SUMMARY OF RESULTS FROM THE CALIFORNIA PESTICIDE ILLNESS SURVEILLANCE PROGRAM - 2001 -

HS-1843

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

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Pesticide Illness Surveillance Program – 2001

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." Several other states have initiated surveillance programs for pesticide illness. As yet, most of them have collected only limited numbers of case reports, and the U.S. EPA still relies heavily on California data.

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. The Pesticide Illness Surveillance Program (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

[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, disinfectants, as well as insect growth regulators. In California, adjuvants are also subject to the regulations that control pesticides.

other application conditions, or require pesticide handlers to use protective equipment that meets certain standards. A recent illness episode identified unintentional misuse of the pyrethroid insecticide cyhalothrin, in response to which DPR developed a protective regime to allow workers to enter the contaminated field and minimize exposure. 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 development of proposals for modification of regulations. In some instances, changes to pesticide labels provide the most appropriate mitigation measures, and DPR cooperates with the 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.

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 California Environmental Protection Agency Office of Environmental Health Hazard Assessment, to the Department of Industrial Relations (DIR), and to 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. Staff members select for investigation any DFROII that mentions a pesticide, or pesticides in general, as a possible cause of injury. Reports that mention unspecified chemicals also are investigated if the

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Adjuvants are substances added to enhance the efficacy of a pesticide, and include emulsifiers, spreaders, and wetting and dispersing agents.

setting is one in which pesticide use is likely. Until recently, DFROII review identified two-thirds to three-quarters of the incidents investigated. In 2001, review of DFROIIs was interrupted while DPR negotiated a new memorandum of understanding with DIR and the California Department of Health Services (see Numeric Results, below).

Over the past several years, DPR has worked with the California Poison Control System (CPCS) to assist in identifying potential pesticide illnesses. Prior to 2000, DPR scientists managed two pilot projects where CPCS specialists would offer to report pesticide-related illnesses for physicians. Funds from U.S. EPA supported development of an enhanced system of poison control facilitation, which operated from mid-2001 through November 2002. A summary of the 2001 reporting results from CPCS can be found at the end of this document.

During 2001, DPR scientists completed a comprehensive review of data sources on medical consultations following exposure to pesticides (Mehler, 2001). This review determined that the PISP is highly successful in identifying episodes that affect groups of people, and reasonably successful in identifying exposures related to agriculture or employment. Many residential and intentional exposures, however, continue to escape surveillance. Cooperation with CPCS showed great promise for filling this gap, 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.

The agricultural commissioner of the county where the incident occurred investigates each incident. They primarily investigate incidents to determine if violations occurred. 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 took a close look at the quality of investigations of agricultural episodes in a special project supported by U.S. EPA and completed in 2001 (Edmiston, 2001). Reviewers evaluated the information in investigations of 376 case reports derived from 210 episodes of exposure to pesticides used agriculturally. They concluded that investigators generally collected adequate information on the immediate circumstances and on aspects related to regulatory compliance, but too often neglected to explore background factors that contributed to development of hazardous situations. DPR scientists developed training to address the shortcomings identified and presented the training to agricultural investigators throughout the State.

Evaluators undertake a complex task of determining the likelihood that a pesticide exposure caused the incident. Standards for the determination are described in the PISP program brochure, “Preventing Pesticide Illness,” which is available through the DPR Web site at http://www.cdpr.ca.gov/docs/dprdocs/pisp/brochure.pdf.

DPR scientists participate in the working group convened by the National Institute for Occupational Safety and Health (NIOSH) to develop standards for collection of information on pesticide illnesses. They provide the group with documentation of the data elements and standards the PISP uses. The 1998 PISP database upgrade 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 the DPR’s Worker Health & Safety Branch (WH&S).

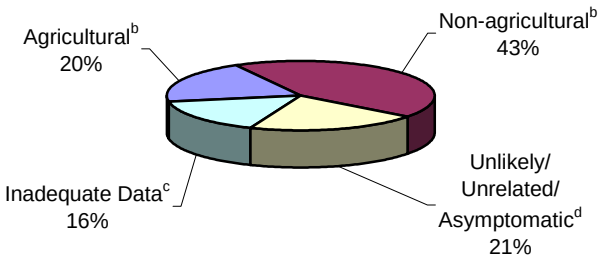
2001 Numeric Results -- Totals

For calendar year 2001, DPR assigned 979 investigations of case reports that suggested health effects from pesticide exposure. This represents a decrease of 165 (14 percent) relative to 2000, when 1,144 cases were investigated, and follows annual declines of 30 percent and 26 percent in the preceding years. Only 329 of the 979 cases were identified by retrieval of DFROIIs, including 98 located after a revised memorandum of understanding was signed in March 2002 (see Background on the Reporting System, above). Through July 2002, DPR assigned 2001 identification numbers to reports that would have been retrieved during 2001 if document review had not been interrupted. Because agricultural commissioners received these reports long after the events, investigations were difficult and often unproductive. This increases the number of cases that could not be evaluated, and leaves open the likelihood that evaluations will be revised if commissioners supply additional information in the future. This report describes the information available as of January 6, 2003.

Based on the information available, DPR found that pesticide exposure had been at least a possible contributing factor to 616 (63 percent) of the cases assigned for investigation (Figure 1). Lack of information prevented evaluation of 159 (16 percent) of the cases, reflecting the difficulties agricultural commissioners encountered in trying to investigate cases identified months after the fact. From 1988 through 2000, the percentage of unclassifiable cases ranged from 4.4 to 9.4.

Of the 616 cases recognized as definitely, probably, or possibly related to pesticide exposure, 192 (31 percent) involved use of pesticides for agricultural purposes and 424 (69 percent) occurred in other settings. Evidence established a definite relationship to pesticide exposure for 131 of the 616 cases. Another 299 were classified as probable, with 186 entered as possible. Evidence established an unlikely or unrelated relationship to pesticide exposure for 204 of the 979 cases assigned for investigation. Tabular summaries presenting different aspects of the data are available through DPR's Web site at http://www.cdpr.ca.gov/docs/dprdocs/pisp/2001pisp.htm, or by contacting the WH&S Branch.

