

# Fact Sheet

# Chlorpyrifos



## Why California needs to phase out this brain-harming pesticide to protect children's health

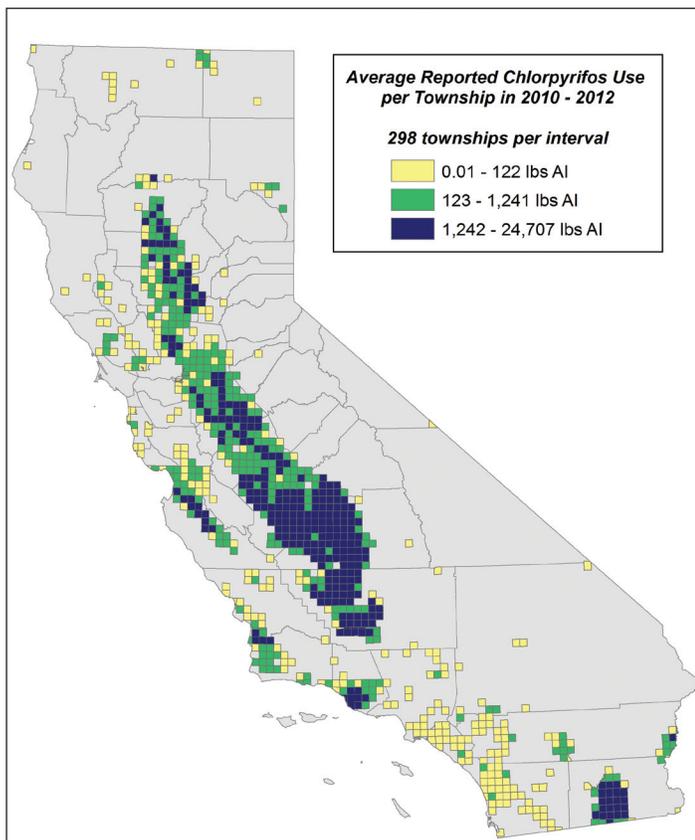
The pesticide chlorpyrifos is a potent neurotoxin, and children are the most vulnerable to its permanent brain-harming effects. The California Department of Pesticide Regulation (DPR) must ban chlorpyrifos to protect children and front line communities from exposure to this drift-prone pesticide, which is found in significant quantities as residue on fruits and vegetables, in air, water, dust and in people's bodies.

While it works toward a full statewide phaseout, DPR must take immediate steps to decrease exposure of California's children by completing a human health risk assessment, banning risky aerial and air-blast application methods, and mandating protection zones around schools, homes and other sensitive sites.

### California's children are at risk

There is more to children's success than having the right school supplies, a good teacher, and strong parental involvement. To have their best chance, children need to have a healthy beginning and a healthy environment.

**Children's health and brain function can be permanently and irreversibly harmed by exposure to neurotoxic pesticides such as chlorpyrifos, even at very low levels of exposure and even if this exposure happens before they are born.**



Although banned by U.S. EPA for home use because it harms children's development, chlorpyrifos is still widely used for agriculture in California's rural areas — especially the Central Valley, Central Coast and Imperial Valley. Rural communities' health is at risk when chlorpyrifos drifts from fields; urban communities are at risk from residue on food. *AI = active ingredient.*

From gestation through their school years, California's children living in rural areas are at a disadvantage from disproportionate exposure to environmental health hazards such as chlorpyrifos; meanwhile, urban children are still exposed to chlorpyrifos in the food they eat. To protect the next generations, California must take action now and support growers to use safe replacements for chlorpyrifos.

### California is the highest user of chlorpyrifos in the United States

Chlorpyrifos is one of the most widely used insecticides in the U.S., and California accounts for over 20% of its use nationwide: in 2011, California used 1.3 million pounds of the approximately five million pounds used across the country.<sup>1,2</sup> Widely used to kill insects in almond, walnut, orange, grape and broccoli crops (the top crops on which it was used in 2012), chlorpyrifos is found in air and water — and people's bodies — across the state. Chlorpyrifos use is concentrated in counties with some of the highest environmental burdens and vulnerable populations in the state, including the San Joaquin Valley, the Central Coast and the Imperial Valley.

