# Failing Health
## Pesticide Use In California Schools

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Research Assistance provided by:
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CALPIRG Charitable Trust

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## California Public Interest Research Group Charitable Trust

The CALPIRG Charitable Trust is the 501(c)(3) sister organization of the California Public Interest Research Group (CALPIRG), a non-profit, non-partisan research and advocacy organization working on behalf of consumers and the environment. With over 70,000 members and 14 offices statewide, CALPIRG is the largest consumer group in California.

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## Californians for Pesticide Reform

Californians for Pesticide Reform (CPR) is a coalition of public interest organizations committed to protecting public health and the environment from pesticide proliferation. CPR's mission is to: 1) educate Californians about environmental and health risks posed by pesticides; 2) eliminate the use of the most dangerous pesticides in California and reduce overall pesticide use; and 3) hold government agencies accountable to protecting public health and Californians' right to know about pesticide use and exposure.

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Pesticides are *not* "safe." They are produced specifically because they are toxic to something.

—U.S. Environmental Protection Agency
Citizen's Guide to Pesticides, 1987

# Executive Summary

Twenty five years ago, the California Parent Teacher Association passed a resolution calling for the reduced use of pesticides in schools, calling on policymakers to consider all possible alternatives before using any pesticides and to use pesticides only as an emergency measure. Since then, the National Parent Teacher Association, the National Education Association and a wide array of public interest organizations across the nation have announced support for reducing pesticide use in schools.

Meanwhile, the overall incidence of childhood cancer increased 10% between 1974 and 1991, the most recent statistics available, making cancer the leading cause of childhood death from disease. Approximately 4.8 million children in the U.S. under the age of 18 have asthma, the most common chronic illness in children and one which is on the rise. Numerous scientific studies have linked both diseases to pesticide exposure.

Unfortunately, neither public interest advocates nor ominous health trends have convinced authorities to remove toxic pesticides from California schools. In an attempt to characterize the current use of pesticides in our schools, researchers at the California Public Interest Research Group (CALPIRG) Charitable Trust recently requested pesticide use information from 54 California school districts statewide, representing urban, suburban and rural areas. This research effort was hindered by the absence of state pesticide use reporting and notification requirements for schools. Reluctance on the part of school staff, lack of pesticide record keeping by schools and limited school resources all made it difficult to obtain pesticide-related records. CALPIRG Charitable Trust eventually resorted to legal counsel to obtain this information. Because of incomplete, illegible and missing pesticide use information, it was not possible to assess the overall quantity of pesticides used in the school districts surveyed—some may have applied pesticides listed in this report infrequently or in small amounts while others may have applied large quantities.

However, by scrutinizing the pesticide use records and school invoices for pesticide purchases and contracted services for 46 responding school districts—representing approximately one in four of all children enrolled in California's public schools grades K–12—this report is able to provide the first-ever statewide assessment of pesticides used in our school systems.

**We found that:**

**1. Highly toxic pesticides are used in California school districts.**
Of the 46 school districts responding to our request for information, 87% (40) reported using one or more of 27 particularly hazardous pesticides that can cause cancer, affect the reproductive system, mimic the hormone (endocrine) system or act as nerve toxins. The percentage of surveyed school districts using each of these most-hazardous pesticides is provided in Table A below.

The use of highly toxic chemicals in schools is of significant concern. According to the National Academy of Sciences, children are

Table A: Use of toxic pesticides in surveyed California schools.

| Health Effect(s) | Percentage & (number) of Responding School Districts Reporting Pesticide Use |
|---|---|
| "Probable" or "known" human carcinogens | 20% (9) |
| "Possible" human carcinogens | 70% (32) |
| Developmental and reproductive toxins | 52% (24) |
| Hormone mimicking pesticides | 50% (23) |
| EPA Category I Nerve Toxins | 26% (12) |
| EPA Category II Nerve Toxins | 41% (19) |

highly susceptible to the effects of toxic chemicals and may not be protected from pesticides under current regulations. Not simply "little adults," children are in the midst of highly complex, and vulnerable, developmental processes that regulate tissue growth and organ development. They may also receive greater pesticide exposures than adults—both because of their physiology and because childhood behaviors may increase contact with surfaces sprayed with pesticides.