Figure 1: Outcome of 2001 Pesticide Illness Investigations[a]

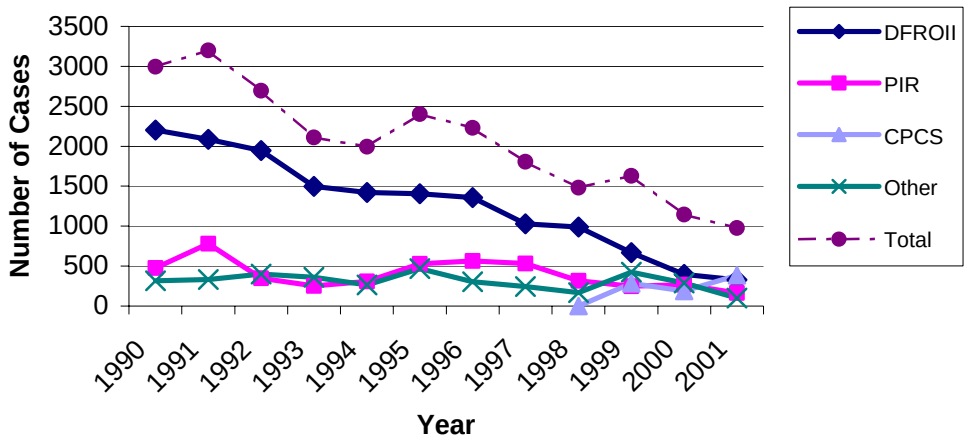


[a] Total cases investigated = 979.
[b] *Agricultural* and *Non-agricultural* refers to the intended use of the pesticide.
[c] *Inadequate* means that there was not enough data available or reported to determine if pesticides were involved in the case.
[d] *Unlikely/Unrelated/Asymptomatic* refers to 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 investigative reports. Based on the information available, DPR scientists were able to recognize that actions already prohibited by pesticide safety regulations had contributed to 261 (42 percent) of the 616 cases evaluated as definitely, probably, or possibly related to pesticide exposure. This indicates that safety could be further improved through increased compliance efforts.

Occupational exposures (those that occurred while the affected people were at work, not necessarily related to their assignments) accounted for 408 (66 percent) of the 616 pesticide-related cases from 2001. From 1982 through 2000, occupational exposures accounted for 88 percent of the cases classified as definitely, probably, or possibly related to pesticide exposure. The relatively low percentage for 2001 reflects the shifts that have occurred in case identification sources. The past decade's downward trend in DFROII retrieval (Figure 2) has continued. The decrease in DFROIIs has been partially compensated by reporting through poison control centers, which provided notification of more 2001 cases than any other source. The majority of cases reported through poison control concerned non-occupational exposures.

Figure 2. Number of Cases Reported by Method of Reporting, 1990-2001



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.

DPR scientists hypothesized that the decrease in pesticide cases identified by DFROIIs may reflect changes in insurer procedures. During the period of decline in DFROII retrieval, insurers accommodated a legislative mandate to convert from postal to electronic transmission of employers' reports. Regulations still require insurers to forward physical copies of DFROIIs, but DPR was concerned that transmission may have been compromised by changes in procedures for related reports.

To investigate this possibility, DPR scientists reviewed all of the DFROIIs selected for investigation during 1990, 1995, and 2000, and collected the names of the insurers responsible for forwarding them. DPR could not detect any important change in the sources of DFROIIs during this period. The California State Compensation Insurance Fund was the largest source in all three years, providing from 22 percent to 30 percent of the case reports investigated. The number that did not identify their source ranged from 7 percent to 14 percent. No other source accounted for more than 7 percent of the cases in any year. The top ten insurers all provided cases in all three years. The total number of insurers represented decreased in later years, but by

a smaller percentage than the drop in case identification. Nothing suggested insurer failure to forward reports as required.

Another analysis suggested that some but not the entire decline did result from worsening DFROII retrieval. Throughout the period, some physicians continued to comply with the statutory requirement to report pesticide illnesses. These reports were received on an identifiable form, the PIR. If these consultations concerned occupational exposures evaluated under workers' compensation, they should also have given rise to DFROIIs, which we might retrieve through standard DFROII review. The fraction of occupational PIR cases for which DPR subsequently locate DFROIIs provides a measure of the overall effectiveness of the DFROII route of case identification.

DPR scientists extracted from the database all occupational cases reported by PIR and grouped them by episode so that statistics would not be distorted by a small number of events that involved large numbers of people. For each year from 1988 through 2000, DPR determined the fraction of those episodes for which DFROIIs were subsequently retrieved. From 1988 through 1995, DPR retrieved DFROIIs for sixty percent of the occupational episodes identified by PIRs. Since not all occupational injuries are processed through the workers' compensation system, this suggests a very high rate of DFROII retrieval for those that were. The percentage fell to fifty in 1997. In 1998, 1999, and 2000, DPR found DFROIIs for less than forty percent of the episodes reported by PIRs. If the sixty percent that DPR found from 1988 through 1995 represents complete or near complete success in finding the DFROIIs doctors sent to insurers, by 1998 the success rate had fallen to two-thirds or less.

The observed decrease in DFROII retrieval effectiveness does not fully account for the decrease in case identification. The analysis described above suggests that DPR's ability to locate DFROIIs has decreased by a third to a half, beginning around 1996. The total number of DFROIIs, however, has dropped to about one-fifth the number found prior to 1990.

Cases reported by PIRs may not be typical of all pesticide cases that occur. It is possible that DPR has greater difficulty recognizing DFROIIs concerning pesticide cases that were not

reported by PIR. DPR can propose one scenario that would have such an effect, although it cannot be tested: In recent years, DPR scientists who select DFROIIs for investigation report a sense that they find less detail in DFROIIs to guide their decision. It may be that doctors who reported via PIRs also include the critical information in the DFROIIs they submit. Doctors who did not report by PIRs may provide only generic information in DFROIIs, causing DPR to overlook those cases.

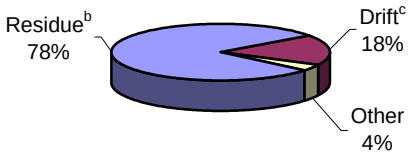
Alternatively, DPR may retrieve fewer DFROIIs because doctors file fewer. This possibility is supported by the observation that the number of episodes identified by PIRs has declined to about half the 1990 level. If the true number of pesticide-related DFROIIs dropped (like the PIRs) by half and DPR's ability to find them also decreased by half, the overall drop in DFROIIs would be very close to what DPR observed. Filing of DFROIIs could decrease either because fewer occupational pesticide illnesses occur, or because fewer victims seek treatment than a decade ago.

Agricultural Field Worker Incidents

In 2001, only 57 cases involving field worker illness and injury were evaluated as definitely, probably, or possibly related to pesticide exposure. Nine field worker cases could not be evaluated because of lack of information, and 11 were evaluated as unrelated or unlikely to be related to pesticide exposure.

Exposure to residue was implicated for 45 (79 percent) of the field workers. Another 10 field workers (18 percent) were exposed to drift. Two field workers were exposed by other mechanisms: one field worker smelled pesticide (metam-sodium) that leaked from a vandalized tractor in an equipment yard adjacent to his work site, and a disinfectant spilled into a worker's eyes when his tractor overturned on the way to a field.

Figure 3. Field Worker Exposure to Pesticides, 2001[a]



[a] Total field worker cases associated with pesticide exposure = 57.
[b] Residue refers to field worker cases associated with exposure to residue on the crops.
[c] Drift refers to field worker cases associated with exposure to drift from a pesticide application.

