SUMMARY OF RESULTS FROM THE CALIFORNIA PESTICIDE ILLNESS SURVEILLANCE PROGRAM
- 2002 -

HS-1851

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Worker Health and Safety Branch
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Pesticide Illness Surveillance Program – 2002

Background on the Reporting System

The California pesticide safety program, which the Department of Pesticide Regulation (DPR) administers, is widely regarded as the most stringent in the nation. Mandatory reporting of pesticide[1] illnesses has been part of this comprehensive program since 1971. The U.S. General Accounting Office (GAO, 1993) noted that "California had by far the most effective and well-established monitoring system in place" and that the U.S. Environmental Protection Agency (U.S. EPA) "relies heavily on the pesticide illness data collected by the California monitoring system . . . and has tried to encourage selected states to develop monitoring systems modeled after the California system."

DPR scientists participate in the national working group on pesticide illness surveillance convened by the National Institute for Occupational Safety and Health (NIOSH) to develop standards for information collection. DPR's 1998 upgrade of the Pesticide Illness Surveillance Program (PISP) database incorporated several features from the NIOSH standards. NIOSH now partially supports programs in the states of Massachusetts, Michigan, New Mexico, New York, Oregon, Texas, and Washington, which make use of the standards defined by the working group. This NIOSH program also provides technical assistance to the states of Arizona, Florida, and Louisiana, and supports pesticide-related work by the Occupational Health Branch of the California Department of Health Services, which coordinates with DPR's Worker Health & Safety Branch (WH&S). As yet, most of the other states have collected only limited numbers of case reports, and U.S. EPA still relies heavily on California data for evidence of pesticide-related adverse effects.

In 2002, DPR scientists made a concerted effort to develop rules by which questionable entries could be identified automatically. They determined that only a handful of data elements could

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

ever be left blank, and identified a series of necessary relationships among data elements. Data from 1992 through the present are being reviewed and updated to assure conformity with these standards. Data earlier than 1992 have not been revised to incorporate database upgrades, and will be presented only when historical perspective is important.

Excessive exposure to pesticides may cause illness by various mechanisms, and the surveillance program attempts to monitor all of them. Every pesticide active ingredient has a pharmacologic effect by which it controls its target pests. Pesticide products may have other potentially harmful properties in addition to the qualities designed to control pests. PISP collects information on adverse effects from any component of pesticide products including the active ingredients, inert ingredients, impurities, and breakdown products. Whether pesticide products act as irritants or as allergens, through their smell or by causing fires or explosions, DPR's mission is to mitigate exposures that compromise health.

DPR maintains its surveillance of human health effects of pesticide exposure in order to evaluate the circumstances of pesticide exposures that result in illness. The PISP database provides the means to identify high-risk situations warranting DPR action including the implementation of additional California restrictions on pesticide use. Taking illness data into consideration, DPR may adjust the restricted entry interval following pesticide application, specify buffer zones or other application conditions, or require pesticide handlers to use protective equipment that meets certain standards. Reviews of illness investigations concerning mixer/loader/applicators (Fong, 2001), field posting requirements (Spencer, 2001), and hazard communication/notification requirements (McCarthy, 2002) have contributed to developing proposals for modifying regulations. In some instances, changes to pesticide labels provide the most appropriate mitigation measures, and DPR cooperates with U.S. EPA to develop appropriate instructions for users throughout the country. If an illness incident results from illegal practices, state and county enforcement staff take appropriate action to deter future incidents. DPR has also revised the Pesticide Safety Information Series, a set of brochures for use in pesticide safety training, to help reduce exposures by making the language and presentation easier to understand.

Sources of Illness Cases

Under a statute enacted in 1971 and amended in 1977 (now codified as Health and Safety Code section 105200), California physicians are required to report any suspected case of pesticide-related illness or injury by telephone to the local health officer within 24 hours of examining the patient. The health officer informs the county agricultural commissioner (CAC) and also completes a pesticide illness report (PIR), copies of which are distributed to the Office of Environmental Health Hazard Assessment, Department of Industrial Relations (DIR), and DPR. Scientists regularly consult the data collected to evaluate the effectiveness of DPR's pesticide safety regulatory programs and assess the need for changes.

DPR strives to ensure that the PISP captures the majority of illness incidents and records them in its database. For example, since doctors do not always properly report pesticide cases, DPR also reviews Doctor's First Reports of Occupational Illness and Injury (DFROIIs), which California's Labor Code requires workers' compensation claims payers to forward to DIR. Scientists select for investigation any DFROII that mentions a pesticide, or pesticides in general, as a possible cause of injury. Reports that mention unspecified chemicals are also investigated if the setting is one in which pesticide use is likely. Until recently, two-thirds to three-quarters of the incidents investigated were identified through DFROII review.

Over the past several years, DPR has worked with the California Poison Control System (CPCS) to assist in identifying potential pesticide illnesses. Before 2000, DPR scientists managed two pilot projects in which CPCS specialists offered to report pesticide-related illnesses on behalf of physicians. Funds from U.S. EPA supported development of an enhanced system of poison control facilitation, which operated from mid-2001 through November 2002. Cooperation with CPCS identified several hundred exposures that otherwise would have escaped detection, but the State's fiscal crisis necessitated suspension of the contract. When resources become available, DPR will pursue funding for a continuing contractual relationship with CPCS. A summary of the 2002 reporting results from CPCS can be found at the end of this document.

The agricultural commissioners of the counties where incidents occurred investigate all identified incidents. They attempt to locate and interview all the people with knowledge of the

event, and also review relevant records. Primarily, their investigations determine whether pesticide safety requirements were fully followed. Secondarily, the CAC determines the causes of exposure and characterizes the illness. DPR provides instructions, training, and technical support for conducting investigations. These instructions include directions for when and how to collect samples of foliage, clothing, or surface residues to document environmental exposures. As part of the technical support, DPR maintains specialized laboratories to analyze the samples. The CACs prepare reports describing the circumstances in which pesticide exposure may have occurred and any other relevant aspects of the case. When appropriate, they request authorization from the affected people to include relevant portions of their medical records with the report. When investigations identify additional affected people (not previously reported by other mechanisms), they are identified in the investigation report and recorded in the PISP database. DPR scientists evaluate the physicians' reports and all the information the CACs have gathered. They then classify incidents according to the circumstances of pesticide exposure.

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

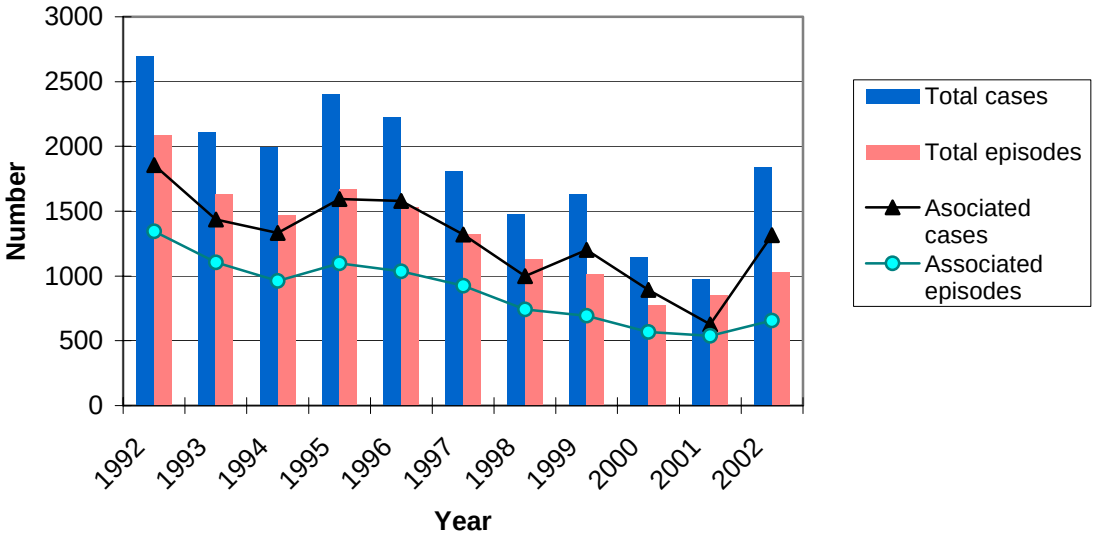
2002 Numeric Results -- Totals

The number of case investigations nearly doubled in calendar year 2002, increasing to 1,859 from the 2001 total of 979. This reverses a trend of declining case identification over the past decade, but does not represent a major increase in the number of events in which people were exposed to pesticides. In 2002, there were 1,029 episodes investigated compared to 852 in 2001 (see Figure 1). Several 2002 events exposed large numbers of individuals, each of whom is represented by a separate case record. Investigators collected information on 73 group episodes that occurred in 2002, involving a total of 903 individuals. Offsite movement from metam-sodium applications elicited 273 case reports in one episode and 138 in another (see descriptions under drift, below). By comparison, the 979 cases investigated in 2001 included only 173

reports of people exposed in 47 group episodes. The largest 2001 group episode involved 16 people. Assistance from CPCS also increased the number of cases identified in 2002.