### 2. In California schools, pesticides are the rule, not the exception.

Ninety-three percent (43) of the responding school districts reported using pesticides. Combined, these school districts reported using over 70 different pesticide active ingredients in over 170 pesticide product formulations.

At least 30% (14) of the surveyed school districts contracted with commercial exterminators who applied pesticides on a regular monthly, bi-monthly or quarterly basis—in some cases even when no pests were present. So-called "calendar spraying" may also have occurred in any of another 28 surveyed school districts which submitted more ambiguous records. According to data collected by the Department of Pesticide Regulation in late 1993, only 2% of the 556 responding California school districts were able to document plans or programs for practicing least-toxic pest control or Integrated Pest Management (IPM).

### 3. Least-toxic pest management is proven to be effective.

The above findings suggest that California school districts have not embraced opportunities for using least-toxic methods to combat pests. Combinations of techniques, such as improved sanitation, mechanical exclusions (screens, caulking), inspections and traps can eliminate the need for applying highly toxic chemicals. Three of the surveyed school districts are already managing pest problems without toxic chemicals. In addition, a recent survey of 21 Pennsylvania school districts that have adopted IPM programs found that these programs are effective, of equal or lower cost than using hazardous pesticides, and may even reduce school absenteeism.

### 4. Parents, policymakers and the public are prevented from getting basic information about pesticide use in schools.

Unlike several other states, including Arizona, Texas and Michigan, California has no law requiring notification of parents or teachers before applying pesticides in schools. Without notification, parents and teachers are unable to take precautionary measures or participate in pest management decision-making.

Similarly, there is no requirement for schools to report their own overall pesticide use. When school districts contract with commercial applicators, the applicator reports pesticide use to the Department of Pesticide Regulation. However, unlike agricultural pesticide use reports, this information is not coded in a way to identify the location (name of school) where the pesticides were used. In effect, pesticide use is better documented for an acre of cabbage than for a California classroom. As a result, finding information about pesticide use in schools is next to impossible. It is therefore extremely difficult for school managers, state regulators and the public to obtain the most basic information necessary to ensure that our children's health is protected.

### Recommendations

When it comes to protecting our children's health from the use of pesticides in California schools, Governor Wilson and the California legislature get a failing grade. Under the Wilson Administration, the Department of Pesticide Regulation has continued to permit the use of highly toxic pesticides in our classrooms while keeping parents and teachers in the dark about school pesticide use. Opportunities for using least-toxic alternative methods of pest management have been all but ignored. In 1992, State Senator Nicholas Petris (D-Oakland) introduced legislation that would have banned the use of highly toxic pesticides in California schools. Unfortunately, his bill was weakened in the legislature and finally vetoed by Governor Wilson.

The CALPIRG Charitable Trust, together with the statewide coalition Californians for Pesticide Reform, urges swift action to protect our children from the unnecessary risks posed by using dangerous pesticides in schools.

- Policymakers should eliminate the school use of pesticides which cause cancer, adverse reproductive and developmental effects, disrupt hormones or harm the nervous system; provide training, incentives, materials and quantifiable reduction goals to promote the reduction of pesticides in schools; ensure that school pesticide use is identifiably reported under the state pesticide use reporting system; and require prior-notification to parents and school staff before the application of pesticides.
- School managers should not wait for leadership from state agencies to implement these reforms.
- Teachers, parents and students should request information about pesticides used in and around schools and participate in school pest management decision-making to ensure that least-toxic pest management is practiced.

# I. Introduction

In 1972, the California State Parent Teacher Association passed a resolution calling for the reduced use of pesticides in schools, asking policymakers to consider all possible alternatives before using any pesticides and to use pesticides only as an emergency measure.[1] Since then, the National Parent Teacher Association, the National Education Association and a wide array of public interest organizations across the nation have announced support for reducing pesticide use in schools.

