

**Illnesses and Injuries of Application Workers Reported by California Physicians¹ Associated With² Pesticide Exposure Summarized by the Type of Equipment, Type of Activity and Occupational Status
2008**

Occupational³

| Type of Equipment⁴ | Type of Activity⁵ | | | | Total |
|--|-------------------------------------|-------------------|----------------|-----------------|--------------|
| | Mixer/Loader | Applicator | Flagger | Mechanic | |
| Airblast Sprayers | 2 | 6 | 0 | 0 | 8 |
| Ground, Boom Below/Behind | 1 | 3 | 0 | 0 | 4 |
| Ground Boom, Other or Unspecified | 0 | 1 | 0 | 0 | 1 |
| Ground, Other or Unspecified | 2 | 7 | 0 | 2 | 11 |
| Pressurized Hose-line Sprayers | 0 | 16 | 0 | 0 | 16 |
| Hand Pump Sprayer | 0 | 2 | 0 | 0 | 2 |
| Back Pack Sprayer | 0 | 8 | 0 | 0 | 8 |
| Unpressurized Hand-held Spray Equipment | 2 | 11 | 0 | 0 | 13 |
| Aerosol Can | 0 | 3 | 0 | 0 | 3 |
| Hand, Other or Unspecified | 1 | 7 | 0 | 0 | 8 |
| Chamber | 0 | 3 | 0 | 0 | 3 |
| Automatic Equipment, Chlorinators | 3 | 0 | 0 | 8 | 11 |
| Automatic Equipment, Other or Unspecified | 3 | 0 | 0 | 0 | 3 |
| Immersion Equipment | 6 | 5 | 0 | 0 | 11 |
| Implements with Handles | 1 | 2 | 0 | 0 | 3 |
| Implements without Handles | 0 | 12 | 0 | 0 | 12 |
| Manual Placement | 5 | 10 | 0 | 0 | 15 |
| Manual Application Methods, Other or Unspecified | 4 | 17 | 0 | 0 | 21 |
| Other | 2 | 0 | 0 | 0 | 2 |
| Unknown | 7 | 22 | 0 | 0 | 29 |
| Total Occupational Cases | 39 | 135 | 0 | 10 | 184 |

Non-Occupational³

| Type of Equipment ⁴ | Type of Activity ⁵ | | | | |
|--|-------------------------------|------------|----------|-----------|------------|
| | Mixer/Loader | Applicator | Flagger | Mechanic | Total |
| Pressurized Hose-line Sprayers | 0 | 1 | 0 | 0 | 1 |
| Hand Pump Sprayer | 1 | 5 | 0 | 0 | 6 |
| Back Pack Sprayer | 0 | 1 | 0 | 0 | 1 |
| Unpressurized Hand-held Spray Equipment | 0 | 6 | 0 | 0 | 6 |
| Aerosol Can | 0 | 9 | 0 | 0 | 9 |
| Foggers | 0 | 17 | 0 | 0 | 17 |
| Hand, Other or Unspecified | 0 | 9 | 0 | 0 | 9 |
| Automatic Equipment, Chlorinators | 1 | 0 | 0 | 0 | 1 |
| Manual Placement | 6 | 23 | 0 | 0 | 29 |
| Manual Application Methods, Other or Unspecified | 1 | 5 | 0 | 0 | 6 |
| Implements with Handles | 2 | 8 | 0 | 0 | 10 |
| Other | 0 | 1 | 0 | 0 | 1 |
| Unknown | 2 | 13 | 0 | 0 | 15 |
| Total Non-Occupational Cases | 13 | 98 | 0 | 0 | 111 |
| Total Occupational and Non-Occupational Cases⁶ | 52 | 234 | 0 | 10 | 296 |

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

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

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

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

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

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

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

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

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

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

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

which is classified under shank injection with tarps. This also excludes surface applied pesticides that are subsequently incorporated into the soil by a cultivator.

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

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

⁶ This total includes one case in which the activity could not be determined as occupational or non-occupational.

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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.