Of the 1,859 cases investigated, DPR found that pesticide exposure had been at least a possible contributing factor to 1,316 (71 percent). Lack of information prevented evaluation of another 196 (11 percent) (Figure 2).

Figure 1: Number of Cases vs. Number of Episodes, 1992 - 2002

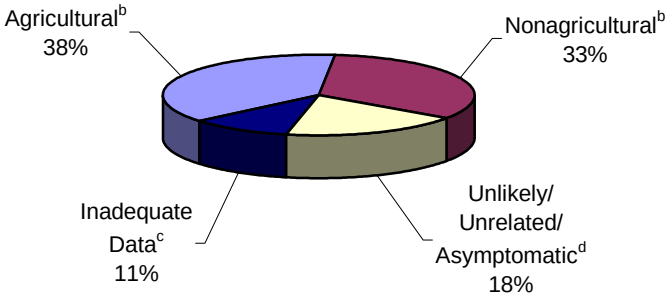


A case is the Pesticide Illness Surveillance Program representation of a person whose health problems may relate to pesticide exposure.
An episode is an event in which one or more people experienced pesticide exposure from a particular source.
Associated cases are those evaluated as definitely, probably,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

Of the 1,316 cases recognized as definitely, probably, or possibly related to pesticide exposure, 702 (53 percent) involved use of pesticides for agricultural purposes and 614 (47 percent) involved pesticide exposure in other settings. Evidence established a definite relationship to pesticide exposure for 105 of the 1,316 cases. Another 920 were classified as probable, with 291

entered as possible. Evidence established an unlikely or unrelated relationship to pesticide exposure for 343 of the 1,859 cases assigned for investigation. Four cases were attributed to precautions prescribed for avoiding pesticide exposure, and not to pesticide exposure (i.e. a reaction to the warning agent, chloropicrin, put in some fumigant products). Tabular summaries presenting different aspects of the data are available through DPR's Web site at www.cdpr.ca.gov/docs/dprdocs/pisp/2002pisp.htm, or by contacting the WH&S Branch.

Figure 2: Outcome of 2002 Illness Investigations[a]



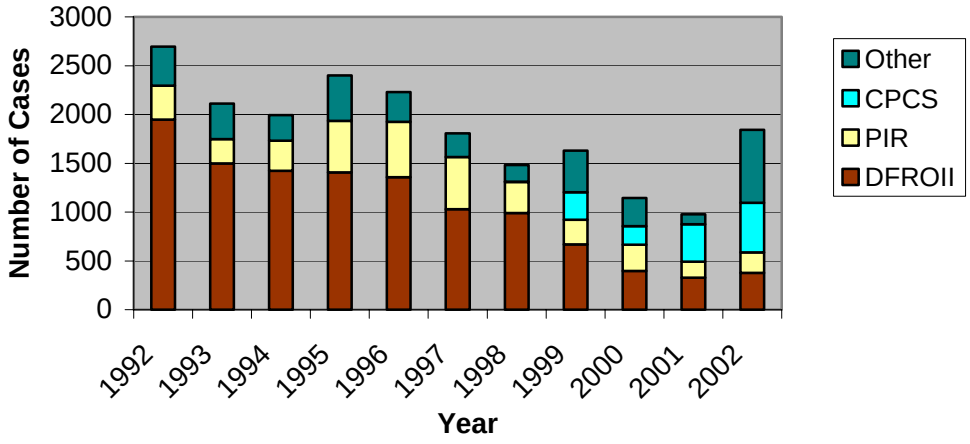
[a] Total cases investigated = 1859.
[b] *Agricultural* and *Nonagricultural* refers to the intended use of the pesticide.
[c] *Inadequate* means that there was not enough data available or reported to determine if pesticides were involved in the case.
[d] *Unlikely/Unrelated/Asymptomatic* refers to cases determined as unlikely related or unrelated to pesticide exposure or the exposed person did not develop symptoms.

Enforcement actions often are still under consideration when DPR receives the illness investigative reports. Based on the information available, DPR scientists identified contributory factors already prohibited by pesticide safety regulations in 255 (39 percent) of the 656 episodes in which at least one case was evaluated as definitely, probably, or possibly related to pesticide exposure. Violations during or following agricultural pesticide use contributed to 48 episodes and 207 episodes derived from other exposure circumstances. This indicates that improving compliance could further reduce illnesses.

Occupational exposures (those that occurred while the affected people were at work) accounted for 793 (60 percent) of the 1,316 pesticide-associated cases from 2002. Before 1999,

occupational exposures accounted for 90 percent of the cases classified as definitely, probably, or possibly related to pesticide exposure. The relative percentage of occupational vs. non-occupational cases is at least partially the result of case identification sources. Over the last decade the percent of cases identified through DFROIIs has decreased dramatically (Figure 3). DPR scientists have identified no demonstrable cause for the long-term decrease in case identification by DFROII retrieval. The percentage of occupational cases was further reduced in 2002 by the large number of people exposed by pesticide movement into a residential area.

Figure 3: Number of Cases Reported by Method of Reporting



DFROII – Doctor's First Report of Occupational Illnesses and Injury (Workers' Compensation report).
PIR – Pesticide Illness Report (physician reporting).
CPCS – California Poison Control System (facilitated physician reporting).
Other – All other methods of case identification.

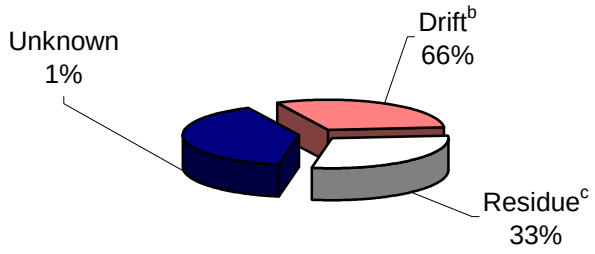
Agricultural Field Worker Incidents

In 2002, 240 cases involving field worker illness and injury were evaluated as probably or possibly related to pesticide exposure. Exposure via drift or offsite movement was implicated for 160 (67 percent) of the field workers, including 123 exposed in a single episode (described under "drift", below). Another 78 field workers (32 percent) were exposed to residue. The cause of exposure could not be identified for the other two field workers.

Early reentry violations contributed to 55 of the 78 residue cases. In 38 of the 55 cases, investigators identified additional violations. Other violations, but not early reentry, contributed

to six more of the cases of field workers exposed to pesticide residue. Violations were identified as contributing to the drift episode that affected 123 field workers and to 26 of the other 37 field worker drift/offsite movement cases. Of the 240 total pesticide-associated cases of field workers exposed to pesticides by any mechanism, DPR evaluated 187 as probable and 53 as possible. Exposures to drift gave rise to 144 of the cases evaluated as probable and 16 of those evaluated as possible.

Figure 4: Field Worker Exposure to Pesticides, 2002[a]



[a] Total field worker cases associated with pesticide exposure = 240.
[b] Drift refers to field worker cases associated with exposure to drift from a pesticide application.
[c] Residue refers to field worker cases associated with exposure to residue on the crops.

One episode accounted for 37 of the 38 cases involving early reentry and additional violations. In June, a Kern County grape grower did not post the vineyard as required or notify his farm labor contractor of a treatment with methomyl and other pesticides. When workers arrived in the morning to resume tipping bunches, they observed that the vines were wet as well as having an odor. Safety training was also found to have been inadequate, but some workers remembered what they had learned previously and refused to handle the contaminated plants. When the error was confirmed, the workers were withdrawn from the vineyard and, in groups of ten, all were transported for medical care. Symptoms of exposure included eye and skin irritation, nausea, vomiting, headache and dizziness. Enforcement action for this incident is pending at the time of this writing.

WH&S assisted in the onsite investigation of the episode described above, and in analysis of the samples that documented the level of methomyl contamination. WH&S scientists also

participated in investigating another reentry episode and an episode of drift onto field workers. In each case, field samples demonstrated the presence of compounds known to have been applied and detected no unexpected pesticides.

