

**SUMMARY OF RESULTS FROM THE  
CALIFORNIA PESTICIDE ILLNESS  
SURVEILLANCE PROGRAM  
- 2012 –**

**HS-1896**

California Environmental Protection Agency  
Department of Pesticide Regulation  
Worker Health and Safety Branch  
1001 I Street  
Sacramento, California 95814

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## Executive Summary

This report provides a summary of illnesses identified by the Pesticide Illness Surveillance Program (PISP) of the California Department of Pesticide Regulation (DPR) in 2012. DPR identified 1,418 cases potentially involving health effects from pesticide exposure. The 1,418 cases represent a 4% decrease from the 1,473 cases identified in 2011, and a 27% increase from the 1,114 cases identified in 2010. The number of cases identified remains within the range of cases in prior years (1992 – 2011).

DPR epidemiologists concluded that pesticide exposure had been at least a possible contributing factor to 992 (70%) of the 1,418 cases. Agricultural use of pesticides was the source of exposure in 245 (25%) of the 992 cases, while 75% (741 cases) were associated with non-agricultural use. Six of the 992 pesticide-associated cases could not be characterized as agricultural or non-agricultural due to unclear circumstances.

PISP data reflects that 146 field workers were injured by pesticide exposure over 26 separate episodes in 2012. This is fairly consistent with the previous year, in which 137 field workers were injured in 28 separate episodes. In 2012, the largest number of field workers injured in a single episode was 42, which coincidentally occurred twice. In 2011, the largest number of field workers injured in a single episode was 14. Despite these larger episodes, the total number of multi-person field worker episodes decreased 31% from 13 multi-person episodes in 2011 to 9 in 2012.

Twenty illnesses evaluated as definitely, probably, or possibly associated with pesticide exposure occurred in schools, two of which involved children. These 20 cases reflect a 67% increase from 2011 data, which included 12 school-related illness cases, and a 54% decrease from the 44 cases in 2010 data. None of the pesticide illnesses reported in schools in 2012 involved agricultural use pesticides; the majority (75%) of the 2012 cases involved exposure to antimicrobial pesticides or pool adjuvants.

## Background, Sources, and Purpose of Illness Surveillance

DPR administers the California pesticide safety program, widely regarded as the most stringent in the nation. Mandatory reporting of pesticide<sup>1</sup> illnesses has been part of the program since 1971. Illness reports are collected, evaluated, and analyzed by program staff. PISP is the oldest and largest program of its kind in the nation; its epidemiologists provide data to regulators, advocates, industry, and others.

Under the California Health and Safety Code Section 105200, physicians are required to report any suspected case of pesticide-related illness or injury by telephone to the Local Health Officer

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<sup>1</sup> "Pesticide" is used to describe any substance which is intended to prevent, destroy, repel, or mitigate any pest. Pests may be insects, fungi, weeds, rodents, nematodes, algae, viruses, or bacteria that may infest or be detrimental to vegetation, man, animals, or households, or any agricultural or non-agricultural environment. 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, water modifiers, and wetting and dispersing agents.

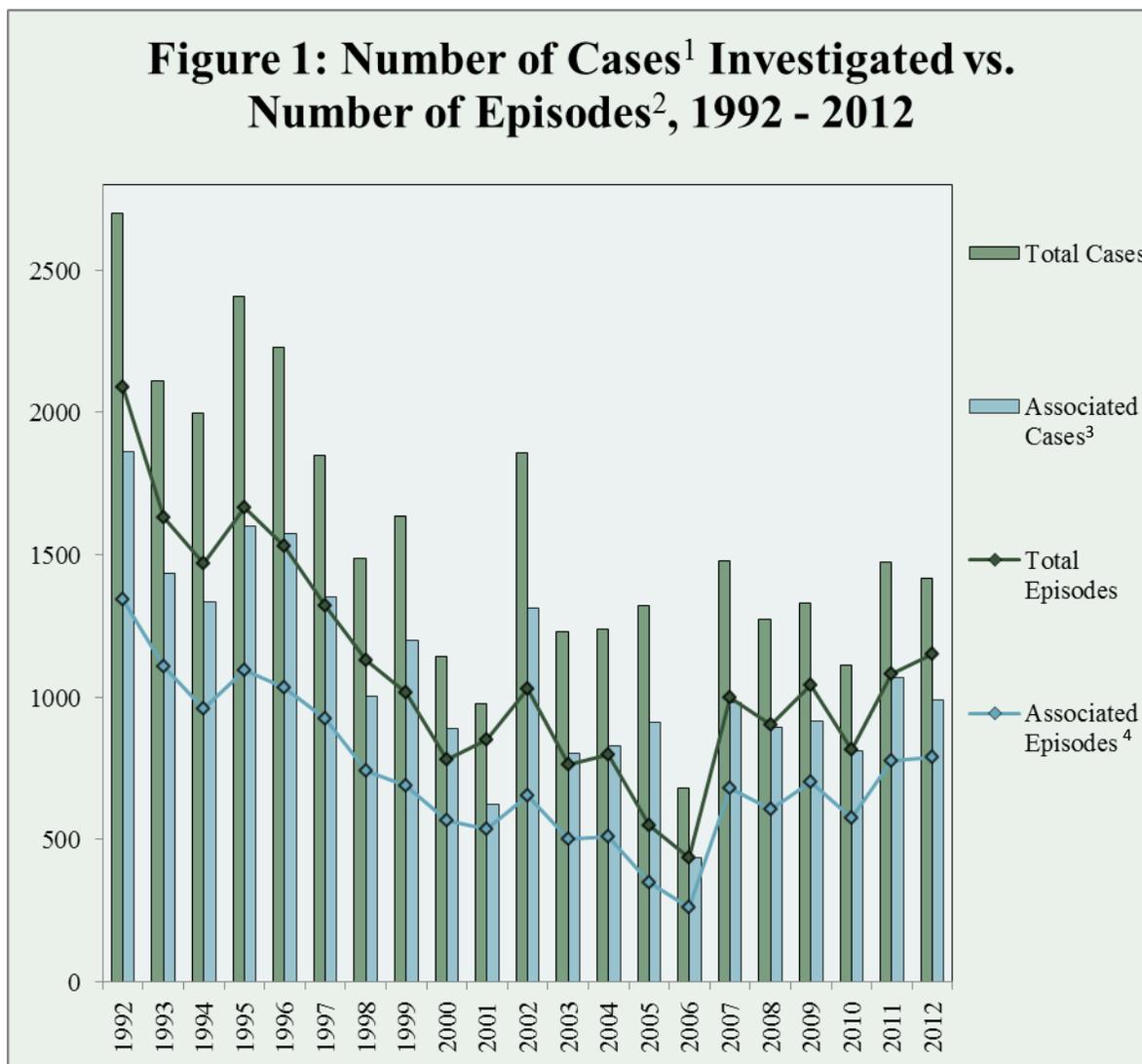
within 24 hours of examining the patient. The law requires health officers to inform the county agricultural commissioner (CAC) and to complete a pesticide illness report (PIR), which is sent to the Office of Environmental Health Hazard Assessment (OEHHA), the Department of Industrial Relations (DIR), and DPR. This reporting pathway identifies only a minority of the cases identified. DPR strives to ensure that PISP captures the majority of illness incidents. To identify unreported pesticide illness cases, DPR has a memorandum of understanding with the Occupational Health Branch of the California Department of Public Health (CDPH-OHB), under which PISP epidemiologists review copies of the Doctor's First Report of Occupational Illness and Injury (DFROII). These are documents associated with workers' compensation claims that physicians are required to forward to DIR and are subsequently shared with CDPH-OHB. PISP epidemiologists select for investigation any DFROII that mentions a pesticide as a possible cause of injury, or involves a situation in which pesticide use is likely. Another significant source of pesticide illness reports is the California Poison Control System (CPCS), which began assisting with pesticide illness reporting in 1999. (Budgetary constraints prevented complete CPCS participation from 2003-2006.) When a medical professional contacts CPCS and there is suspicion that a pesticide may have caused an illness, CPCS offers to report on behalf of the medical provider and then submits a pesticide incident report to DPR. Through our contract with CPCS, PISP continues to identify hundreds of symptomatic exposures that may otherwise escape detection.

County agricultural commissioners investigate suspected pesticide illnesses that occur in their jurisdictions, whether or not they involve agriculture. DPR provides instructions, training and technical support for investigators. The instructions include directions for when and how to collect samples to document unintended exposure or contamination of persons and/or the environment. As part of the technical support, DPR contracts with the California Department of Food and Agriculture Center of Analytical Chemistry to analyze the samples. When investigations are complete, CACs send reports to DPR describing their findings. These reports describe the circumstances that may have led to pesticide exposure and the consequences to the exposed individuals. DPR epidemiologists evaluate medical reports and all information the CACs gather in the investigative process. They abstract and encode basic descriptors of the event, then undertake a complex synthesis of all available evidence to assess the likelihood that pesticide exposure caused the illness. Standards for the determination are described in the PISP program brochure, "Preventing Pesticide Illness," which can be viewed or downloaded from DPR's web site at <http://www.cdpr.ca.gov/docs/whs/pisp/brochure.pdf>.

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 epidemiologists regularly consult the PISP database to evaluate the effectiveness of DPR's pesticide safety regulatory programs and assess need for changes. If illness reports indicate excessive risk, DPR may implement additional restrictions on pesticide use by providing CACs with California-specific recommendations for restricted material permit conditions or by changing regulations. If an illness incident results from illegal practices, state and county enforcement staff take appropriate action to educate pesticide users and promote appropriate pesticide use.

### 2012 Numeric Results

In 2012, 1,418 cases were identified that potentially involved health effects from pesticide exposure. This represents a 4% decrease from 1,473 cases identified in 2011, and a 27% increase from 1,114 cases identified in 2010 (Figure 1). Though a slight decrease was seen from the number of 2011 cases, the number of cases identified remains within a typical range.