### Strong scientific evidence: chlorpyrifos harms children's brain development

A solid body of research has shown that prenatal exposure to organophosphate pesticides, including chlorpyrifos, has negative impacts on children's brain development.<sup>3</sup> Such exposures are associated with long-lasting effects, including poorer perceptual reasoning,<sup>4</sup> working memory<sup>5</sup> and intellectual development at seven years old.<sup>6</sup> In fact, one study linked prenatal exposure to a seven-point reduction in IQ by age seven and another found that even *very low levels* of chlorpyrifos residues in cord blood resulted in lower IQ and reduced working memory. Higher blood chlorpyrifos concentrations during pregnancy were also found to be associated with poorer mental and motor development at three years of age.<sup>7</sup>

Studies on pregnant women exposed to chlorpyrifos through home use demonstrated a link between *in utero* exposure and low birth weights, reduced head circumference of newborns, delays in learning and mental development, attention problems

and pervasive development disorders.<sup>8</sup> Chlorpyrifos is also a suspected hormone-disrupting compound.<sup>9</sup> Dietary exposure to organophosphate pesticides like chlorpyrifos, at levels common among U.S. children may also contribute to Attention Deficit Hyperactivity Disorder (ADHD).<sup>10</sup>

All of the health issues caused by chlorpyrifos and other organophosphate pesticides—attention deficit/hyperactivity disorder, autism, declines in IQ and reduced cognitive function—are on the rise among children in what public health experts from Harvard and Mt. Sinai Hospital call a “silent pandemic.”

## **Chlorpyrifos disproportionately affects frontline and Latino communities**

Agricultural pesticide use near schools and communities is a significant civil rights concern in California. Rural residents, including children and farmworkers, are disproportionately exposed to chlorpyrifos, especially those who live near fields where chlorpyrifos is applied. A June 2014 study<sup>11</sup> from UC Davis showed that children of mothers who lived up to one mile from fields treated with chlorpyrifos in their second trimester were 3.3 times more likely to have autism.

The UC Berkeley CHAMACOS study looked at chemical exposures in a cohort of pregnant women and their children from the Salinas Valley in Monterey County—most of the subjects are Latina and from poor farmworker communities. This study found associations between prenatal chlorpyrifos exposure and negative impacts on brain development.<sup>12</sup>

The California Department of Public Health’s April 2014 report on agricultural pesticide use near California’s schools also demonstrated a pattern of disproportionate racial exposure.<sup>13</sup> It found that in the 15 agricultural counties

studied, Latino children were 46% more likely than white children to attend schools where there was highly hazardous pesticide use used within ¼ mile. The racial difference was more pronounced with increased pesticide use: **Latino children are nearly twice as likely as white children to attend schools near the highest use of the most hazardous pesticides.** Of all pesticides analyzed, the report found that chlorpyrifos was the eighth most common highly hazardous pesticide used within ¼ mile of public schools in the 15 counties studied. Over 7,700 pounds of chlorpyrifos were applied in a single year within ¼ mile of 438 schools, putting tens of thousands of students at risk.

California needs to take targeted action to protect communities that are already vulnerable due to economic and social factors—including limited access to healthcare—and who also suffer a disproportionate burden of exposure to chlorpyrifos.

## **Banned for home use, but children are still exposed through food residues and pesticides drifting from fields**

The U.S. EPA banned chlorpyrifos for home, lawn and garden use in 2000 after studies clearly indicated that exposed children had smaller head circumference (a known indicator of reduced cognitive function). Yet it continues to be widely used in agriculture where rural children, workers and other residents are exposed through both air and water—including through direct skin contact, contact with treated surfaces, inhaling chlorpyrifos-contaminated dust, and by breathing air near fields where it was applied. This is a clear inequity putting rural children in greatest jeopardy.

Yet children and others who live in urban areas are not safe from exposure: exposures also result from eating food contaminated with chlorpyrifos residues.<sup>14,15</sup> Residues on food are a significant route of exposure for children across the state. Children eating conventionally produced foods have higher levels of chlorpyrifos in their bodies than children eating a primarily organic diet. A 2008 study reported that of the children tested, 91% had detectable levels of chlorpyrifos breakdown products in their bodies.<sup>16</sup> Chlorpyrifos had the highest level of detection among the five organophosphate pesticides tested. In 2016, the U.S. Environmental Protection Agency also concluded that chlorpyrifos residues put children at high risk, finding that for children 1–2 years of age, exposures from food exceed the EPA’s safety threshold by *140 times*.<sup>17</sup>