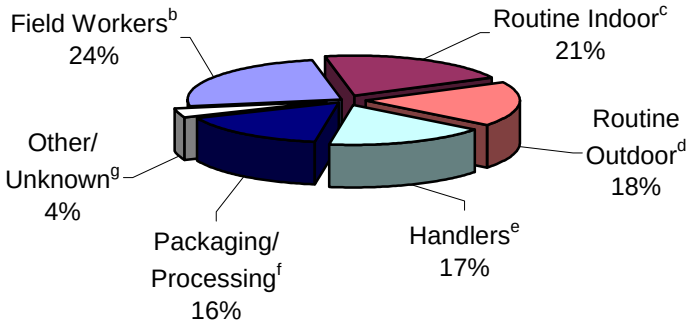
Drift Exposure

The PISP defines drift exposure as exposure to pesticide "spray, mist, fumes, or odor carried from the target site by air." This definition includes the offsite movement of pesticides after they have been deposited on the target site, so long as the application remains in progress. In 2002, DPR recorded a total of 648 individuals who reported symptoms definitely, probably, or possibly related to exposure to drift (Figure 4) in 174 separate episodes. Thirteen of these episodes affected five or more people, and two episodes of metam-sodium drift each affected more than 100 people. The county referred both of these episodes to DPR for enforcement action.

One of the large episodes occurred in June when 138 people detected a strong odor as they arrived at work in a Kern County vineyard where they were scheduled to girdle vines, pull leaves, and tip bunches. The odor came from a sprinkler application of metam-sodium to an adjacent field. The application was completing as the vineyard workers arrived, and the sprinklers were then switched to running clean water to keep the pesticide in the soil. An hour later, an unexposed monitor arrived at the field and reported no odor.

Supervisors repeatedly offered to take the exposed crews for medical care, but only one worker accepted the offer. Once clear of the contaminated area, the rest of the crew felt well and preferred to resume work. DPR evaluated 123 of the exposed workers as having symptoms probably related to exposure: primarily eye irritation, with some workers additionally reporting respiratory irritation and/or systemic symptoms. DPR did not receive specific information about the symptoms the other 15 experienced, so could not classify their cases. Penalties in this case are still under consideration.

Figure 5: Illnesses Associated with Exposure to Pesticide Drift by Activity, 2002[a]



[a] Total drift cases for 2002 = 648.
[b] Field Workers are people working in agricultural fields at the time of drift exposure
[c] Routine Indoor includes people in offices and businesses, residential structures, etc. (occupational and non-occupational) who were not handling pesticides.
[d] Routine Outdoor includes people outdoors (occupational and non-occupational) with little expectation of contacting pesticides (e.g., gardeners not handling pesticides, residents).
[e] Handlers include people mixing, loading and applying pesticides, repairing pesticide equipment and flagging for aerial application.
[f] Packaging/Processing includes people involved in processing harvested crops.
[g] Other/Unknown – Any other type of activity or unknown activity.

The other large episode occurred in July and affected workers at a Kern County carrot processing plant and residents of a long, narrow housing development that occupied a block-wide strip of land between the carrot processor and the treated field. In this episode, metam-sodium was shank-injected into the soil, after which workers ran clean water through sprinklers to contain it in the fields.

The application tractors moved faster, however, than the irrigators could supply water. By evening, a temperature inversion developed and a shift in wind direction blew irritant gases through the residential community. The PISP characterized this episode as exposure by drift, since air carried pesticide breakdown products offsite before the water treatment was completed.

The residents summoned emergency services, but by the time the fire department responded, the gas had largely dissipated. The fire crew took one woman to the hospital, because of her

longstanding lung problems; they were so severely exacerbated that it took a week of inpatient care to stabilize her. In all, reports were collected from 72 workers at the carrot processor and from 201 residents and visitors in the residential area. DPR concluded that sufficient evidence was available to demonstrate that the woman who was hospitalized definitely had been affected by pesticide exposure, and that most of the rest probably had been. Twenty-one of the residents denied experiencing health effects, and two did not mention having any symptoms. Five residents reported delayed or atypical symptoms that were judged possibly related.

DPR reached a legal settlement with the applicator in this case. Without admitting liability, the applicator has agreed to pay DPR $50,000 in civil penalties and reimburse Kern County $10,000 for local investigation costs.

Apart from the two episodes described above, drift exposure was evaluated as definitely, probably, or possibly related to health effects reported by 30 people engaged in routine indoor activities when exposed, 44 people engaged in routine outdoor activities, 37 field workers, 32 workers handling harvested agricultural products, and 23 people involved in other activities. Additionally, 109 pesticide handlers were definitely, probably, or possibly affected by airborne exposure to the pesticides they handled. Such exposures are recorded as drift.

Overall, agricultural pesticide use was found responsible for 478 (74 percent) of drift cases, while nonagricultural pesticides accounted for 170 (26 percent). Of the 109 pesticide handlers who exposed themselves via drift, just 13 were working in agriculture.

Morbidity and Mortality

Among the 1,025 cases evaluated as <u>definitely or probably</u> related to pesticide exposure, 19 people were admitted to hospitals and 106 lost time from work. Of the 291 <u>possible</u> cases, six reported hospitalization and 42 lost work time.

DPR investigated five deaths in 2002, and found three of them definitely related to pesticide exposure: Two people died of unintentional pesticide ingestion, and one broke into his home

while it was being fumigated. DPR evaluated as unrelated to pesticide exposure the death of an 85-year-old man who suffered a heart attack a few hours after spraying an herbicide (prometon) in his back yard. No information was available to determine whether pesticide exposure might have contributed to a fatal crash when an aerial applicator hit a power line.

One of the ingestion victims was an 88-year-old Alzheimer's disease patient who drank sanitizer under the misimpression it was apple juice. She was hospitalized for four days before she succumbed. The other was an 88-year-old farmer who used old bleach bottles to store both pesticides and drinking water. One afternoon after spraying herbicides in his orchard, he drank from a bottle he thought contained water. It proved to contain demeton concentrate, an organophosphate insecticide. He informed his family of the mistake, and they called for help, but he died at the hospital about an hour later.

No California children are known to have suffered life-threatening illness from pesticide exposure in 2002.

Examples of the Importance of Compliance with Safety Procedures

Severe intoxications typically result from careless and often illegal use of pesticides. Besides the farmer who fell victim to his dangerous and illegal practice of storing pesticides in unmarked containers, a man was hospitalized overnight after drinking an herbicide (monosodium methane arsonate) that he found in a lemonade container at a friend's home. These cases demonstrate the importance of properly storing pesticides in accordance with regulations.

Results of Cooperation with Poison Control Centers

As discussed earlier in this report, DPR constantly works to improve reporting of pesticide illnesses. Cooperation with CPCS has shown particular promise for identifying pesticide illnesses that would otherwise be missed and providing the information more promptly than any other mechanism. In 2001, renewed U.S. EPA funding allowed DPR to negotiate a new contract with CPCS to assist physicians in reporting pesticide cases. Reporting under the new contract began July 1, 2001, and continued through November 2002. Availability of this information source greatly improves the likelihood that DPR will learn of pesticide problems that occur

outside of agriculture or the workplace. In particular, it allows some confidence that the absence of severely affected children may be real and not just the consequence of poor reporting.

In 2002, DPR assigned 508 cases for investigation based on information that CPCS had helped to provide. These reports included 54 (89 percent) of the 61 reports received on the day of the event, 185 (93 percent) of the 198 reported the day after, and 440 (82 percent) of the 539 reported within a week of occurrence. The average time from occurrence to notification was five days for cases that CPCS helped to report. For all other cases, the average time from occurrence to notification was 120 days. Median time to notification was two days for reports facilitated by poison control; for PIRs without poison control assistance, it was seven days. For DFROIIs, the median time from occurrence to case identification was 113 days.

Investigation revealed at least a possible relation to pesticide exposure in 317 (62 percent) of the 508 cases reported with assistance from poison control. These 317 cases include 214 (41 percent) of the 523 cases associated with non-occupational exposures, 14 (56 percent) of 25 hospitalizations, 45 (87 percent) of 52 cases in which people ingested pesticide, and 36 (34 percent) of the 107 cases involving children 10 years old or younger.

These figures demonstrate the importance of poison control intervention to identify non-occupational and pediatric pesticide exposures. This cooperation has been valuable to DPR surveillance, which otherwise has limited ability to detect health problems caused by home-use pesticides. Prompt notification enhances the value of investigation, as CACs take advantage of the opportunity to collect environmental samples and to interview the people involved.