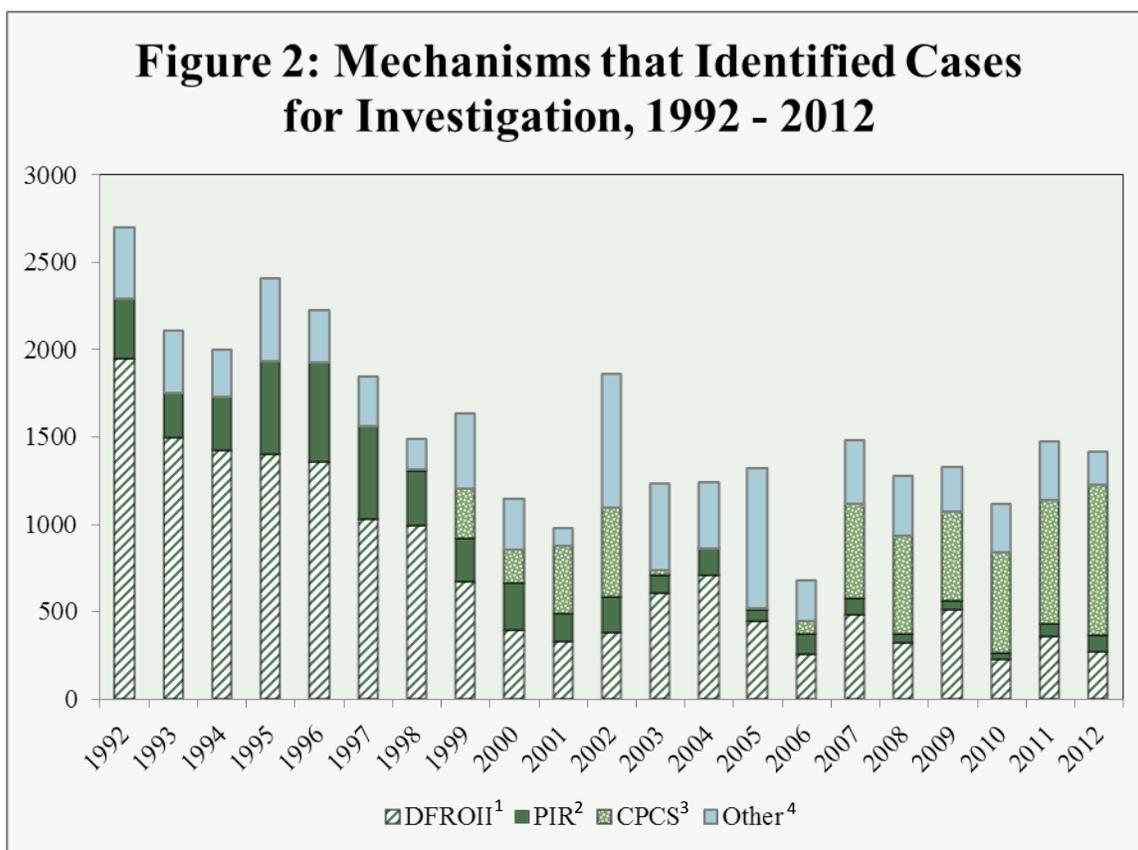
1. A *case* is the Pesticide Illness Surveillance Program representation of a person whose health problems may relate to pesticide exposure.
2. An *episode* is an event in which a single source appears to have exposed one or more people (cases) to pesticides.
3. *Associated cases* are those evaluated as definitely, probably, or possibly related to pesticide exposure. A definite relationship indicates a high degree of correlation between the pattern of exposure and resulting symptomatology. The relationship requires both physical evidence of exposure and medical evidence of consequent ill health to support the conclusions. A probable relationship indicates a relatively high degree of correlation between the pattern of

exposure and resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable. A possible relationship indicates that health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.

4. *Associated episodes* are those in which at least one case was evaluated as associated.

Figure 2 demonstrates the variation in numbers of cases identified by the different sources of initiating documents. The source document proportions for 2012 are similar to those of recent years.

The California Poison Control System remained a major source of case identification in 2012. CPCS reporting accounted for 61% of 2012 cases. Of the 1,418 cases identified in 2012, CPCS reports totaled 862, an increase from 711 in 2011. DFR reports contributed 274 (19%) illness cases, a decrease from 360 (24%) in 2011. Other reporting sources, such as county complaints, media reports, or multi-person episodes led to 191 (13%) cases. Direct physician reporting to Local Health Officers accounted for 91 (6%) of all identified cases.

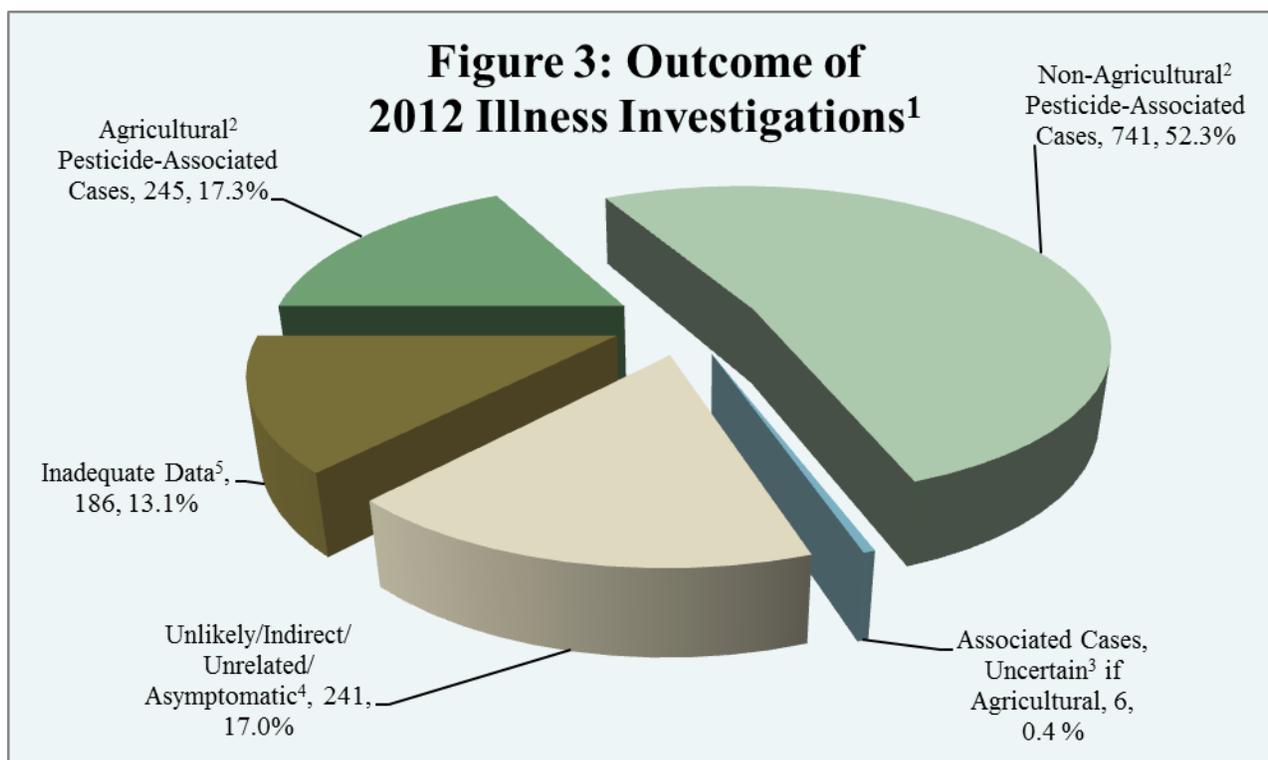


1. *DFROI* – Doctor’s First Report of Occupational Illnesses and Injury (Workers’ Compensation document).
2. *PIR* – Pesticide Illness Report (physician reporting to Local Health Officers in compliance with Health and Safety Code Section 105200).
3. *CPCS* – California Poison Control System (facilitated physician reporting). CPCS began assisting with pesticide illness reporting in 1999. Budgetary constraints prevented complete CPCS participation from 2003-2006.

4. *Other* – All other methods of case identification, including citizen complaints, contacts by emergency responders, and news reports.

DPR epidemiologists found pesticide exposure to be at least a possible contributing factor in 992 (70%) of the 1,418 cases identified. The percent of associated cases were similar to that of 2011, with 72% of 1,473 cases associated with pesticide exposure. PISP defines the term “associated” as cases evaluated as definitely, probably, or possibly related to pesticide exposure.

Of the 992 pesticide-associated cases, 245 (25%) were attributed to pesticides used for agricultural purposes (Figure 3). “Agricultural” is defined as involving pesticides intended to contribute to production of an agricultural commodity, including livestock. This corresponds to the regulatory definition of “production agriculture.” Use or intended use in non-production agriculture is designated as “non-agricultural.” Structural, sanitation, or home garden situations, as well as pesticide manufacture, transport, storage, and disposal are also considered “non-agricultural.” Another 741 associated cases (75%) occurred under circumstances considered non-agricultural. Six of the 992 pesticide-associated cases could not be characterized as agricultural or non-agricultural due to unclear circumstances. These uncharacterized cases constituted less than 1% of the associated cases. Evidence indicated that pesticide exposure did not cause or contribute to ill health in 241 (17%) of the 1,418 cases evaluated. Insufficient information prevented evaluation of 185 cases (13%).




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1. Total cases = 1,418
2. *Agricultural* and *Non-Agricultural* refer to the intended use of the pesticides definitely, probably, or possibly related to human health effects.

3. *Associated Cases, Uncertain if Agricultural* refers to cases in which little or no information relating to the intended use of the pesticide was available, such as when victims could not be located or refused to be interviewed.
4. *Unlikely/Indirect/Unrelated/Asymptomatic* refers to cases in which the weight of the evidence was against pesticide causation. This occurs when exposed people did not develop symptoms, or if symptoms were not caused or were unlikely to have been caused by pesticide exposure.
5. *Inadequate* means that there was not enough data reported to determine if pesticides contributed to ill health.

Table 1 shows the numbers of cases evaluated at each level of relationship. Among the 992 pesticide-associated cases, evidence established a definite relationship to pesticide exposure for 119 (12%), a probable relationship for 591 (60%), and a possible relationship for 282 (28%) (Table 1).

<b>Table 1: Relationship Evaluation of 2012 Illness Investigations</b>				
<b>Relationship</b>	<b>Relation to Agriculture</b>			<b>Total</b>
	<b>Agricultural<sup>1</sup></b>	<b>Non-Agricultural<sup>2</sup></b>	<b>Unknown or Not Applicable<sup>3</sup></b>	
<b>Definite<sup>4</sup></b>	18	101	0	119
<b>Probable<sup>5</sup></b>	149	439	3	591
<b>Possible<sup>6</sup></b>	78	201	3	282
<b>Pesticide-Associated Subtotal</b>	<b>245</b>	<b>741</b>	<b>6</b>	<b>992</b>
<b>Unlikely<sup>7</sup></b>	12	36	0	48
<b>Indirect<sup>8</sup></b>	1	5	0	6
<b>Asymptomatic<sup>9</sup></b>	46	14	0	60
<b>Unrelated<sup>10</sup></b>	0	0	127	127
<b>Not Applicable<sup>11</sup></b>	18	141	26	185
<b>Overall Total</b>	<b>322</b>	<b>937</b>	<b>159</b>	<b>1,418</b>

1. *Agricultural* cases are those that implicate exposure to pesticides intended to contribute to the production of agricultural commodities.
2. *Non-agricultural* cases include all those in which the pesticide was not intended to contribute to production of agricultural commodities.
3. Agricultural designation is not applicable to cases unrelated to pesticide exposure.
4. A *definite* relationship indicates a high degree of correlation between the pattern of exposure and resulting symptomatology. The relationship requires both physical evidence of exposure and medical evidence of consequent ill health to support the conclusions.
5. A *probable* relationship indicates a relatively high degree of correlation between the pattern of exposure and resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.
6. A *possible* relationship indicates that health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.
7. An *unlikely* relationship indicates that a correlation cannot be ruled out absolutely. Medical and/or physical evidence suggest a cause other than pesticide exposure.

8. An *indirect* relationship indicates that pesticide exposure is not responsible for symptomatology, but pesticide regulations or product label requirements contributed in some way, (e.g., heat stress while wearing chemical resistant clothing).
9. An *asymptomatic* relationship indicates that exposure occurred, but did not result in illness/injury.
10. An *unrelated* relationship indicates definite evidence of causes other than pesticide exposure, including exposure to chemicals other than pesticides.
11. *Not applicable* indicates that relationship cannot be established because the necessary information is not available to the evaluator.

Occupational exposures, defined as those that occurred while the affected people were at work, accounted for 453 (46%) of the 992 pesticide-associated cases from 2012. Non-occupational exposures accounted for 524 pesticide-associated cases (53%). Fifteen pesticide-associated cases could not be characterized as occupational or non-occupational; 2 of these 15 cases also could not be characterized as agricultural or non-agricultural.