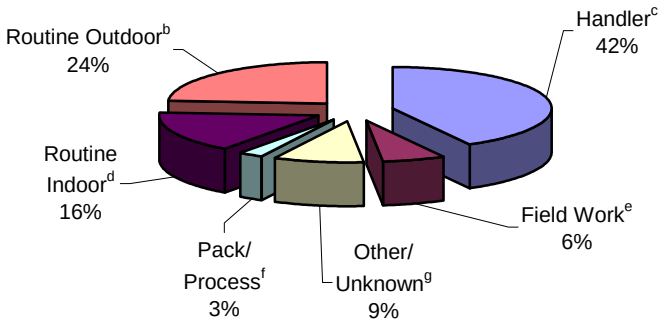
Of the 57 total pesticide-related cases of field workers exposed to pesticides by any mechanism, DPR evaluated 43 as possible and 13 as probable. Only one field worker case, the spill in an overturned tractor, could be definitely attributed to pesticide exposure. Exposures to residue gave rise to 38 of the cases evaluated as possible and seven of those evaluated as probable. Known violations of existing safety requirements contributed to 10 (22 percent) of the 45 cases involving exposure to field residue. Reentry during the restricted entry interval contributed to eight of the cases, including seven of the nine cases with other contributory violations. The largest field worker episode affected six workers; no more than three field workers were involved in any other single episode.

Drift Exposure

The PISP defines drift exposure as exposure to pesticide "spray, mist, fumes, or odor carried from the target site by air." In 2001, DPR recorded a total of 155 individuals who reported symptoms definitely, probably, or possibly related to exposure to drift (Figure 4) in 112 separate episodes. This includes 25 people exposed in the course of routine indoor activities (e.g., office worker, store clerk, etc.) and 37 exposed during routine outdoor activities, in addition to 10 field workers and 65 pesticide handlers (including two people who did maintenance work on pesticide equipment as well as mixers, loaders, and/or applicators). Four people were drifted upon while packing or processing harvested crops. Drift from agricultural applications was responsible for 73 (47.1 percent) of the 155 drift exposures, including all 10 field workers, three of the four

packers, 11 of the 25 people exposed during routine indoor activities, and 27 of the 37 drifted on during routine outdoor activities, as well as 14 of the of the 65 pesticide handlers.

Figure 4. Illnesses Associated with Exposure to Pesticide Drift by Activity, 2001[a]



[a] Total drift cases for 2001 = 155.
[b] Routine Outdoor includes people outdoors (occupational and non-occupational) with little expectation of contacting pesticides (e.g., gardeners not handling pesticides, residents).
[c] Handler includes people mixing, loading and applying pesticides, repairing pesticide equipment and flagging for aerial application.
[d] Routine Indoor includes people in offices and businesses, residential structures, etc. (occupational and non-occupational) who were not handling pesticides.
[e] Field Worker are people working in agricultural fields at the time of drift exposure.
[f] Packer/Processor includes people involved in processing harvested crops.
[g] Other/Unknown – Any other type of activity or unknown activity.

The largest 2001 drift episode affected 16 students at a Tulare County continuation school adjacent to an orange grove. Most of the affected students were exposed when, as part of a fitness test, they ran along the road that separates the school from the orchard. Several of them observed that the applicator continued spraying during turns at the ends of rows. Analysis of environmental and clothing samples demonstrated drift. The Tulare CAC fined the grower $4,000.

Morbidity and Mortality

Among the 430 cases evaluated as definitely or probably related to pesticide exposure, 27 people were admitted to hospitals and 78 lost time from work. Of the 186 possible cases, two reported hospitalization and 25 lost work time.

DPR investigated only one death that occurred in 2001, and found it was unrelated to pesticide exposure. A man died of an infection acquired a month after he was drenched with herbicide at work.

DPR learned of 40 non-fatal suicide attempts using products identified as pesticides, all but two of which were reported through poison control centers. Because DPR instructs investigators not to risk aggravating such sensitive situations by contacting the individuals involved, 13 of the 40 could not be evaluated for lack of basic information. In another eight suicide attempts, of which six involved anticoagulant rodenticides, pesticide ingestion produced no effects on health.

Examples of the Importance of Compliance with Safety Procedures

Severe intoxications typically result from careless and often illegal use of pesticides. Continuing the dismal series of young children whose lives were endangered by adults' carelessness, in 2001 a three-year-old girl was hospitalized for six days after drinking the organophosphate insecticide product 'Asuntol', which is not registered for use in the United States. The child's family refused to speak to investigators, so they could not find out how she was able to get into it, but did learn she made a full recovery.

Excessive pesticide use at home caused injuries to the users and others. One man became convinced he suffered from a severe mite infestation (which an entomologist could not detect). He treated his property with massive quantities of various products and, without authorization, sprayed pesticides on his neighbors' property also. Several neighbors complained about his irresponsible and illegal behavior. One of them, a nurse with no prior history of respiratory disease, appears to have developed a chronic respiratory condition from her exposure. In a separate incident, a man was hospitalized for two days after repeatedly over-treating his small apartment with various insecticides.

Pesticide labels all provide explicit instructions for use. Using pesticides in excess of the specified application rate, besides being a violation of state and federal laws, greatly increases hazards to health without comparable improvement in efficacy.

Results of Cooperation with Poison Control

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 be otherwise 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. Under the new contract, CPCS implemented software enhancements to notify specialists early in case management that the substance involved might be subject to the pesticide reporting requirement and to reduce the amount of manual work required to report each case. Equally importantly, the new contract included assignment of a staff professional to act as liaison to DPR.

Reporting under the new contract began July 1, 2001. In the following six months, DPR assigned 383 cases for investigation based on information that CPCS had helped to provide. This made CPCS, participating just half of the year, the largest single source of case identification for 2001. Investigation revealed at least a possible relation to pesticide exposure in 237 of the 383 cases.

These 237 cases include 148 (71 percent) of the 208 cases associated with non-occupational exposures, 23 (79 percent) of 29 hospitalizations, 42 (98 percent) of 43 cases in which people ingested pesticide, and 27 (82 percent) of the 33 cases involving children 10 years old or younger.

Cases in which CPCS assisted also included all 35 cases reported on the day of exposure, 131 (89 percent) of the 148 reported the day after exposure, and 311 (89 percent) of the 348 reported within a week of exposure. The average time from exposure to notification was eight days for cases that CPCS helped to report. For all other cases (excluding the DFROIIs delayed by

renegotiation of the memorandum of understanding), the average time from exposure to notification was 66 days. Median time to notification was two days for reports facilitated by poison control; for PIRs without poison control assistance, it was 15 days. For DFROIIs (excluding those delayed by renegotiation of the memorandum of understanding), the median time from exposure to case identification was 37 days.