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Summary of Illness/Injury Incidents
Reported in California as Potentially Related to Pesticide Exposure
Summarized Statewide and by County of Occurrence[1]
2002

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
TOTALS							
Definite	105	85	9	0	11	15	90
Probable	920	112	553	95	160	524	396
Possible	291	20	86	74	111	163	128
Unlikely	50	2	5	15	28	29	21
Indirect	4	0	0	3	1	1	3
Asymptomatic	109	13	25	13	58	55	54
Unrelated	184						
Insufficient	5						
Unavailable	191						
OVERALL	**1859**	**232**	**678**	**200**	**369**	**787**	**692**
COUNTY[5]							
ALAMEDA							
Definite	1	1	0	0	0	0	1
Probable	9	4	3	1	1	0	9
Possible	2	0	0	0	2	0	2
Unrelated	7						
Unavailable	4						
AMADOR							
Unrelated	1						
Unavailable	1						

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
BUTTE							
Definite	2	2	0	0	0	0	2
Probable	3	0	1	0	2	0	3
Possible	3	1	0	0	2	2	1
Asymptomatic	1	1	0	0	0	0	1
Unrelated	2						
Unavailable	1						
CALAVERAS							
Definite	1	1	0	0	0	0	1
Unlikely	1	1	0	0	0	0	1
COLUSA							
Probable	5	0	3	0	2	4	1
Unrelated	1						
Unavailable	1						
CONTRA COSTA							
Definite	1	0	1	0	0	0	1
Probable	6	2	1	1	2	1	5
Possible	3	0	1	0	2	1	2
Unrelated	3						
Unavailable	4						
DEL NORTE							
Probable	1	1	0	0	0	0	1
EL DORADO							
Definite	3	3	0	0	0	0	3
Probable	1	1	0	0	0	0	1
Asymptomatic	1	0	0	0	1	0	1
Unrelated	3						

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
FRESNO							
Definite	5	5	0	0	0	1	4
Probable	20	1	10	3	6	8	12
Possible	26	0	12	8	6	20	6
Unlikely	6	0	0	0	6	4	2
Asymptomatic	1	1	0	0	0	0	1
Unrelated	14						
Unavailable	7						
GLENN							
Probable	1	0	1	0	0	0	1
Possible	2	0	0	0	2	2	0
Asymptomatic	1	0	0	0	1	0	1
Unrelated	1						
Unavailable	1						
HUMBOLDT							
Probable	3	2	0	0	1	0	3
Asymptomatic	1	0	0	0	1	0	1
Unrelated	2						
IMPERIAL							
Definite	1	0	1	0	0	0	1
Probable	5	0	4	0	1	3	2
Possible	18	0	2	0	16	17	1
Asymptomatic	15	0	0	0	15	15	0
Unavailable	27						
INYO							
Possible	1	0	0	0	1	0	1

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
KERN							
Definite	3	2	1	0	0	2	1
Probable	410	2	371	36	1	405	5
Possible	30	0	5	21	4	28	2
Unlikely	3	0	0	3	0	1	2
Asymptomatic	26	2	21	0	3	23	3
Unrelated	3						
Unavailable	19						
KINGS							
Probable	1	0	0	0	1	1	0
Possible	1	0	1	0	0	1	0
Unlikely	1	0	0	0	1	1	0
Unrelated	2						
LAKE							
Probable	3	0	3	0	0	3	0
Unrelated	1						
Unavailable	1						
LASSEN							
Definite	1	1	0	0	0	0	1
Unrelated	1						
LOS ANGELES							
Definite	13	11	1	0	1	0	13
Probable	64	24	12	14	14	0	64
Possible	29	1	7	5	16	1	28
Unlikely	4	0	0	0	4	0	4
Asymptomatic	7	1	0	0	6	0	7
Unrelated	15						
Insufficient	1						
Unavailable	41						

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
MADERA							
Definite	1	0	1	0	0	1	0
Probable	10	0	7	0	3	7	3
Possible	2	1	0	0	1	2	0
Unlikely	1	0	1	0	0	1	0
Unrelated	4						
Unavailable	1						
MARIN							
Definite	1	1	0	0	0	0	1
Probable	3	0	3	0	0	0	3
Possible	2	0	1	1	0	0	2
MARIPOSA							
Probable	1	1	0	0	0	0	1
MENDOCINO							
Probable	1	1	0	0	0	0	1
Unlikely	1	0	0	0	1	1	0
Asymptomatic	2	0	0	0	2	0	2
MERCED							
Definite	3	3	0	0	0	3	0
Probable	34	3	6	1	24	25	9
Possible	11	1	0	3	7	8	3
Unlikely	4	0	0	2	2	2	2
Unrelated	14						
Unavailable	5						
MODOC							
Definite	1	1	0	0	0	0	1
Unrelated	1						
MONO							
Probable	1	0	1	0	0	0	1

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
MONTEREY							
Definite	4	4	0	0	0	1	3
Probable	30	2	25	2	1	18	12
Possible	12	0	10	1	1	11	1
Unlikely	1	0	0	0	1	1	0
Asymptomatic	1	0	1	0	0	1	0
NAPA							
Definite	1	1	0	0	0	0	1
Probable	3	3	0	0	0	2	1
Possible	1	0	0	0	1	0	1
Indirect	1						
Unrelated	4						
NEVADA							
Probable	2	0	2	0	0	0	2
Possible	1	0	1	0	0	0	1
ORANGE							
Definite	7	6	1	0	0	0	7
Probable	21	4	9	2	6	0	21
Possible	9	0	2	3	4	0	9
Unlikely	1	0	0	0	1	0	1
Asymptomatic	3	0	1	0	2	0	3
Unrelated	2						
Unavailable	9						
PLACER							
Definite	2	1	0	0	1	0	2
Probable	37	1	1	0	35	0	37
Possible	1	0	0	0	1	0	1
Asymptomatic	1	0	0	0	1	0	1
Unrelated	1						

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
RIVERSIDE							
Definite	1	0	0	0	1	0	1
Probable	16	6	6	1	3	2	14
Possible	6	1	1	2	2	0	6
Unlikely	3	0	0	1	2	2	1
Asymptomatic	1	0	0	0	1	0	1
Unrelated	2						
Unavailable	4						
SACRAMENTO							
Definite	3	2	1	0	0	0	3
Probable	28	7	8	3	10	0	28
Possible	11	3	3	3	2	0	11
Asymptomatic	4	2	0	0	2	0	4
Unrelated	7						
Unavailable	11						
SAN BENITO							
Possible	14	0	14	0	0	1	13
Unlikely	1	0	0	0	1	0	1
SAN BERNARDINO							
Definite	4	2	1	0	1	0	4
Probable	29	9	6	8	6	1	28
Possible	1	0	0	0	1	0	1
Asymptomatic	2	0	0	0	2	0	2
Unrelated	3						
Unavailable	4						

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
SAN DIEGO							
Definite	9	6	1	0	2	0	9
Probable	27	4	10	3	10	0	27
Possible	11	2	1	4	4	2	9
Unlikely	1	0	0	1	0	0	1
Indirect	2	0	0	2	0	0	2
Asymptomatic	4	2	1	0	1	0	4
Unrelated	19						
Unavailable	14						
SAN FRANCISCO							
Probable	3	1	1	1	0	0	3
Possible	1	0	0	0	1	0	1
Unrelated	4						
Unavailable	3						
SAN JOAQUIN							
Definite	4	4	0	0	0	1	3
Probable	31	5	10	2	14	9	22
Possible	7	1	1	2	3	3	4
Unlikely	1	0	0	0	1	1	0
Asymptomatic	8	0	0	0	8	0	8
Unrelated	9						
Unavailable	10						
SAN LUIS OBISPO							
Definite	1	1	0	0	0	0	1
Probable	13	2	3	7	1	4	9
Possible	36	0	9	11	16	33	3
Unlikely	9	0	0	7	2	8	1
Indirect	1	0	0	1	0	0	1
Asymptomatic	9	1	1	7	0	8	1
Unrelated	7						
Unavailable	3						

