

**SUMMARY OF RESULTS FROM THE
CALIFORNIA PESTICIDE ILLNESS
SURVEILLANCE PROGRAM
- 2011 –**

HS-1893

California Environmental Protection Agency
Department of Pesticide Regulation
Worker Health and Safety Branch
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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 2011. DPR identified 1,473 cases potentially involving health effects from pesticide exposure. This represents a 32% increase from the 1,114 cases investigated in 2010, and an 11% increase from the 1,329 cases investigated in 2009. The number of cases investigated remains within the range of cases in prior years (1992 – 2010).

DPR epidemiologists concluded that pesticide exposure had been at least a possible contributing factor to 1,067 (72%) of the 1,473 cases. Agricultural use of pesticides was the source of exposure in 239 (22%) of the 1,067 cases, while 76% (816 cases) were associated with non-agricultural situations. This is within the range of the proportion of associated non-agricultural cases seen from 1992 to 2010.

The increase in associated cases in 2011 is largely attributed to non-agricultural pesticide exposures, which increased 42%, from 572 to 816 cases. Agricultural cases increased 3% in 2011, up from 231 to 239 associated cases. Pesticide illnesses at schools, none of which involved children, dropped sharply from 44 cases in 2010 to 12 cases in 2011.

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 pesticide¹ 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 individual citizens.

Under Health and Safety Code section 105200, California physicians are required to report any suspected case of pesticide-related illness or injury by telephone to the local health officer 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. Unfortunately, this reporting pathway identifies only a minority of the cases investigated. DPR strives to ensure that PISP captures the majority of illness incidents. To identify unreported pesticide cases, DPR has a memorandum of understanding with the Occupational Health Branch of the California Department of Public

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

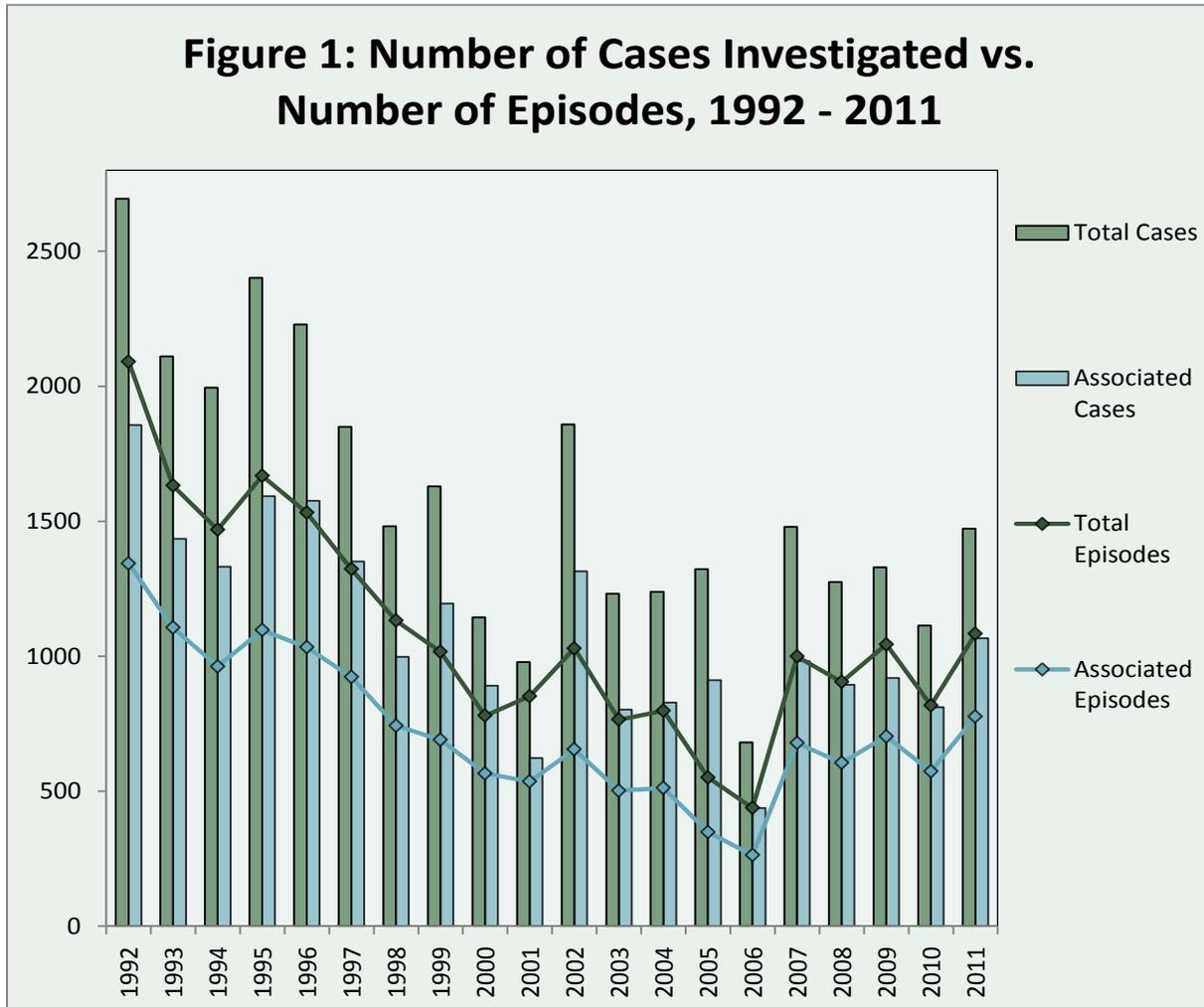
Health (CDPH-OHB), under which PISP epidemiologists review copies of the Doctor's First Report of Occupational Illness and Injury (DFROII), documents that workers' compensation claims payers are required to forward to DIR and are subsequently shared with CDPH. PISP epidemiologists select for investigation any DFROII that mentions a pesticide as a possible cause of injury, or mentions unspecified chemicals if the occupation or setting is one 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 troubles prevented complete CPCS participation from 2003-2006. When medical professionals contact CPCS and suspect that a pesticide caused an illness, CPCS submits a pesticide incident report to DPR which satisfies the physician's reporting requirement. Through our contract with CPCS, PISP continues to identify hundreds of symptomatic non-occupational exposures that otherwise would escape detection.

County agricultural commissioners investigate identified 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 pesticide application permit conditions or by changing regulations. If an illness incident results from illegal practices, state and county enforcement staff take appropriate action to deter future incidents.

2011 Numeric Results – Totals

In 2011, 1,473 cases were identified potentially involving health effects from pesticide exposure. This represents a 32% increase from 1,114 cases investigated in 2010, and an 11% increase from 1,329 cases investigated in 2009 (Figure 1). Over time, the number of cases investigated remains within a typical range; the 2011 case total falls within two standard deviations of the average annual total of the previous four years of data since poison control renewed reporting assistance (2007-2010 mean = 1,299, SD = 151).



A *case* is the Pesticide Illness Surveillance Program representation of a person whose health problems may relate to pesticide exposure.

An *episode* is an event in which a single source appears to have exposed one or more people (cases) to pesticides.

Associated cases are those evaluated as definitely, probably, or possibly related to pesticide exposure. A definite relationship indicates 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.

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

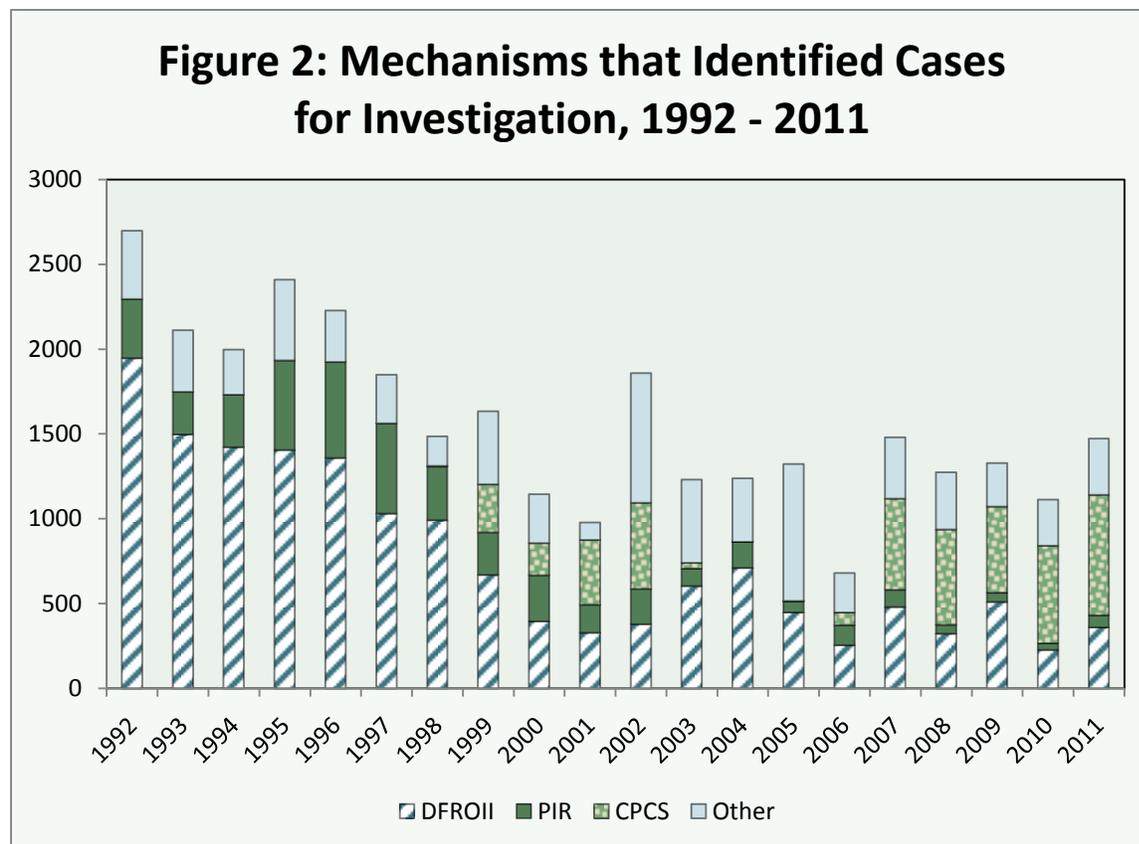
Figure 2 demonstrates the variation in numbers of cases identified by the different sources of initiating documents. The source document proportions for 2011 are similar to those of recent years.

