer with small volume tanks (1 to 5 gallons). This excludes backpack sprayers.
Hand-Held Dusters	:	Hand-held application equipment for granules or dust. This includes belly grinders, bellows, squeeze bulbs, etc.
Back Pack Sprayer	:	Compressed air sprayer where the tank is worn on the back of the applicator.
Unpressurized Hand-Held Spray Equipment	:	Hand-held spray bottles (usually plastic) with built-in finger triggers.
Aerosol Can	:	Disposable pressurized cans designed for intermittent use. The pesticide is propelled out of the can by an inert compressed gas propellant. This excludes foggers.
Foggers	:	Disposable pressurized cans designed for the total release of the contents in a single use. The pesticide is propelled out of the can by an inert compressed gas propellant.
Aerosol/Fog Generating	:	Refillable application equipment designed to disperse pesticide as a small airborne droplet, either in confined spaces or outdoor areas. These include truck-mounted equipment for

Equipment		outdoor use, hand-carried portable units and wall mounted electric units that are found in dairies, restaurants, etc.
Hand, Other Or Unspecified	:	Hand-held application equipment, other or unspecified. The equipment must propel the pesticide from a reservoir. This includes 1) hose-end sprayers, and 2) two or more types of hand-held application equipment. This excludes hand-held equipment already specified above.
Chamber	:	An enclosed, sealed chamber designed specifically for fumigating or sterilizing the contents of the chamber.
Tarp	:	Tarp placed over a commodity or structure and designed to restrict a fumigant to the application site.
Automatic Equipment, Chlorinators	:	Chlorination units that automatically inject chlorine into water for disinfection purposes. This includes chlorinators for swimming pools, packing houses and food processing plants.
Drip Irrigation Equipment	:	Chemigation through drip irrigation equipment.
Sprinkler Irrigation Equipment	:	Chemigation through sprinkler irrigation equipment.
Automatic Equipment, Other Or Unspecified	:	Equipment that automatically injects the pesticide to the target area. This includes equipment attached to milking machinery, dishwashers, etc. This excludes equipment already described above.
Immersion Equipment	:	Tanks, trays, sinks, etc. used for the dipping of animals, produce, bulbs, medical equipment, dishes, pots and pans, etc.
Implements With Handles	:	Mops, brushes, and other implements with handles.
Implements Without Handles	:	Cloths, towels, rags, sponges and other implements without handles.
Manual Placement	:	Manual placement of a pesticide directly to a target site. This includes bait stations, hand tossed pellets, and direct pouring of a pesticide onto a target surface from a container (such as pouring liquid chlorine directly into swimming pool water). This excludes the placement of fumigation pellet packs in chambers and under tarps.
Manual Application Methods, Other Or Unspecified	:	Manual application methods, other or unspecified. The pesticide is not propelled by any type of equipment. This includes two or more types of manual application methods. This excludes manual application method already described above.
Other	:	Any application methodology not described above. This includes two or more types of application equipment not elsewhere specified.
Unknown	:	The type of application equipment is not known.

[4] **Type of Activity:** Activity of the individual at the time of exposure.

Field Worker	Works in an agricultural field performing tasks such as advising, scouting, harvesting, thinning, irrigating, driving tractor (except as part of an application), field packing, conducting cultural

work in a greenhouse, etc. Researchers performing similar tasks in an agricultural field are also included.

Routine Indoor	Conducts activities in an indoor environment with minimal expectation for exposure to pesticides. This includes people in offices and businesses, residential structures, etc. who are not handling pesticides.
Routine Outdoor	Conducts activities in an outdoor environment with minimal expectation for exposure to pesticides. This excludes field workers in agricultural fields. This includes gardeners who are not handling pesticides.
Other	Any activity, including handling pesticides, other than routine indoor, routine outdoor, or field work.