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
SAN MATEO							
Definite	2	2	0	0	0	0	2
Probable	7	3	1	1	2	1	6
Unrelated	1						
Unavailable	4						
SANTA BARBARA							
Definite	1	1	0	0	0	0	1
Probable	3	0	1	2	0	1	2
Possible	4	2	1	1	0	1	3
SANTA CLARA							
Definite	3	3	0	0	0	0	3
Probable	9	5	4	0	0	0	9
Possible	1	1	0	0	0	0	1
Asymptomatic	2	1	0	0	1	0	2
Unrelated	3						
SANTA CRUZ							
Probable	3	1	2	0	0	0	3
Possible	1	1	0	0	0	0	1
Unrelated	2						
Unavailable	1						
SHASTA							
Definite	1	1	0	0	0	0	1
Probable	4	1	0	0	3	0	4
Possible	1	1	0	0	0	1	0
Unrelated	2						
Insufficient	3						
Unavailable	1						
SISKIYOU							
Probable	12	1	11	0	0	11	1
Unavailable	1						

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
SOLANO							
Definite	3	3	0	0	0	1	2
Probable	7	0	5	0	2	0	7
Possible	2	1	0	0	1	1	1
Unlikely	2	1	0	1	0	2	0
Unrelated	2						
Insufficient	1						
Unavailable	1						
SONOMA							
Definite	4	3	0	0	1	1	3
Probable	11	2	5	1	3	4	7
Possible	5	0	1	3	1	4	1
Unlikely	4	0	4	0	0	4	0
Asymptomatic	3	0	0	1	2	0	3
Unrelated	6						
Unavailable	1						
STANISLAUS							
Definite	5	4	0	0	1	0	5
Probable	16	5	9	0	2	3	13
Possible	8	2	2	0	4	6	2
Unlikely	1	0	0	0	1	0	1
Asymptomatic	6	0	0	0	6	1	5
Unrelated	24						
Unavailable	3						
SUTTER							
Definite	1	1	0	0	0	0	1
Probable	5	2	2	0	1	2	3
Possible	2	0	2	0	0	1	1
Unrelated	1						
TRINITY							
Definite	1	1	0	0	0	0	1
Probable	1	1	0	0	0	0	1

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
TULARE							
Definite	4	4	0	0	0	4	0
Probable	10	2	3	4	1	5	5
Possible	9	1	0	3	5	7	2
Unlikely	1	0	0	0	1	0	1
Asymptomatic	7	2	0	5	0	7	0
Unrelated	4						
Unavailable	3						
TUOLUMNE							
Definite	1	1	0	0	0	0	1
Possible	1	0	0	0	1	0	1
VENTURA							
Definite	1	1	0	0	0	0	1
Probable	4	1	1	1	1	3	1
Possible	10	0	8	1	1	9	1
Unrelated	3						
Unavailable	3						
YOLO							
Definite	5	2	0	0	3	0	5
Probable	5	2	2	1	0	1	4
Possible	4	0	1	1	2	0	4
Unlikely	4	0	0	0	4	1	3
Unrelated	3						
Unavailable	2						
YUBA							
Probable	1	0	0	0	1	0	1
Possible	2	0	0	1	1	1	1
Asymptomatic	3	0	0	0	3	0	3

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

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

Definite	:	High degree of correlation between pattern of exposure and resulting symptomatology. Requires both medical evidence (such as measured cholinesterase inhibition, positive allergy tests, characteristic signs observed by medical professional) and physical evidence of exposure (environmental and/or biological samples, exposure history) to support the conclusions.
Probable	:	Relatively high degree of correlation exists between the pattern of exposure and the resulting symptomatology. Either medical or physical evidence is inconclusive or unavailable.
Possible	:	Some degree of correlation evident. Medical and physical evidence are inconclusive or unavailable.
Unlikely	:	A correlation cannot be ruled out absolutely. Medical and/or physical evidence suggest a cause other than pesticide exposure.
Indirect	:	Pesticide exposure is not responsible, but pesticide regulations or product label requirements contributed in some way, (e.g. heat stress while wearing chemical resistant clothing).
Asymptomatic	:	Exposure occurred, but did not result in illness/injury. Cholinesterase depression without symptoms falls in this category.
Unrelated	:	Definite evidence of cause other than pesticide exposure including exposures to chemicals other than pesticides. Since there is no exposure to pesticides, there are no entries under "Type of Exposure" or "Intended Use."
Insufficient	:	The available information is inadequate to make an informed judgment on the relationship between pesticide exposure and the reported symptomatology. For submitted investigations, the investigator failed to make an adequate attempt to obtain the necessary information. Since a relationship to pesticide exposure cannot be determined, there are no entries under "Type of Exposure" or "Intended Use."
Unavailable	:	The available information is inadequate to make an informed judgment on the relationship between pesticide exposure and the reported symptomatology. For submitted investigations, the investigator made an adequate attempt to collect the necessary information, but was not able to do so (e.g., none of the parties concerned could be contacted). There usually needs to be more effort than to say the employee is not available for interview; other parties can often supply useful information. Since a relationship to pesticide exposure cannot be determined, there are no entries under "Type of Exposure" or "Intended Use."

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

Direct Contact	:	An appreciable amount of pesticide contacted the individual's body surface. This includes: 1) sprays or squirts from application equipment; 2) leaks or spills whether or not related to the application; and 3) deliberate immersion (as when cleaning implements in a basin with antimicrobials). This excludes drift exposures.
Drift	:	Spray, mist, fumes, or odor carried from the target site by air. Drift must be related to an application or mix/load activity.
Residue	:	The part of a pesticide that remains in the environment for a period of time following an application or drift. This includes odor after the completion of an application.
Other/Unknown	:	Any of the following: 1) ingestion; 2) multiple routes of exposure; 3) residue from a spill; 4) exposure to smoke or pyrolitic products from a fire where pesticides are burning; 5) route of exposure is not known.

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

Agricultural	:	The pesticide(s) were intended to contribute to the production of agricultural commodities, including livestock. This includes: 1) agricultural research facilities, 2) handling of raw agricultural commodities in packing houses, 3) drift from agricultural applications into non-agricultural areas, and 4) transportation and storage of pesticides on farm lands. It excludes forestry operations, although they are classified as agricultural for regulatory purposes. It also excludes manufacture, transportation, and storage of pesticides prior to arrival at the site of agricultural production.
Non-Agricultural	:	The pesticide(s) were not intended to contribute to the production of agricultural commodities. This includes: 1) residential pesticide uses, 2) structural pest control, 3) rights-of-way, 4) parks, 5) landscaped urban areas, and 6) manufacture, transportation and storage of pesticides except on farm lands.

5. **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
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About the Pesticide Illness Surveillance Program Data

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

Cases Reported in California[1] with Documented[2] Pesticide Exposure Summarized by the Type of Illness and the Type of Pesticides 2002

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	27	3	11	1	27	56	**125**
Systemic with Respiratory Effects	27	26	17	13	27	32	**142**
Systemic with Topical Effects	7	0	20	6	50	37	**120**
Systemic Only	7	17	44	29	54	54	**205**
Respiratory							
Respiratory with Topical Effects	18	9	4	1	18	52	**102**
Respiratory Only	31	51	3	5	10	19	**119**
Topical							
Eye Only	94	14	10	3	198	85	**404**
Skin Only	40	2	10	2	27	4	**85**
Eye and Skin	2	1	3	0	7	1	**14**
Asymptomatic							
Asymptomatic	2	4	21	10	8	64	**109**
TOTAL	**255**	**127**	**143**	**70**	**426**	**404**	**1425**

[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 cases of documented exposure that did not lead to symptomatology.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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Illnesses and Injuries Reported in California[1] Associated With[2] Pesticide Exposure Summarized by the Type of Activity and Type of Exposure 2002

Occupational[3]

Type of Activity[4]	Type of Exposure[5]								
	Drift	**Residue**	**Direct Spray/ Squirt**	**Spill/ Other Direct**	**Ingestion**	**Multiple**	**Other**	**Unknown**	**Total**
Mixer/Loader	10	0	5	48	0	0	3	3	69
Applicator	45	1	22	54	0	4	5	37	168
Mechanical	1	0	3	1	0	0	0	0	5
Packaging/Processing	104	9	0	0	0	24	0	0	137
Field Worker	160	78	0	0	0	0	0	2	240
Routine Indoor	17	28	2	4	0	2	6	4	63
Routine Outdoor	26	0	2	0	0	0	1	2	31
Manufacturing/Formulation	0	0	0	4	0	0	0	1	5
Transport/Storage/Disposal	0	0	0	10	0	1	7	1	19
Emergency Response	0	1	0	0	0	0	4	0	5
Other	7	12	1	7	1	0	21	2	51
Total Occupational Cases	***370***	***129***	***35***	***128***	***1***	***31***	***47***	***52***	***793***