Never-the-less, pesticides continue to be used in a number of school settings including classrooms, cafeterias, athletic fields and even school buses. The use of pesticides in our children's environment is of particular concern because children are uniquely vulnerable to toxic chemicals. According to the National Academy of Sciences, children are more susceptible to the effects of toxic chemicals than adults and may not be protected from pesticides under current regulations.[2] Not simply "little adults," children's bodies are in the midst of highly complex, and vulnerable developmental processes that regulate tissue growth and organ development. They may also receive relatively greater pesticide exposures than adults—both because of their physiology and because of childhood behaviors which increase contact with surfaces sprayed with pesticides.

In a first-ever attempt to characterize the use of pesticides in California's public schools, researchers at the California Public Interest Research Group (CALPIRG) Charitable Trust recently requested pesticide use information from 54 randomly selected California school districts, representing urban, suburban and rural areas. Forty-six school districts responded, representing approximately one in four of all children enrolled in California's public schools grades K–12.

The survey results are indicate that pesticide use is the rule and not the exception when it comes to pest management in our public school system. Of the responding school districts surveyed for this report, 93% (or 43 school districts) reported using one or more of 73 different pesticides to control pests. Eighty seven percent (40) reported using one or more of 27 highly toxic pesticides—chemicals that can cause cancer, reproductive disorders, hormone disruption, neurological toxicity and acute (single dose) poisonings.

Fortunately, we do not have to perpetuate an ongoing experiment with the health of our children—least-toxic pest management programs are already practiced in California and by schools around the nation. Three schools responding to the survey (Arcata Unified School District, Mendocino Unified School District and Placer Hills Unified School District) reported using no pesticides at all. This strongly suggests that the vast majority of school pesticide use is unnecessary.

**At a time when childhood cancer rates are increasing, and cancer is the leading cause of death by disease among non-infant children under the age of 15, our need to protect children's health is greater than ever.**

Changing the pest management practices of school districts away from toxic pesticides will require leadership by state officials and school managers. To date, Governor Wilson's administration and the California legislature get failing grades for permitting the use of highly toxic pesticides in schools and not providing schoools with adequate information, training and incentives for using least-toxic pest management strategies.

At a time when childhood cancer rates are increasing, and cancer is the leading cause of death by disease among non-infant children under the age of 15, our need to protect children's health is greater than ever.[3] It's time that we use common sense and move toward least-toxic methods of managing pests.

Our children are waiting.

## II. Highly Toxic Pesticides Are Used in California Schools

Of the 46 California school districts responding to our survey, we found that 87% (40) used one or more of 27 highly toxc pesticides—chemicals that health authorities believe can cause cancer, reproductive harm, mimic hormones or are acutely toxic to the nervous system.

**Eighty-seven percent of surveyed California schools use one or more of 27 highly toxic pesticides.**

Specifically, we found that 20% (9) of the responding school districts used one or more of three "known" or "probable" human carcinogens; 70% (32) used one or more of ten "possible" human carcinogens; 52% (24) used one or more of ten developmental and reproductive toxins; 50% (23) used one or more of four pesticides suspected of mimicking human hormones and disrupting the endocrine system; 26% (12) used one or more of four highly acutely toxic nerve poisons, ranked in Category I, U.S. EPA's highest acute toxicity rating; and 41% (19) used one or more of two EPA Category II organophosphate and carbamate nerve toxins. The pesticides found in each of these categories and the percentage of school districts using them is presented in Table 1. Summary information for each school district, including a district-specific list of reported pesticides used, is provided in Appendix B: Survey Response Information by School District.

Note that because of incomplete, illegible and missing pesticide use information, it was not possible to assess the overall quantity of pesticides used in the school districts surveyed—some may have applied pesticides listed in this report infrequently or in small amounts while others may have applied large quantities frequently.