Chlorpyrifos is also prone to drifting from fields where it is applied. An air and bio-monitoring study conducted from 2004–2006 in the town of Lindsay in Tulare County, California, found that of the more than 100 air samples collected near homes in this agricultural community, three-quarters of the samples had detectable levels of chlorpyrifos. Eleven percent of the samples were above the levels determined to be “acceptable” for a 24-hour exposure by children. The

## **Poisoning Incidents in California**

In the five years from 2005–2009, over 110 community members and workers are documented as having been acutely poisoned by chlorpyrifos.<sup>1</sup> Up to ½ mile from application sites, victims experienced dizziness, nausea, vomiting and burning eyes. Some of these incidents poisoned farmworkers in nearby fields, some affected nearby businesses, and some poisoned neighbors in their homes—once even waking up two girls with poisoning symptoms. Since then, children have also been affected on school buses.

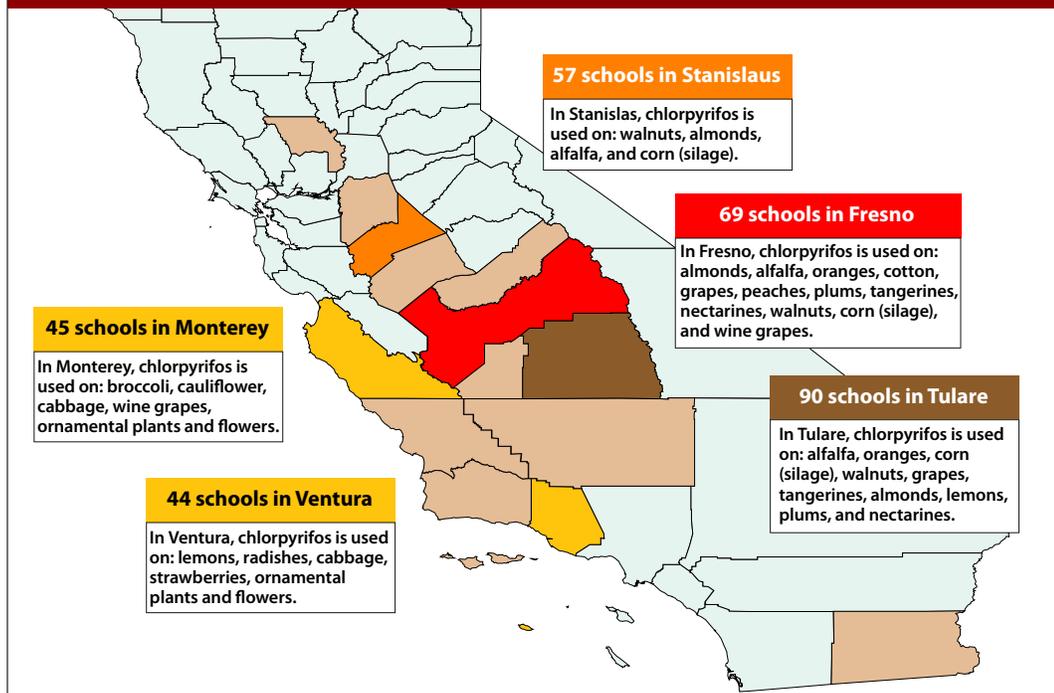
These numbers only show a small part of the problem: very low levels of chlorpyrifos exposure can have serious long-term health effects without someone experiencing immediate symptoms. Also, these reported poisoning numbers are only the tip of the iceberg since many barriers ensure that most incidents go unreported.<sup>2,3</sup>

1 California Pesticide Illness Query (CalPIQ). [http://apps.cdpr.ca.gov/calpiq/calpiq\\_input.cfm](http://apps.cdpr.ca.gov/calpiq/calpiq_input.cfm).