Non-Occupational[3]

Type of Activity[4]	Type of Exposure[5]								
	Drift	**Residue**	**Direct Spray/ Squirt**	**Spill/ Other Direct**	**Ingestion**	**Multiple**	**Other**	**Unknown**	**Total**
Mixer/Loader	6	0	0	9	1	1	3	0	20
Applicator	47	0	12	15	0	2	4	11	91
Routine Indoor	116	35	3	2	15	3	5	18	197
Routine Outdoor	92	5	2	1	6	1	36	2	145
Transport/Storage/Disposal	0	0	0	0	0	0	1	0	1
Other	17	0	2	8	29	4	3	5	68
Unknown	0	0	0	0	0	0	1	0	1
Total Non-Occupational Cases	***278***	***40***	***19***	***35***	***51***	***11***	***53***	***36***	***523***
Total Occupational/ Non-Occupational	**648**	**169**	**54**	**163**	**52**	**42**	**100**	**88**	**1316**

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

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

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

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

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

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

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

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

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

Mixer/Loader : Mixes and/or loads pesticides. This includes: (1) removing a pesticide from its original container, (2) transferring the pesticide to a mixing or holding tank, (3) mixing pesticides prior to application, (4) driving a nurse rig, or (5) transferring the pesticide from a mix/holding tank or nurse rig to an application tank.

Applicator : Applies pesticides by any method or conducts activities considered ancillary to the application (e.g., cleans spray nozzles in the field).

Flagger : Flags for an aerial application, either fixed-winged or helicopter.

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

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

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

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

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

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

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

Multiple	:	Contact with pesticides occurred through two or more mechanisms.
Other	:	Other known route of exposure not included in other exposure categories. This includes, but not limited to: 1) Residue from a spill and 2) Exposure to smoke or pyrolitic products from a fire where pesticides are burning.
Unknown	:	Route of exposure is not known.

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Illnesses and Injuries Reported by California Physicians[1] Associated With[2] Pesticide Exposure Summarized by Pesticide(s) and Type of Illness 2002

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	17	2	1	1	18	3
DDVP	22	2	0	0	22	2
Demeton	1	0	0	0	1	0
Diazinon	13	6	4	1	17	7
Malathion	5	4	1	0	6	4
Naled	0	1	0	0	0	1
Phosmet	0	1	0	0	0	1
Trichlorfon	0	1	0	0	0	1
N-Methyl Carbamates						
Aldicarb	0	1	0	0	0	1
Carbaryl	1	0	0	1	1	1
Methomyl	1	0	0	0	1	0
Propoxur	2	0	0	0	2	0
Pyrethrins and Pyrethroids						
Bifenthrin	2	1	1	0	3	1
Cyfluthrin	4	2	3	2	7	4
Cyhalothrin	0	0	1	0	1	0
Cypermethrin	4	1	1	0	5	1
Deltamethrin	0	1	0	0	0	1
Esfenvalerate	3	1	2	0	5	1
Permethrin	6	1	0	0	6	1
Pyrethrins	0	1	0	0	0	1
Tralomethrin	2	0	1	0	3	0
Organochlorines						
Endosulfan	0	0	1	0	1	0
Other Pesticides						
2,4-D	0	1	0	0	0	1
Abamectin	0	1	0	0	0	1
Adjuvant	0	0	1	0	1	0
Aluminum Phosphide	1	1	0	0	1	1
Arsenic Trioxide	1	0	0	0	1	0
Borax	1	0	1	0	2	0

Pesticide[3]	Systemic/ Respiratory[4]		Topical[4]		TOTAL	
	Definite/ Probable	Possible	Definite/ Probable	Possible	Definite/ Probable	Possible
Boric Acid	0	1	0	0	0	1
Brodifacoum	2	0	0	0	2	0
Bt (Berliner) Aizawai Serotype H-7	0	0	0	1	0	1
Bt (Berliner) Kurstaki Serotype 3a, 3b	0	0	0	1	0	1
Calcium Hypochlorite	3	2	2	0	5	2
Captan	0	3	0	2	0	5
Chlorine	9	0	0	0	9	0
Chlorothalonil	0	0	5	0	5	0
Copper Hydroxide	0	1	0	0	0	1
Copper Naphthenate	3	1	0	0	3	1
Creosote	0	0	0	2	0	2
Cyanuric Acid	13	1	6	0	19	1
D-Limonene	1	0	0	0	1	0
Deet	1	0	2	0	3	0
Diquat	1	0	0	0	1	0
Eptc	0	0	1	0	1	0
Ethalfluralin	0	0	1	0	1	0
Fenbutatin-Oxide	0	0	1	0	1	0
Gibberellic Acid	0	10	0	1	0	11
Glutaraldehyde	9	1	7	1	16	2
Glyphosate	4	8	5	2	9	10
Halogenated Hydantoins	1	0	0	0	1	0
Hexazinone	0	1	0	0	0	1
Hydrogen Chloride	1	0	2	0	3	0
Imidacloprid	0	1	1	0	1	1
Lime-sulfur	0	1	2	0	2	1
Lithium Hypochlorite	0	0	1	0	1	0
MSMA	1	0	0	0	1	0
Mancozeb	0	1	0	0	0	1
Metaldehyde	1	0	0	0	1	0
Metam-Sodium	147	4	232	1	379	5
Methyl Bromide	1	1	1	0	2	1
Myclobutanil	0	0	0	1	0	1
None	0	1	0	0	0	1
Oxyfluorfen	0	0	1	0	1	0
Ozone	0	0	1	0	1	0
Paraquat	0	0	2	1	2	1
Peroxyacetic Acid	0	0	3	0	3	0

Pesticide[3]	Systemic/ Respiratory[4]		Topical[4]		TOTAL	
	Definite/ Probable	Possible	Definite/ Probable	Possible	Definite/ Probable	Possible
Phenolic Disinfectants	0	0	5	0	5	0
Pine Oil	6	1	2	0	8	1
Potassium Peroxymonosulfate	0	0	1	0	1	0
Propargite	0	0	1	0	1	0
Quaternary Ammonia	6	3	26	4	32	7
Sethoxydim	0	1	1	0	1	1
Sodium Chlorite	1	1	0	0	1	1
Sodium Hypochlorite	58	9	60	5	118	14
Strychnine	1	0	0	0	1	0
Sulfur	0	2	3	4	3	6
Sulfur Dioxide	0	1	0	2	0	3
Sulfuryl Fluoride	1	8	0	0	1	8
Thiram	0	0	0	1	0	1
Trichloromelamine	0	0	1	0	1	0
Trifluralin	1	1	1	0	2	1
Trinexapac-Ethyl	1	0	0	0	1	0
Ziram	0	0	1	0	1	0
Combinations of Antimicrobials	68	3	10	4	78	7
Combinations of Fumigants	4	23	0	0	4	23
Combinations of Fungicides	5	0	1	4	6	4
Combinations of Herbicides	11	9	2	4	13	13
Combinations of Insecticides Including ChE Inhibitor(s)	14	2	1	2	15	4
Combinations of Insecticides Without ChE Inhibitor(s)	39	26	4	1	43	27
Miscellaneous Combinations	57	64	15	8	72	72
Unknown Antimicrobials	7	1	5	4	12	5
Unknown Fungicides	0	0	0	1	0	1
Unknown Herbicides	2	0	0	0	2	0
Unknown Insecticides	18	4	5	1	23	5
Unknown Pesticides	1	1	0	1	1	2
TOTAL	**586**	**227**	**439**	**64**	**1025**	**291**

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

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

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

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

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

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

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

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

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

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

Whom to Contact:

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About the Pesticide Illness Surveillance Program Data

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

Summary of Cases Reported by California[1] as Associated With[2] Pesticide Exposure Summarized by Occupational Status and by Location of the Incident 2002