The California Poison Control System (CPCS) remained a major source of case identification. CPCS reporting accounted for 48% of 2011 investigations. Of the 1,473 cases identified in 2011, investigated CPCS reports totaled 711, an increase from the 575 in 2010. Of the 711 CPCS reports investigated, 527 (74%) were evaluated as associated with pesticide exposure. Of these 527 cases, 477 (91%) were non-agricultural, 38 (9%) were related to pesticides intended for agricultural use, and in 12 (2%) cases the agricultural context remained unknown.

DFR reports contributed 360 (24%) illness investigations, a slight rise despite an overall decrease in reports over time, likely attributable to a multitude of complex reasons. Of the 360 DFR reports investigated, 239 (66%) were evaluated as related to pesticide exposure, 34 (14%) of which were agricultural in nature.

Other reporting sources, such as county complaints, media reports, or multi-person episodes led to 331 (22%) investigations. Of these, 246 (74%) of these were found to be at least possibly related to exposure. Of these 246 associated cases, 132 (54%) were agricultural.

Direct physician reporting to Local Health Officers accounted for only 71 (5%) of all investigated cases, with 55 (77%) evaluated as associated with pesticide exposure, and 35 (64%) of the 55 were agriculturally related.



DFROII – Doctor’s First Report of Occupational Illnesses and Injury (Workers’ Compensation document).

PIR – Pesticide Illness Report (physician reporting to Local Health Officers in compliance with Health and Safety Code Section 105200).

CPCS – California Poison Control System (facilitated physician reporting).

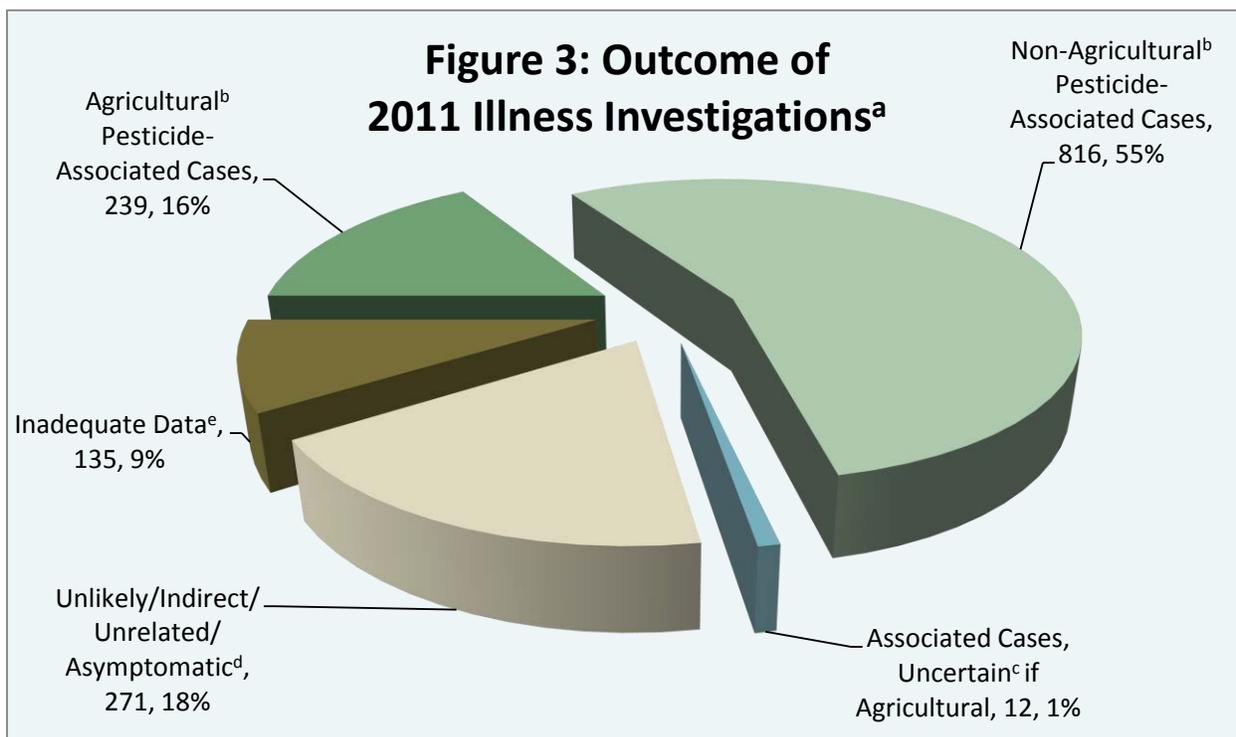
Other – All other methods of case identification, including citizen complaints, contacts by emergency responders, and news reports.

DPR epidemiologists found pesticide exposure to be at least a possible contributing factor to 1,067 (72%) of the 1,473 cases identified. The percent of associated cases were similar to that of 2010, with 73% of cases associated with pesticide exposure. PISP defines the term “associated” as cases evaluated as definitely, probably, or possibly related to pesticide exposure.

“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”.

Of the 1,067 pesticide-associated cases, 239 (22%) were attributed to pesticides used for agricultural purposes. Another 816 associated cases (76%) occurred under circumstances

considered non-agricultural. Twelve (1%) of the 1,067 pesticide-associated cases could not be characterized as agricultural or non-agricultural due to unclear circumstances presented in the investigations. Evidence indicated that pesticide exposure did not cause or contribute to ill health in 271 (18%) of the 1,473 cases assigned for investigation. Insufficient information prevented evaluation of 135 cases (9%) (Figure 3).



^a Total cases investigated = 1,473

^b *Agricultural* and *Nonagricultural* refer to the intended use of the pesticides definitely, probably, or possibly related to human health effects.

^c *Associated Cases, Uncertain if Agricultural* refers to cases in which investigators could provide little or no information, such as when victims could not be located or refused interviews.

^d *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.

^e *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 1,067 pesticide-associated cases, evidence established a definite relationship to pesticide exposure for 181 (17%), a probable relationship for 637 (60%), and a possible relationship for 249 (23%) (Table 1).

Table 1: Relationship Evaluation of 2011 Illness Investigations				
Relationship	Relation to Agriculture			Total
	Agricultural ^a	Non-Agricultural ^b	Unknown or Not Applicable ^c	
Definite ^d	27	153	1	181
Probable ^e	161	470	6	637
Possible ^f	51	193	5	249
Pesticide-Associated Subtotal	239	816	12	1067
Unlikely ^g	8	40	1	49
Indirect ^h	0	17	0	17
Asymptomatic ⁱ	62	15	0	77
Unrelated ^j	0	0	128	128
Not Applicable (inadequate data) ^k	9	107	19	135
Overall Total	318	995	160	1,473

^a *Agricultural* cases are those that implicate exposure to pesticides intended to contribute to the production of agricultural commodities.

^b *Non-agricultural* cases include all those in which the pesticide was not intended to contribute to production of agricultural commodities.

^c Agricultural designation is not applicable to cases unrelated to pesticide exposure.

^d 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.

^e 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.

^f A *possible* relationship indicates that health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.

^g An *unlikely* relationship indicates that a correlation cannot be ruled out absolutely. Medical and/or physical evidence suggest a cause other than pesticide exposure.

^h 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).

ⁱ An *asymptomatic* relationship indicates that exposure occurred, but did not result in illness/injury.

^j An *unrelated* relationship indicates definite evidence of causes other than pesticide exposure, including exposure to chemicals other than pesticides.

^k A relationship of “*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 563 (53%) of the 1,067 pesticide-associated cases from 2011. Non-occupational exposures accounted for 493 pesticide-associated cases (46% of the total). Eleven pesticide-associated cases could not be characterized as occupational or non-occupational; 7 of these 11 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 1,067 pesticide-associated cases, 656 (61%) 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 656 cases with contributory violations, 163 (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 56 (5%) cases. It was unknown whether violations contributed to 145 cases (14%) and 210 cases (20%) had health effects attributed to pesticide exposure in spite of apparent compliance with all applicable label instructions and safety regulations. Of these 210 cases, 50 (24%) were attributed to pesticides used for agricultural purposes. Further evaluation of these cases is needed to determine if additional safety requirements are appropriate.

Legislative update – AB 1963

Assembly Bill 1963 (Nava, Chapter 369, Statutes of 2010), which modified Health and Safety Code (HSC) 105206, requires clinical laboratories to provide DPR the results of all cholinesterase blood tests performed for agricultural pesticide-related exposures related to 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 employees who regularly handle toxicity category I or II pesticides that inhibit cholinesterase. Physicians order baseline and periodic blood testing for these employees to measure the level of activity of cholinesterase enzyme. HSC Section 105206 requires clinical laboratories to provide numeric results along with the reason medical providers ordered the cholinesterase tests (pursuant to Section 6728 of Title 3 CCR). Information on the patient, physician, employer and laboratory should also be provided. PISP began receiving cholinesterase test results from six DPH-approved laboratories in the first quarter of 2011. Cholinesterase test results are reported monthly through DPR's Secure Access Website. PISP epidemiologists review each file submitted by the laboratories for consistency in reporting requirements. Laboratories are required to re-submit test result files if any discrepancies were noted in the data elements submitted. The information is shared electronically with the Office of Environmental Health Hazard Assessment (OEHHA) and the California Department of Public

Health (CDPH). PISP staff continue to investigate ways to integrate the data received from reporting laboratories into a database that can link cholinesterase test results to the individuals tested, so that changes may be identified over time. In 2015, DPR and OEHHA, in consultation with DPH, 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.

Non-agricultural pesticide episodes

PISP defines drift as spray, mist, fumes, or odor carried from the target site by air. PISP illnesses classified as drift may include on-site or off-site movement of pesticide during or after an application. Definitions of drift may vary among agencies. Thirty-six non-agricultural drift episodes resulted in 232 illnesses in 2011. While most incidents affected only one person, two chlorine release episodes affected 58 people. Details of these exposures are highlighted below.

Chlorine release at a recreational water park

Eleven illnesses resulted from chlorine exposure at a Sacramento County recreational water park. On the day of the incident, despite a deactivated pump, a system bypass allowed a chlorine feeder to continue pumping chlorine into the water recirculation system causing chlorine to accumulate in the pool's piping. When a worker activated the pump, super-chlorinated water was released into a cyclical wave pool.

According to an employee, people began screaming and left the pool area when the water turned green from the influx of chlorine. A gas-like odor was described by multiple pool users and employees. News media initially reported at least 20 individuals (9 minors, 8 adults, and 3 water park employees) developed respiratory symptoms, but only 11 were reported to PISP by CPCS. The remainder could not be reached for interview. Four of the 11 injured people experienced coughing alone, while seven experienced two or more of the following symptoms: difficulty breathing, coughing, burning (of throats, eyes, or lungs), headache, nausea, painful or sore throat, and abdominal pain. Three water park employees who provided first aid and assisted in the transport of swimmers during the incident also complained of symptoms.