Enforcement actions often are still under consideration when PISP receives and evaluates illness investigative reports, so linking cases to DPR Enforcement Branch violations is approximate. Based on the information available at the time of evaluation, PISP epidemiologists concluded that of the 992 pesticide-associated cases, 541 (55%) provided evidence that violation of safety requirements had contributed to exposure, and harm might have been avoided if all the people involved had adhered strictly to safety procedures already required by regulations and/or pesticide labels. Of the 541 cases with contributory violations, 136 (25%) were attributed to pesticides intended for agricultural purposes. Non-compliance with regulations that did not contribute to the pesticide exposure (e.g., paperwork violations) was identified in 83 (8%) cases. It was unknown whether violations contributed to 147 cases (15%) and 215 cases (22%) had health effects attributed to pesticide exposure in spite of apparent compliance with all applicable label instructions and safety regulations. Of these 215 cases, 50 (23%) were attributed to pesticides used for agricultural purposes. Further evaluation of these cases is needed to determine if additional safety requirements are appropriate.

### **Non-Agricultural Pesticide Episodes**

PISP defines drift as spray, mist, fumes, or odor carried from the target site by air. Drift episodes may include on-site or off-site movement of pesticide during or after an application. Definitions of drift may vary among agencies. One hundred seventy-four non-agricultural drift episodes resulted in 181 illnesses in 2012, which constitutes 24% of the 741 non-agricultural cases. Residue, defined as exposure to pesticide that remains in the environment for a period of time following an application or drift, accounted for 102 non-agricultural illnesses in 79 episodes, or 14% of the non-agricultural cases. While most incidents affected only one person, a multi-person episode involving pesticide residue is highlighted below.

### **Residential Pesticide Use**

A landlord failed to notify his tenants prior to the application of an insecticide to one unit of a duplex complex in San Bernardino County. He also did not advise the tenants to vacate the

premises, so they stayed in their homes while he sprayed dimethoate on the interior and exterior of the building.

The application left oily residue in the yard, on toys inside the garage, and on the kitchen floor. Five tenants in the treated unit and neighboring units described a strong odor, and six tenants developed symptoms. The five tenants who noted an odor experienced symptoms such as headache, throat irritation, and stomachache. The sixth tenant developed itchy feet after she walked through the kitchen barefoot.

Concerned for her children's welfare, a tenant asked the landlord for the product name. When the landlord refused to tell her, she contacted law enforcement. The police advised the tenants to evacuate the premises due to the strong chemical odor. The affected individuals were evaluated by paramedics on site and one person was taken for medical attention the following day.

Though the landlord reported that he had followed label instructions, the county investigator noted that the label of the pesticide container was torn. The insecticide is prohibited for use in residential settings and has a 2-25 day restricted entry interval when used appropriately. The investigator ensured that the remainder of the pesticide was properly disposed of, and a remediation company was hired to clean up the treated sites and remove contaminated items. The landlord was fined \$3,000 for failing to follow the label, improper storage, handling, or disposal of a pesticide, and for failing to properly notify the residents of the application.

### **Pesticide Illness Among Field Workers**

PISP data reflects that 146 field workers were injured by pesticide exposure in 26 separate episodes in 2012, which constitutes 60% of the 245 agricultural illness cases and 31% of the 84 agricultural episodes. This is fairly consistent with 2011, in which 137 field workers were injured in 28 separate episodes.

In 2012, the largest number of field workers injured in a single episode was 42, which coincidentally occurred twice. The previous year, the largest number of field workers injured in a single episode was 14. Despite these larger episodes, the total number of multi-person field worker episodes decreased 31% from 13 multi-person episodes in 2011 to 9 in 2012. Pesticide drift as defined by PISP was associated with 126 (86%) of the 146 field worker illnesses in 12 separate multi- and single-person episodes. Among field workers, pesticide residue contributed to 17 illnesses (12%) over 11 multi- and single-person episodes. There were three additional single-person episodes. One case sustained multiple exposures, one was exposed by spill or other direct contact, and one was directly sprayed by application equipment (Figure 4). Three field worker episodes are highlighted below.

#### **Drift – Santa Barbara County**

In Santa Barbara County, a miscommunication resulted in two strawberry harvesting crews entering a buffer zone three hours before the expiration of a restricted entry interval and while fumigation tarps were still in place. Two applications of chloropicrin took place nearby on the

weekend the exposure occurred. Both were pre-plant soil treatments for strawberries and both treatments were applied using chemical irrigation equipment and covered with standard tarps. The harvesting work site was 50 feet west of the applications, which is 250 feet closer than the buffer zone permits. Though the harvesters' employer was aware of the buffer zone, he relayed to the crews that it would be acceptable to enter the field the morning of the incident, but he did not specify the time.

Soon after arriving at the field, 42 workers from the two crews experienced symptoms including watering and irritated eyes, headache, respiratory discomfort, and nausea. They were all transported for medical attention and all recovered within a few hours. No workers were hospitalized and none missed days of work.

A third crew worked further west and a fourth crew worked to the east; they did not report symptoms. The weather was described as clear and calm, with some workers reporting a slight breeze blowing from east to west. The grower was fined \$5,000 for failing to properly notify workers about the buffer zones and failing to keep them out of the 300-foot buffer zone required when using standard tarps.

### **Drift – Monterey County**

In Monterey County, members of two lettuce harvesting crews became ill working near a pre-plant strawberry field that was fumigated with 1, 3-dichloropropene and chloropicrin the previous day. The fumigant was introduced via a tarped drip irrigation system, and the introduction was complete by 11:00 a.m.

Workers arrived the next day at 4:00 a.m. One crew worked approximately 920 feet to the southwest of the fumigation; the other crew was 2,240 feet away, also to the southwest. Many workers noticed an odor described as “manure,” “chemicals,” “paint,” “pesticides,” “PVC glue,” “bleach,” “fertilizer,” “tear gas,” “diesel,” “piney,” “ammonia,” “ground cilantro seed,” “sulfur,” and “propane.” Symptoms started soon after the smell was noticed, around 6:30 a.m., and included watering and irritated eyes, respiratory discomfort, headache, and nausea.

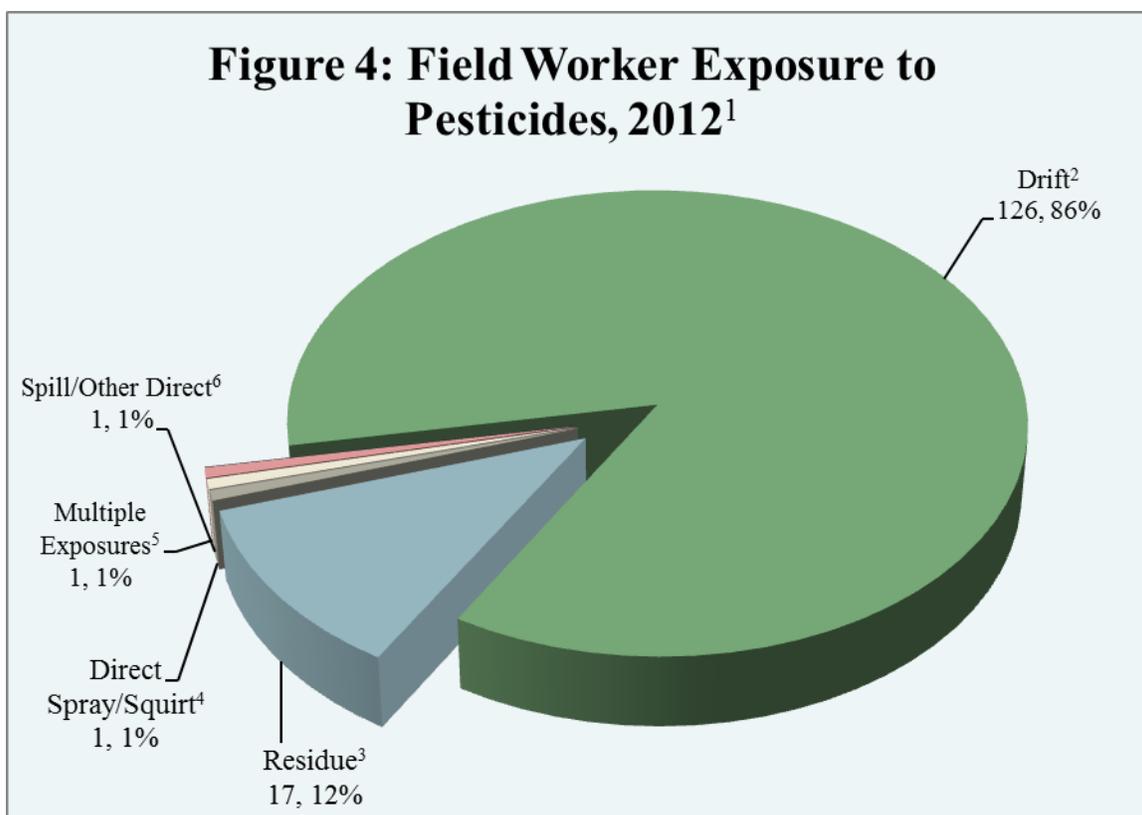
Investigators were notified and arrived on scene around 11:45 a.m. They found no tears or holes in the tarps, no standing water, and had no sensory irritation. The temperature on the day of the fumigation was unexpectedly high, in the 90s, and night time air movement was minimal. At the time of the incident, a slight breeze blew from the direction of the fumigation toward the workers. The pesticide applicator reported taking two air samples near the application site that morning. He said both samples were negative for the presence of fumigants. Of 52 workers, two people were asymptomatic and four were unavailable for interview. Forty-two field workers reported symptoms, of which 16 were taken for care. Four management employees also reported symptoms after driving around the fields in an attempt to find the source of the odor.

No violations were found in relation to the application. However, the farm labor contractor was fined \$5,000 for failing to take all crew members for medical attention when a pesticide-related illness was suspected.

## Residue

In Tulare County, 18 field workers were exposed to pesticide residue when they entered a vineyard before the 24-hour restricted entry interval had expired. A fungicide was applied to the vineyard at 5:00 a.m. that morning, and the crew entered the area to tie canes around 11:00 a.m. the same day. The field workers were not notified of the application prior to arriving and no signs were posted. Within 15-30 minutes of working, a supervisor came to inform the crew leader that the area had been sprayed a few hours earlier. The crew was asked to stop working and sent home.

According to interviews, the field workers were not told what product was applied to the area and they were not asked about their symptoms or lack thereof. Some of the employees noted an odor in the field. Of the 18 field workers exposed, 13 were asymptomatic. Five workers reported symptoms of throat irritation, chest irritation, nausea, dizziness, and/or headache. One employee sought care for his symptoms and recovered after missing one day of work. The employer was cited for multiple violations, including failure to keep workers out of the field under restricted entry interval, not notifying the field workers about the application, and for failing to complete a pesticide use report.



1. Total pesticide-associated field worker cases = 146
2. *Drift* refers to field worker cases associated with exposure to spray, mist, fumes, or odor carried from the target application site by air.
3. *Residue* refers to field worker cases associated with exposure to pesticide that remains in the environment for a period of time following an application or drift.

4. *Direct Spray/Squirt* indicates that application equipment propelled pesticide onto the worker.
5. *Multiple Exposures* indicates that contact with pesticide occurred through two or more distinct mechanisms.
6. *Spill/Other Direct* refers to contact made where the material is not propelled by application equipment.

### **Agricultural Pesticide Use Affecting Bystanders**

In Kern County, chlorpyrifos drifted onto a school bus carrying 29 elementary school students when a crop duster, which was applying the pesticide to a wheat field adjacent to the road, flew across the highway. A few students had their windows open about one inch and many smelled an odor and complained to the bus driver. Of the 29 students aboard at the time of incident, 18 smelled an odor and 14 reported symptoms. The bus driver also noted an odor but did not report symptoms. The driver reported the incident to the school district and was instructed to return to the school. On the way back, he picked up 10 additional students, none of whom complained of an odor or experienced symptoms.