Incident Setting[3]	Occupational Exposures[4]		Non-Occupational Exposures[4]		TOTAL	TOTAL
	Definite/ Probable[2]	Possible[2]	Definite/ Probable[2]	Possible[2]	Definite/ Probable[2]	Possible[2]
Farm	220	78	2	0	**222**	**78**
Nursery	8	11	0	0	**8**	**11**
Livestock Production Facility	5	0	1	2	**6**	**2**
Crop/Livestock Processing Facility	136	31	0	0	**136**	**31**
Animal Premise (Veterinary Hospital, Kennels, not Livestock)	5	3	0	0	**5**	**3**
Single Family Home	8	5	300	69	**308**	**74**
Multi-unit Housing	2	3	30	8	**32**	**11**
Residential Institution	5	0	1	1	**6**	**1**
School	29	3	2	1	**31**	**4**
Prison	3	1	1	0	**4**	**1**
Hospital/Medical	47	7	1	0	**48**	**7**
Pesticide Manufacturing Facility	4	1	0	0	**4**	**1**
Industrial or Other Manufacturing Facility	3	1	0	0	**3**	**1**
Office/Business	13	2	0	0	**13**	**2**
Retail Establishment	20	3	1	0	**21**	**3**
Service Establishment	65	4	33	0	**98**	**4**
Wholesale Establishment	6	1	0	0	**6**	**1**
Road/Rail Or Utility Right Of Way	14	17	2	11	**16**	**28**
Park	2	0	3	1	**5**	**1**
Golf Course	1	2	0	0	**1**	**2**
Landscape, Lawn	0	0	2	1	**2**	**1**
Landscape, Other	1	1	10	9	**11**	**10**
Other (Telephone Poles, Fences, Etc)	11	3	1	1	**12**	**4**
Unknown	5	3	22	7	**27**	**10**
TOTAL	**613**	**180**	**412**	**111**	**1025**	**291**

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

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

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

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

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

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

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

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

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

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

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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 California[1] as Associated With[2] Pesticide Exposure Summarized by Gender, Age Distribution, by Type of Pesticide and by Type of Use
2002

Agricultural Use Pesticide Exposure Incidents[3]

Age Group	Pesticides other than Antimicrobial Pesticides[4]			Antimicrobial Pesticides[4]			TOTAL
	Male	Female	Unknown	Male	Female	Unknown	
0 - 9	22	17	0	0	0	0	**39**
10 - 14	14	16	0	0	0	0	**30**
15 - 19	14	8	0	0	0	0	**22**
20 - 29	53	34	0	6	3	0	**96**
30 - 39	45	40	0	4	6	0	**95**
40 - 49	34	30	0	2	6	0	**72**
50 - 59	28	10	0	2	1	0	**41**
60 - 69	7	9	0	0	1	0	**17**
70 +	4	2	0	0	0	0	**6**
Unknown	129	147	7	1	0	0	**284**
TOTAL	**350**	**313**	**7**	**15**	**17**	**0**	**702**

Non-Agricultural Use Pesticide Exposure Incidents

Age Group	Pesticides other than Antimicrobial Pesticides			Antimicrobial Pesticides			TOTAL
	Male	Female	Unknown	Male	Female	Unknown	
0 - 9	15	7	0	19	16	3	**60**
10 - 14	2	5	0	3	7	1	**18**
15 - 19	3	5	0	18	14	0	**40**
20 - 29	31	14	0	29	37	0	**111**
30 - 39	25	21	0	27	42	1	**116**
40 - 49	23	25	0	34	39	0	**121**
50 - 59	26	19	0	19	18	0	**82**
60 - 69	10	10	0	3	5	0	**28**
70 +	4	9	0	2	1	0	**16**
Unknown	4	12	0	3	3	0	**22**
TOTAL	**143**	**127**	**0**	**157**	**182**	**5**	**614**

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

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

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

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

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

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

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

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

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

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Illnesses and Injuries of Application Workers Reported by California Physicians[1] Associated With[2] Pesticide Exposure Summarized by the Type of Equipment, Type of Activity and Occupational Status 2002

Occupational[3]

Type of Equipment[4]	Type of Activity[5]				
	Mixer/ Loader	Applicator	Flagger	Mechanic	Total
Fixed Wing Aircraft	4	0	0	0	**4**
Helicopter	1	0	0	0	**1**
Airblast Sprayers	2	1	0	0	**3**
Electrostatic Sprayer	0	1	0	0	**1**
Power Dusters	0	2	0	0	**2**
Ground, Boom Below/Behind	2	8	0	0	**10**
Ground, Other or Unspecified	5	6	0	0	**11**
Ground Boom, Other or Unspecified	0	5	0	0	**5**
Shank Injection without Tarps	0	2	0	0	**2**
Hand, Other or Unspecified	2	10	0	0	**12**
Pressurized Hose-line Sprayers	1	19	0	1	**21**
Hand Pump Sprayer	2	2	0	0	**4**
Hand-held Dusters	0	1	0	0	**1**
Back Pack Sprayer	1	8	0	0	**9**
Unpressurized Hand-held Spray Equipment	3	6	0	0	**9**
Aerosol Can	0	7	0	0	**7**
Foggers	0	1	0	0	**1**
Aerosol/fog Generating Equipment	1	0	0	0	**1**
Chamber	2	4	0	0	**6**
Tarp	0	1	0	0	**1**
Automatic Equipment, Other or Unspecified	1	4	0	1	**6**
Automatic Equipment, Chlorinators	8	2	0	2	**12**

Occupational[3]

Type of Equipment[4]	Type of Activity[5]				
	Mixer/ Loader	**Applicator**	**Flagger**	**Mechanic**	**Total**
Sprinkler Irrigation Equipment	0	4	0	0	**4**
Manual Application Methods, Other or Unspecified	7	13	0	0	**20**
Immersion Equipment	6	13	0	0	**19**
Implements with Handles	6	12	0	0	**18**
Implements without Handles	4	7	0	0	**11**
Manual Placement	1	9	0	1	**11**
Other	1	1	0	0	**2**
Unknown	9	19	0	0	**28**
Total Occupational Cases	**69**	**168**	**0**	**5**	**242**

Non-Occupational[3]

Type of Equipment[4]	Type of Activity[5]				
	Mixer/ Loader	**Applicator**	**Flagger**	**Mechanic**	**Total**
Hand, Other or Unspecified	3	12	0	0	**15**
Pressurized Hose-line Sprayers	0	1	0	0	**1**
Hand Pump Sprayer	3	9	0	0	**12**
Hand-held Dusters	1	1	0	0	**2**
Back Pack Sprayer	0	2	0	0	**2**
Unpressurized Hand-held Spray Equipment	1	7	0	0	**8**
Aerosol Can	0	14	0	0	**14**
Foggers	0	6	0	0	**6**
Automatic Equipment, Chlorinators	2	0	0	0	**2**
Manual Application Methods, Other or Unspecified	1	7	0	0	**8**
Implements with Handles	0	4	0	0	**4**
Implements without Handles	0	2	0	0	**2**
Manual Placement	5	14	0	0	**19**
Not Applicable	1	0	0	0	**1**
Other	0	1	0	0	**1**
Unknown	3	11	0	0	**14**
Total Non-Occupational Cases	**20**	**91**	**0**	**0**	**111**
Total Occupational and Non-Occupational Cases	**89**	**259**	**0**	**5**	**353**

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

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

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

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

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

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

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

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

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

[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 Unspecifed	: 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.
Not applicable	: No application equipment was involved.
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.

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 *Definitely or Probably Related* to Pesticide Exposure in California[1,2], Summarized by Occupational Status and Activity 2002

Occupational[3]

Activity[4]	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown[5]	No. Cases	%	Unknown[6]
Mixer/Loader	62	0	0	0	9	14.5	4
Applicator	123	1	0.8	0	30	24.4	5
Mechanical	5	0	0	1	2	40	0
Packaging/Processing	115	0	0	0	18	15.7	5
Field Worker	187	0	0	0	3	1.6	1
Routine Indoor	53	3	5.7	0	15	28.3	2
Routine Outdoor	20	0	0	0	3	15	1
Manufacturing/Formulation	4	0	0	0	1	25	0
Transport/Storage/Disposal	15	0	0	0	4	26.7	1
Emergency Response	1	0	0	0	0	0	0
Other	28	0	0	0	10	35.7	0
Total Occupational	**613**	**4**	**0.7**	**1**	**95**	**15.5**	**19**

Non- Occupational[3]

Activity[4]	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown[5]	No. Cases	%	Unknown[6]
Mixer/Loader	18	0	0	0	2	11.1	4
Applicator	73	1	1.4	1	1	1.4	24
Routine Indoor	147	4	2.7	2	2	1.4	119
Routine Outdoor	128	0	0	0	1	0.8	96
Transport/Storage/Disposal	1	0	0	0	0	0	1
Other	44	10	22.7	4	5	11.4	26
Unknown	1	0	0	0	0	0	1
Total Non-Occupational	**412**	**15**	**3.6**	**7**	**11**	**2.7**	**271**
TOTAL CASES	**1025**	**19**	**1.9**	**8**	**106**	**10.3**	**290**

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

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

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

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

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

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

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

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

Mixer/Loader : Mixes and/or loads pesticides. This includes: (1) removing a pesticide from its original container, (2) transferring the pesticide to a mixing or holding tank, (3) mixing pesticides prior to application, (4) driving a nurse rig, or (5) transferring the pesticide from a mix/holding tank or nurse rig to an application tank.