Investigators found that a cable was attached to a chemical feeder pump, allowing pool maintenance staff to manually control it. Likewise, a jumper cable was attached to the sensor unit allowing its function to be bypassed. In order for the chlorinating unit to work efficiently, the two vertical pumps should both be running at all times except on scheduled maintenance, with the sensor unit engaged and not bypassed or manually controlled. The water park company was cited by the California Occupational Safety and Hazard Administration (CalOSHA) for gross negligence of safety.

Chlorine release at a tomato cannery

Improper wiring of a chlorine pump in a Yolo County tomato canning plant triggered the release of a large amount of chlorine into a water flume used for transporting tomatoes. The exposure resulted in 47 cases of pesticide illness among plant employees. An investigation revealed that a contract technician serviced the flume system a week prior to the incident to repair an unspecified chlorine pump problem. The day before the incident, the flume was shut down for the first time since it was serviced in order to change the type of tomato on the processing line.

During the shutdown, the chlorine metering system continued to pump chlorine into the holding tank, allowing as much as 840 gallons of chlorine to enter the 1,700 gallon water tank during a 28 hour period. An inspection later revealed that a system to prevent addition of chlorine while the flume line is turned off had been bypassed. Interview statements among plant workers and the contract technician conflicted, so the party who bypassed the system remained unidentified.

When the flume was restarted, highly chlorinated water entered the work area, and several employees noticed an odor and a blue or green cloud. Ultimately, 47 employees were transported for medical care, and many more were evacuated from the building. A woman who had been standing near the flume fainted and was hospitalized for three days. She was unable to return to work for more than 30 days. Two other workers were admitted to the hospital overnight for observation, and several workers missed multiple work days as a result of the chlorine release. Many stated that the symptoms they experienced, which included burning eyes, coughing, head ache, nausea, vomiting, difficulty breathing, and dizziness, persisted for weeks.

Upon interview, several workers complained about the cannery's evacuation process, claiming no announcement was made over the loudspeaker. As a result, some workers were unaware the evacuation was underway, and continued to work as others left the premises. This may have contributed to the ill effects experienced.

The same facility experienced an event in 2007. A chlorine sensing probe became heavily coated with plant material and unable to properly detect the level of chlorine in the system, caused a chlorine release that was 15 times the normal level. Thirty-nine people complained of suffering ill effects from the exposure and two workers were hospitalized. In response to the 2007 incident, the facility was cited for failing to properly maintain equipment.

After the 2011 episode, the California Occupational Safety and Health Administration found that the cannery was in noncompliance with California laws requiring safe equipment in good repair and the use of engineering controls to prevent harmful exposures. OSHA fined the cannery over \$60,000 for these violations.

Pesticide illness among fieldworkers

PISP data reflects that 137 fieldworkers were injured by pesticide exposure over 28 separate episodes. This total includes 31 fieldworker cases that occurred in 2010 but were not reported to DPR until 2011.

The largest number of fieldworkers injured in a single episode in 2011 was 14, compared with 33 in 2010. It is difficult to attribute the smaller scale of 2011 episodes to a specific cause.

Depending on a number of factors, one episode has the potential to affect large numbers of workers. Larger episodes may not happen in every calendar year, but when they do, they can dramatically alter the overall number of cases from year to year.

Pesticide drift as defined by PISP was associated with 99 (72%) of the 137 fieldworker illnesses in 15 separate episodes. Among fieldworkers, pesticide residue contributed to 28 illnesses (20%) over five episodes. Of the remaining ten cases, the exposure remained uncertain in seven cases - one sustained multiple exposures, one was exposed by spill or other direct contact, and one was directly sprayed by application equipment.

Two fieldworker episodes, each affecting 14 people, are highlighted because they affected the largest number of agricultural workers in 2011. One episode resulted from agricultural drift; the other involved exposure to pesticide residue.

In Imperial County, 23 fieldworkers were drifted upon by insecticides during an application to a nearby alfalfa field. Three days after the incident, the CAC received an anonymous complaint from a worker advocacy group alleging that workers were exposed while harvesting lettuce. The CAC conducted a fieldworker safety inspection and interviewed workers. Many workers mentioned smelling a strong odor and seeing an airplane apply pesticides to a nearby alfalfa field. Use reports indicated a crop duster plane made an application to an adjacent field about a mile southeast of the fieldworkers. Of the 23 harvesters exposed, 14 reported symptoms and nine were asymptomatic. Symptoms reported included eye and nose irritation, headache, upset stomach, vomiting and difficulty breathing. The CAC collected gradient foliage samples and results indicated drift of malathion and permethrin onto the lettuce field. The CAC cited the Agricultural Pest Control Business (AgPCB) for failing to contain pesticides to the target area during application.

In Kings County, 15 fieldworkers were exposed to pesticide residue when they entered a field before the restricted entry interval (REI) had expired. The day before the application, an employee of the farm was unsuccessful in his attempt to notify the supervisor of the weeding crew. An aerial application of pesticides took place the next day as planned. One of the pesticides had an REI of 48 hours. The weeding crew arrived the day after the application to

continue where they had previously worked. Since the farm operators failed to post signs before the scheduled application and did not direct the AgPCB to put up signs, the crew of 15 fieldworkers entered the treated field less than 10 hours after the application was complete. Two-thirds into their first pass of a row, the workers' clothing became wet from moisture on the plants. Fourteen of the 15 workers complained of symptoms of nausea, headache, and dizziness. In addition, a few reported blurry vision, burning throat and skin irritation. Accounts differed on whether all fieldworkers showered after the exposure, and whether instructions were given for the workers to return to work, go home, or to headquarters to decontaminate further before transport for care. The farm operator was cited for failure to give notice of a scheduled application, failure to ensure that signs were posted around the treated fields and for allowing fieldworkers to enter a treated field before the REI expired. The farm labor contractor was cited for failure to immediately take an employee to a physician when there are reasonable grounds to suspect that an employee has pesticide illness. The AgPCB was cited for applying pesticide in conflict with label directions; the insecticide label requires posting of the application.

Pesticide Exposure affecting Bystanders

In Merced County, 11 bystanders were exposed when miticides applied to a nearby corn field drifted into a residential area. Two families living near the corn field, one to the east and another to the north of the field, complained of an odor and symptoms. They reported symptoms of burning eyes, difficulty breathing, headache, and blotchy skin, but none sought medical attention. Although both families were indoors at the time of application, one family, located 50 feet north of the field, said they could "taste" and smell an odor. They sealed doors with duct tape to keep the odor out. County investigators collected swab samples three days later from the homes and the corn field. Pesticides were detected only on the samples retrieved from within the field. Investigators concluded that label directions were apparently followed during the application, but cited the pest control operator for failing to submit a pesticide use report within seven days of application.

Pesticide Illness in Schools

Twelve 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 12 cases reflect a 73% decrease from 2010 data which included 44 school-related illness cases.

In 2011, no children were reported to have sustained pesticide illness at schools. All of the reported pesticide illnesses occurred in adults employed at schools, and all involved exposure to antimicrobial pesticides or pool adjuvants.

Morbidity and Mortality

Of the 1,067 cases evaluated as associated with pesticide exposure, 23 people (2%) were hospitalized and 94 (9%) reported time lost from work or normal activity (e.g. going to school) (Table 2). Fifteen (65%) of the 23 people that were hospitalized ingested pesticide. One of the ingestion cases was ultimately fatal. Of the 15 patients hospitalized due to ingesting pesticide, nine (60%) acknowledged suicide attempts.

Table 2: Summary of Pesticide-Associated^a Hospitalization and Disability, 2011			
Relationship	Total Cases	Number Hospitalized^d	Lost Work Time^e
Definite/Probable ^b	818	18	79
Possible ^c	249	5	15
Total Cases	1067	23	94

a *Pesticide-associated* cases are those in which pesticide exposure was evaluated as definite, probable, or possible contributor to ill health.

b 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.

c A *possible* relationship indicates health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.

d Number of associated cases who were admitted and spent at least one full day (24-hour period) hospitalized.

e Number of associated cases who missed at least one day of work or normal activity such as school.

A total of five fatalities were evaluated as definitely, probably, or possibly associated with pesticide exposure. Three of the five incidents were related to deliberate self-harm. One suicide involved the ingestion of an herbicide and the other two cases involved mixing pesticides with household cleaners to produce a lethal gas, a method known as detergent suicide. The same readily available, non-restricted fungicide was implicated in both detergent suicides. The manufacturer did not renew the product registration for 2011; the product, however, was not recalled nor removed from store shelves.

Of the remaining fatalities, one person was suspected of unwittingly ingesting insecticide and the other was exposed to a fumigant. The first case involved a man suffering from dementia who ingested a small amount of an unidentified flea and tick shampoo. After being hospitalized for four days, he died. His death may have been due to pre-existing health conditions, but contributory effects of a pesticide cannot be ruled out. The second non-suicide fatality involved a

man who was discovered by a Structural Pest Control Operator (SPCO) crew when they returned to aerate a house after it was fumigated two days previously. The crew discovered that tarp clips had been removed and someone had entered through a window. They called emergency responders who found the man, who had entered the home illegally, deceased inside the home. Diagnostic analysis confirmed a lethal dose of sulfuryl fluoride in his blood. Statements from police and fire departments confirmed that the SPCO used secondary locks to secure the external doors of the house and garage.