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]
2001

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
TOTALS							
Definite	131	98	14	1	18	20	111
Probable	299	71	103	40	85	84	215
Possible	186	21	38	69	58	88	98
Unlikely	50	2	2	23	23	10	40
Asymptomatic	51	4	7	6	34	5	46
Unrelated	103	0	0	0	0	0	0
Insufficient	32	0	0	0	0	0	0
Unavailable	127	0	0	0	0	0	0
OVERALL	**979**	**196**	**164**	**139**	**218**	**207**	**510**
COUNTY[5]							
ALAMEDA							
Definite	3	1	1	1	0	0	3
Probable	6	0	1	3	2	0	6
Possible	2	0	0	1	1	0	2
Unlikely	1	1	0	0	0	0	1
Unrelated	2	0	0	0	0	0	0
Unavailable	5	0	0	0	0	0	0
AMADOR							
Possible	2	0	0	0	2	0	2
BUTTE							
Definite	6	6	0	0	0	0	6
Probable	5	3	1	1	0	0	5
Possible	5	1	1	3	0	3	2
Asymptomatic	2	0	2	0	0	2	0
Unrelated	3	0	0	0	0	0	0

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

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
FRESNO							
Definite	9	9	0	0	0	2	7
Probable	18	3	10	0	5	10	8
Possible	15	2	2	5	6	10	5
Unlikely	4	0	0	4	0	2	2
Asymptomatic	1	0	0	0	1	0	1
Unrelated	9	0	0	0	0	0	0
Insufficient	3	0	0	0	0	0	0
Unavailable	5	0	0	0	0	0	0
GLENN							
Definite	1	1	0	0	0	0	1
Possible	3	0	0	0	3	3	0
Unrelated	1	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0
HUMBOLDT							
Possible	2	0	0	1	1	1	1
Unrelated	1	0	0	0	0	0	0
IMPERIAL							
Definite	2	2	0	0	0	1	1
Possible	5	1	1	3	0	4	1
Unrelated	1	0	0	0	0	0	0
INYO							
Asymptomatic	1	0	0	0	1	0	1
KERN							
Definite	3	2	0	0	1	0	3
Probable	13	3	4	3	3	5	8
Possible	16	1	2	9	4	14	2
Unlikely	10	0	0	4	6	0	10
Asymptomatic	2	0	0	2	0	0	2
Unrelated	2	0	0	0	0	0	0
Insufficient	1	0	0	0	0	0	0
Unavailable	2	0	0	0	0	0	0

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
KINGS							
Definite	5	4	1	0	0	2	3
Probable	6	0	3	1	2	3	3
Possible	6	1	5	0	0	1	5
Unrelated	2	0	0	0	0	0	0
Unavailable	3	0	0	0	0	0	0
LAKE							
Unavailable	1	0	0	0	0	0	0
LASSEN							
Definite	1	1	0	0	0	0	1
Probable	2	1	0	0	1	0	2
Unavailable	1	0	0	0	0	0	0
LOS ANGELES							
Definite	17	10	2	0	5	0	17
Probable	30	8	6	4	12	0	30
Possible	10	0	2	7	1	1	9
Unlikely	5	0	0	2	3	0	5
Asymptomatic	10	1	0	0	9	0	10
Unrelated	5	0	0	0	0	0	0
Insufficient	4	0	0	0	0	0	0
Unavailable	29	0	0	0	0	0	0
MADERA							
Definite	5	3	0	0	2	2	3
Probable	3	1	0	0	2	3	0
Possible	3	0	0	0	3	3	0
Insufficient	3	0	0	0	0	0	0
Unavailable	2	0	0	0	0	0	0
MARIN							
Probable	4	0	2	0	2	0	4
Possible	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
MENDOCINO							
Definite	2	2	0	0	0	1	1
Probable	4	0	3	0	1	0	4
Asymptomatic	5	0	3	0	2	0	5
Unrelated	1	0	0	0	0	0	0
MERCED							
Definite	1	1	0	0	0	1	0
Probable	3	1	0	1	1	2	1
Possible	5	0	1	1	3	3	2
Unlikely	1	0	0	0	1	0	1
Asymptomatic	3	1	0	0	2	1	2
Unrelated	3	0	0	0	0	0	0
Unavailable	2	0	0	0	0	0	0
MONO							
Definite	1	1	0	0	0	0	1
MONTEREY							
Definite	2	2	0	0	0	1	1
Probable	10	2	0	8	0	9	1
Possible	7	0	3	4	0	7	0
Unlikely	1	0	0	0	1	1	0
Unrelated	2	0	0	0	0	0	0
NAPA							
Definite	2	2	0	0	0	0	2
Probable	4	0	2	1	1	2	2
Possible	3	1	0	1	1	1	2
Unlikely	1	0	0	0	1	1	0
Unrelated	3	0	0	0	0	0	0
NEVADA							
Probable	1	0	0	0	1	0	1
Unrelated	2	0	0	0	0	0	0

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
ORANGE							
Definite	5	5	0	0	0	0	5
Probable	15	4	4	2	5	1	14
Possible	3	2	1	0	0	0	3
Unlikely	1	0	0	1	0	0	1
Asymptomatic	4	1	0	0	3	0	4
Unrelated	2	0	0	0	0	0	0
Unavailable	11	0	0	0	0	0	0
PLACER							
Probable	1	0	0	0	1	0	1
Asymptomatic	1	0	0	0	1	0	1
Unrelated	1	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0
PLUMAS							
Asymptomatic	1	0	0	0	1	0	1
RIVERSIDE							
Definite	3	1	1	0	1	0	3
Probable	16	5	6	3	2	4	12
Possible	4	2	1	0	1	1	3
Unlikely	1	0	0	1	0	0	1
Asymptomatic	1	0	0	0	1	0	1
Unrelated	5	0	0	0	0	0	0
Unavailable	4	0	0	0	0	0	0
SACRAMENTO							
Definite	7	6	1	0	0	0	7
Probable	18	7	5	2	4	0	18
Possible	6	2	1	0	3	1	5
Unlikely	7	0	0	2	5	0	7
Asymptomatic	1	0	0	0	1	0	1
Unrelated	3	0	0	0	0	0	0
Unavailable	8	0	0	0	0	0	0

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
SAN BERNARDINO							
Definite	3	3	0	0	0	0	3
Probable	15	3	3	0	9	0	15
Possible	13	1	0	9	3	0	13
Unlikely	3	0	0	2	1	0	3
Asymptomatic	1	0	0	1	0	0	1
Unrelated	5	0	0	0	0	0	0
Unavailable	2	0	0	0	0	0	0
SAN DIEGO							
Definite	8	4	2	0	2	0	8
Probable	17	5	4	0	8	0	17
Possible	5	1	1	0	3	0	5
Unlikely	1	0	0	1	0	0	1
Asymptomatic	1	0	0	0	1	0	1
Unrelated	7	0	0	0	0	0	0
Insufficient	1	0	0	0	0	0	0
Unavailable	16	0	0	0	0	0	0
SAN FRANCISCO							
Definite	1	1	0	0	0	0	1
Probable	3	2	0	0	1	0	3
Possible	1	0	0	1	0	0	1
Unrelated	1	0	0	0	0	0	0
Insufficient	2	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0
SAN JOAQUIN							
Definite	8	7	0	0	1	2	6
Probable	20	3	11	2	4	11	9
Possible	12	1	1	6	4	7	5
Unlikely	3	0	1	1	1	1	2
Asymptomatic	3	0	0	3	0	0	3
Unrelated	5	0	0	0	0	0	0
Insufficient	6	0	0	0	0	0	0
Unavailable	2	0	0	0	0	0	0