2 Pesticide Action Network North America. *Fields of Poison: California Farmworkers and Pesticides*. 1999.

3 Californians for Pesticide Reform’s 2005–6 survey of community residents’ experience with pesticide poisonings. <http://pesticidereform.org/article.php?id=269>

**A highly neurotoxic pesticide, chlorpyrifos, is widely used in close proximity to many California schools. Five counties top the chart with a combined 305 schools and more than 150,000 kids in harm's way.**



Schools were identified based on CDPH report <[cehtp.org/projects/ehss01/pesticides\\_and\\_schools/Pesticides\\_Schools\\_Report\\_April2014.pdf](http://cehtp.org/projects/ehss01/pesticides_and_schools/Pesticides_Schools_Report_April2014.pdf)> and crop data from CDPH <[calpip.cdpr.ca.gov](http://calpip.cdpr.ca.gov)> and represent usage from 2010 in amounts totaling greater than 50 pounds per county.

highest concentration observed was nearly eight times the level of concern.<sup>18</sup> The study also found chlorpyrifos in people's bodies: 11 of the 12 people tested had above average levels of the primary chlorpyrifos breakdown product in their urine, and seven of the eight women had amounts above the "acceptable" level for pregnant and nursing women calculated from U.S. EPA data.<sup>19</sup>

DPR recently released 2013 air monitoring data that shows chlorpyrifos frequently moves off treated fields in the air, as chlorpyrifos was found in the air in a third of samples taken in three California communities, even though these sites were at considerable distances from agricultural fields.<sup>20</sup> In 2016, the U.S. EPA concluded that airborne levels of chlorpyrifos measured in California communities pose a risk to children and women of childbearing age.<sup>21</sup>

### **Chlorpyrifos pollutes California's water**

In addition to its effects on brain function, chlorpyrifos is also a potent water and air contaminant. A 2007 U.S. Geological Survey study showed that the breakdown products of chlorpyrifos are 10 to 100 times more toxic to amphibians than the pesticide itself.<sup>22</sup> This is significant because a diverse aquatic invertebrate community provides critical functions such as nutrient cycling and decomposition, and is the foundation of a healthy aquatic ecosystem: it means that a body of water is healthy and can sustain other life.

The Central Coast Regional Water Quality Control Board (CCRWQCB) acknowledged that pesticides are "causing serious damage" to Central Coast water resources, with monitoring programs documenting "high levels of chemicals leaving agricultural areas and entering the waterways of our Region."<sup>23</sup>

DPR's 2011 water monitoring data<sup>24</sup> detected chlorpyrifos in 17.7% of samples (with 10% exceeding U.S. EPA's target level), showing that chlorpyrifos frequently moves from treated fields into water at levels that might harm aquatic life.

### **Safe, sustainable & effective replacements to chlorpyrifos are already in use**

Safe and effective replacements for chlorpyrifos, including use of pheromones for insect mating disruption, has led to dramatic reduction of chlorpyrifos use in some crops. Research is still needed to ensure the availability of safe and effective chlorpyrifos replacements for specific pests on certain crops such as alfalfa, broccoli, citrus and cotton.

The University of California Statewide Integrated Pest Management Program, UC Santa Cruz and other programs with solid track records for research and innovation are already identifying and developing alternatives. DPR needs to provide necessary resources for researchers and farmers to develop and transition to effective replacements for chlorpyrifos for priority crop-pest combinations.

# California must take immediate action to protect children, workers and rural residents from brain-harming chlorpyrifos

Fourteen years after U.S. EPA banned chlorpyrifos for home use because of the danger it poses to children's health—and despite the abundance of strong scientific studies showing that it causes permanent to children's development—California still allows heavy use of chlorpyrifos in the state's fields.

**Immediate action is necessary to prevent children's exposure to this pesticide.** Although the California Department of Pesticide Regulation (DPR) released new rules in September 2014 making chlorpyrifos a “restricted use” pesticide (meaning that growers must get a permit before they apply it), DPR is not requiring any additional measures that would protect children and community members from exposure or reduce chlorpyrifos use.<sup>25</sup>

## Notes

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## Policy recommendations for chlorpyrifos

### DPR must take the following immediate actions:

1. **Ban all agricultural uses of chlorpyrifos in California by the end of 2017.**
2. **While the ban is put in place, require strong protection measures for chlorpyrifos use in the interim, including:**
  - Banning risky aerial and air-blast application methods, and
  - Establishing protection zones of at least one mile around schools, homes and other sensitive sites.
3. **Establish an ongoing program to support growers to transition to safe replacements for chlorpyrifos, including identifying funding sources for a competitive grant program that funds research, extension and direct support for growers, as necessary.**

**CPR Steering Committee:** California Rural Legal Assistance Foundation, Center on Race, Poverty and the Environment, Center for Environmental Health, El Quinto Sol de América, Monterey Bay Central Labor Council, Pesticide Action Network, Physicians for Social Responsibility – Los Angeles

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