Tabular summaries presenting different aspects of 2011 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
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

**Summary of Illness/Injury Incidents
Reported in California as Potentially Related to Pesticide Exposure
Summarized Statewide and by County of Occurrence¹
2011**

Relationship ²	TOTAL CASES	Type of Exposure ³				Intended Use ⁴	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non- Agricultural
TOTALS							
Definite	181	93	51	16	21	27	153
Probable	637	152	269	108	108	161	470
Possible	249	29	62	29	129	51	193
Unlikely	49	4	5	10	30	8	40
Indirect	17	0	0	17	0	0	17
Asymptomatic	77	4	51	17	5	62	15
Unrelated	128	0	0	0	0	0	0
Insufficient	10	0	0	0	0	0	0
Unavailable	125	0	0	0	0	0	0
OVERALL	1473	282	438	197	293	309	888

COUNTY⁵							
Relationship ²	TOTAL CASES	Type of Exposure ³				Intended Use ⁴	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non- Agricultural
ALAMEDA							
Definite	6	4	1	0	1	0	6
Probable	19	5	6	3	5	0	18
Possible	8	1	1	2	4	0	7
Unrelated	6	0	0	0	0	0	0
Unavailable	6	0	0	0	0	0	0
TOTAL	45	10	8	5	10	0	31
AMADOR							
Probable	6	0	0	5	1	0	6
Possible	1	0	0	1	0	0	1
Asymptomatic	1	0	0	1	0	0	1
Unavailable	1	0	0	0	0	0	0
TOTAL	9	0	0	7	1	0	8

BUTTE							
Definite	2	1	0	0	1	0	2
Probable	3	1	1	1	0	0	3
Possible	6	1	1	1	3	1	4
Unlikely	1	0	0	0	1	0	1
Unrelated	1	0	0	0	0	0	0
Unavailable	3	0	0	0	0	0	0
TOTAL	16	3	2	2	5	1	10
CALAVERAS							
Probable	2	1	1	0	0	0	2
TOTAL	2	1	1	0	0	0	2
COLUSA							
Definite	1	1	0	0	0	0	1
Unlikely	1	0	0	1	0	1	0
Unrelated	2	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0
TOTAL	5	1	0	1	0	1	1
CONTRA COSTA							
Definite	6	4	0	0	2	0	6
Probable	14	3	8	0	3	0	14
Possible	2	0	0	0	2	0	2
Unrelated	1	0	0	0	0	0	0
Insufficient	1	0	0	0	0	0	0
Unavailable	2	0	0	0	0	0	0
TOTAL	26	7	8	0	7	0	22
DEL NORTE							
Definite	3	2	1	0	0	1	2
Probable	2	1	1	0	0	0	2
TOTAL	5	3	2	0	0	1	4
EL DORADO							
Definite	1	1	0	0	0	0	1
Probable	1	0	0	0	1	0	1
Unrelated	1	0	0	0	0	0	0
TOTAL	3	1	0	0	1	0	2
FRESNO							

Definite	13	4	9	0	0	7	6
Probable	34	17	14	1	2	12	20
Possible	15	1	8	1	5	4	11
Asymptomatic	2	1	1	0	0	1	1
Unrelated	6	0	0	0	0	0	0
Unavailable	4	0	0	0	0	0	0
TOTAL	74	23	32	2	7	24	38
GLENN							
Definite	1	0	1	0	0	1	0
Probable	1	0	0	0	1	0	1
TOTAL	2	0	1	0	1	1	1
HUMBOLDT							
Definite	1	0	1	0	0	0	1
Probable	5	3	1	0	1	0	5
Possible	3	0	0	0	3	0	2
Unavailable	2	0	0	0	0	0	0
TOTAL	11	3	2	0	4	0	8
IMPERIAL							
Probable	21	2	11	8	0	18	3
Possible	8	1	4	1	2	4	4
Asymptomatic	10	0	10	0	0	9	1
Unrelated	3	0	0	0	0	0	0
Unavailable	2	0	0	0	0	0	0
TOTAL	44	3	25	9	2	31	8
INYO							
Probable	1	0	1	0	0	0	1
TOTAL	1	0	1	0	0	0	1
KERN							
Definite	6	1	1	0	4	1	5
Probable	15	8	1	2	4	2	13
Possible	14	1	3	1	9	5	9
Unlikely	4	0	1	1	2	0	4
Unrelated	10	0	0	0	0	0	0
Insufficient	1	0	0	0	0	0	0
Unavailable	4	0	0	0	0	0	0
TOTAL	54	10	6	4	19	8	31

KINGS							
Definite	4	2	0	2	0	2	2
Probable	16	3	0	12	1	12	4
Possible	4	1	0	1	2	1	3
Unlikely	2	0	0	0	2	0	2
Asymptomatic	1	0	0	1	0	1	0
Unrelated	4	0	0	0	0	0	0
TOTAL	31	6	0	16	5	16	11
LAKE							
Probable	3	0	2	0	1	1	2
TOTAL	3	0	2	0	1	1	2
LASSEN							
Possible	1	0	0	0	1	0	1
TOTAL	1	0	0	0	1	0	1
LOS ANGELES							
Definite	28	17	8	1	2	0	28
Probable	75	24	16	10	25	1	73
Possible	49	6	9	6	28	0	49
Unlikely	5	0	1	0	4	0	5
Indirect	13	0	0	13	0	0	13
Asymptomatic	1	0	0	0	1	0	1
Unrelated	14	0	0	0	0	0	0
Unavailable	26	0	0	0	0	0	0
TOTAL	211	47	34	30	60	1	169
MADERA							
Definite	3	1	0	2	0	0	3
Probable	11	0	2	9	0	1	10
Possible	1	0	1	0	0	0	1
Unrelated	1	0	0	0	0	0	0
TOTAL	16	1	3	11	0	1	14
MARIN							
Definite	1	1	0	0	0	0	1
Probable	2	1	0	0	1	0	2
Possible	2	0	0	1	1	0	2
Unrelated	2	0	0	0	0	0	0
Insufficient	1	0	0	0	0	0	0

TOTAL	8	2	0	1	2	0	5
MENDOCINO							
Definite	2	2	0	0	0	0	2
Probable	4	3	0	1	0	0	4
Possible	1	0	0	0	1	0	1
Unlikely	2	0	1	1	0	1	1
Unavailable	1	0	0	0	0	0	0
TOTAL	10	5	1	2	1	1	8
MERCED							
Definite	4	3	1	0	0	0	4
Probable	7	2	2	0	3	1	6
Possible	16	0	12	0	4	12	4
Unlikely	3	0	1	1	1	0	3
Asymptomatic	1	0	0	0	1	0	1
Unrelated	6	0	0	0	0	0	0
Unavailable	3	0	0	0	0	0	0
TOTAL	40	5	16	1	9	13	18
MONTEREY							
Definite	10	2	8	0	0	9	1
Probable	63	4	45	12	2	56	7
Possible	5	0	2	0	3	4	1
Unlikely	1	1	0	0	0	1	0
Asymptomatic	34	0	24	10	0	34	0
Unrelated	3	0	0	0	0	0	0
Insufficient	1	0	0	0	0	0	0
TOTAL	117	7	79	22	5	104	9
NAPA							
Probable	5	0	3	0	2	3	2
Possible	1	0	0	0	1	0	1
Unrelated	2	0	0	0	0	0	0
TOTAL	8	0	3	0	3	3	3
NEVADA							
Probable	3	0	0	2	1	0	3
Unrelated	1	0	0	0	0	0	0
Insufficient	1	0	0	0	0	0	0
TOTAL	5	0	0	2	1	0	3

ORANGE							
Definite	5	3	0	0	2	0	5
Probable	17	5	5	1	6	0	17
Possible	10	2	2	3	3	0	9
Unlikely	2	0	0	1	1	0	2
Unrelated	3	0	0	0	0	0	0
Insufficient	2	0	0	0	0	0	0
Unavailable	6	0	0	0	0	0	0
TOTAL	45	10	7	5	12	0	33
PLACER							
Definite	2	0	1	0	1	0	2
Probable	3	1	1	0	1	0	3
Possible	1	1	0	0	0	0	1
Unavailable	1	0	0	0	0	0	0
TOTAL	7	2	2	0	2	0	6
PLUMAS							
Probable	2	1	1	0	0	0	2
TOTAL	2	1	1	0	0	0	2
RIVERSIDE							
Definite	5	3	2	0	0	0	5
Probable	18	6	4	1	7	0	18
Possible	16	1	1	2	12	1	15
Unlikely	1	1	0	0	0	0	1
Unrelated	5	0	0	0	0	0	0
Insufficient	1	0	0	0	0	0	0
Unavailable	8	0	0	0	0	0	0
TOTAL	54	11	7	3	19	1	39
SACRAMENTO							
Definite	9	7	2	0	0	0	9
Probable	16	8	3	1	4	1	14
Possible	6	0	2	1	3	1	4
Unlikely	1	0	0	0	1	0	1
Unrelated	1	0	0	0	0	0	0
Unavailable	9	0	0	0	0	0	0
TOTAL	42	15	7	2	8	2	28
SAN BENITO							

Definite	1	1	0	0	0	1	0
Probable	1	0	0	1	0	1	0
Unrelated	1	0	0	0	0	0	0
TOTAL	3	1	0	1	0	2	0
SAN BERNARDINO							
Definite	8	4	2	0	2	0	8
Probable	23	5	7	2	9	0	23
Possible	9	0	2	0	7	0	9
Unlikely	4	0	0	1	3	0	4
Asymptomatic	1	0	0	0	1	0	1
Unrelated	13	0	0	0	0	0	0
Unavailable	3	0	0	0	0	0	0
TOTAL	61	9	11	3	22	0	45
SAN DIEGO							
Definite	11	3	4	2	2	0	10
Probable	54	12	11	24	7	1	53
Possible	17	1	2	1	13	1	16
Unlikely	1	0	0	0	1	0	1
Asymptomatic	6	0	0	5	1	0	6
Unrelated	9	0	0	0	0	0	0
Unavailable	7	0	0	0	0	0	0
TOTAL	105	16	17	32	24	2	86
SAN FRANCISCO							
Definite	5	3	0	1	1	0	5
Probable	6	3	2	0	1	0	6
Possible	2	0	0	0	2	0	2
Unlikely	1	1	0	0	0	0	1
Unrelated	1	0	0	0	0	0	0
TOTAL	15	7	2	1	4	0	14
SAN JOAQUIN							
Definite	5	4	1	0	0	1	4
Probable	7	3	2	1	1	2	5
Possible	6	1	1	2	2	0	6
Unlikely	5	1	0	2	2	3	2
Unrelated	8	0	0	0	0	0	0
Unavailable	4	0	0	0	0	0	0

TOTAL	35	9	4	5	5	6	17
SAN LUIS OBISPO							
Definite	4	2	0	1	1	2	2
Possible	2	0	2	0	0	2	0
Unlikely	1	0	0	0	1	0	1
Unrelated	3	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0
TOTAL	11	2	2	1	2	4	3
SAN MATEO							
Definite	1	1	0	0	0	0	1
Probable	5	2	2	0	1	0	5
Possible	2	0	0	2	0	0	2
Unavailable	3	0	0	0	0	0	0
TOTAL	11	3	2	2	1	0	8
SANTA BARBARA							
Definite	4	4	0	0	0	0	4
Probable	8	1	5	1	1	6	2
Possible	9	1	7	1	0	7	2
Unlikely	1	0	0	0	1	0	1
Indirect	4	0	0	4	0	0	4
Asymptomatic	5	0	5	0	0	5	0
Unrelated	2	0	0	0	0	0	0
Insufficient	1	0	0	0	0	0	0
TOTAL	34	6	17	6	2	18	13
SANTA CLARA							
Definite	7	3	1	1	2	0	7
Probable	26	5	18	1	2	0	26
Possible	1	1	0	0	0	0	1
Unlikely	2	0	0	0	2	0	2
Asymptomatic	1	1	0	0	0	0	1
Unrelated	3	0	0	0	0	0	0
Unavailable	3	0	0	0	0	0	0
TOTAL	43	10	19	2	6	0	37
SANTA CRUZ							
Definite	5	4	1	0	0	1	4
Probable	4	2	1	1	0	0	4