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Illnesses and Injuries in California[1] Associated With Pesticide Residue in Agricultural Fields, 1982-2006

Year	Systemic/ Respiratory[2]		Topical[2]		TOTAL
	Definite/ Probable[3]	Possible[3]	Definite/ Probable[3]	Possible[3]	
1982	23	43	48	117	**231**
1983	19	29	41	96	**185**
1984	8	9	49	112	**178**
1985	25	24	156	164	**370**
1986	30	14	155	60	**259**
1987	58	83	52	180	**375**
1988	57	37	74	202	**370**
1989	17	22	30	93	**162**
1990	3	32	11	119	**165**
1991	16	38	7	87	**148**
1992	11	57	19	112	**199**
1993	10	38	2	67	**117**
1994	33	31	5	42	**111**
1995	20	48	74	89	**231**
1996	29	37	15	60	**141**
1997	83	44	20	62	**209**
1998	40	19	5	47	**111**
1999	23	17	0	42	**82**
2000	21	30	2	22	**75**
2001	7	22	0	17	**46**
2002	30	23	13	12	**78**
2003	4	17	4	33	**58**
2004	15	27	1	25	**68**
2005	1	9	2	16	**28**
2006	1	9	2	13	**25**
Total	**584**	**759**	**787**	**1889**	**4022**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness and Surveillance Program.

[2] **Type of Illness:** Categorization of the type of symptoms experienced.

Systemic : Any health effects not limited to the respiratory or skin and/or eye. Cases involving multiple illness symptom types including systemic symptoms are included in the systemic category.

Respiratory : Health effects involving any part of the respiratory tree.

Topical : Health effects involving only the eyes and/or skin. This excludes outward physical signs (miosis and lacrimation) related to effects on internal bodily systems. These signs are classified under 'Systemic.'

[3] **Associated With:** Includes cases classified as definitely, probably or possibly related to pesticide exposure.

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

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Incidents Involving *Field Workers* Reported in California[1] Associated With[2] Pesticide Residue Exposure Summarized by Crop and Type of Illness
2006

Crop	Systemic/ Respiratory[3]		Topical[3]		TOTAL
	Definite/ Probable	Possible	Definite/Probable	Possible	
BERRIES					
Strawberries	0	0	0	1	1
CUCURBITS					
Watermelons	0	1	0	0	1
GRAPES					
Grapes	1	3	2	3	9
HERB/SPICE					
Flavoring and Spice Crops (Other or Unspecified)	0	0	0	1	1
NON-CROP					
Soil	0	0	0	1	1
NUT TREES					
Almonds	0	2	0	2	4
ORNAMENTAL					
Ornamental Plants (Other or Unspecified)	0	0	0	1	1
POME FRUIT					
Apples	0	0	0	1	1
STRUCTURE					
Wood	0	0	0	1	1
TREES					
Ornamental and/or Shade Trees	0	1	0	0	1
VEGETABLE, FRUITING					
Tomatoes	0	0	0	1	1
VEGETABLE, LEAFY/STEM					
Leafy/Stem Vegetables (Other or Unspecified)	0	1	0	0	1
Lettuce	0	1	0	0	1

VEGETABLE, ROOT CROP					
Root Crops (Other or Unspecified)	0	0	0	1	1
TOTAL	**1**	**9**	**2**	**13**	**25**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness and Surveillance Program.

[2] **Associated With:** Includes cases classified as definitely, probably or possibly related to pesticide exposure

Definite : High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.

Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Type of Illness:** Categorization of the type of symptoms experienced.

Systemic : Any health effects not limited to the respiratory or skin and/or eye. Cases involving multiple illness symptom types including systemic symptoms are included in the systemic category.

Respiratory : Health effects involving any part of the respiratory tree.

Topical : Health effects involving only the eyes and/or skin. This excludes outward physical signs (miosis and lacrimation) related to effects on internal bodily systems. These signs are classified under 'Systemic.'