At the school, emergency responders decontaminated 27 of the students and the driver at the school's swimming pool showers. Kern County Agricultural Commissioner staff took swab samples from inside and outside the bus and obtained clothing samples from three students. All samples were positive for chlorpyrifos residue and levels between 0.36 and 0.91 micrograms were detected on the student's t-shirt samples.

Kern County staff were able to interview all but one student, and although accounts varied widely, many reported hearing or seeing a plane. The students ranged in age from 7 to 13 years old and reported symptoms which included itchiness, stomachache, burning eyes, and headache. One child was reportedly taken for care by her parents.

The crop duster pilot was issued a violation for failure to use the product pursuant to the label instructions by not ensuring persons would not be contacted directly or through drift.

### **Pesticide Illness in Schools**

Twenty illnesses evaluated as definitely, probably, or possibly associated with pesticide exposure occurred in schools. PISP defines schools as establishments that provide academic or technical instruction, including child day care centers. These 20 cases reflect a 67% increase from 2011 data which included 12 school-related illness cases, and a 54% decrease from 44 cases in 2010. None of the pesticide illnesses reported in schools in 2012 involved agricultural use pesticides; the majority (75%) of the 2012 cases involved exposure to antimicrobial pesticides or pool adjuvants.

In 2012, two children were reported to have sustained pesticide illness at schools. In the first case, a 14 year-old boy drank from a water bottle that, unbeknownst to him, contained an antimicrobial. In the second case, a boy of unknown age developed symptoms during football practice. Parents then noticed signs indicating that aluminum phosphide had been used on the

premises. In both cases, the children's parents did not respond to interview requests and the investigators were unable to gather detailed information on the exposures.

### Morbidity and Mortality

Of the 992 cases evaluated as associated with pesticide exposure, 47 people (5%) were hospitalized and 118 (12%) reported time lost from work or normal activity (e.g., going to school) (Table 2). Twenty-eight (60%) of the 47 people hospitalized had ingested pesticide. Of the 28 patients hospitalized due to ingesting pesticide, 20 (71%) acknowledged suicide attempts.

<b>Relationship</b>	<b>Total Cases</b>	<b>Hospitalized<sup>4</sup></b>	<b>Lost Work Time<sup>5</sup></b>
Definite/Probable <sup>2</sup>	710	34	84
Possible <sup>3</sup>	282	13	34
<b>Total Cases</b>	<b>992</b>	<b>47</b>	<b>118</b>

1. *Pesticide-associated* cases are those in which pesticide exposure was evaluated as definite, probable, or possible contributor to ill health.
2. A *definite* relationship indicates a high degree of correlation between the pattern of exposure and resulting symptomology. The relationship requires both physical evidence of exposure and medical evidence of consequent ill health to support the conclusions. A *probable* relationship indicates a relatively high degree of correlation between the pattern of exposure and resulting symptomology. Either medical or physical evidence is inconclusive or unavailable.
3. A *possible* relationship indicates that health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.
4. Number of associated cases who were admitted and were hospitalized at least one full day (24-hour period).
5. Number of associated cases who missed at least one day of work or normal activity such as school.

A total of seven fatalities were evaluated as definitely, probably, or possibly associated with pesticide exposure. Six of the seven incidents were related to deliberate self-harm. Two of the suicide cases involved the ingestion of insecticides, one of which was aluminum phosphide, a restricted use pesticide. The individual in this case impersonated a pest control company employee in order to purchase the product. The four other suicide cases involved mixing products registered as pesticides, such as fungicides and disinfectants, to produce a lethal gas, a method known as detergent suicide. Due to the high toxicity of the resultant fumes and public health concerns, some county emergency responders have established a designated team to respond to these incidents.

The one non-suicide related fatality involved a man who illegally entered a business that was being fumigated with sulfuryl fluoride. The fumigant had been introduced the day before and the aeration process had not yet begun. After leaving the premises, the individual collapsed at a nearby gas station. Emergency responders took him to the hospital where he was stabilized and

then released. He collapsed again several hours later and was taken to a different hospital. He died shortly after arrival. Diagnostic analysis confirmed a significantly elevated level of fluoride in his blood.

## **PISP Program Updates**

### **Legislative Update – AB 1963**

Assembly Bill 1963 (Nava, Chapter 369, Statutes of 2010), which modified California Health and Safety Code Section 105206, requires clinical laboratories to provide DPR the results of all cholinesterase tests performed for agricultural pesticide-related exposures associated with certain activities. AB 1963 was established to evaluate the Medical Supervision Program (California Food and Agriculture Code, Section 12981), which requires agricultural employers to contract with physicians to monitor their employees who regularly handle cholinesterase-inhibiting, toxicity category I or II pesticides. Physicians order baseline and periodic blood testing for these employees to measure the level of cholinesterase enzyme activity.

Health and Safety Code Section 105206 requires clinical laboratories to provide the test results values, and the reason medical providers order cholinesterase tests (pursuant to Section 6728 of Title 3, California Code of Regulations). Information on the patient, physician, employer and laboratory should also be provided.

PISP began receiving cholinesterase test results in 2011 and continued to receive results in 2012. In 2015, DPR and OEHHA, in consultation with CDPH, will produce a report on the effectiveness of the Medical Supervision Program and the usefulness of laboratory-based reporting of cholinesterase testing for pesticide illness and surveillance.

### **Further Information**

Tabular summaries presenting different aspects of 2012 pesticide illness data are available online at <http://www.cdpr.ca.gov/docs/whs/currpisp.htm> or by contacting the WHS Branch at (916) 445-4222. Additionally, the public can retrieve reports of pesticide illness and generate reports according to their own specifications using the California Pesticide Illness Query program (CalPIQ). CalPIQ is available at <http://apps.cdpr.ca.gov/calpiq> and can retrieve cases evaluated as definitely, probably, or possibly related to pesticides from 1992 through the most recent year published.

### **Appendix I: Acronyms**

CAC	County Agricultural Commissioner
CDPH	California Department of Public Health
CPCS	California Poison Control System
DFROII	Doctor's First Reports of Occupational Illness and Injury
DIR	Department of Industrial Relations

DPR	California Department of Pesticide Regulation
HIPAA	Health Insurance Portability and Accountability Act
NIOSH	National Institute for Occupational Safety and Health
OEHHA	Office of Environmental Health Hazard Assessment
OHB	Occupational Health Branch (of CDPH)
PIR	Pesticide Illness Report
PISP	Pesticide Illness Surveillance Program
REI	Restricted Entry Interval
SENSOR	Sentinel Event Notification System for Occupational Risk
U.S. EPA	United States Environmental Protection Agency
WHS	Worker Health and Safety Branch

**Pesticide-Associated Illnesses and Injuries Reported In California Schools<sup>1,2</sup>  
by Exposure Category, Pesticide Type and Illness Symptoms  
2012**

Exposure <sup>5</sup>	Systemic/ Respiratory <sup>4</sup>			Topical <sup>4</sup>			Total
	Antimicrobials <sup>5</sup>	Cholinesterase Inhibitors <sup>5</sup>	Other Pesticides <sup>5</sup>	Antimicrobials <sup>5</sup>	Cholinesterase Inhibitors <sup>5</sup>	Other Pesticides <sup>5</sup>	
Drift	4	0	0	0	0	0	4
Residue	0	0	3	0	0	0	3
Direct Spray/Squirt	0	0	1	0	0	0	1
Spill/Other Direct	1	0	0	7	0	0	8
Ingestion	1	0	0	0	0	0	1
Other	1	0	0	0	0	0	1
Unknown	1	1	0	0	0	0	2
<b>TOTAL</b>	<b>8</b>	<b>1</b>	<b>4</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>20</b>

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 (e.g., measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (e.g., 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:** Health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.

3. **Type of Exposure:** Characterization of how an individual came in contact with a pesticide. Exposure categories not listed on the table indicate that no illnesses 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 pyrolytic 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 (e.g., miosis, lacrimation) related to effects on internal bodily systems. These signs are classified under 'Systemic.'

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

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

**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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Fax: (916) 445-4280

[www.cdpr.ca.gov](http://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 the effectiveness of the DPR pesticide safety programs and recommend changes when appropriate.

## Incidents Involving Field Workers Reported in California<sup>1</sup> Associated With<sup>2</sup> Pesticide Residue Exposure Summarized by Crop and Type of Illness 2012

Crop	Systemic/ Respiratory <sup>3</sup>		Topical <sup>3</sup>		Total
	Definite/ Probable	Possible	Definite/ Probable	Possible	
<b>BERRIES</b>					
Blackberries	0	1	0	0	1
Raspberries	0	0	0	1	1
Strawberries	0	0	1	0	1
<b>GRAPES</b>					
Grapes	1	7	1	1	10
<b>ORNAMENTAL</b>					
Ornamental Plants (Other or Unspecified)	0	1	0	0	1
<b>OTHER VEGETABLE</b>					
Vegetables (Other or Unspecified)	2	0	0	0	2
<b>TOTAL</b>	<b>4<sup>4</sup></b>	<b>9</b>	<b>2</b>	<b>2</b>	<b>17<sup>4</sup></b>

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 (e.g., measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (e.g., 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:** Health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.

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 (e.g., miosis, lacrimation) related to effects on internal bodily systems. These signs are classified under 'Systemic.'

4. Totals include one field worker who was exposed to insecticide residue on a toilet seat that was provided at his work site.

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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 the effectiveness of the DPR pesticide safety programs and recommend changes when appropriate.

## Illnesses and Injuries in California<sup>1</sup> Associated With Pesticide Residue in Agricultural Fields, 1982-2012

Year	Systemic/ Respiratory <sup>2</sup>		Topical <sup>2</sup>		Total
	Definite/ Probable <sup>3</sup>	Possible <sup>3</sup>	Definite/ Probable <sup>3</sup>	Possible <sup>3</sup>	
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
2007	24	15	1	18	58
2008	48	16	2	7	73
2009	80	9	7	4	100
2010	8	8	1	2	19
2011	26	1	1	0	28
2012	4	9	2	2	17
<b>TOTAL</b>	<b>774</b>	<b>817</b>	<b>801</b>	<b>1922</b>	<b>4317</b>

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

**2. 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 (e.g., miosis, 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 (e.g., measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (e.g., 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:** Health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.

**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 the effectiveness of the DPR pesticide safety programs and recommend changes when appropriate.