### Possible, probable and known carcinogens in California schools

The surveyed California school districts reported using 12 pesticides identified as possible, probable and known carcinogens. This is of particular concern as childhood cancer is now the leading cause of death due to disease among non-infant children in the U.S. under the age of 15,[4] with about 8,000 children under the age of 15 developing cancer each year.[5] Between 1974 and 1991, the overall incidence of childhood cancer increased 10%,[6] and the rate is increasing approximately one percent on average per year.[7]

Scientific studies suggest that pesticide use in and around homes may increase risk of childhood cancer.[8] For example, a 1987 study of children ten years and younger in Los Angeles County linked usage of pesticides in the home to increased likelihood of leukemia.[9] Similarly, a 1995 study correlated home exterminations and the use of pest strips with childhood cancer, finding increased risk of childhood lymphomas with increased household extermination. The authors of the study also found an association between soft tissue sarcomas and yard treatment with herbicides.

### Reproductive and developmental toxins

Of the 46 responding school districts, 52% (24) reported using one or more pesticides identified by the U.S. Environmental Protection Agency or the State of California as a reproductive or developmental toxin. Exposure to these chemicals may jeopardize a child's physical and mental development, increasing risk of behavioral and neurological disorders, immune system suppression and damage to the reproductive system. Unborn children carried by pregnant teachers may also face increased risk of a variety of physical and mental birth defects.[10] Other effects included spontaneous abortion or miscarriage in humans, low birth weight and sterility or infertility.[11]

### Hormone-mimicking pesticides

Fifty percent of the school districts surveyed reported using pesticides suspected

*continued on page 5*

# Table 1. Highly Toxic Pesticides Used in Surveyed California School Districts

| Health Effect | Pesticide (Active Ingredients) | Percent of responding school districts using one or more of these pesticides | Responding school districts using one or more of these pesticides |
|---|---|---|---|
| "Known" or "probable" carcinogens (a) | fenoxycarb<br>propoxur<br>oxadiazon<br>TOTAL: 3 | 20% | Imperial, Irvine, Lompoc, Los Angeles, Madera, Sacramento, San Diego, San Jose, Stockton (9) |
| "Possible" human carcinogens (b) | acephate<br>cypermethrin<br>hydramethylnon<br>isoxaben<br>oryzalin<br>pendimethalin<br>permethrin<br>piperonyl butoxide<br>simazine<br>tetramethrin<br>TOTAL: 10 | 70% | Alameda, Alhambra, Chico, Conejo Valley, Downey, Esparto, Fremont, Fresno, Glendale, Imperial, Irvine, Jurupa, Linden, Lompoc, Los Angeles, Madera, Manteca, Mojave, Monterey, Napa, River Delta, Rowland, Sacramento, San Diego, San Jose, San Marino, Santa Monica-Malibu, Shasta, Siskiyou, Southern Humboldt, Stockton, Vista (32) |
| Developmental and reproductive toxins (c) | diazinon<br>dicamba<br>diuron<br>EPTC<br>fenoxycarb<br>methyl bromide<br>hydramethylnon<br>oxadiazon<br>simazine<br>tebuthiuron<br>TOTAL: 10 | 52% | Alameda, Conejo Valley, Downey, Fresno, Inglewood, Los Angeles, Madera, Manteca, Modoc, Mojave, Monterey, Napa, New Haven, River Delta, Rowland, Sacramento, San Diego, San Francisco, San Jose, Santa Monica-Malibu, Shasta, Stockton, Vista , Woodland, (24) |
| Hormone mimicking pesticides (d) (endocrine disruptors) | cypermethrin<br>2,4-D<br>esfenvalerate<br>permethrin<br>TOTAL: 4 | 50% | Alhambra, Chico, Conejo Valley, Downey, Fresno, Glendale, Linden, Lompoc, Los Angeles, Madera, Manteca, Modoc, Mojave, Monterey, New Haven, Rowland, Sacramento, San Diego, San Jose, Santa Monica-Malibu, Siskiyou, Southern Humboldt, Ventura (23) |
| U.S. EPA Category I Extremely High Acute Toxicity/ Systemic Pesticides Labeled "Danger/Poison" (e) | aluminum phosphide<br>chloropicrin<br>strychnine<br>sulfuryl fluoride<br>TOTAL: 4 | 26% | Conejo Valley, Downey, Fremont, Irvine, Jurupa,, Madera, Manteca, Monterey, Rowland, San Jose, Santa Monica, Ventura (12) |
| Category II organophosphate or carbamate nerve toxins (f) | chlorpyrifos<br>propetamphos<br>TOTAL: 2 | 41% | Chico, Conejo Valley, Downey, Fresno, Glendale, Inglewood, Jurupa, Los Angeles, Madera, Manteca, Modoc, Mojave, Monterey, Sacramento, San Francisco, San Jose, San Marino, Ventura, Woodland (19) |