Whom to Contact:

California Department of Pesticide Regulation
Worker Health and Safety Branch
Phone: (916) 445-4222.
Physical address: 1001 I St., Sacramento CA 95814-2828.
Mailing address: P.O. Box 4015, Sacramento, CA 95812-4015
Fax: (916) 445-4280
www.cdpr.ca.gov

About the Pesticide Illness Surveillance Program Data

Pesticide-related illnesses have been tracked within the state of California for more than 50 years. The California Environmental Protection Agency, Department of Pesticide Regulation (DPR) maintains a surveillance program which records human health effects of pesticide exposure. The Pesticide Illness Surveillance Program (PISP) documents information on adverse effects from pesticide products, whether elicited by the active ingredients, inert ingredients, impurities, or breakdown products. This program maintains a database, which is utilized for evaluating the circumstances of pesticide exposures resulting in illness. This database is consulted regularly by staff who evaluate(s) the effectiveness of the DPR pesticide safety programs and recommend changes when appropriate.

Pesticide-Associated Illnesses and Injuries Reported In California Schools[1, 2] by Exposure Category, Pesticide Type and Illness Symptoms 2006

Exposure[3]	Systemic/Respiratory[4]			Topical[4]			TOTAL
	Antimicrobials[5]	Cholinesterase Inhibitors[5]	Other Pesticides[5]	Antimicrobials[5]	Cholinesterase Inhibitors[5]	Other Pesticides[5]	
Direct Spray/Squirt	0	0	0	2	0	0	**2**
Spill/Other Direct	0	0	0	4	0	0	**4**
Unknown	1	0	0	0	0	0	**1**
TOTAL	**1**	**0**	**0**	**6**	**0**	**0**	**7**

[1] **Source:** California Department of Pesticide Regulation, Pesticide Illness Surveillance Program.

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Probable : Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.

Possible : Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.

[3] **Type of Exposure:** Characterization of how an individual came in contact with a pesticide. Exposure categories not listed on the table indicate there were no illnesses that occurred under that category.

Drift : Spray, mist, fumes, or odor carried from the target site by air. Drift must be related to an application or mix/load activity.

Residue : The part of a pesticide that remains in the environment for a period of time following an application or drift. This includes odor after the completion of an application.

Direct Spray/Squirt	:	Material propelled by the application or mix/load equipment. Contact with the material can be by direct projection or ricochet. This includes exposure of mechanics working on application or mix/load equipment when the material is forced out by pressure.
Spill/Other Direct	:	Any of the following: 1) Contact made during an application or mixing/loading operation where the material is not propelled by the equipment; 2) Expected direct contact during use (e.g. washing dishes in a disinfectant solution); 3) Leaks, spills, etc. not related to an application.
Ingestion	:	Intentional or unintentional oral ingestion.
Multiple	:	Contact with pesticides occurred through two or more mechanisms.
Other	:	Other known route of exposure not included in other exposure categories. This includes, but not limited to: 1) Residue from a spill and 2) Exposure to smoke or pyrolitic products from a fire where pesticides are burning.
Unknown	:	Route of exposure is not known.

[4] **Type of Illness:** Categorization of the type of symptoms experienced.

Systemic	:	Any health effects not limited to the respiratory, skin and/or eye. Cases involving multiple illness symptom types including systemic symptoms are included in the systemic category.
Respiratory	:	Health effects involving any part of the respiratory tree.
Topical	:	Health effects involving only the eyes and/or skin. This excludes outward physical signs (miosis and lacrimation) related to effects on internal bodily systems. These signs are classified under 'Systemic.'
Asymptomatic	:	Exposure occurred, but did not result in illness/injury. Cholinesterase depression without symptoms falls in this category.

[5] **Type of Pesticide:** Type of pesticide based on functional class.

Antimicrobials	:	Pesticides used to kill or inactivate microbiological organisms (bacteria, viruses, etc.).
Cholinesterase	:	Pesticides known to inhibit the function of the cholinesterase enzyme.

Inhibitors

Other Pesticides : Any pesticide that is not an antimicrobial or cholinesterase-inhibiting pesticide.

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