**Illnesses and Injuries of Application Workers Reported by California Physicians<sup>1</sup>  
Associated With<sup>2</sup> Pesticide Exposure Summarized by Type of Equipment, Type of  
Activity and Occupational Status  
2012**

**Occupational<sup>3</sup>**

Type of Equipment <sup>4</sup>	Type of Activity <sup>5</sup>				
	Mixer/ Loader	Applicator	Flagger	Mechanic	Total
Fixed Wing Aircraft	0	1	0	1	2
Helicopter	0	2	0	0	2
Ground, Other or Unspecified	2	10	0	3	15
Ground Boom, Other or Unspecified	0	2	0	0	2
Ground, Boom Below/Behind	1	1	0	1	3
Airblast Sprayers	1	1	0	1	3
Shank Injection with Tarps	0	1	0	0	1
Hand, Other or Unspecified	2	7	0	0	9
Pressurized Hose-line Sprayers	1	6	0	0	7
Hand Pump Sprayer	1	1	0	0	2
Back Pack Sprayer	0	5	0	0	5
Unpressurized Hand-held Spray Equipment	3	9	0	0	12
Aerosol Can	0	1	0	0	1
Foggers	0	1	0	0	1
Chamber	0	2	0	0	2
Automatic Equipment, Other or Unspecified	8	2	0	2	12
Automatic Equipment, Chlorinators	5	2	0	4	11
Manual Application Methods, Other or Unspecified	4	7	0	0	11
Immersion Equipment	1	8	0	0	9
Implements with Handles	3	6	0	0	9
Implements without Handles	0	25	0	0	25
Manual Placement	3	13	0	0	16
Not Applicable	0	0	0	1	1
Other	0	2	0	0	2
Unknown	5	14	0	0	19
<b>Total Occupational Cases</b>	<b>40</b>	<b>129</b>	<b>0</b>	<b>13</b>	<b>182</b>

### Non-Occupational<sup>3</sup>

Type of Equipment <sup>4</sup>	Type of Activity <sup>5</sup>				
	Mixer/Loader	Applicator	Flagger	Mechanic	Total
Hand, Other or Unspecified	2	13	0	0	15
Pressurized Hose-line Sprayers	0	1	0	0	1
Hand Pump Sprayer	2	7	0	0	9
Hand-held Dusters	0	1	0	0	1
Back Pack Sprayer	0	1	0	1	2
Unpressurized Hand-held Spray Equipment	3	19	0	0	22
Aerosol Can	1	30	0	0	31
Foggers	0	28	0	0	28
Manual Application Methods, Other or Unspecified	0	23	0	0	23
Implements with Handles	0	2	0	0	2
Implements without Handles	0	1	0	0	1
Manual Placement	3	37	0	0	40
Other	0	3	0	0	3
Unknown	5	14	0	0	19
<b>Total Non-Occupational Cases</b>	<b>16</b>	<b>180</b>	<b>0</b>	<b>1</b>	<b>197</b>
<b>Total Occupational/ Non-Occupational Cases<sup>6</sup></b>	<b>57</b>	<b>317</b>	<b>0</b>	<b>14</b>	<b>388</b>

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 (e.g., measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (e.g., 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:** Health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.

3. **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 (e.g., 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: Hand-held spray equipment attached by a long hose to a power-pressurized tank. This excludes hose-end sprayers,

Hose-Line 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	Manual placement of a pesticide directly to a target site. This includes bait stations, hand tossed pellets, and direct

- Placement: 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.

6. Totals include 9 cases in which the activity could not be determined as occupational or non-occupational.

**Whom to Contact:**

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**Agricultural Drift Cases<sup>1</sup> Reported by California Physicians as Associated With<sup>2</sup>  
Pesticide Exposure Summarized by the Activity of the Exposed Person and by the  
Type of Application Equipment Used  
2012**

Type of Application Equipment Used <sup>3</sup>	Type of Activity <sup>4</sup>				Total
	Routine Indoor	Routine Outdoor	Field Worker	Other	
Fixed Wing Aircraft	0	0	25	14	39
Helicopter	0	0	0	1	1
Ground, Other or Unspecified	0	3	1	5	9
Ground Boom, Other or Unspecified	0	2	7	3	12
Ground, Boom Below/Behind	0	0	0	1	1
Airblast Sprayers	0	1	4	0	5
Shank Injection without Tarps	0	8	3	0	11
Pressurized Hose-line Sprayers	5	1	1	1	8
Hand Pump Sprayer	0	0	0	1	1
Back Pack Sprayer	0	0	0	1	1
Aerosol/Fog Generating Equipment	0	8	0	0	8
Chamber	0	0	0	1	1
Automatic Equipment, Other or Unspecified	0	0	0	1	1
Automatic Equipment, Chlorinators	0	0	0	1	1
Drip Irrigation Equipment	0	0	84	4	88
Manual Placement	0	0	0	1	1
Unknown	0	0	1	1	2
<b>TOTAL</b>	<b>5</b>	<b>23</b>	<b>126</b>	<b>36</b>	<b>190</b>

**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 (e.g., measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (e.g., 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:** Health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.

**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 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.

**4. Type of Activity:** Activity of the injured 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.

**Whom to Contact:**

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Worker Health and Safety Branch

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**About the Pesticide Illness Surveillance Program Data**

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**Agricultural Drift Cases Reported in California<sup>1</sup> Associated With<sup>2</sup> Pesticide  
Exposure Summarized by Application Sites  
2012**

<b>Application Site<sup>3</sup></b>	<b>Number of Cases<sup>4</sup></b>	<b>Number of Incidents<sup>5</sup></b>
<b>BERRIES</b>		
Blackberries	2	1
Strawberries	9	2
<b>FIXTURES</b>		
Milking Equipment (Milking Machine, Etc.)	1	1
Agricultural & Farm Equipment (Other or Unspecified)	2	2
<b>GRAIN</b>		
Wheat	14	1
<b>GRAPES</b>		
Grapes	11	8
<b>LEAFY/STEM VEGETABLE</b>		
Celery	1	1
Cauliflower	1	1
<b>MULTIPLE</b>		
Potatoes, Unknown	1	1
<b>NON-CROP</b>		
Uncultivated Agricultural Areas (Other or Unspecified)	2	1
Soil	99	3
Irrigation Systems (Ditches, Canal Banks, Etc.)	5	1
<b>NUT TREES</b>		
Almonds	3	3
Nut Crops, Nut Trees (Other or Unspecified)	1	1
<b>ORNAMENTAL</b>		
Ornamental Plants (Other or Unspecified)	9	2
<b>OTHER FRUIT</b>		
Avocados	1	1
<b>OTHER VEGETABLE</b>		
Vegetables (Other or Unspecified)	1	1
<b>PREMISES</b>		
Dairy Farm Milk Handling Facilities & Equipment	1	1
<b>SEED/POD VEGETABLE</b>		
Beans (Other or Unspecified)	24	1
<b>STONE FRUIT</b>		
Peaches	1	1
<b>UNKNOWN</b>		
Unknown	1	1
<b>TOTAL</b>	<b>190</b>	<b>35</b>

**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 (e.g., measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (e.g., 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:** Health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.

**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.

**Whom to Contact:**

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Worker Health and Safety Branch

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**Summary of Cases Reported in California<sup>1</sup> as Associated With<sup>2</sup> Pesticide Exposure  
Summarized by Gender, Age Distribution, by Type of Pesticide and by Type of Use  
2012**

**Agricultural Use Pesticide Exposure Incidents<sup>3</sup>**

Age Group	Pesticides other than Antimicrobial Pesticides <sup>4</sup>			Antimicrobial Pesticides <sup>4</sup>			Total
	Male	Female	Unknown	Male	Female	Unknown	
Unknown	48	14	0	0	0	0	62
0 - 9	3	3	0	0	0	0	6
10 - 14	5	4	0	0	0	0	9
15 - 19	3	1	0	0	0	0	4
20 - 29	48	22	0	1	0	0	71
30 - 39	25	13	0	2	0	0	40
40 - 49	15	6	0	3	2	0	26
50 - 59	16	2	0	0	0	0	18
60 - 69	4	1	0	0	0	0	5
70 +	4	0	0	0	0	0	4
<b>Total</b>	<b>171</b>	<b>66</b>	<b>0</b>	<b>6</b>	<b>2</b>	<b>0</b>	<b>245</b>

**Non-Agricultural Use Pesticide Exposure Incidents<sup>3</sup>**

Age Group	Pesticides other than Antimicrobial Pesticides <sup>4</sup>			Antimicrobial Pesticides <sup>4</sup>			Total
	Male	Female	Unknown	Male	Female	Unknown	
Unknown	4	7	1	2	2	0	16
0 - 9	37	32	0	29	23	0	121
10 - 14	5	3	0	9	3	0	20
15 - 19	5	3	0	12	6	0	26
20 - 29	31	31	0	26	34	0	122
30 - 39	29	23	0	25	25	0	102
40 - 49	38	26	0	26	33	0	123
50 - 59	42	22	0	24	27	0	115
60 - 69	23	20	0	7	12	0	62
70 +	16	9	0	6	3	0	34
<b>Total</b>	<b>230</b>	<b>176</b>	<b>1</b>	<b>166</b>	<b>168</b>	<b>0</b>	<b>741</b>
<b>Total Ag /Non-Ag Cases<sup>5</sup></b>	<b>406</b>	<b>242</b>	<b>1</b>	<b>173</b>	<b>170</b>	<b>0</b>	<b>992</b>

**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 (e.g., measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (e.g., 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:** Health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.

**3. 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.

**4. Antimicrobial:** Pesticides used to kill or inactivate microbiological organisms (e.g., bacteria, viruses).

**5. Totals** include an additional 5 cases which could not be determined to be agricultural or non-agricultural use situations.

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**Summary of Cases Reported by California<sup>1</sup> as Associated With<sup>2</sup> Pesticide Exposure  
Summarized by Occupational Status and by Location of the Incident  
2012**

Incident Setting <sup>3</sup>	Occupational Exposures <sup>4</sup>		Non-Occupational Exposures <sup>4</sup>		TOTAL	
	Definite/ Probable	Possible	Definite/ Probable	Possible	Definite/ Probable	Possible
Farm	145	39	1	0	146	39
Nursery	2	9	1	2	3	11
Livestock Production Facility	3	1	0	0	3	1
Crop/Livestock Processing Facility	16	4	0	0	16	4
Animal Premise (Veterinary Hospital, Kennels, not Livestock)	4	0	0	0	4	0
Single Family Home	2	2	133	55	135	58
Multi-unit Housing	5	0	47	36	52	36
Residence (Other or Unspecified)	2	3	129	61	132	64
Residential Institution	11	1	1	1	12	2
School	15	3	1	1	16	4
Prison	5	1	2	0	7	1
Hospital/Medical	40	3	0	0	40	3
Pesticide Manufacturing Facility	3	0	0	0	3	0
Industrial or Other Manufacturing Facility	10	1	0	0	10	1
Wood Treatment	1	0	0	0	1	0
Office/Business	7	1	2	0	9	1
Retail Establishment	12	1	0	0	13	1
Service Establishment	41	18	2	1	43	19
Wholesale Establishment	2	1	0	0	2	1
Road/Rail Or Utility Right Of Way	9	1	3	15	12	16
Park	4	0	0	0	4	0
Golf Course	2	0	0	0	2	0
Landscape, Lawn	1	0	1	4	3	4
Landscape, Other	2	1	3	3	5	4
Other (Telephone Poles, Fences, Etc)	6	1	0	0	6	1
Unknown	9	3	14	5	31	11
<b>TOTAL<sup>5</sup></b>	<b>359</b>	<b>94</b>	<b>340</b>	<b>184</b>	<b>710</b>	<b>282</b>

**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 (e.g., measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (e.g., 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:** Health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.

**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:** Facilities engaged in manufacture and/or formulation of pesticides.

Facility:

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 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 (e.g., before the start or after the end of their workday).