Sources:

a. "Known to the State of California to cause cancer" (oxadiazinon): California Environmental Protection Agency, Department of Pesticide Regulation, *Chemicals Known to the State to Cause Cancer or Reproductive Toxicity*, May 1, 1997. "Probable human carcinogens" (fenoxycarb, propoxur): U.S. Environmental Protection Agency, *List of Chemicals Evaluated for Carcinogenic Potential*, February 19, 1997.

b. U.S. Environmental Protection Agency, *List of Chemicals Evaluated for Carcinogenic Potential*, February 19, 1997.

c. U.S. Environmental Protection Agency, *Federal Register*, Vol. 59, No. 229, 61436, November 30, 1994 and California Environmental Protection Agency, *Chemicals Known to the State to Cause Cancer or Reproductive Toxicity*, May 1, 1997 (methyl bromide).

d. Illinois Environmental Protection Agency, *IEPA's Endocrine Disruptor Strategy: Preliminary List of Chemicals Associated with Endocrine System Effects in Animals and Humans or In Vitro*, February 1997. We have included "possible" and "probable" endocrine disruptors from this list.

e. Meister, *Farm Chemicals Handbook*, 1997, DPR online Product/Label Data Base: www.cdpr.ca.gov./docs/database.html. Only Category I pesticides bearing the label "Danger/Poison," the designation reserved for highly toxic systemic (toxic through ingestion, absorption or inhalation) toxins, were included. The same active ingredient may have several different classifications. Only those active ingredients used in products designated with a "Danger/Poison" label are included in this table.

f. Meister, *Farm Chemicals Handbook*, 1997. EPA Category II pesticides must carry the "Warning" label. Several school districts reported using the same active ingredients which are listed above as requiring a "Warning" label, but because the chemical is formulated into a weaker concentration, it does not require such a listing and as such is not included here. Only those products designated with a "Warning" label are included in this table.

## Pesticide Illnesses in California Schools: The Tip of the Iceberg

There have been numerous complaints about illnesses stemming from pesticide use in California schools in recent years. Among them:

- The San Bernardino County Agriculture Commissioner is currently investigating the potential misuse of pesticides at Southridge Middle School after complaints last October by both students and teachers of allergic reactions, illnesses and the death of one student who suffered severe seizures at the school. The school had been using four different pesticides in classrooms, cafeterias and kitchens, even spraying one pesticide from an automatic dispenser into classrooms.[1]
- Last April, six families with children at Jurupa Hills Elementary filed suit against Stanley Pest Control alleging that their children became ill from the use of pesticides in the school between 1994 and 1995.[2]
- In December of 1992, Theresa Tye's son was having problems with chronic fatigue, frequent urination and headaches. Her investigation of pesticide use at Mitchell Elementary in the Sulphur Springs School District in Canyon Country showed that the school routinely treated with Dursban (chlorpyrifos). This same product had caused similar health effects when used at home previously.[3]
- In September of 1992, a pesticide which was not registered for use in California was sprayed into the ventilation system of a San Francisco elementary school, forcing the evacuation of more than 450 school children and staff. Several of the staff and students sought medical attention with symptoms including eye, nose and throat irritation; coughing; skin rash on exposed areas of the face, lips and arms; nausea and upset stomachs.[4]

In terms of actual pesticide-related health impacts, these stories most likely represent the tip of the iceberg. Illnesses resulting from acute (short term) pesticide exposure are only partially tracked by national and state agencies. The EPA found that at least 2,766 pesticide poisoning incidents occurred in schools nationally from 1985 to 1992, according to data collected from Poison Control Centers around the nation.[5] Similarly, the California Pesticide Illness Surveillance Program, that requires doctors to report any illnesses that may be caused by exposure to pesticides, reports 58 poisonings of workers, teachers, students and even a school principal in California schools between 1992 and 1994, the most recent data available.[6]

