

Weak Label Requirements and Inadequate Protection Put Workers' Health and Safety at Risk

Researchers and farmworker advocates alike have identified barriers to access and proper use of appropriate personal protective equipment (PPE) for farmworkers who mix, load and apply pesticides. However, even when the PPE requirements on a pesticide label are strictly followed, situations frequently arise where required PPE is inadequate and workers are left unprotected against obvious exposures.

Consider the following examples from research, investigations and the California Department of Pesticide Regulation Pesticide Illness Query (CalPIQ) database that demonstrate the deficiencies of some pesticide labels regarding PPE.



Tree branches, vines, uneven ground dislodged PPE or damaged sprayers

An applicator spraying azinphosmethyl on apple trees felt spray mist hit his face when tree branches pulled his respirator out of place. He developed symptoms of nausea, vomiting and headache several hours later.

CalPIQ, Kern 1998, Case No. 759

A low branch knocked an applicator's face shield up while he was applying propargite and permethrin to almonds. He may have contaminated his eyes with his gloves when he raised his arm to catch another branch so it hit him.

CalPIQ, Stanislaus 2000, Case No. 545

As an applicator turned his tractor at the end of the row, a tree limb hit him in the face and pulled his goggles off allowing some chlorothalonil spray to get into his eyes.

CalPIQ, Colusa 2001, Case No. 121

An applicator got sprayed on the back of his neck and head with paraquat when a low grape cone hit and broke 2 spray nozzles causing the spray to shoot towards him.

CalPIQ, Colusa 2001, Case No. 336

During a glyphosate application, a tractor wheel hit a hole and caused the spray nozzles to turn upwards and spray at the applicator's face and eyes.

CalPIQ, San Joaquin 2003, Case No. 537

During a herbicide application, an almond tree branch struck and broke a plastic fitting on the spray rig. Glyphosate and oxyfluorfen sprayed out onto the applicator's neck and back.

CalPIQ, Colusa 2003, Case No. 537

A mixer/loader/applicator developed symptoms after a tree branch hit him and knocked off his goggles and hood. He then felt propargite spray mist hit his face and eyes. He was diagnosed with corneal abrasion.

CalPIQ, Mendocino 2005, Case No. 485



Backpack and other hand wand sprayer malfunction

As an applicator sprayed ornamentals with abamectin, acephate and iprodione, the backpack sprayer hose broke near the handle. The pesticide mixture shot up under his face shield and into his left eye.

CalPIQ, Monterey 1998, Case No. 1433

As an applicator sprayed paraquat on weeds, the hand wand separated from the hose which allowed paraquat to squirt up underneath his face shield and onto his face.

CalPIQ, Tulare 1999, Case No. 584

As an employee sprayed herbicides diuron, paraquat and trifluralin around a nursery, the hose blew off the hand wand of his hand pump sprayer allowing the material to spray onto his face and into his right eye.

CalPIQ, Modesto 2000, Case No. 492

A hose disconnected and sprayed a pesticide on the applicator's back as he sprayed dicofol with a hand wand from a tractor. Until the rash developed that evening, he did not realize it had soaked through his tyvek coveralls.

CalPIQ, Stanislaus 2000, Case No. 759

As an employee applied herbicides paraquat and pendimethalin in an orchard, the hand wand hose broke and squirted the herbicides on his face and into his mouth. He spit the liquid out.

CalPIQ, Tulare 2001, Case No. 347

While treating a pond with the aquatic herbicide, endothal, a farmer stopped and moved his tractor. While returning to the spray gun, the pressurized hose broke and sprayed the herbicide into his right eye.

CalPIQ, Colvers 2001, Case No. 833

A hose broke at the connection to an applicator's hand wand and sprayed glyphosate up underneath his safety glasses and into his eyes.

CalPIQ, Tulare 2002, Case No. 1088

As a worker spot-sprayed weeds in a tomato field, the hose from the spray rig to his spray wand broke. Paraquat seeped past his goggles and into his eyes.

CalPIQ, Butlers 2005, Case No. 329



PPE failed to protect applicators doing air-blast applications in open tractor cabs

As an applicator made a turn at the end of a vineyard row, the wind blew the spray mist behind his safety glasses and into his eyes. His eyes began burning later that day and persisted for at least 3 days.