Possible	2	0	0	0	2	0	2
Unrelated	2	0	0	0	0	0	0
Unavailable	5	0	0	0	0	0	0
TOTAL	18	6	2	1	2	1	10
SHASTA							
Probable	7	3	3	0	1	0	7
Unlikely	2	0	0	1	1	0	2
Unrelated	1	0	0	0	0	0	0
Unavailable	2	0	0	0	0	0	0
TOTAL	12	3	3	1	2	0	9
SISKIYOU							
Possible	1	0	1	0	0	1	0
TOTAL	1	0	1	0	0	1	0
SOLANO							
Probable	2	1	1	0	0	0	2
Possible	3	1	1	0	1	0	3
Asymptomatic	1	0	0	0	1	0	1
Unrelated	2	0	0	0	0	0	0
Unavailable	2	0	0	0	0	0	0
TOTAL	10	2	2	0	2	0	6
SONOMA							
Probable	3	1	1	0	1	0	3
Possible	4	0	0	0	4	2	2
Asymptomatic	2	2	0	0	0	1	1
Unrelated	1	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0
TOTAL	11	3	1	0	5	3	6
STANISLAUS							
Definite	3	2	1	0	0	0	3
Probable	10	2	6	1	1	1	8
Possible	4	3	0	0	1	0	4
Unlikely	4	0	0	1	3	0	3
Unrelated	5	0	0	0	0	0	0
Unavailable	3	0	0	0	0	0	0
TOTAL	29	7	7	2	5	1	18
SUTTER							

Probable	1	1	0	0	0	0	1
TOTAL	1	1	0	0	0	0	1
TEHAMA							
Probable	3	1	0	0	2	1	2
Possible	3	1	0	0	2	2	1
TOTAL	6	2	0	0	4	3	3
TULARE							
Definite	7	2	0	5	0	0	7
Probable	44	3	31	7	3	38	6
Possible	4	1	0	1	2	1	3
Unlikely	1	0	0	0	1	0	1
Asymptomatic	11	0	11	0	0	11	0
Unrelated	3	0	0	0	0	0	0
Unavailable	4	0	0	0	0	0	0
TOTAL	74	6	42	13	6	50	17
TUOLUMNE							
Probable	2	2	0	0	0	0	2
Possible	2	1	0	0	1	0	2
Unlikely	1	0	1	0	0	0	1
TOTAL	5	3	1	0	1	0	5
VENTURA							
Definite	2	0	1	1	0	1	1
Probable	6	1	3	0	2	2	4
Possible	4	1	0	1	2	0	4
Unlikely	1	0	0	0	1	1	0
Unrelated	2	0	0	0	0	0	0
Unavailable	3	0	0	0	0	0	0
TOTAL	18	2	4	2	5	4	9
YOLO							
Definite	5	1	4	0	0	0	5
Probable	52	4	46	0	2	1	51
Possible	1	1	0	0	0	0	1
Unavailable	2	0	0	0	0	0	0
TOTAL	60	6	50	0	2	1	57
YUBA							
Probable	4	1	1	0	2	0	4

Possible	3	0	0	0	3	2	1
Unlikely	2	0	0	0	2	1	1
Insufficient	1	0	0	0	0	0	0
Unavailable	3	0	0	0	0	0	0
TOTAL	13	1	1	0	7	3	6

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

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

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

- 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.

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:

California Department of Pesticide Regulation

Worker Health and Safety Branch

Phone: (916) 445-4222.

Physical address: 1001 I St., Sacramento CA 95814-2828.

Mailing address: P.O. Box 4015, Sacramento, CA 95812-4015

Fax: (916) 445-4280

www.cdpr.ca.gov

About the Pesticide Illness Surveillance Program Data

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

**Cases Reported in California¹ with Documented² Pesticide Exposure
Summarized by the Type of Illness and the Type of Pesticides
2011**

Type of Illness ³	Antimicrobials ⁴		Cholinesterase Inhibitors ⁴		Other Pesticides ⁴		Total
	Occupational ⁵	Non-Occupational ⁵	Occupational ⁵	Non-Occupational ⁵	Occupational ⁵	Non-Occupational ⁵	
Systemic							
Systemic with Respiratory and Topical Effects	21	6	6	0	41	20	94
Systemic with Respiratory Effects	37	35	10	9	31	67	191
Systemic Only	13	33	45	8	40	91	234
Systemic with Topical Effects	13	6	14	1	31	16	81
Respiratory							
Respiratory Only	35	46	6	1	8	26	124
Respiratory with Topical Effects	11	10	2	1	12	20	57
Topical							
Skin Only	35	3	2	1	13	16	72
Eye Only	94	25	2	2	21	32	176
Eye and Skin	12	3	1	0	7	15	38
Asymptomatic							
Asymptomatic	1	0	41	0	30	5	77
TOTAL	272	167	129	23	234	308	1144

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

2 **Documented Pesticide Exposure:** Includes cases classified as definitely, probably, or possibly related to pesticide exposure as well as documented pesticide exposure that did not result in symptomatology.

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

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

Possible : 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 (miosis and lacrimation) related to effects on internal bodily systems. These signs are classified under ‘Systemic.’

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

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

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

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

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

5 **Occupational or Non-Occupational:** The relationship between the illness/injury and the individual’s work.

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

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

6 In an additional 11 cases, occupational status remained unknown.

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**Hospitalization and Disability Associated with Illnesses/Injuries *Definitely or Probably Related to Pesticide Exposure in California*^{1,2}, Summarized by Occupational Status and Activity
2011**

Occupational³

Activity ⁴	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown ⁵	No. Cases	%	Unknown ⁶
Mixer/Loader	32	1	3.0	0	5	15.0	2
Applicator	125	0	0	0	18	14.0	18
Mechanical	13	0	0	0	3	23.0	2
Packaging/Processing	52	3	5.0	0	13	25.0	22
Field Worker	116	1	0	0	5	4.0	1
Routine Indoor	54	0	0	0	9	16.0	7
Routine Outdoor	14	0	0	0	0	0	1
Manufacturing/Formulation	2	0	0	0	0	0	1
Transport/Storage/Disposal	8	0	0	0	2	25.0	1
Other	53	0	0	0	11	20.0	5
Unknown	10	0	0	0	1	10.0	7
Total Occupational⁷	479	5	1.0	0	67	14.0	67

Non-Occupational³

Activity ⁴	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown ⁵	No. Cases	%	Unknown ⁶
Mixer/Loader	12	0	0	0	0	0	3
Applicator	124	3	2.0	1	2	1.0	49
Routine Indoor	113	1	0	0	3	2.0	37
Routine Outdoor	27	1	3.0	0	0	0	18
Transport/Storage/Disposal	1	0	0	0	0	0	0
Other	44	7	15.0	4	6	13.0	23
Unknown	11	0	0	1	0	0	9
Total Non-Occupational⁷	332	12	3.6	6	11	3.3	139
TOTAL CASES⁷	818	18	2.2	7	79	9.7	212

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

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

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

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

3 Occupational 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 or conducts maintenance) pesticide contaminated equipment used to mix, load or apply pesticides as well as the protective equipment used by individuals involved in such activities. This excludes the following: 1) maintenance performed by applicators on their equipment incidental to the application; 2) maintenance performed by mixer/loaders on their equipment incidental to mixing and loading; 3) decontamination by HAZMAT teams.

Packaging/Processing : Handles (packs, processes or retails agricultural commodities from the packing house to the final market place. Field packing of agricultural commodities is classified as FIELD WORKER.

Field Worker : Works in an agricultural field performing tasks such as advising, scouting, harvesting, thinning, irrigating, driving tractor (except as part of an application), field packing, conducting cultural work in a greenhouse, etc. Researchers performing similar tasks in an agricultural field are also included.

Routine Indoor : Conducts activities in an indoor environment with minimal expectation for exposure to pesticides. This includes people in offices and businesses, residential structures, etc. who are not handling pesticides.

Routine Outdoor : Conducts activities in an outdoor environment with minimal expectation for exposure to pesticides. This excludes field workers in agricultural fields. This includes gardeners who are not handling pesticides.

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

Transport/Storage/Disposal : Transports or stores pesticides between packaging and preparation for use. This includes shipping, warehousing and retailing as well as storage by the end-user prior to preparation for use. Disposal of unused pesticides is also included in this activity. This excludes driving a nurse rig to an application site.

- Emergency Response : Emergency Response Personnel (Police, fire, ambulance and HAZMAT personnel) responding to a fire, spill, accident or any other pesticide incident in the line of duty.
- Other : Activity is not adequately described by any other activity category. This includes but is not limited to: 1) being inside a vehicle; 2) dog groomers not handling pesticides; 3) individuals handling pesticide treated wood; 4) two or more activities with potential for pesticide exposure.
- Unknown : Activity is not known.

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

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

7 This total includes 7 cases in which the activity could not be determined as occupational or non-occupational. Of the 7 cases with unknown occupational status, 1 was hospitalized, 1 had disability, 1 remained unknown if hospitalization occurred or not, and 1 remained unknown if disability occurred or not. The remaining 3 had no hospitalization or disability.

Whom to Contact:

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About the Pesticide Illness Surveillance Program Data

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

**Hospitalization and Disability Associated with Illnesses/Injuries *Possibly Related to Pesticide Exposure in California*^{1,2}, Summarized by Occupational Status and Activity
2011**

Occupational³

Activity ⁴	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown ⁵	No. Cases	%	Unknown ⁶
Mixer/Loader	3	0	0	0	1	33.0	0
Applicator	28	0	0	1	6	21.0	6
Mechanical	1	0	0	0	0	0	1
Packaging/Processing	2	0	0	0	0	0	0
Field Worker	21	0	0	0	1	4.0	0
Routine Indoor	14	0	0	0	2	14.0	6
Routine Outdoor	4	0	0	0	1	25.0	2
Transport/Storage/Disposal	3	0	0	0	0	0	2
Other	5	0	0	0	1	20.0	1
Unknown	3	0	0	0	0	0	1
Total Occupational⁷	84	0	0	1	12	14.3	19

Non-Occupational³

Activity ⁴	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown ⁵	No. Cases	%	Unknown ⁶
Applicator	48	1	2.0	1	1	2.0	28
Routine Indoor	48	3	6.0	1	2	4.0	20
Routine Outdoor	14	0	0	0	0	0	5
Transport/Storage/Disposal	2	0	0	0	0	0	1
Other	44	1	2.0	5	0	0	25
Unknown	5	0	0	0	0	0	5
Total Non-Occupational⁷	161	5	3.1	7	3	1.9	84
TOTAL CASES⁷	249	5	2.0	9	15	6.0	107

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

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

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

3 Occupational 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

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- Unknown : Activity is not known.