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

Relationship[2]	TOTAL CASES	Type Of Exposure[3]				Intended Use[4]	
		Direct Contact	Drift	Residue	Other/ Unknown	Agricultural	Non-Agricultural
TEHAMA							
Probable	2	1	0	1	0	0	2
Possible	1	0	0	0	1	1	0
TULARE							
Definite	4	1	2	0	1	3	1
Probable	25	1	17	3	4	18	7
Possible	14	1	3	9	1	12	2
Unlikely	3	1	1	0	1	1	2
Asymptomatic	1	0	1	0	0	1	0
Unrelated	9	0	0	0	0	0	0
Unavailable	3	0	0	0	0	0	0
TUOLUMNE							
Possible	1	1	0	0	0	0	1
Unrelated	1	0	0	0	0	0	0
VENTURA							
Definite	2	2	0	0	0	0	2
Probable	3	1	1	0	1	2	1
Possible	3	0	1	0	2	2	1
Unavailable	1	0	0	0	0	0	0
YOLO							
Definite	3	2	1	0	0	2	1
Probable	2	2	0	0	0	0	2
Possible	2	0	1	0	1	2	0
Unlikely	1	0	0	1	0	1	0
Unrelated	3	0	0	0	0	0	0
Insufficient	3	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0
YUBA							
Definite	2	1	0	0	1	0	2
Probable	4	1	2	0	1	2	2
Possible	1	0	1	0	0	0	1
Asymptomatic	1	0	0	0	1	0	1
Unrelated	1	0	0	0	0	0	0
Unavailable	1	0	0	0	0	0	0

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

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

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

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

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

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

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

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

Whom to Contact:

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

About the Pesticide Illness Surveillance Program Data

Pesticide-related illnesses have been tracked within the state of California for nearly 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] as Associated with[2] Pesticide Exposure Summarized by the Type of Illness and the Type of Pesticides 2001

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	8	1	3	9	19	13	**53**
Systemic with Respiratory Effects	20	9	5	5	25	17	**81**
Systemic with Topical Effects	1	1	5	3	16	5	**31**
Systemic Only	6	12	25	20	29	27	**119**
Respiratory							
Respiratory with Topical Effects	12	4	2	1	14	5	**38**
Respiratory Only	27	14	0	3	7	14	**65**
Topical							
Eye Only	87	11	4	8	24	10	**144**
Skin Only	22	2	4	3	33	10	**74**
Eye and Skin	8	1	0	0	2	0	**11**
Asymptomatic							
Asymptomatic	2	6	0	4	10	29	**51**
TOTAL	**193**	**61**	**48**	**56**	**179**	**130**	**667**

[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 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 exposure occurred while working or not working.

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 nearly 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.

Illnesses and Injuries Reported in California[1] Associated With[2] Pesticide Exposure Summarized by the Type of Activity and Type of Exposure 2001

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	14	0	3	32	0	1	2	0	52
Applicator	26	1	17	51	0	3	4	30	132
Mechanical	2	0	3	7	1	0	6	1	20
Packaging/Processing	4	4	0	1	0	0	0	2	11
Field Worker	10	45	0	1	0	0	1	0	57
Routine Indoor	9	15	2	3	2	0	5	1	37
Routine Outdoor	6	3	0	0	0	0	1	0	10
Manufacturing/Formulation	0	0	0	2	0	0	0	1	3
Transport/Storage/Disposal	0	0	1	12	0	0	7	3	23
Emergency Response	0	3	0	7	0	0	0	0	10
Other	6	19	4	7	1	3	6	1	47
Unknown	1	0	1	1	0	0	3	0	6
Total Occupational Cases	***78***	***90***	***31***	***124***	***4***	***7***	***35***	***39***	***408***

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	1	1	0	0	0	0	8
Applicator	17	0	9	11	1	3	6	9	56
Routine Indoor	16	14	5	2	11	5	1	1	55
Routine Outdoor	31	4	2	0	1	1	1	0	40
Other	4	2	0	4	25	2	5	0	42
Unknown	3	0	0	0	1	0	1	2	7
Total Non-Occupational Cases	***77***	***20***	***17***	***18***	***39***	***11***	***14***	***12***	***208***
Total Occupational/ Non-Occupational	**155**	**110**	**48**	**142**	**43**	**18**	**49**	**51**	**616**

[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.

Whom to Contact:

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Worker Health and Safety Branch
Phone: (916) 445-4222.
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About the Pesticide Illness Surveillance Program Data

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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 2001

Pesticide[3]	Systemic/ Respiratory[4]		Topical[4]		TOTAL	
	Definite/ Probable	Possible	Definite/ Probable	Possible	Definite/ Probable	Possible
Organophosphates						
Acephate	3	2	0	0	3	2
Chlorpyrifos	4	6	3	0	7	6
Coumaphos	1	0	0	0	1	0
DDVP	1	0	0	0	1	0
Diazinon	5	5	3	1	8	6
Dimethoate	1	0	0	0	1	0
Disulfoton	0	0	0	1	0	1
Malathion	5	5	1	0	6	5
Methyl Parathion	1	0	0	0	1	0
Naled	1	1	0	0	1	1
Phosmet	1	2	1	0	2	2
Tetrachlorvinphos	2	0	0	0	2	0
N-Methyl Carbamates						
Aldicarb	0	1	0	1	0	2
Carbofuran	0	0	1	0	1	0
Propoxur	4	0	1	0	5	0
Pyrethrins and Pyrethroids						
Bifenthrin	2	0	0	2	2	2
Cyfluthrin	3	4	0	0	3	4
Cyhalothrin	1	0	0	0	1	0
Cypermethrin	5	1	1	0	6	1
Deltamethrin	0	0	1	0	1	0
Esfenvalerate	7	0	0	0	7	0
Fenpropathrin	0	0	0	2	0	2
Permethrin	0	1	1	2	1	3
Tralomethrin	2	0	0	0	2	0
Organochlorines						
Lindane	1	0	0	0	1	0
Other Pesticides						
Adjuvant	0	0	1	0	1	0
Aluminum Phosphide	2	0	0	2	2	2
Benomyl	0	0	1	0	1	0
Boric Acid	3	1	0	1	3	2