Both reporting systems are likely to under-report actual poisonings for a variety of reasons, including inadequate training of doctors in identification and diagnosis of pesticide illnesses.[7] Under the California reporting program, few doctors report non-worker pesticide illnesses (such as those incurred by children in schools) because most physician reports are administered through workers' compensation programs which reimburse doctors preparing reports of work-related injuries.[8]

Most importantly, government reporting programs do not even attempt to capture pesticide-related illnesses that have unmeasurable effects, such as learning disorders, or that may not be manifested until years after exposure, such as cancer, reproductive and developmental effects.

1 Anderson, T, "Death Fuels Pesticide Probe,"Inland Valley Daily Bulletin, October 22, 1997; Frazier, J., "Parents Complain about Pesticide Spray: Fontana School Officials Say Rooms at Southridge Middle School Do Not Pose Health Risks to Children," *The Press-Enterprise*, October 25, 1997.

2 Ibid.

3 Goldsmith, S., "Bugged by Pesticide Spraying," *The Signal and Saugus Enterprise*, January 7, 1993.

4 Sesline, D., et al., Irritative and Systemic Symptoms following Exposure to Microban Disinfectant through a School Ventilation System, *Archives of Environmental Health*, November/December Vol. 49, No. 6, 1994, pp. 439-444 and Health and Safety Code, Chapter 3 Pesticide Poisoning, Section 105200: Reports by Physicians and local health officers; treatment deemed first aid; violations.

5 Personal Communication with with Dr. Jerome Blondell, U.S. Environmental Protection Agency (EPA), October 31, 1997. The Agency is not able to explain significant details about the incidents, such as which pesticide caused the problem, which symptoms were reported, how the situation was remedied or even in which school the poisoning took place. New data covering 1993 through 1996 will be available in March 1998 and will be fully searchable electronically.

6 Health and Safety Code, Chapter 3 Pesticide Poisoning, Section 105200: Reports by Physicians and local health officers; treatment deemed first aid; violations and Mehler, L. *Case Reports Received by the California Pesticide Illness Surveillance Program in Which Health Effects were Attributed to Pesticide Exposure Identified by the Word "School" in the Narrative Summary or by SIC Code 8211 and Including all Cases that Reference Cases so Identified: 1992-1994,* California Environmental Protection Agency, Department of Pesticide Regulation, November 14, 1997.

7 Robinson, J., et al., "Pesticides in the Home and Community," *California Policy Seminar*, Berkeley, CA, 1994 ; Personal Communication with Dr. Bill Pease, Environmental Defense Fund, Berkeley, CA, November 1997.

8 Personal Communication with Dr. Louise Mehler, Department of Pesticide Regulations, November 13, 1997.

*continued from page 2*

of disrupting hormonal processes in humans. Four pesticides used by the school districts, cypermethrin, 2,4-D, esfenvalerate and permethrin, may block, mimic or otherwise interfere with the human hormone system.[12] Hormones act as chemical messengers in the human body, triggering a wide array of highly complex and sensitive biological processes. As such, they are responsible for a range of important functions, including determination of height and weight, gender differentiation, development of reproductive organs, energy levels, skin health and other biological processes. Because hormones can "switch" on and off biological processes at extremely low levels, hormone mimicking pesticides may be harmful at very low levels of exposure.[13]

### Nervous system toxins

Of the 46 surveyed school districts, 54% (25) used pesticides identified by U.S. EPA as Category I or Category II poisons—the Agency's highest and second highest ranking for acutely toxic nerve poisons. These pesticides are designed to disrupt the cholinesterase enzymes that control the nervous system of insects. Because humans have these same enzymes, these pesticides pose a priority health concern.[14]