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- 7** This total includes 4 cases in which the activity could not be determined as occupational or non-occupational.

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**Illnesses and Injuries Reported in California¹ Associated With² Pesticide Exposure
Summarized by the Type of Activity and Type of Exposure
2011**

Occupational³

Type of Activity⁴	Type of Exposure⁵								
	Drift	Residue	Direct Spray/ Squirt	Spill/ Other Direct	Ingestion	Multiple	Other	Unknown	Total⁶
Mixer/Loader	8	0	3	21	0	0	1	2	35
Applicator	28	4	15	76	1	4	6	19	153
Mechanical	2	2	7	2	0	0	0	1	14
Packaging/Processing	48	3	2	0	0	0	0	1	54
Field Worker	99	28	1	1	0	1	0	7	137
Routine Indoor	21	36	2	2	0	0	4	3	68
Routine Outdoor	15	0	0	1	1	0	1	0	18
Manufacturing/Formulation	0	0	0	2	0	0	0	0	2
Transport/Storage/Disposal	0	0	1	7	0	0	2	1	11
Other	23	10	5	11	2	1	2	4	58
Unknown	2	0	0	5	1	0	0	5	13
Total Occupational Cases	246	83	36	128	5	6	16	43	563

Non-Occupational³

Type of Activity ⁴	Type of Exposure ⁵								
	Drift	Residue	Direct Spray/Squirt	Spill/Other Direct	Ingestion	Multiple	Other	Unknown	Total ⁶
Mixer/Loader	5	0	1	5	0	1	0	0	12
Applicator	76	6	22	29	3	6	0	30	172
Routine Indoor	26	48	11	10	50	5	7	4	161
Routine Outdoor	11	2	2	12	6	2	3	3	41
Transport/Storage/Disposal	0	0	1	1	0	0	1	0	3
Other	11	11	4	6	39	2	9	6	88
Unknown	4	2	3	2	3	0	1	1	16
Total Non-Occupational Cases	133	69	44	65	101	16	21	44	493
Total Occupational/ Non-Occupational Cases	379	152	80	193	106	22	37	87	1056

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

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

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

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

Possible : 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.

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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 there were no illnesses that occurred under that category.

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

6 In an additional 11 cases, occupational status remained unknown.

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**Illnesses and Injuries Reported by California Physicians¹ Associated With²
Pesticide Exposure Summarized by Pesticide(s) and Type of Illness
2011**

Pesticide ³	Systemic/ Respiratory ⁴		Topical ⁴		TOTAL	
	Definite/ Probable	Possible	Definite/ Probable	Possible	Definite/ Probable	Possible
Organophosphates						
Acephate	1	0	0	0	1	0
Chlorpyrifos	3	3	0	0	3	3
DDVP	1	0	0	0	1	0
Diazinon	2	0	0	0	2	0
Malathion	1	1	1	1	2	2
Naled	0	1	0	0	0	1
Phosmet	0	1	0	1	0	2
N-Methyl Carbamates						
Propoxur	1	1	0	0	1	1
Pyrethrins and Pyrethroids						
Allethrin	1	1	0	0	1	1
Beta-Cyfluthrin	24	4	0	1	24	5
Bifenthrin	0	4	1	0	1	4
Cyfluthrin	2	0	0	0	2	0
Cyhalothrin	0	2	0	0	0	2
Cypermethrin	13	5	0	0	13	5
Deltamethrin	3	3	0	0	3	3
Esfenvalerate	2	1	1	1	3	2
Gamma-Cyhalothrin	2	0	0	0	2	0
Lambda-Cyhalothrin	7	3	2	1	9	4
Permethrin	3	0	1	1	4	1
Phenothrin	0	0	1	0	1	0
Pyrethrins	3	2	1	2	4	4
Resmethrin	1	0	0	0	1	0
Tetramethrin	1	0	0	0	1	0
Organochlorines						
Chlordane	0	2	0	0	0	2
Other Pesticides						
Abamectin	0	1	0	0	0	1

Adjuvant	0	0	2	0	2	0
Aluminum Phosphide	3	0	0	0	3	0
Bacillus Thuringiensis	1	1	0	0	1	1
Benfluralin	0	1	0	0	0	1
Boric Acid	8	4	0	0	8	4
Brodifacoum	2	1	0	0	2	1
Bromethalin	0	1	0	0	0	1
Bromine	1	0	0	0	1	0
Calcium Hydroxide	0	0	1	0	1	0
Calcium Hypochlorite	9	0	5	0	14	0
Chlorfenapyr	0	1	0	0	0	1
Chlorhexidine Diacetate	0	0	1	1	1	1
Chlorine	5	0	1	1	6	1
Chlorine Dioxide	1	0	1	0	2	0
Chlorothalonil	0	0	0	1	0	1
Combinations of Antimicrobials	103	2	16	4	119	6
Combinations of Fumigants	30	1	4	0	34	1
Combinations of Fungicides	22	2	4	0	26	2
Combinations of Herbicides	10	5	6	2	16	7
Combinations of Insecticides Including ChE Inhibitor(s)	35	8	2	2	37	10
Combinations of Insecticides Without ChE Inhibitor(s)	42	25	16	4	58	29
Copper	0	1	0	0	0	1
Copper Naphthenate	2	1	0	0	2	1
Copper Sulfate	1	0	1	0	2	0
Cyanuric Acid	8	0	5	1	13	1
Diatomaceous Earth	1	0	0	0	1	0
Dichlobenil	1	0	0	0	1	0
Dinoseb	0	0	1	0	1	0
Dinotefuran	0	1	0	0	0	1
Diquat	1	0	0	0	1	0
Fipronil	1	0	1	0	2	0
Gibberellic Acid	0	1	0	0	0	1
Glutaraldehyde	3	0	4	0	7	0
Glyphosate	3	4	3	2	6	6
Halogenated Hydantoin	3	0	0	0	3	0
Hydramethylnon	1	0	0	0	1	0
Hydrogen Chloride	3	0	4	0	7	0
Imidacloprid	0	0	0	1	0	1
Isothiazoline Disinfectants	0	0	1	0	1	0

Lime-sulfur	1	0	0	0	1	0
Mandipropamid	0	0	1	0	1	0
Mefenoxam	1	0	0	0	1	0
Metaldehyde	1	1	1	0	2	1
Metam-sodium	3	1	10	1	13	2
Methyl Bromide	2	0	0	0	2	0
Miscellaneous Combinations	69	33	6	6	75	39
Myclobutanil	0	0	1	0	1	0
Neem Oil	1	1	0	0	1	1
OIL OF LEMONGRASS	0	0	1	0	1	0
Oxyfluorfen	0	3	0	0	0	3
Ozone	1	1	0	0	1	1
Para-Dichlorobenzene	1	0	0	0	1	0
Paraformaldehyde	7	0	0	0	7	0
Paraquat	1	0	0	2	1	2
Petroleum Oil	0	1	0	0	0	1
Phenolic Disinfectants	2	0	1	0	3	0
Phthalaldehyde	1	0	1	0	2	0
Pine Oil	1	0	0	0	1	0
Quaternary Ammonia	6	0	44	0	50	0
Sodium Chlorite	1	0	0	0	1	0
Sodium Hypochlorite	67	18	68	5	135	23
Spinosad	0	1	0	0	0	1
Sulfur	6	3	0	2	6	5
Sulfur Dioxide	2	0	1	0	3	0
Sulfuryl Fluoride	3	1	1	0	4	1
Thiamethoxam	0	1	0	0	0	1
Thiophanate-methyl	1	0	0	0	1	0
Triclopyr	0	0	0	1	0	1
Unknown Antimicrobials	10	3	7	0	17	3
Unknown Fungicides	1	0	0	0	1	0
Unknown Herbicides	1	1	2	1	3	2
Unknown Insecticides	17	29	5	4	22	33
Unknown Pesticides	3	7	0	0	3	7
TOTAL	581	200	237	49	818	249

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

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

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

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

Possible : 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 (bacteria, viruses, etc.).

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

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

4 Type of Illness: Categorization of the type of symptoms experienced.

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

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

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

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

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Summary of Cases Reported by California¹ as Associated With² Pesticide Exposure Summarized by Occupational Status and by Location of the Incident 2011

Incident Setting ³	Occupational Exposures ⁴		Non-Occupational Exposures ⁴		TOTAL ⁵	
	Definite/Probable	Possible	Definite/Probable	Possible	Definite/Probable	Possible
Farm	132	35	1	13	133	48
Nursery	2	2	0	0	2	2
Livestock Production Facility	3	0	0	0	3	0
Crop/Livestock Processing Facility	73	3	0	0	73	3
Animal Premise (Veterinary, Kennels, not Livestock)	9	0	1	0	10	0
Single Family Home	3	1	142	40	145	41
Multi-unit Housing	6	4	49	24	56	28
Labor Housing	0	0	1	0	1	0
Residence (Other or Unspecified)	1	0	76	50	77	50
Residential Institution	4	0	1	0	5	0
School	12	0	0	0	12	0
Prison	3	1	1	1	4	2
Hospital/Medical	46	1	0	0	46	1
Pesticide Manufacturing Facility	2	2	0	0	2	2
Industrial or Other Manufacturing Facility	7	1	0	0	7	1
Wood Treatment	1	0	0	0	1	0
Office/Business	46	5	0	0	46	5
Retail Establishment	23	6	2	0	25	6
Service Establishment	57	7	24	0	81	7
Wholesale Establishment	1	0	0	0	1	0
Road/Rail Or Utility Right Of Way	11	1	4	6	15	7
Park	5	2	0	0	5	2
Golf Course	1	1	0	0	1	1
Landscape, Lawn	0	1	2	2	2	3
Landscape, Other	2	2	6	5	8	7
Other (Telephone Poles, Fences, Etc)	11	5	3	1	14	6
Unknown	18	4	19	19	43	27
TOTAL	479	84	332	161	818	249

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

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

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

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

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

Industrial Or Other Manufacturing Facility : Facilities involved in the mechanical or chemical transformations of materials or substances into new products. This excludes: 1) facilities engaged in manufacture or formulation of pesticides; and 2) facilities engaged in treatment of wood to protect against pest damage.