Pesticide[3]	Systemic/ Respiratory[4]		Topical[4]		TOTAL	
	Definite/ Probable	Possible	Definite/ Probable	Possible	Definite/ Probable	Possible
Bromadiolone	1	1	0	0	1	1
Bromethalin	0	1	0	0	0	1
Bt Kurstaki Eg7841 Lepidopteran Toxin	0	0	0	1	0	1
Bt Kurstaki Strain Sa-11	0	0	1	1	1	1
Calcium Hydroxide	0	0	1	0	1	0
Calcium Hypochlorite	3	1	0	0	3	1
Captan	0	0	0	1	0	1
Chlorine	10	1	0	0	10	1
Chlorine Dioxide	1	2	0	0	1	2
Chlorothalonil	0	0	1	0	1	0
Clove Oil	1	0	0	0	1	0
Copper Sulfate	0	1	0	1	0	2
Cyanuric Acid	4	1	3	2	7	3
Dicofol	1	0	0	0	1	0
Diquat	0	1	0	0	0	1
Diuron	1	0	0	0	1	0
Endothall	0	0	1	0	1	0
Ethylene Oxide	0	9	0	0	0	9
Formaldehyde	0	0	3	0	3	0
Fosetyl-al	0	1	0	0	0	1
Gibberellic Acid	1	0	0	0	1	0
Glutaraldehyde	3	3	6	0	9	3
Glyphosate	0	4	7	2	7	6
Hydrogen Chloride	3	0	0	1	3	1
Imazalil	0	0	0	1	0	1
Imidacloprid	0	2	1	0	1	2
Iodine-complex	0	0	1	0	1	0
K Salts Of Fatty Acids	0	0	1	0	1	0
Kathon	0	0	1	0	1	0
Metaldehyde	0	1	0	0	0	1
Metam-sodium	4	0	0	1	4	1
Metribuzin	0	1	0	0	0	1
Oil of Peppermint	1	0	0	0	1	0
Oryzalin	0	0	0	1	0	1
Paraquat	2	0	1	1	3	1
Peroxyacetic Acid	0	0	3	0	3	0
Phenolic Disinfectants	2	0	1	1	3	1
Pine Oil	1	1	2	0	3	1
Piperalin	0	1	0	0	0	1

Pesticide[3]	Systemic/ Respiratory[4]		Topical[4]		TOTAL	
	Definite/ Probable	Possible	Definite/ Probable	Possible	Definite/ Probable	Possible
Polixetonium Chloride	0	0	1	0	1	0
Prometon	0	1	0	0	0	1
Propargite	0	1	0	0	0	1
Propionic Acid	0	0	1	0	1	0
Pyridaben	0	0	1	0	1	0
Pyrithiobac-sodium	0	0	0	1	0	1
Quaternary Ammonia	1	2	29	4	30	6
Sethoxydim	1	0	0	1	1	1
Sodium Hydroxide	0	0	1	0	1	0
Sodium Hypochlorite	41	5	47	2	88	7
Sodium Tetrathiocarbonate	1	0	0	0	1	0
Streptomycin	0	1	0	0	0	1
Strychnine	2	1	0	0	2	1
Sulfluramid	0	0	1	0	1	0
Sulfur	1	6	2	2	3	8
Sulfur Dioxide	0	0	0	1	0	1
Sulfuryl Fluoride	1	0	0	0	1	0
Tebufenozide	0	1	0	0	0	1
Trichloromelamine	0	0	1	1	1	1
Zinc Phosphide	1	0	0	0	1	0
Combinations of Antimicrobials	15	2	8	3	23	5
Combinations of Fumigants	20	8	3	0	23	8
Combinations of Fungicides	4	2	1	4	5	6
Combinations of Herbicides	1	5	3	2	4	7
Combinations of Insecticides Including ChE Inhibitor(s)	12	4	1	4	13	8
Combinations of Insecticides Without ChE Inhibitor(s)	33	8	6	4	39	12
Miscellaneous Combinations	13	10	2	4	15	14
Unknown Antimicrobials	10	1	7	1	17	2
Unknown Insecticides	14	3	1	2	15	5
Unknown Pesticides	0	0	0	2	0	2
TOTAL	**265**	**122**	**165**	**64**	**430**	**186**

[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.'

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Summary of Cases Reported by California[1] as Associated With[2] Pesticide Exposure Summarized by Occupational Status and by Location of the Incident 2001

Incident Setting[3]	Occupational Exposures[4]		Non-Occupational Exposures[4]		TOTAL Definite/ Probable[2]	TOTAL Possible[2]
	Definite/ Probable[2]	Possible[2]	Definite/ Probable[2]	Possible[2]		
Farm	47	62	1	0	**48**	**62**
Nursery	2	11	0	0	**2**	**11**
Livestock Production Facility	5	1	0	0	**5**	**1**
Crop/Livestock Processing Facility	20	9	0	0	**20**	**9**
Animal Premise (Veterinary Hospital, Kennels, not Livestock)	1	1	0	0	**1**	**1**
Single Family Home	6	5	97	16	**103**	**21**
Multi-unit Housing	9	2	15	7	**24**	**9**
Residential Institution	7	0	0	0	**7**	**0**
School	20	1	14	2	**34**	**3**
Prison	5	7	1	0	**6**	**7**
Hospital/Medical	30	6	0	0	**30**	**6**
Pesticide Manufacturing Facility	2	1	0	0	**2**	**1**
Industrial or Other Manufacturing Facility	11	10	0	0	**11**	**10**
Office/Business	5	4	0	0	**5**	**4**
Retail Establishment	21	5	1	0	**22**	**5**
Service Establishment	38	11	3	0	**41**	**11**
Wholesale Establishment	2	2	0	0	**2**	**2**
Road/Rail Or Utility Right Of Way	5	4	5	0	**10**	**4**
Park	3	0	3	0	**6**	**0**
Landscape, Lawn	0	0	4	0	**4**	**0**
Landscape, Other	0	2	6	6	**6**	**8**
Other (Telephone Poles, Fences, Etc)	12	5	0	1	**12**	**6**
Unknown	7	1	22	4	**29**	**5**
TOTAL	**258**	**150**	**172**	**36**	**430**	**186**

[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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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
2001

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	1	2	0	0	0	0	**3**
10 - 14	3	1	0	0	0	0	**4**
15 - 19	11	7	0	0	0	0	**18**
20 - 29	44	3	0	4	0	0	**51**
30 - 39	29	3	0	3	2	0	**37**
40 - 49	22	8	0	2	3	0	**35**
50 - 59	14	3	0	1	1	0	**19**
60 - 69	3	2	0	0	0	0	**5**
70 +	1	0	0	0	0	0	**1**
Unknown	12	7	0	0	0	0	**19**
TOTAL	**140**	**36**	**0**	**10**	**6**	**0**	**192**