Applicator : Applies pesticides by any method or conducts activities considered ancillary to the application (e.g., cleans spray nozzles in the field).

Flagger : Flags for an aerial application, either fixed-winged or helicopter.

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

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

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

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

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

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

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

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

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Hospitalization and Disability Associated with Illnesses/Injuries *Possibly Related* to Pesticide Exposure in California[1,2], Summarized by Occupational Status and Activity 2002

Occupational[3]

Activity[4]	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown[5]	No. Cases	%	Unknown[6]
Mixer/Loader	7	1	14.3	0	1	14.3	0
Applicator	45	0	0	0	9	20	2
Packaging/Processing	22	0	0	0	6	27.3	0
Field Worker	53	0	0	0	12	22.6	8
Routine Indoor	10	0	0	0	3	30	0
Routine Outdoor	11	0	0	0	0	0	1
Manufacturing/Formulation	1	0	0	0	0	0	0
Transport/Storage/Disposal	4	0	0	0	0	0	0
Emergency Response	4	0	0	0	2	50	0
Other	23	0	0	0	3	13	1
Total Occupational	**180**	**1**	**0.6**	**0**	**36**	**20**	**12**

Non- Occupational[3]

Activity	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown[5]	No. Cases	%	Unknown[6]
Mixer/Loader	2	0	0	0	0	0	1
Applicator	18	0	0	0	2	11.1	6
Routine Indoor	50	0	0	0	4	8	12
Routine Outdoor	17	0	0	0	0	0	4
Other	24	5	20.8	3	0	0	21
Total Non-Occupational	**111**	**5**	**4.5**	**3**	**6**	**5.4**	**44**
Total Cases	**291**	**6**	**2.1**	**3**	**42**	**14.4**	**56**

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

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

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

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

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

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

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

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

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

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Agricultural Drift Cases Reported in California[1] Associated With[2] Pesticide Exposure Summarized by Application Sites[3]
2002

Application Site[3]	Number of Cases[4]	Number of Incidents[5]
BERRIES		
Strawberries	5	1
FRUITING VEGETABLES		
Tomatoes	3	3
GRAPES		
Grapes	36	4
LEAFY/STEM VEGETABLES		
Broccoli	1	1
Lettuce	3	2
MULTIPLE		
Grapes, Uncultivated Non-agricultural Areas	3	1
NON-CROP		
Soil	399	12
Uncultivated Agricultural Areas (Other or Unspecified)	3	3
NUT TREES		
Almonds	1	1
OTHER VEGETABLES		
Asparagus (Spears, Ferns, Etc.)	3	2
POME FRUIT		
Pears	3	1
PREMISES		
Dairy Barns	1	1
Dairy Farm Milk Handling Facilities & Equipment	1	1
Food Processing/Handling Plant/Area (Other or Unspecified)	2	2
ROOT CROP VEGETABLES		
Carrots	1	1
Potatoes	11	1

Application Site[3]	Number of Cases[4]	Number of Incidents[5]
SEED/POD VEGETABLES		
Peas	1	1
STONE FRUIT		
Prunes	1	1
TOTAL	**478**	**39**

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

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

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

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

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

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

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

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

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Agricultural Drift Cases[1] Reported by California Physicians as Associated With[2] Pesticide Exposure Summarized by the Activity of the Exposed Person and by the Type of Application Equipment Used
2002

Type of Application Equipment Used [3]	Type of Activity [4]				TOTAL
	Routine Indoor	Routine Outdoor	Field Worker	Other	
Fixed Wing Aircraft	0	2	1	0	**3**
Helicopter	0	1	0	0	**1**
Airblast Sprayers	0	3	0	10	**13**
Electrostatic Sprayer	0	5	20	0	**25**
Over-the-vine Boom	0	0	5	0	**5**
Power Dusters	0	1	0	0	**1**
Ground, Boom Below/Behind	0	0	8	5	**13**
Ground Boom, Other or Unspecified	0	1	1	2	**4**
Ground, Other or Unspecified	1	1	0	1	**3**
Shank Injection without Tarps	103	74	0	75	**252**
Shank Injection with Tarps	1	5	1	1	**8**
Pressurized Hose-Line Sprayers	0	0	1	1	**2**
Back Pack Sprayer	0	0	0	1	**1**
Automatic Equipment, Chlorinators	0	0	0	1	**1**
Automatic Equipment, Other or Unspecified	0	0	0	11	**11**
Sprinkler Irrigation Equipment	0	5	123	1	**129**
Other	0	3	0	0	**3**
Unknown	0	0	0	3	**3**
TOTAL	**105**	**101**	**160**	**112**	**478**

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

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

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

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

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

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

Fixed Wing Aircraft	: Fixed wing aircraft.
Helicopter	: Helicopter.
Air, Other Or Unspecified	: Aerial application equipment, other or unspecified. This includes two or more types of aerial application equipment and excludes fixed wing aircraft and helicopters.
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.
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.
Over-The-Vine Boom	: Ground operated equipment with the arms of the spray boom extending over the tops of grapevines.
Power Dusters	: Ground application equipment used to apply dust formulated pesticides.
Ground Boom Below/Behind	: Ground application equipment with a spray boom located below or behind the equipment operator with the spray nozzles pointed downward.
Ground Boom, Other Or Unspecifed	: 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, Other Or Unspecified	: Ground application equipment, unknown or unspecified. This includes two or more types of ground application equipment
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.
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.

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

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.
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.
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.

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Illnesses and Injuries in California[1] Associated With Pesticide Residue in Agricultural Fields, 1982-2002

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	7	7	50	114	**178**
1985	20	20	161	168	**369**
1986	29	10	156	63	**258**
1987	58	80	53	182	**373**
1988	57	35	75	204	**371**
1989	17	22	30	93	**162**
1990	3	32	11	119	**165**
1991	16	37	7	87	**147**
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**
Total	**556**	**681**	**787**	**1815**	**3839**

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

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

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

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

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

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

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

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

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

Whom to Contact:

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Worker Health and Safety Branch
Phone: (916) 445-4222.
Physical address: 1001 I St., Sacramento CA 95814-2828.
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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.

Incidents Involving *Field Workers* Reported in California[1] Associated With[2] Pesticide Residue Exposure Summarized by Crop and Type of Illness
2002

Crop	Systemic/ Respiratory[3]		Topical[3]		TOTAL
	Definite/ Probable	Possible	Definite/ Probable	Possible	
BERRIES					
Strawberries	0	0	0	1	1
CITRUS					
Oranges	1	15	0	0	16
Citrus (Other or Unspecified)	3	0	0	0	3
FORAGE CROPS					
Alfalfa	0	1	0	0	1
GRAPES					
Grapes	25	7	12	8	52
LEAFY/STEM VEGETABLES					
Celery	1	0	0	0	1
MULTIPLE CROPS					
Grapes, Ornamental Plants (Other or Unspecified)	0	0	0	1	1
ORNAMENTALS					
Carnations	0	0	0	1	1
Ornamental Plants (Other or Unspecified)	0	0	0	1	1
OTHER CROPS					
Research Commodity	0	0	1	0	1
TOTAL	**30**	**23**	**13**	**12**	**78**

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Pesticide-Associated Illnesses and Injuries Reported In California Schools[1, 2] by Exposure Category, Pesticide Type and Illness Symptoms 2002

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	4	11	0	0	1	0	**16**
Residue	0	1	1	0	0	0	**2**
Direct Spray/Squirt	0	0	0	3	0	1	**4**
Spill/Other Direct	0	0	0	8	0	0	**8**
Multiple Exposures	0	0	1	0	0	0	**1**
Other	0	1	0	0	0	0	**1**
Unknown	0	0	0	3	0	0	**3**
TOTAL	**4**	**13**	**2**	**14**	**1**	**1**	**35**

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

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

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

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

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

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

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

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

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

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

Antimicrobials	:	Pesticides used to kill or inactivate microbiological organisms (bacteria, viruses, etc.).
Cholinesterase Inhibitors	:	Pesticides known to inhibit the function of the cholinesterase enzyme.
Other Pesticides	:	Any pesticide that is not an antimicrobial or cholinesterase-inhibiting pesticide.

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