Wood Treatment	: Establishments involved in the treatment of wood with preservatives to protect against pest damage.
Office/Business	: Commercial establishments including public and private business offices. This excludes retail establishments and service establishments.
Retail Establishment	: Businesses engaged in selling merchandise for personal or household consumption and providing services related to the products. This excludes restaurants which are classified under service establishment.
Service Establishment	: Establishments engaged in providing services to individuals, businesses and government. This includes restaurants, laundries, etc. This excludes medical service establishments.
Wholesale Establishment	: Establishments involved in the distribution of merchandise to retail establishments or other wholesale establishments. This excludes "wholesalers" who sell directly to the public.
Road/Rail Or Utility Right Of Way	: Roads, rails or utilities and adjacent right-of-way areas. This includes aqueducts, manholes, landscaped median strips and vehicles moving along roadways.
Park	: An area of public land set aside for recreation. This includes public swimming pool facilities. This excludes private recreational facilities such as amusement parks, physical fitness facilities, etc. which are classified under SERVICE ESTABLISHMENT.
Golf Course	: Land used for playing or practicing golf, including putting greens and driving ranges. This excludes miniature golf courses.
Landscape, Lawn	: Landscaped lawns. This excludes lawn areas in the following locations: 1) road/rail or utility right-of-ways; 2) parks; and 3) golf courses.
Landscape, Other	: Landscaped ornamental shrub and tree areas. This excludes ornamental shrub and tree areas in the following locations: 1) road/rail or utility right-of-ways; 2) parks; and 3) golf courses.
Other	: Location of exposure occurred at a site not adequately described in any other incident setting category. This includes, but is not limited to, telephone poles, fences, water supply systems and wastewater treatment plants.
Unknown	: The location of the incident is unknown.

4 Occupational 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).

5 In an additional 11 cases, occupational status remained unknown.

Whom to Contact:

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About the Pesticide Illness Surveillance Program Data

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

**Summary of Cases Reported in California¹ as Associated With² Pesticide Exposure
Summarized by Gender, Age Distribution, by Type of Pesticide and by Type of Use
2011**

Agricultural Use Pesticide Exposure Incidents³

Age Group	Pesticides other than Antimicrobial Pesticides ⁴			Antimicrobial Pesticides ⁴			Total ⁵
	Male	Female	Unknown	Male	Female	Unknown	
Unknown	36	31	1	0	0	0	68
0 - 9	2	1	0	0	0	0	3
10 - 14	0	0	0	1	0	0	1
15 - 19	6	1	0	1	0	0	8
20 - 29	21	11	0	2	0	0	34
30 - 39	26	22	0	2	2	0	52
40 - 49	22	10	0	1	2	0	35
50 - 59	17	9	0	2	0	0	28
60 - 69	7	1	0	0	0	0	8
70 +	1	1	0	0	0	0	2
TOTAL⁵	138	87	1	9	4	0	239

Non-Agricultural Use Pesticide Exposure Incidents³

Age Group	Pesticides other than Antimicrobial Pesticides ⁴			Antimicrobial Pesticides ⁴			Total ⁵
	Male	Female	Unknown	Male	Female	Unknown	
Unknown	7	18	0	1	9	0	35
0 - 9	34	30	0	29	15	0	108
10 - 14	3	5	0	6	3	0	17
15 - 19	13	5	0	9	10	0	37
20 - 29	26	17	0	38	43	0	124
30 - 39	38	27	0	23	42	0	130
40 - 49	32	17	0	36	65	0	150
50 - 59	25	25	0	33	38	0	121
60 - 69	22	15	0	7	10	0	54
70 +	14	17	0	5	4	0	40
TOTAL⁵	214	176	0	187	239	0	816

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

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

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

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

Possible : 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 (bacteria, viruses, etc.).

5 In 2011, an additional 12 cases could not be determined as agricultural or non-agricultural use situations.

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About the Pesticide Illness Surveillance Program Data

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

***Agricultural Drift Cases Reported in California¹ Associated With² Pesticide
Exposure Summarized by Application Sites
2011***

Application Site³	Number of Cases⁴	Number of Incidents⁵
BERRIES		
Strawberries	4	2
CITRUS		
Citrus (Other or Unspecified)	1	1
Lemons	2	1
Oranges	6	2
FORAGE CROP		
Alfalfa	14	1
FRUITING VEGETABLE		
Tomatoes	6	1
GRAIN		
Corn	12	2
Wheat	8	1
GRAPES		
Grapes	18	3
IMPLEMENTS		
Inanimate Objects	1	1
LEAFY/STEM VEGETABLE		
Lettuce	6	3
Celery	12	3
Leafy/Stem Vegetables (Other or Unspecified)	8	1
NON-CROP		
Uncultivated Agricultural Areas (Other or Unspecified)	3	1
Soil	40	5
NOT APPLICABLE		
Not Applicable	2	2
NUT TREES		
Almonds	1	1
Pistachios	4	3
OTHER FRUIT		
Fruit (Other or Unspecified)	1	1

UNKNOWN		
Unknown	1	1
TOTAL	150	36

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

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

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

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

Possible : 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.

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**Agricultural Drift Cases¹ Reported by California Physicians as Associated With²
Pesticide Exposure Summarized by the Activity of the Exposed Person and by the
Type of Application Equipment Used
2011**

Type of Application Equipment Used ³	Type of Activity ⁴				
	Routine Indoor	Routine Outdoor	Field Worker	Other	Total
Fixed Wing Aircraft	0	0	14	0	14
Helicopter	0	9	18	1	28
Ground, Other or Unspecified	0	0	2	0	2
Ground Boom, Other or Unspecified	0	0	6	0	6
Ground, Boom Below/Behind	6	4	14	1	25
Airblast Sprayers	7	1	14	2	24
Power Dusters	0	3	0	0	3
Shank Injection without Tarps	0	2	0	3	5
Shank Injection with Tarps	0	2	31	0	33
Hand, Other or Unspecified	0	0	0	1	1
Backpack Sprayer	0	0	0	2	2
Aerosol/Fog Generating Equipment	0	0	0	2	2
Tarp	0	1	0	0	1
Automatic Equipment, Other or Unspecified	0	0	0	1	1
Manual Application Methods, Other or Unspecified	0	0	0	1	1
Not Applicable	0	0	0	2	2
TOTAL	13	22	99	16	150

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

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

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

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

Possible : 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 individual at the time of exposure.

Fieldworker	: Works in an agricultural field performing tasks such as advising, scouting, harvesting, thinning, irrigating, driving tractor (except as part of an application), field packing, conducting cultural work in a greenhouse, etc. Researchers performing similar tasks in an agricultural field are also included.
Routine Indoor	: Conducts activities in an indoor environment with minimal expectation for exposure to pesticides. This includes people in offices and businesses, residential structures, etc. who are not handling pesticides.
Routine Outdoor	: Conducts activities in an outdoor environment with minimal expectation for exposure to pesticides. This excludes field workers in agricultural fields. This includes gardeners who are not handling pesticides.
Other	: Any activity, including handling pesticides, other than routine indoor, routine outdoor, or field work.

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**Illnesses and Injuries of Application Workers Reported by California Physicians¹
Associated With² Pesticide Exposure Summarized by Type of Equipment, Type of
Activity and Occupational Status
2011**

Occupational³

Type of Equipment⁵	Type of Activity⁴				Total
	Mixer/ Loader	Applicator	Flagger	Mechanic	
Helicopter	1	0	0	0	1
Ground, Other or Unspecified	0	1	0	0	1
Ground Boom, Other or Unspecified	0	1	0	0	1
Ground, Boom Below/Behind	0	1	0	0	1
Over-the-Vine Boom	0	1	0	0	1
Airblast Sprayers	2	4	0	0	6
Hand, Other or Unspecified	3	27	0	0	30
Pressurized Hose-line Sprayers	0	12	0	1	13
Hand Pump Sprayer	1	6	0	0	7
Backpack Sprayer	0	9	0	0	9
Unpressurized Hand-held Spray Equipment	1	16	0	0	17
Aerosol Can	0	1	0	0	1
Foggers	0	1	0	0	1
Aerosol/Fog Generating Equipment	0	2	0	0	2
Chamber	2	0	0	0	2
Tarp	0	1	0	0	1
Automatic Equipment, Other/Unspecified	4	2	0	3	9
Automatic Equipment, Chlorinators	2	6	0	9	17
Drip Irrigation Equipment	0	0	0	1	1
Manual App. Methods, Other/Unspecified	10	8	0	0	18
Immersion Equipment	3	11	0	0	14
Implements with Handles	1	10	0	0	11
Implements without Handles	0	11	0	0	11
Manual Placement	2	8	0	0	10
Other	0	3	0	0	3
Unknown	3	11	0	0	14
Total Occupational Cases	35	153	0	14	202

Non-Occupational³

Type of Equipment ⁴	Type of Activity ⁵				
	Mixer/ Loader	Applicator	Flagger	Mechanic	Total
Hand, Other or Unspecified	2	27	0	0	29
Hand Pump Sprayer	3	13	0	0	16
Back Pack Sprayer	1	0	0	0	1
Unpressurized Hand-held Spray Equipment	0	19	0	0	19
Aerosol Can	0	30	0	0	30
Foggers	0	18	0	0	18
Automatic Equipment, Chlorinators	0	1	0	0	1
Manual Application Methods, Other or Unspecified	1	18	0	0	19
Implements with Handles	0	3	0	0	3
Implements without Handles	0	3	0	0	3
Manual Placement	5	21	0	0	26
Not Applicable	0	1	0	0	1
Other	0	1	0	0	1
Unknown	0	17	0	0	17
Total Non-Occupational Cases	12	172	0	0	184
Total Occupational/ Non-Occupational Cases⁶	47	325	0	14	386

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

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

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

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

Possible : 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 or conducts maintenance) pesticide contaminated equipment used to mix, load or apply pesticides as well as the protective equipment used by individuals involved in such activities. This excludes the following: 1) maintenance performed by applicators on their equipment incidental to the application; 2) maintenance performed by mixer/loaders on their equipment incidental to mixing and loading; 3) decontamination by HAZMAT teams.