5. Totals include 15 cases in which the activity could not be determined as occupational or non-occupational.

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**Illnesses and Injuries Reported by California Physicians<sup>1</sup> Associated With<sup>2</sup> Pesticide Exposure Summarized by Pesticide(s) and Type of Illness  
2012**

Pesticide <sup>3</sup>	Systemic/ Respiratory <sup>4</sup>		Topical <sup>4</sup>		TOTAL	
	Definite/ Probable	Possible	Definite/ Probable	Possible	Definite/ Probable	Possible
<b>Organophosphates</b>						
Chlorpyrifos	1	7	1	8	2	15
DDVP	3	1	0	0	3	1
Diazinon	3	3	0	0	3	3
Dimethoate	5	2	2	0	7	2
Malathion	7	2	0	0	7	2
Parathion	1	0	0	0	1	0
Tetrachlorvinphos	1	0	2	0	3	0
<b>N-Methyl Carbamates</b>						
Carbaryl	1	2	1	0	2	2
<b>Pyrethrins and Pyrethroids</b>						
Allethrin	1	0	0	0	1	0
Beta-Cyfluthrin	2	1	1	0	3	1
Bifenthrin	3	3	0	1	3	4
Cyfluthrin	0	1	0	1	0	2
Cyhalothrin	0	1	0	0	0	1
Cypermethrin	11	7	1	0	12	7
Deltamethrin	7	1	0	0	7	1
Esfenvalerate	4	0	0	0	4	0
Gamma-Cyhalothrin	1	0	1	0	2	0
Lambda-Cyhalothrin	4	4	3	1	7	5
Permethrin	3	1	1	0	4	1
Pyrethrins	2	0	0	0	2	0
Tralomethrin	1	0	0	0	1	0
<b>Other Pesticides</b>						
Abamectin	1	2	0	0	1	2
Acetamiprid	1	0	0	0	1	0
Adjuvant	1	0	1	0	2	0
Aluminum Phosphide	2	3	0	1	2	4
Bacillus Thuringiensis	1	0	0	0	1	0
Borax	0	1	0	0	0	1
Boric Acid	5	2	0	0	5	2

<b>Other Pesticides</b>						
Bromadiolone	0	2	0	0	0	2
Calcium Hypochlorite	10	1	2	0	12	1
Chlorfenapyr	0	1	0	0	0	1
Chlorine Dioxide	1	0	0	0	1	0
Chlorothalonil	1	1	0	0	1	1
Combinations of Antimicrobials	27	2	23	2	50	4
Combinations of Fumigants	41	1	48	1	89	2
Combinations of Fungicides	2	8	0	0	2	8
Combinations of Herbicides	9	13	8	3	17	17
Combinations of Insecticides Including ChE Inhibitor(s)	0	1	0	0	0	1
Combinations of Insecticides Without ChE Inhibitor(s)	72	53	10	3	82	57
Copper Naphthenate	0	2	0	0	0	2
Copper Sulfate	2	0	0	0	2	0
Cyanuric Acid	12	0	6	0	18	0
Deet	2	0	1	0	3	0
Device, Heat	1	0	0	0	1	0
Diatomaceous Earth	0	4	0	0	0	4
Difethialone	0	1	0	0	0	1
Diflubenzuron	1	0	0	0	1	0
Disodium Octaborate Tetrahydrate	0	0	1	0	1	0
Ethyl Alcohol	1	0	0	0	1	0
Glutaraldehyde	0	0	3	0	3	0
Glyphosate	4	3	3	3	7	6
Heptyl Butyrate	0	2	0	0	0	2
Hydrogen Chloride	11	2	2	0	13	2
Hydrogen Cyanamide	1	0	0	0	1	0
Hydrogen Peroxide	1	0	5	0	6	0
K Salts Of Fatty Acids	0	1	0	0	0	1
Mefenoxam	1	0	0	0	1	0
Metaldehyde	0	2	1	1	1	3
Metam-potassium	1	0	10	0	11	0
Miscellaneous Combinations	32	8	8	9	40	17
Neem Oil	1	0	0	0	1	0
Oxyfluorfen	0	2	0	0	0	2
Paraquat	1	0	2	0	3	0
Phenolic Disinfectants	2	0	0	0	2	0
Phenylethyl Propionate	1	0	0	0	1	0
Phosphine	0	2	0	0	0	2
Phthalaldehyde	0	0	1	0	1	0

<b>Other Pesticides</b>						
Quaternary Ammonia	12	3	32	3	44	6
Sethoxydim	1	0	0	0	1	0
Sodium Chlorite	1	0	0	0	1	0
Sodium Hypochlorite	88	15	39	3	127	18
Spinosad	1	0	0	0	1	0
Strychnine	1	0	0	0	1	0
Sulfur	2	1	4	0	6	1
Sulfuryl Fluoride	4	6	0	0	4	6
Triclopyr	0	1	0	0	0	1
Trifloxystrobin	1	0	0	0	1	0
Unknown Antimicrobials	10	4	7	3	17	7
Unknown Herbicides	1	5	0	0	1	5
Unknown Insecticides	27	28	6	8	33	35
Unknown Pesticides	12	8	1	1	13	9
Zinc Phosphide	2	0	0	0	2	0
Ziram	0	1	0	0	0	1
<b>TOTAL</b>	<b>473</b>	<b>227</b>	<b>237</b>	<b>52</b>	<b>710</b>	<b>282</b>

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 (e.g., measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (e.g., 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:** Health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.

3. **Type of Pesticide:** Type of pesticide based on functional class.

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

**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.

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 (e.g., miosis, 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.

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**Illnesses and Injuries Reported in California<sup>1</sup> Associated With<sup>2</sup> Pesticide Exposure  
Summarized by the Type of Activity and Type of Exposure  
2012**

**Occupational<sup>3</sup>**

<b>Type of Activity<sup>4</sup></b>	<b>Type of Exposure<sup>5</sup></b>								
	<b>Drift</b>	<b>Residue</b>	<b>Direct Spray/ Squirt</b>	<b>Spill/ Other Direct</b>	<b>Ingestion</b>	<b>Multiple</b>	<b>Other</b>	<b>Unknown</b>	<b>Total</b>
Mixer/Loader	8	1	4	24	0	0	2	1	40
Applicator	29	5	6	64	0	0	5	20	129
Mechanical	1	2	5	3	0	0	1	1	13
Packaging/Processing	3	4	0	0	0	0	0	0	7
Field Worker	126	17	1	1	0	1	0	0	146
Routine Indoor	11	18	2	2	1	0	6	2	42
Routine Outdoor	14	0	0	0	1	0	0	0	15
Transport/Storage/Disposal	0	0	0	12	0	0	0	0	12
Emergency Response	1	0	0	0	0	0	3	0	4
Other	10	12	4	9	1	0	6	0	42
Unknown	1	0	0	2	0	0	0	0	3
<b>Total Occupational Cases</b>	<b>204</b>	<b>59</b>	<b>22</b>	<b>117</b>	<b>3</b>	<b>1</b>	<b>23</b>	<b>24</b>	<b>453</b>

**Non-Occupational<sup>3</sup>**

Type of Activity <sup>4</sup>	Type of Exposure <sup>5</sup>								
	Drift	Residue	Direct Spray/Squirt	Spill/Other Direct	Ingestion	Multiple	Other	Unknown	Total
Mixer/Loader	8	0	1	4	2	0	0	1	16
Applicator	102	9	21	18	2	5	7	16	180
Mechanical	0	0	1	0	0	0	0	0	1
Routine Indoor	16	47	8	8	67	7	3	10	166
Routine Outdoor	13	5	2	4	7	1	3	2	37
Transport/Storage/Disposal	0	0	0	3	0	0	2	0	5
Other	22	3	1	6	45	2	12	4	95
Unknown	3	3	2	0	6	0	0	10	24
<b>Total Non-Occupational Cases</b>	<b>164</b>	<b>67</b>	<b>36</b>	<b>43</b>	<b>129</b>	<b>15</b>	<b>27</b>	<b>43</b>	<b>524</b>
<b>Total Occupational/ Non-Occupational Cases<sup>6</sup></b>	<b>373</b>	<b>126</b>	<b>58</b>	<b>160</b>	<b>134</b>	<b>16</b>	<b>51</b>	<b>74</b>	<b>992</b>

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 (e.g., measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (e.g., 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:** Health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.

**3. 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).

**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, 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 (e.g., 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. Exposure categories not listed on the table indicate that no illnesses 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 pyrolytic products from a fire where pesticides are burning.

Unknown: Route of exposure is not known.

6. These totals include 15 cases in which the activity could not be determined as occupational or non-occupational.

**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](http://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 the effectiveness of the DPR pesticide safety programs and recommend changes when appropriate.

**Hospitalization and Disability Associated with Illnesses/Injuries  
Possibly Related to Pesticide Exposure in California<sup>1,2</sup>,  
Summarized by Occupational Status and Activity  
2012**

**Occupational<sup>3</sup>**

Activity <sup>4</sup>	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown <sup>5</sup>	No. Cases	%	Unknown <sup>6</sup>
Mixer/Loader	3	0	0	0	1	33.3	0
Applicator	33	1	3.1	1	9	27.2	7
Mechanical	3	0	0	0	0	0	1
Packaging/Processing	1	0	0	0	0	0	0
Field Worker	21	0	0	0	6	28.6	1
Routine Indoor	14	0	0	0	4	28.6	2
Routine Outdoor	7	0	0	0	0	0	0
Transport/Storage/Disposal	1	0	0	0	0	0	0
Other	10	0	0	2	3	30.0	5
Unknown	1	0	0	0	0	0	1
<b>Total Occupational</b>	<b>94</b>	<b>1</b>	<b>1.1</b>	<b>3</b>	<b>23</b>	<b>24.5</b>	<b>17</b>

**Non-Occupational<sup>3</sup>**

Activity <sup>4</sup>	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown <sup>5</sup>	No. Cases	%	Unknown <sup>6</sup>
Mixer/Loader	4	0	0	0	0	0	1
Applicator	40	1	2.5	1	1	2.5	19
Routine Indoor	83	2	2.4	2	3	3.6	37
Routine Outdoor	14	2	13.3	1	0	0	9
Other	33	6	18.2	4	6	18.2	6
Unknown	10	1	10.0	0	1	10.0	6
<b>Total Non-Occupational</b>	<b>184</b>	<b>12</b>	<b>6.5</b>	<b>8</b>	<b>11</b>	<b>6.0</b>	<b>78</b>
<b>TOTAL CASES<sup>7</sup></b>	<b>282</b>	<b>13</b>	<b>4.6</b>	<b>11</b>	<b>34</b>	<b>12.1</b>	<b>98</b>

**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 (e.g., measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (e.g., 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 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 (e.g., 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, 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 (e.g., 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.

7. Totals include 4 cases in which the activity could not be determined as occupational or non-occupational. Of the 4 cases with unknown occupational status, none were hospitalized. The disability status of 3 of the cases is unknown, and 1 case had no disability.