Non-Agricultural Use Pesticide Exposure Incidents

Age Group	Pesticides other than Antimicrobial Pesticides			Antimicrobial Pesticides			TOTAL
	Male	Female	Unknown	Male	Female	Unknown	
0 - 9	5	7	0	6	11	0	**29**
10 - 14	1	0	0	2	0	0	**3**
15 - 19	5	4	0	7	8	0	**24**
20 - 29	23	12	0	32	19	0	**86**
30 - 39	21	20	0	34	31	0	**106**
40 - 49	18	22	0	21	19	0	**80**
50 - 59	11	10	0	15	16	0	**52**
60 - 69	7	7	0	5	2	0	**21**
70 +	3	6	0	1	1	0	**11**
Unknown	8	4	0	0	0	0	**12**
TOTAL	**102**	**92**	**0**	**123**	**107**	**0**	**424**

[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 People Involved in Pesticide Application Reported by California Physicians[1] Associated With[2] Pesticide Exposure Summarized by the Type of Equipment, Type of Activity and Occupational Status
2001

Occupational[3]

Type of Equipment[4]	Type of Activity[5]				
	Mixer/ Loader	Applicator	Flagger	Mechanic	Total
Ground, Boom Below/Behind	0	5	0	0	**5**
Ground Boom, Other or Unspecified	1	3	0	0	**4**
Airblast Sprayers	1	3	0	0	**4**
Power Dusters	0	2	0	0	**2**
Ground, Other or Unspecified	3	9	0	6	**18**
Shank Injection without Tarps	0	1	0	0	**1**
Shank Injection with Tarps	0	2	0	0	**2**
Pressurized Hose-line Sprayers	0	11	0	1	**12**
Hand Pump Sprayer	0	2	0	0	**2**
Back Pack Sprayer	1	4	0	0	**5**
Unpressurized Hand-held Spray Equipment	2	7	0	0	**9**
Aerosol Can	0	5	0	0	**5**
Foggers	0	2	0	0	**2**
Hand, Other or Unspecified	3	15	0	0	**18**
Chamber	0	6	0	0	**6**
Automatic Equipment, Other or Unspecified	4	2	0	3	**9**
Automatic Equipment, Chlorinators	7	0	0	9	**16**
Sprinkler Irrigation Equipment	0	2	0	0	**2**
Manual Application Methods, Other or Unspecified	8	6	0	0	**14**
Immersion Equipment	3	16	0	0	**19**
Implements with Handles	8	5	0	0	**13**
Implements without Handles	1	6	0	0	**7**

Occupational[3]

Type of Equipment[4]	Type of Activity[5]				
	Mixer/ Loader	**Applicator**	**Flagger**	**Mechanic**	**Total**
Manual Placement	1	6	0	0	**7**
Not Applicable	1	0	0	0	**1**
Other	0	0	0	1	**1**
Unknown	8	12	0	0	**20**
Total Occupational Cases	**52**	**132**	**0**	**20**	**204**

Non-Occupational[3]

Type of Equipment[4]	Type of Activity[5]				
	Mixer/ Loader	**Applicator**	**Flagger**	**Mechanic**	**Total**
Hand Pump Sprayer	1	6	0	0	**7**
Unpressurized Hand-held Spray Equipment	1	2	0	0	**3**
Aerosol Can	0	10	0	0	**10**
Foggers	0	11	0	0	**11**
Hand, Other or Unspecified	0	5	0	0	**5**
Automatic Equipment, Chlorinators	2	0	0	0	**2**
Implements with Handles	0	1	0	0	**1**
Manual Placement	2	12	0	0	**14**
Other	0	2	0	0	**2**
Unknown	2	7	0	0	**9**
Total Non-Occupational Cases	**8**	**56**	**0**	**0**	**64**
Total Occupational and Non-Occupational Cases	**60**	**188**	**0**	**20**	**268**

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

Automatic Equipment, Other Or Unspecified	:	Equipment that automatically injects the pesticide to the target area. This includes equipment attached to milking machinery, dishwashers, etc. This excludes equipment already described above.
Immersion Equipment	:	Tanks, trays, sinks, etc. used for the dipping of animals, produce, bulbs, medical equipment, dishes, pots and pans, etc.
Implements With Handles	:	Mops, brushes, and other implements with handles.
Implements Without Handles	:	Cloths, towels, rags, sponges and other implements without handles.
Manual Placement	:	Manual placement of a pesticide directly to a target site. This includes bait stations, hand tossed pellets, and direct pouring of a pesticide onto a target surface from a container (such as pouring liquid chlorine directly into swimming pool water). This excludes the placement of fumigation pellet packs in chambers and under tarps.
Manual Application Methods, Other Or Unspecified	:	Manual application methods, other or unspecified. The pesticide is not propelled by any type of equipment. This includes two or more types of manual application methods. This excludes manual application method already described above.
Other	:	Any application methodology not described above. This includes two or more types of application equipment not elsewhere specified.
Unknown	:	The type of application equipment is not known.

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 nearly 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 2001

Occupational[3]

Activity[4]	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown[5]	No. Cases	%	Unknown[6]
Mixer/Loader	50	0	0	0	12	24	2
Applicator	91	1	1.1	1	18	19.8	4
Mechanical	14	0	0	0	5	35.7	0
Packaging/Processing	4	0	0	0	2	50	0
Field Worker	14	0	0	0	6	42.9	0
Routine Indoor	25	0	0	0	4	16	0
Routine Outdoor	4	0	0	0	1	25	0
Manufacturing/Formulation	2	1	50	0	0	0	2
Transport/Storage/Disposal	16	1	6.3	1	6	37.5	2
Emergency Response	8	0	0	1	4	50	0
Other	24	1	4.2	0	7	29.2	2
Unknown	6	0	0	0	1	16.7	1
Total Occupational	**258**	**4**	**1.6**	**3**	**66**	**25.6**	**13**

Non- Occupational[3]

Activity[4]	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown[5]	No. Cases	%	Unknown[6]
Mixer/Loader	8	0	0	0	0	0	2
Applicator	43	6	14	3	3	7	15
Routine Indoor	45	2	4.4	0	3	6.7	20
Routine Outdoor	34	2	5.9	2	1	2.9	27
Other	38	13	34.2	4	5	13.2	18
Unknown	4	0	0	0	0	0	3
Total Non-Occupational	**172**	**23**	**13.4**	**9**	**12**	**7**	**85**
TOTAL CASES	**430**	**27**	**6.3**	**12**	**78**	**18.1**	**98**

[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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About the Pesticide Illness Surveillance Program Data

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

Hospitalization and Disability Associated with Illnesses/Injuries *Possibly Related* to Pesticide Exposure in California[1,2], Summarized by Occupational Status and Activity 2001

Occupational[3]

Activity[4]	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown[5]	No. Cases	%	Unknown[6]
Mixer/Loader	2	0	0	0	2	100	0
Applicator	41	0	0	0	5	12.2	4
Mechanical	6	0	0	0	0	0	1
Packaging/Processing	7	0	0	0	1	14.3	0
Field Worker	43	0	0	1	6	14	8
Routine Indoor	12	1	8.3	1	2	16.7	3
Routine Outdoor	6	0	0	0	2	33.3	0
Manufacturing/Formulation	1	0	0	0	0	0	0
Transport/Storage/Disposal	7	0	0	1	2	28.6	3
Emergency Response	2	0	0	0	0	0	0
Other	23	0	0	0	4	17.4	1
Total Occupational	**150**	**1**	**0.7**	**3**	**24**	**16**	**20**