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

Fixed Wing Aircraft	: Fixed wing aircraft.
Helicopter	: Helicopter.
Air, Other Or Unspecified	: Aerial application equipment, other or unspecified. This includes two or more types of aerial application equipment and excludes fixed wing aircraft and helicopters.
Over-The-Vine Boom	: Ground operated equipment with the arms of the spray boom extending over the tops of grapevines.
Electrostatic Sprayer	: Ground operated equipment designed to impart an electrical charge to the pesticide particles. The electrostatic designation for ground application equipment overrides any other type of equipment it is used with.
Airblast Sprayers	: Ground application equipment with a pump that delivers spray into an air stream created by a large fan at the back of the spray equipment.
Power Dusters	: Ground application equipment used to apply dust formulated pesticides.
Shank Injection Without Tarps	: Ground application equipment that uses a shank or other piece of equipment to directly apply a pesticide into the soil except when a tarp is placed over the soil, which is classified under shank injection with tarps. This also excludes surface applied pesticides that are subsequently incorporated into the soil by a cultivator.
Shank Injection With Tarps	: Ground application equipment that uses a shank or other piece of equipment to directly apply a pesticide into the soil. A tarp is placed over the soil to restrict the pesticide to the application site.
Ground, Other Or Unspecified	: Ground application equipment, unknown or unspecified. This includes two or more types of ground application.
Ground Boom, Other Or Unspecified	: Ground application equipment with a spray boom. The following are excluded: 1) Ground Boom Below/Behind, 2) Over-The-Vine Boom, and 3) Electrostatic Sprayer.
Ground Boom Below/Behind	: Ground application equipment with a spray boom located below or behind the equipment operator with the spray nozzles pointed downward.
Pressurized Hose-Line Sprayers	: Hand-held spray equipment attached by a long hose to a power-pressurized tank. This excludes hose-end sprayers, which are classified under hand, other or unspecified.
Hand Pump Sprayer	: Hand-held compressed air sprayer with small volume tanks (1 to 5 gallons). This excludes backpack sprayers.

Hand-Held Dusters	: Hand-held application equipment for granules or dust. This includes belly grinders, bellows, squeeze bulbs, etc.
Backpack 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.

6 In an additional 11 cases, occupational status remained unknown.

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About the Pesticide Illness Surveillance Program Data

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**Illnesses and Injuries in California¹ Associated With Pesticide Residue in
Agricultural Fields
1982-2011**

Year	Systemic/Respiratory ²		Topical ²		TOTAL
	Definite/ Probable ³	Possible ³	Definite/ Probable ³	Possible ³	
1982	23	43	48	117	231
1983	19	29	41	96	185
1984	8	9	49	112	178
1985	25	24	156	164	370
1986	30	14	155	60	259
1987	58	83	52	180	375
1988	57	37	74	202	370
1989	17	22	30	93	162
1990	3	32	11	119	165
1991	16	38	7	87	148
1992	11	57	19	112	199
1993	10	38	2	67	117
1994	33	31	5	42	111
1995	20	48	74	89	231
1996	29	37	15	60	141
1997	83	44	20	62	209
1998	40	19	5	47	111
1999	23	17	0	42	82
2000	21	30	2	22	75
2001	7	22	0	17	46
2002	30	23	13	12	78
2003	4	17	4	33	58
2004	15	27	1	25	68
2005	1	9	2	16	28
2006	1	9	2	13	25
2007	24	15	1	18	58
2008	48	16	2	7	73

Year	Systemic/Respiratory ²		Topical ²		TOTAL
	Definite/ Probable ³	Possible ³	Definite/ Probable ³	Possible ³	
2009	80	9	7	4	100
2010	8	8	1	2	19
2011	26	1	1	0	28
TOTAL⁴	744	807	798	1920	4272

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

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

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

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

Possible : Health effects correspond generally to the reported exposure, but evidence is not available to support a relationship.

4 Total reflects the total number of cases affected. Some cases are counted twice.

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Incidents Involving *Fieldworkers* Reported in California¹ Associated With² Pesticide Residue Exposure Summarized by Crop and Type of Illness 2011

Crop	Systemic/ Respiratory ³		Topical ³		TOTAL
	Definite/ Probable	Possible	Definite/ Probable	Possible	
FRUITING VEGETABLE					
Tomatoes	15	0	0	0	15
LEAFY/STEM VEGETABLE					
Broccoli	10	0	1	0	11
NON-CROP					
Soil	0	1	0	0	1
ROOT CROP VEGETABLE					
Beets	1	0	0	0	1
TOTAL	26	1	1	0	28

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

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

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

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

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

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

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**Pesticide-Associated Illnesses and Injuries Reported In California Schools^{1,2}
by Exposure Category, Pesticide Type and Illness Symptoms
2011**

Exposure ³	Systemic/ Respiratory ⁴			Topical ⁴			TOTAL
	Antimicrobials ⁵	Cholinesterase Inhibitors ⁵	Other Pesticides ⁵	Antimicrobials ⁵	Cholinesterase Inhibitors ⁵	Other Pesticides ⁵	
Drift	2	0	0	1	0	0	3
Residue	0	0	0	2	0	0	2
Spill/Other Direct	0	0	0	5	0	1	6
Ingestion	1	0	0	0	0	0	1
TOTAL	3	0	0	8	0	1	12

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

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

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

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

Possible : 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 there were no illnesses that occurred under that category.

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

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

- Direct Spray/Squirt : Material propelled by the application or mix/load equipment. Contact with the material can be by direct projection or ricochet. This includes exposure of mechanics working on application or mix/load equipment when the material is forced out by pressure.
- Spill/Other Direct : Any of the following: 1) Contact made during an application or mixing/loading operation where the material is not propelled by the equipment; 2) Expected direct contact during use (e.g. washing dishes in a disinfectant solution); 3) Leaks, spills, etc. not related to an application.
- Ingestion : Intentional or unintentional oral ingestion.
- Multiple : Contact with pesticides occurred through two or more mechanisms.
- Other : Other known route of exposure not included in other exposure categories. This includes, but not limited to: 1) Residue from a spill and 2) Exposure to smoke or 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 (miosis and 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 (bacteria, viruses, etc.).
- Cholinesterase Inhibitors : Pesticides known to inhibit the function of the cholinesterase enzyme.
- Other Pesticides : Any pesticide that is not an antimicrobial or cholinesterase-inhibiting pesticide.
- Asymptomatic : Exposure occurred, but did not result in illness/injury. Cholinesterase depression without symptoms falls in this category.

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2011 Case Reports of Illness and Injury Attributed to Pesticide Exposure by County¹

COUNTY	AGRICULTURAL ²					NON-AGRICULTURAL				
	Systemic		Topical		Total Ag	Systemic		Topical		Total Non-Ag
	Def/Pro ³	Pos ⁴	Def/Pro ³	Pos ⁴		Def/Pro ³	Pos ⁴	Def/Pro ³	Pos ⁴	
ALAMEDA	0	0	0	0	0	18	6	6	1	31
AMADOR	0	0	0	0	0	6	1	0	0	7
BUTTE	0	0	0	1	1	3	4	2	0	9
CALAVERAS	0	0	0	0	0	2	0	0	0	2
COLUSA	0	0	0	0	0	0	0	1	0	1
CONTRA COSTA	0	0	0	0	0	15	2	5	0	22
DEL NORTE	1	0	0	0	1	2	0	2	0	4
EL DORADO	0	0	0	0	0	1	0	1	0	2
FRESNO	15	2	4	2	23	11	7	15	4	37
GLENN	0	0	1	0	1	0	0	1	0	1
HUMBOLDT	0	0	0	0	0	5	2	1	0	8
IMPERIAL	11	3	7	1	22	2	3	1	1	7
INYO	0	0	0	0	0	0	0	1	0	1
KERN	2	5	1	0	8	10	8	8	1	27
KINGS	14	0	0	1	15	3	1	3	2	9
LAKE	1	0	0	0	1	2	0	0	0	2
LASSEN	0	0	0	0	0	0	1	0	0	1
LOS ANGELES	0	0	1	0	1	64	45	37	4	150
MADERA	1	0	0	0	1	4	1	9	0	14
MARIN	0	0	0	0	0	2	2	1	0	5
MENDOCINO	0	0	0	0	0	1	0	5	1	7
MERCED	1	12	0	0	13	5	3	5	1	14
MONTEREY	57	3	8	1	69	4	0	4	1	9
NAPA	3	0	0	0	3	1	1	1	0	3
NEVADA	0	0	0	0	0	3	0	0	0	3
ORANGE	0	0	0	0	0	16	7	6	2	31
PLACER	0	0	0	0	0	4	0	1	1	6
PLUMAS	0	0	0	0	0	2	0	0	0	2
RIVERSIDE	0	1	0	0	1	16	12	7	3	38
SACRAMENTO	1	1	0	0	2	19	4	4	0	27
SAN BENITO	1	0	1	0	2	0	0	0	0	0
SAN BERNARDINO	0	0	0	0	0	23	9	8	0	40
SAN DIEGO	0	1	1	0	2	51	14	12	2	79
SAN FRANCISCO	0	0	0	0	0	6	0	5	2	13
SAN JOAQUIN	1	0	2	0	3	7	4	2	2	15

COUNTY	AGRICULTURAL ²					NON-AGRICULTURAL				
	Systemic		Topical		Total Ag	Systemic		Topical		Total Non-Ag
	Def/Pro ³	Pos ⁴	Def/Pro ³	Pos ⁴		Def/Pro ³	Pos ⁴	Def/Pro ³	Pos ⁴	
SAN LUIS OBISPO	2	2	0	0	4	1	0	1	0	2
SAN MATEO	0	0	0	0	0	3	1	3	1	8
SANTA BARBARA	6	7	0	0	13	3	1	3	1	8
SANTA CLARA	0	0	0	0	0	24	1	9	0	34
SANTA CRUZ	0	0	1	0	1	3	1	5	1	10
SHASTA	0	0	0	0	0	3	0	4	0	7
SISKIYOU	0	1	0	0	1	0	0	0	0	0
SOLANO	0	0	0	0	0	1	2	1	1	5
SONOMA	0	1	0	1	2	1	2	2	0	5
STANISLAUS	1	0	0	0	1	8	3	3	1	15
SUTTER	0	0	0	0	0	0	0	1	0	1
TEHAMA	1	1	0	1	3	1	1	1	0	3
TULARE	34	1	4	0	39	9	1	4	2	16
TUOLUMNE	0	0	0	0	0	0	1	2	1	4
VENTURA	2	0	1	0	3	4	3	1	1	9
YOLO	0	0	1	0	1	51	0	5	1	57
YUBA	0	2	0	0	2	2	1	2	0	5

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

- 1 Counties not listed have no reported illnesses for the year 2011.
- 2 Cases classified as agricultural are those in which people were exposed to pesticides that had been or were being used to contribute to the production of an agricultural commodity.
- 3 “Def/Pro” indicates that after evaluation, cases were classified as definitely or probably related to pesticide exposure.
- 4 “Pos” indicates that after evaluation, cases were classified as possibly related to pesticide exposure.

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