**Whom to Contact:**

California Department of Pesticide Regulation

Worker Health and Safety Branch

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**Hospitalization and Disability Associated with Illnesses/Injuries  
Definitely or Probably Related to Pesticide Exposure in California<sup>1,2</sup>,  
Summarized by Occupational Status and Activity  
2012**

**Occupational<sup>3</sup>**

Activity <sup>4</sup>	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown <sup>5</sup>	No. Cases	%	Unknown <sup>6</sup>
Mixer/Loader	37	0	0	0	10	27.0	5
Applicator	96	3	3.1	0	18	18.8	9
Mechanical	10	0	0	0	1	10.0	2
Packaging/Processing	6	0	0	0	3	50.0	0
Field Worker	125	1	0.8	0	9	7.2	0
Routine Indoor	28	1	3.6	0	10	35.7	2
Routine Outdoor	8	0	0	0	1	12.5	0
Transport/Storage/Disposal	11	0	0	0	1	9.1	1
Emergency Response	4	0	0	0	1	25.0	0
Other	32	0	0	0	6	18.8	5
Unknown	2	0	0	0	0	0	2
<b>Total Occupational</b>	<b>359</b>	<b>5</b>	<b>1.4</b>	<b>0</b>	<b>60</b>	<b>16.7</b>	<b>26</b>

**Non-Occupational<sup>3</sup>**

Activity <sup>4</sup>	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown <sup>5</sup>	No. Cases	%	Unknown <sup>6</sup>
Mixer/Loader	12	2	16.7	0	0	0	7
Applicator	140	2	1.4	0	2	1.4	52
Mechanical	1	0	0	0	0	0	1
Routine Indoor	83	6	7.2	0	3	3.6	26
Routine Outdoor	23	0	0	0	0	0	4
Transport/Storage/Disposal	5	0	0	0	1	20.0	1
Other	62	18	29.0	10	17	27.4	27
Unknown	14	1	7.1	0	1	7.1	10
<b>Total Non-Occupational</b>	<b>340</b>	<b>29</b>	<b>8.5</b>	<b>10</b>	<b>24</b>	<b>7.1</b>	<b>128</b>
<b>TOTAL CASES<sup>7</sup></b>	<b>710</b>	<b>34</b>	<b>4.8</b>	<b>10</b>	<b>84</b>	<b>11.8</b>	<b>163</b>

**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 (e.g., measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (e.g., 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 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).

**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, 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.

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**Manufacturing and Formulation:** Manufactures, processes, or packages pesticides. This includes "mixing" if it is done in a plant for application elsewhere.

**Transport/Storage:** 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

Disposal: 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.

7. Totals include 11 cases in which the activity could not be determined as occupational or non-occupational. Of the 11 cases with unknown occupational status, none were hospitalized. The disability status of 9 cases is unknown, and 2 cases had no disability.

**Whom to Contact:**

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Worker Health and Safety Branch  
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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 the effectiveness of the DPR pesticide safety programs and recommend changes when appropriate.

**Cases Reported in California<sup>1</sup> with Documented<sup>2</sup> Pesticide Exposure  
Summarized by the Type of Illness and the Type of Pesticides  
2012**

Type of Illness <sup>3</sup>	Antimicrobials <sup>4</sup>		Cholinesterase Inhibitors <sup>4</sup>		Other Pesticides <sup>4</sup>		Total <sup>6</sup>
	Occupational <sup>5</sup>	Non-Occupational <sup>5</sup>	Occupational	Non-Occupational	Occupational	Non-Occupational	
<b>Systemic</b>							
Systemic with Respiratory and Topical Effects	5	3	3	1	30	8	51
Systemic with Respiratory Effects	12	31	5	5	35	55	144
Systemic Only	7	55	9	17	51	139	283
Systemic with Topical Effects	4	3	0	3	34	9	53
<b>Respiratory</b>							
Respiratory Only	15	56	0	2	10	40	128
Respiratory with Topical Effects	6	7	0	0	19	9	41
<b>Topical</b>							
Skin Only	32	2	2	7	13	20	76
Eye Only	75	13	1	2	71	28	191
Eye and Skin	10	1	0	2	3	5	22
<b>Asymptomatic</b>							
Asymptomatic	6	2	4	20	19	9	60
<b>Unknown</b>							
Unknown	0	0	0	0	1	1	2
<b>TOTAL</b>	<b>172</b>	<b>173</b>	<b>24</b>	<b>59</b>	<b>286</b>	<b>323</b>	<b>1052</b>

**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 (e.g., measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (e.g., 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:** Health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.

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

**Systemic:** Any health effects not limited to the respiratory tree, skin, and/or eyes. 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 (e.g., miosis, 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.

**Unknown:** Illness apparently occurred, but the specific nature of the illness could not be determined.

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

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

**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 (e.g., before the start or after the end of their workday).

6. Totals include 15 cases in which the activity could not be determined as occupational or non-occupational.

**Whom to Contact:**

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**Summary of Illness/Injury Incidents  
Reported in California as Potentially Related to Pesticide Exposure  
Summarized Statewide and by County of Occurrence<sup>1</sup>  
2012**

Relationship <sup>2</sup>	TOTAL CASES	Type of Exposure <sup>3</sup>				Intended Use <sup>4</sup>	
		Direct Contact	Drift	Residue	Other/Unknown	Agricultural	Non-Agricultural
<b>TOTALS</b>							
Definite	119	57	22	7	33	18	101
Probable	591	134	273	58	126	149	439
Possible	282	27	78	61	116	78	201
Unlikely	48	4	5	7	32	12	36
Indirect	6	0	0	4	2	1	5
Asymptomatic	60	3	23	20	14	46	14
Unrelated	127	-	-	-	-	-	-
Insufficient	15	-	-	-	-	-	-
Unavailable	170	-	-	-	-	-	-
<b>OVERALL</b>	<b>1418</b>	<b>225</b>	<b>401</b>	<b>157</b>	<b>323</b>	<b>304</b>	<b>796</b>

<b>County<sup>5</sup></b>							
Relationship <sup>2</sup>	TOTAL CASES	Type of Exposure <sup>3</sup>				Intended Use <sup>4</sup>	
		Direct Contact	Drift	Residue	Other/Unknown	Agricultural	Non-Agricultural
<b>ALAMEDA</b>							
Definite	4	2	0	1	1	2	2
Probable	12	4	1	2	5	0	12
Possible	2	0	0	0	2	0	2
Unlikely	1	1	0	0	0	0	1
Asymptomatic	1	0	0	0	1	0	1
Unrelated	6	-	-	-	-	-	-
Insufficient	1	-	-	-	-	-	-
Unavailable	2	-	-	-	-	-	-
<b>TOTAL</b>	<b>29</b>	<b>7</b>	<b>1</b>	<b>3</b>	<b>9</b>	<b>2</b>	<b>18</b>
<b>AMADOR</b>							
Probable	1	0	0	0	1	0	1
Unlikely	1	0	0	0	1	0	1
<b>TOTAL</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>2</b>

<b>BUTTE</b>							
Definite	3	2	0	0	1	0	3
Probable	3	1	0	1	1	0	3
Possible	3	1	0	0	2	0	3
Insufficient	3	-	-	-	-	-	-
Unavailable	1	-	-	-	-	-	-
<b>TOTAL</b>	<b>13</b>	<b>4</b>	<b>0</b>	<b>1</b>	<b>4</b>	<b>0</b>	<b>9</b>
<b>CALAVERAS</b>							
Probable	2	2	0	0	0	0	2
Unrelated	1	-	-	-	-	-	-
<b>TOTAL</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>COLUSA</b>							
Definite	2	0	2	0	0	0	2
Possible	1	0	0	0	1	1	0
<b>TOTAL</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>2</b>
<b>CONTRA COSTA</b>							
Definite	1	1	0	0	0	0	1
Probable	8	4	2	1	1	0	8
Possible	5	0	3	1	1	0	5
Unrelated	8	-	-	-	-	-	-
Unavailable	5	-	-	-	-	-	-
<b>TOTAL</b>	<b>27</b>	<b>5</b>	<b>5</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>14</b>
<b>DEL NORTE</b>							
Probable	2	1	1	0	0	0	2
Unrelated	2	-	-	-	-	-	-
Insufficient	1	-	-	-	-	-	-
<b>TOTAL</b>	<b>5</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>EL DORADO</b>							
Probable	1	1	0	0	0	0	1
Possible	3	0	2	0	1	1	2
Unavailable	1	-	-	-	-	-	-
<b>TOTAL</b>	<b>5</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>3</b>

<b>FRESNO</b>							
Definite	5	3	0	1	1	2	3
Probable	15	5	6	1	3	4	11
Possible	9	1	0	3	5	5	4
Unlikely	1	0	0	0	1	0	1
Unrelated	9	-	-	-	-	-	-
Unavailable	3	-	-	-	-	-	-
<b>TOTAL</b>	<b>42</b>	<b>9</b>	<b>6</b>	<b>5</b>	<b>10</b>	<b>11</b>	<b>19</b>
<b>GLENN</b>							
Possible	1	0	0	0	1	1	0
Unlikely	1	0	0	0	1	1	0
<b>TOTAL</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>0</b>
<b>HUMBOLDT</b>							
Probable	2	1	0	0	1	0	2
Unavailable	3	-	-	-	-	-	-
<b>TOTAL</b>	<b>5</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>2</b>
<b>IMPERIAL</b>							
Definite	2	1	0	0	1	1	1
Probable	5	2	0	1	2	0	5
Possible	4	1	1	2	0	2	2
Unrelated	9	-	-	-	-	-	-
Unavailable	1	-	-	-	-	-	-
<b>TOTAL</b>	<b>21</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>8</b>
<b>KERN</b>							
Definite	3	2	1	0	0	1	2
Probable	31	5	17	2	7	11	20
Possible	23	0	17	2	4	18	5
Unlikely	6	0	1	1	4	1	5
Asymptomatic	21	0	17	4	0	21	0
Unrelated	2	-	-	-	-	-	-
Unavailable	6	-	-	-	-	-	-
<b>TOTAL</b>	<b>92</b>	<b>7</b>	<b>53</b>	<b>9</b>	<b>15</b>	<b>52</b>	<b>32</b>

<b>KINGS</b>							
Definite	2	0	1	0	1	1	1
Probable	2	1	1	0	0	0	2
Possible	1	0	1	0	0	1	0
Unlikely	1	0	0	0	1	0	1
Unrelated	2	-	-	-	-	-	-
<b>TOTAL</b>	<b>8</b>	<b>1</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>4</b>
<b>LAKE</b>							
Possible	1	0	0	0	1	1	0
<b>TOTAL</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>LASSEN</b>							
Probable	1	1	0	0	0	0	1
Possible	1	0	0	0	1	1	0
<b>TOTAL</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>LOS ANGELES</b>							
Definite	25	12	1	1	11	0	25
Probable	73	18	18	6	31	0	73
Possible	60	7	10	16	27	0	60
Unlikely	4	0	0	1	3	0	4
Indirect	2	0	0	2	0	0	2
Asymptomatic	2	0	0	1	1	0	2
Unrelated	18	-	-	-	-	-	-
Insufficient	3	-	-	-	-	-	-
Unavailable	38	-	-	-	-	-	-
<b>TOTAL</b>	<b>225</b>	<b>37</b>	<b>29</b>	<b>27</b>	<b>73</b>	<b>0</b>	<b>166</b>
<b>MADERA</b>							
Probable	3	0	1	1	1	0	3
Possible	1	1	0	0	0	0	1
Unlikely	1	0	0	0	1	0	1
Unrelated	1	-	-	-	-	-	-
Unavailable	1	-	-	-	-	-	-
<b>TOTAL</b>	<b>7</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>5</b>
<b>MARIN</b>							
Probable	2	2	0	0	0	0	2
<b>TOTAL</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>

<b>MARIPOSA</b>							
Definite	1	0	0	0	1	1	0
<b>TOTAL</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MENDOCINO</b>							
Probable	2	1	0	0	1	0	2
Possible	2	0	0	1	1	1	1
Unlikely	2	0	0	0	2	0	2
Unrelated	1	-	-	-	-	-	-
<b>TOTAL</b>	<b>7</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>5</b>
<b>MERCED</b>							
Probable	6	1	5	0	0	2	3
Possible	1	0	0	1	0	0	1
Unavailable	5	-	-	-	-	-	-
<b>TOTAL</b>	<b>12</b>	<b>1</b>	<b>5</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>4</b>
<b>MODOC</b>							
Possible	1	0	0	1	0	0	1
<b>TOTAL</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>MONTEREY</b>							
Probable	52	0	48	2	2	49	3
Possible	5	0	2	2	1	4	1
Unlikely	1	0	0	1	0	1	0
Asymptomatic	3	0	3	0	0	3	0
Unrelated	3	-	-	-	-	-	-
Unavailable	5	-	-	-	-	-	-
<b>TOTAL</b>	<b>69</b>	<b>0</b>	<b>53</b>	<b>5</b>	<b>3</b>	<b>57</b>	<b>4</b>
<b>NAPA</b>							
Definite	1	1	0	0	0	0	1
Probable	1	1	0	0	0	0	1
Possible	1	0	0	1	0	0	1
Unlikely	1	0	0	0	1	1	0
Unavailable	1	-	-	-	-	-	-
<b>TOTAL</b>	<b>5</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>