Non- Occupational[3]

Activity	Total Cases	Hospitalization			Disability		
		No. Cases	%	Unknown[5]	No. Cases	%	Unknown[6]
Applicator	13	0	0	1	0	0	4
Routine Indoor	10	0	0	0	1	10	4
Routine Outdoor	6	0	0	0	0	0	5
Other	4	1	25	1	0	0	3
Unknown	3	0	0	0	0	0	2
Total Non-Occupational	**36**	**1**	**2.8**	**2**	**1**	**2.8**	**18**
Total Cases	**186**	**2**	**1.1**	**5**	**25**	**13.4**	**38**

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

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

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

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

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

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

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

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

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Agricultural Drift Cases Reported in California[1] Associated With[2] Pesticide Exposure Summarized by Application Sites[3]
2001

Application Site[3]	Number of Cases[4]	Number of Incidents[5]
BERRIES		
Strawberries	3	1
CITRUS		
Oranges	17	2
Citrus (Other or Unspecified)	1	1
FIBER CROP		
Cotton	5	4
FIXTURES		
Agricultural & Farm Equipment (Other or Unspecified)	1	1
FORAGE CROP		
Alfalfa	3	3
FRUITING VEGETABLE		
Tomatoes	2	1
GRAPES		
Grapes	5	5
LEAFY/STEM VEGETABLE		
Cauliflower	1	1
Spinach	2	2
NON-CROP		
Animal Burrows (Vertebrate and Insect Pests)	1	1
Soil	15	5
Uncultivated Agricultural Areas (Other or Unspecified)	2	2
NUT TREES		
Almonds	1	1
ORNAMENTAL		
Ornamental Plants (Other or Unspecified)	1	1
OTHER FRUIT		
Dates	1	1

Application Site[3]	Number of Cases[4]	Number of Incidents[5]
POME FRUIT		
Apples	4	1
PREMISES		
Dairy Farm Milk Handling Facilities & Equipment	1	1
Food Processing/Handling Plant/Area (Other or Unspecified)	1	1
STONE FRUIT		
Peaches	4	2
SUGAR CROP		
Sugar Crops (Other or Unspecified)	1	1
UNKNOWN		
Unknown	1	1
TOTAL	**73**	**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:** 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. A single incident may involve more than one person.

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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
2001

Type of Application Equipment Used [3]	Type of Activity [4]				TOTAL
	Routine Indoor	Routine Outdoor	Field Worker	Other	
Fixed Wing Aircraft	2	1	2	1	**6**
Helicopter	0	0	0	2	**2**
Ground, Boom Below/Behind	0	0	3	1	**4**
Ground Boom, Other or Unspecified	0	0	0	1	**1**
Over-the-vine Boom	0	1	0	0	**1**
Ground, Other or Unspecified	4	2	4	4	**14**
Airblast Sprayers	0	17	0	2	**19**
Shank Injection without Tarps	0	0	0	1	**1**
Shank Injection with Tarps	5	3	0	3	**11**
Pressurized Hose-line Sprayers	0	0	0	1	**1**
Unpressurized Hand-held Spray Equipment	0	0	0	1	**1**
Aerosol/fog Generating Equipment	0	1	0	0	**1**
Hand, Other or Unspecified	0	1	0	4	**5**
Automatic Equipment, Chlorinators	0	0	0	1	**1**
Manual Placement	0	0	0	1	**1**
Unknown	0	1	1	2	**4**
TOTAL	**11**	**27**	**10**	**25**	**73**

[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.
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.
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 Unspecified	: Ground application equipment with a spray boom. The following are excluded: 1) Ground Boom Below/Behind, 2) Over-The-Vine Boom, and 3) Electrostatic Sprayer.
Ground, 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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Fax: (916) 445-4280
www.cdpr.ca.gov

About the Pesticide Illness Surveillance Program Data

Pesticide-related illnesses have been tracked within the state of California for nearly 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.

Illnesses and Injuries in California[1] Associated With Pesticide Residue in Agricultural Fields, 1982-2001

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	29	5	42	**109**
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	16	**45**
Total	**526**	**656**	**774**	**1802**	**3758**

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

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

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

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

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

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

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

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

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

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Incidents Involving *Field Workers* Reported in California[1] Associated With[2] Pesticide Residue Exposure Summarized by Crop and Type of Illness
2001

Crop	Systemic/ Respiratory[3]		Topical[3]		TOTAL
	Definite/ Probable	Possible	Definite/ Probable	Possible	
CITRUS					
Oranges	0	1	0	0	1
CUCURBITS					
Watermelons	0	1	0	0	1
FIBER CROP					
Cotton	0	0	0	1	1
FORAGE CROP					
Alfalfa	1	0	0	0	1
FRUITING VEGETABLE					
Tomatoes	0	0	0	1	1
GRAIN					
Corn	0	0	0	1	1
GRAPES					
Grapes	0	6	0	8	14
LEAFY/STEM VEGETABLE					
Lettuce	6	2	0	0	8
MULTIPLE					
Beans (Other or Unspecified), Cotton	0	0	0	1	1
Greenhouses (Environs, Benches, Etc.), Soybeans	0	1	0	0	1
ORNAMENTAL					
Ornamental Bulb, Corm, Rhizome Plants	0	0	0	1	1
Ornamental Plants (Other or Unspecified)	0	4	0	0	4
POME FRUIT					
Apples	0	0	0	2	2

Crop	Systemic/ Respiratory[3]		Topical[3]		TOTAL
	Definite/ Probable	Possible	Definite/ Probable	Possible	
PREMISES					
Feed/Food Storage Areas (Unspecified)	0	3	0	0	3
STONE FRUIT					
Nectarines	0	2	0	1	3
TREES					
Ornamental and/or Shade Trees	0	2	0	0	2
TOTAL	**7**	**22**	**0**	**16**	**45**

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

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

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

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

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

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

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

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

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

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Pesticide-Associated Illnesses and Injuries Reported In California Schools[1, 2] by Exposure Category, Pesticide Type and Illness Symptoms 2001

Exposure[3]	Systemic/Respiratory[4]			Topical[4]			TOTAL
	Antimicrobial[5]	Cholinesterase Inhibitors[5]	Other Pesticides[5]	Antimicrobial[5]	Cholinesterase Inhibitors[5]	Other Pesticides[5]	
Drift	0	1	17	0	0	0	**18**
Residue	0	2	1	0	0	0	**3**
Direct Spray/Squirt	0	0	0	1	0	1	**2**
Spill/Other Direct	0	0	0	11	0	0	**11**
Other	1	0	0	0	0	0	**1**
Unknown	1	0	1	0	0	0	**2**
TOTAL	**2**	**3**	**19**	**12**	**0**	**1**	**37**

[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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