CalPIQ, Fresno 1998, Case No. 348

While making an air blast application, a worker noticed his left eye tearing. He flushed the eye with eyewash but the irritation resumed. He thinks contaminated sweat ran behind his safety glasses.

CalPIQ, Modesto 1998, Case No. 306

A worker applied esfenvalerate to walnut trees with an air blast sprayer. The wind caught some spray mist and blew it underneath his face shield and into his eyes.

CalPIQ, Stanislaus 1998, Case No. 900

Five workers spent 8 days mixing, loading, and applying esfenvalerate and crop oil to almond trees with open cab tractors pulling air blast sprayers. All reported skin irritation, even though all of them were trained, experienced, used well maintained protective gear that exceeded requirements, and had access to appropriate facilities.

CalPIQ, Fresno 2000-Cases No. 50 to 54 and Investigation 3-FRE-00

An applicator drove an open cab tractor while applying propargite to almonds with an air blast sprayer. Although he noted no exposure and had no problems with a similar work the previous week, he developed skin rash during the application.

CalPIQ, Kings 2007, Case No. 209

While towing an airblast sprayer with an open-cab tractor, an applicator removed his safety glasses to improve his sight. He turned to check the spray pattern, and propargite hit him in the face. He cleaned up promptly, but later was diagnosed with corneal abrasion.

CalPIQ, Fresno 2005, Case No. 483



Protective footwear isn't required on many pesticide labels for mixing and loading or application activities even though contaminated shoes are a documented source of take home exposure and even pesticide poisoning.

In 2007, California officials investigated the poisoning of a pesticide applicator with symptoms of headache, nausea and stabbing abdominal pain and plasma cholinesterase depressed to 28% of baseline. The investigation found high levels of chlorpyrifos on the outside and inside of the applicator's work boots and concluded that "the leather of the boots is acting as a reservoir for chlorpyrifos, likely causing low level but sustained exposure."

Fang, H. (2007). California Department of Pesticide Regulation Memorandum HSN-07008, September 27, 2007.

A recent study conducted in the Salinas Valley of California found higher dust levels of pesticides was associated with storage of farmworkers' work shoes in the home.

Hamley, M. et al (2009) Envir Sci and Tech 43(23) 8767-8774



Face shield, safety glasses or goggles failed to protect

As an applicator applied paraquat to weeds in a cherry orchard on a hill with a 30 degree slope, a gust of wind blew spray mist up under his face shield.

CalPIQ, Fresno 1999, Case No. 814

A worker's safety glasses fogged up, so he looked over or around them to navigate the Randall sprayer. While spraying a levee with the sprayer's hand wand, a puff of wind blew glyphosate herbicide into his left eye.

CalPIQ, Teha 2000, Case No. 187

As a mixer/loader opened a pesticide container, liquid squirted under his safety glasses and contacted the skin around his eyes.

CalPIQ, Fresno 2000, Case No. 747

A night applicator turned to see whether a noise indicated a sprayer malfunction, which opened a gap around his safety glasses and allowed flooding mist to enter his eye.

CalPIQ, Napa 2004, Case No. 140

A sudden gust of wind blew a mixture of fosetyl-al and fertilizer into the applicator's face. A few minutes later, his left eye felt irritated so he concluded the spray must have got past his goggles. He immediately flushed the eye with water but developed painful eye irritation.

CalPIQ, Santa Cruz 2005, Case No. 94

Recommendations for reducing exposure during pesticide handling activities

1. Use less toxic pesticides and alternative controls to reduce dependence on personal protective equipment because PPE is uncomfortable, cumbersome and increases risk of heat illness.
2. Use enclosed cabs with filtration systems or enclosed cabs and respiratory protection for air-blast applications to adequately prevent eye, skin and respiratory exposure, especially when applying higher toxicity pesticides.
3. Prohibit use of hand-held wands and backpack sprayers for application of higher toxicity pesticides.
4. To reduce applicator exposure and off-site drift, the time to observe safe practices should be built into spraying and maintenance schedules.
 - Shutting off spray before unplugging nozzles or turning equipment around must be standard practice.
 - Daily equipment inspection and ongoing maintenance is essential for preventing worker exposure from leaking equipment.
5. Provide protective footwear for all types of pesticide mixing and loading and application, especially when applicators are using hand-held application equipment.
6. Provide adequate change areas, storage areas for street clothes, washing facilities and showers.
7. Ensure provision of durable protective equipment that fits well and doesn't tear easily.

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