<b>ORANGE</b>							
Definite	6	1	2	0	3	0	6
Probable	26	6	7	7	6	0	26
Possible	14	2	1	7	4	0	14
Unlikely	3	0	0	0	3	0	3
Indirect	1	0	0	0	1	0	1
Asymptomatic	1	1	0	0	0	0	1
Unrelated	4	-	-	-	-	-	-
Unavailable	14	-	-	-	-	-	-
<b>TOTAL</b>	<b>69</b>	<b>10</b>	<b>10</b>	<b>14</b>	<b>17</b>	<b>0</b>	<b>51</b>
<b>PLACER</b>							
Definite	1	1	0	0	0	0	1
Probable	5	1	3	1	0	0	5
Possible	2	0	0	0	2	0	1
Unrelated	2	-	-	-	-	-	-
<b>TOTAL</b>	<b>10</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>7</b>
<b>PLUMAS</b>							
Possible	1	0	0	0	1	0	1
<b>TOTAL</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>
<b>RIVERSIDE</b>							
Definite	3	0	2	0	1	0	3
Probable	27	4	10	2	11	0	27
Possible	10	0	1	1	8	1	9
Unlikely	3	0	1	2	0	0	3
Asymptomatic	2	0	0	0	2	0	2
Unrelated	7	-	-	-	-	-	-
Unavailable	8	-	-	-	-	-	-
<b>TOTAL</b>	<b>60</b>	<b>4</b>	<b>14</b>	<b>5</b>	<b>22</b>	<b>1</b>	<b>44</b>
<b>SACRAMENTO</b>							
Definite	9	3	2	0	4	0	9
Probable	20	6	9	2	3	2	18
Possible	3	2	0	0	1	0	3
Unlikely	1	0	0	0	1	0	1
Unrelated	1	-	-	-	-	-	-
Unavailable	4	-	-	-	-	-	-
<b>TOTAL</b>	<b>38</b>	<b>11</b>	<b>11</b>	<b>2</b>	<b>9</b>	<b>2</b>	<b>31</b>

<b>SAN BENITO</b>							
Possible	2	0	1	0	1	1	1
<b>TOTAL</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>SAN BERNARDINO</b>							
Definite	7	5	1	0	1	0	7
Probable	47	13	15	4	15	0	47
Possible	15	3	3	1	8	0	15
Unlikely	1	0	0	0	1	0	1
Asymptomatic	4	0	0	0	4	0	4
Unrelated	2	-	-	-	-	-	-
Insufficient	1	-	-	-	-	-	-
Unavailable	12	-	-	-	-	-	-
<b>TOTAL</b>	<b>89</b>	<b>21</b>	<b>19</b>	<b>5</b>	<b>29</b>	<b>0</b>	<b>74</b>
<b>SAN DIEGO</b>							
Definite	7	4	1	0	2	0	7
Probable	34	9	8	6	11	0	34
Possible	19	0	11	1	7	0	19
Unlikely	5	0	1	1	3	0	5
Indirect	1	0	0	1	0	0	1
Unrelated	7	-	-	-	-	-	-
Unavailable	15	-	-	-	-	-	-
<b>TOTAL</b>	<b>88</b>	<b>13</b>	<b>21</b>	<b>9</b>	<b>23</b>	<b>8</b>	<b>58</b>
<b>SAN FRANCISCO</b>							
Definite	3	1	0	0	2	0	3
Probable	5	1	2	1	1	0	5
Possible	2	0	0	1	1	0	2
Unavailable	3	-	-	-	-	-	-
<b>TOTAL</b>	<b>13</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>4</b>	<b>0</b>	<b>10</b>
<b>SAN JOAQUIN</b>							
Definite	9	5	1	3	0	5	4
Probable	21	6	13	1	1	7	13
Possible	11	3	3	0	5	4	7
Unlikely	3	1	1	0	1	3	0
Asymptomatic	6	0	0	3	3	3	3
Unrelated	9	-	-	-	-	-	-
Unavailable	6	-	-	-	-	-	-
<b>TOTAL</b>	<b>65</b>	<b>15</b>	<b>18</b>	<b>7</b>	<b>10</b>	<b>22</b>	<b>27</b>

<b>SAN LUIS OBISPO</b>							
Definite	1	0	0	0	1	0	1
Probable	4	0	4	0	0	1	3
Possible	2	0	0	1	1	0	2
Unlikely	2	0	0	1	1	2	0
Unrelated	5	-	-	-	-	-	-
Unavailable	1	-	-	-	-	-	-
<b>TOTAL</b>	<b>15</b>	<b>0</b>	<b>4</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>6</b>
<b>SAN MATEO</b>							
Definite	1	0	1	0	0	0	1
Probable	5	2	2	0	1	0	5
Possible	3	1	0	0	2	0	3
Unlikely	1	1	0	0	0	0	1
Unrelated	1	-	-	-	-	-	-
Unavailable	2	-	-	-	-	-	-
<b>TOTAL</b>	<b>13</b>	<b>4</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>10</b>
<b>SANTA BARBARA</b>							
Definite	1	1	0	0	0	0	1
Probable	55	3	49	2	1	48	7
Possible	15	0	9	2	3	9	5
Indirect	1	0	0	1	0	0	1
Asymptomatic	1	0	1	0	0	1	0
Unrelated	2	-	-	-	-	-	-
Unavailable	1	-	-	-	-	-	-
<b>TOTAL</b>	<b>76</b>	<b>4</b>	<b>59</b>	<b>5</b>	<b>4</b>	<b>58</b>	<b>14</b>
<b>SANTA CLARA</b>							
Definite	6	3	3	0	0	0	6
Probable	28	9	8	4	7	0	28
Possible	12	0	3	3	6	0	12
Unlikely	2	0	0	0	2	0	2
Unrelated	7	-	-	-	-	-	-
Insufficient	2	-	-	-	-	-	-
Unavailable	5	-	-	-	-	-	-
<b>TOTAL</b>	<b>62</b>	<b>12</b>	<b>14</b>	<b>7</b>	<b>15</b>	<b>0</b>	<b>48</b>

<b>SANTA CRUZ</b>							
Definite	2	1	1	0	0	0	2
Probable	2	0	2	0	0	0	2
Possible	1	0	0	1	0	1	0
Unlikely	1	0	0	0	1	0	1
Unrelated	3	-	-	-	-	-	-
Unavailable	1	-	-	-	-	-	-
<b>TOTAL</b>	<b>10</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>5</b>
<b>SHASTA</b>							
Probable	3	1	0	0	2	0	3
Unrelated	1	-	-	-	-	-	-
<b>TOTAL</b>	<b>4</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>3</b>
<b>SISKIYOU</b>							
Probable	1	0	1	0	0	0	1
Unlikely	1	0	0	0	1	0	1
Indirect	1	0	0	0	1	1	0
<b>TOTAL</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>2</b>
<b>SOLANO</b>							
Definite	2	1	0	0	1	0	2
Probable	8	2	3	1	2	0	8
Possible	3	1	0	0	2	0	3
Unrelated	1	-	-	-	-	-	-
Unavailable	4	-	-	-	-	-	-
<b>TOTAL</b>	<b>18</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>5</b>	<b>0</b>	<b>13</b>
<b>SONOMA</b>							
Probable	6	3	2	0	1	0	6
Possible	6	1	1	3	1	1	5
Asymptomatic	1	1	0	0	0	0	1
Unrelated	3	-	-	-	-	-	-
Insufficient	1	-	-	-	-	-	-
Unavailable	5	-	-	-	-	-	-
<b>TOTAL</b>	<b>22</b>	<b>5</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>12</b>

<b>STANISLAUS</b>							
Definite	3	1	2	0	0	3	0
Probable	28	0	27	0	1	21	7
Possible	8	0	2	3	3	4	4
Unlikely	1	0	0	0	1	1	0
Asymptomatic	2	0	2	0	0	2	0
Unrelated	4	-	-	-	-	-	-
Unavailable	4	-	-	-	-	-	-
<b>TOTAL</b>	<b>50</b>	<b>1</b>	<b>33</b>	<b>3</b>	<b>5</b>	<b>31</b>	<b>11</b>
<b>SUTTER</b>							
Definite	1	1	0	0	0	1	0
Probable	2	1	1	0	0	0	2
Possible	2	0	1	0	1	2	0
<b>TOTAL</b>	<b>5</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>3</b>	<b>2</b>
<b>TEHAMA</b>							
Definite	1	1	0	0	0	0	1
Probable	8	5	0	3	0	1	7
Possible	2	1	0	0	1	0	2
<b>TOTAL</b>	<b>11</b>	<b>7</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>10</b>
<b>TULARE</b>							
Definite	3	1	0	1	1	1	2
Probable	14	2	2	5	5	0	14
Possible	12	0	1	6	5	7	5
Unlikely	2	0	1	0	1	1	1
Asymptomatic	16	1	0	12	3	16	0
Unrelated	4	-	-	-	-	-	-
Insufficient	1	-	-	-	-	-	-
Unavailable	5	-	-	-	-	-	-
<b>TOTAL</b>	<b>57</b>	<b>4</b>	<b>4</b>	<b>24</b>	<b>15</b>	<b>25</b>	<b>22</b>
<b>TUOLUMNE</b>							
Probable	1	1	0	0	0	0	1
Possible	2	1	0	0	1	0	2
<b>TOTAL</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>3</b>

<b>VENTURA</b>							
Definite	2	1	1	0	0	0	2
Probable	10	4	2	2	2	3	7
Possible	8	0	3	1	4	3	5
Insufficient	1	-	-	-	-	-	-
Unavailable	7	-	-	-	-	-	-
<b>TOTAL</b>	<b>28</b>	<b>5</b>	<b>6</b>	<b>3</b>	<b>6</b>	<b>6</b>	<b>14</b>
<b>YOLO</b>							
Definite	2	2	0	0	0	0	2
Probable	4	2	2	0	0	0	4
Possible	1	0	1	0	0	1	0
Unlikely	2	1	0	0	1	1	1
Unrelated	2	-	-	-	-	-	-
Insufficient	1	-	-	-	-	-	-
<b>TOTAL</b>	<b>12</b>	<b>5</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>7</b>
<b>YUBA</b>							
Probable	3	2	1	0	0	0	2
Possible	1	1	0	0	0	0	0
Unavailable	1	-	-	-	-	-	-
<b>TOTAL</b>	<b>5</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>

**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 (e.g., measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (e.g., 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:** Health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.
- 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.”

**3. Type of Exposure:** Characterization of how an individual came in contact with a pesticide. Type of exposure is not inputted in cases classified as Unrelated, Insufficient, or Unavailable.

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 pyrolytic 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. Intended use is not inputted in cases classified as Unrelated, Insufficient, or Unavailable.

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. 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  
Fax: (916) 445-4280  
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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 the effectiveness of the DPR pesticide safety programs and recommend changes when appropriate.