Ironically, use of these toxins in schools may impair the learning process itself. Low levels of neurotoxic pesticide exposure to the developing brain may adversely affect memory, intelligence, judgment and even personality and behavior.[15] For example, in a study of 56 men exposed to organophosphates, scientists reported disturbed memory and difficulty in maintaining alertness and focus.[16] Unfortunately, few pesticides have been evaluated for their ability to cause permanent damage to children's developing central nervous systems, though several researchers suggest that harmful effects should be expected.[17]

An estimated 5% to 10% of school-age children suffer from symptoms of hyperactivity and attention deficit, making it difficult for them to pay attention and learn. In addition, many others experience learning problems ranging from difficulties with memory to impaired fine motor skills such as learning to hold a pen and write.[18]

**Low levels of neurotoxic pesticide exposure to the developing brain may adversely affect memory, intelligence, judgment and even personality and behavior.**

## "Inert" Ingredients: Packaging Poison with Poison

Pesticide products are actually formulations made up of a mixture of "active ingredients"—chemicals which are intended to kill the pest—and "inert" ingredients—chemicals which make the product more potent or easier to use. Inert ingredients often make up the bulk of an applied pesticide. It is not uncommon, for example, for a pesticide to be 99% "inert" ingredients and one percent "active" ingredients.

Ironically, "inert" ingredients are often toxic as well—in a few cases they are more toxic than the active ingredient. Moreover, many inert ingredients may be used by themselves as pesticides; at least 382 chemicals on the U.S. EPA list of pesticide inert ingredients are currently, or once were, registered as pesticide active ingredients.[1]

Eight inert ingredients are considered by the U.S. EPA to be "of toxicological concern" and another 75 are "potentially toxic." Because of concerns about toxicity, the U.S. EPA "strongly encourages registrants to substitute or remove" these products from pesticide products.[2]

Because manufacturers claim that the formulation of these mixtures is "confidential business information," it is difficult or impossible for the public to identify inert ingredients. Thus, we were not able to characterize the use of "inert" pesticidal ingredients in California schools as part of this report.

1 Knight, H., "Hidden Toxic 'Inerts': A Tragecomedy of Errors," *Journal of Pesticide Reform*, Vol. 17, No. 2, 1997, pp. 10-11.

2 Meister Publishing, "Inerts," *Farm Chemicals Handbook*, 1996, pp. D27-D28.

# Special Problems of Pesticide Exposure for Children

## Children are less tolerant to toxic chemicals.

Children are not simply little adults. Early developmental stages of their organs, nervous systems, and immune systems, greater rates of cell division, and their lower body weight increase their susceptibility to pesticide exposure. Immature organs and other developing biological systems are particularly vulnerable to toxic contaminants. Furthermore, pesticides may become more concentrated in the fatty tissues of young children because their fat as a percentage of total body weight is lower than for adults.[1]

A 1993 report by the National Research Council of the National Academy of Sciences has shown that children are more susceptible than adults to the health effects from low-level exposures to pesticides over the long term.[2] Animal studies also suggest that the young are more susceptible to the effects of toxic chemicals. A review of 269 drugs and toxic substances, including a number of pesticides, found that the lethal dose was lower in newborn rodents than in adult rodents in 86% of the cases.[3]

## Children receive relatively greater exposure.

In addition to being more vulnerable to pesticide toxicity, children's behavior and physiology make them more likely to receive greater pesticide exposures, relative to adults. For example, significant exposure to pesticides occurs through the skin—the largest organ in the human body—and children have much more skin surface for their size than adults.[4] Similarly, children have a higher respiratory rate, enabling them to inhale airborne pesticides at a rate faster than adults.[5] Children's increased contact with floors, lawns and playgrounds also increases exposure. Very young children who put fingers and other objects in their mouths may face even greater exposure. Finally, the breathing zone for children is usually closer to the floor where pesticides are re-suspended into the air after floor surfaces are disturbed.[6]

## Children are exposed to pesticide residues in dust and carpets.

Although pesticides contaminate air, soil, food, water and surfaces, studies designed to examine children's exposure to pesticides indicate that the largest number of chemicals and the highest concentrations are often found in household dust.[7]

Carpets act as long-term reservoirs for pesticides that are sprayed indoors.[8] A study assessing pesticide exposure from carpet dust in homes found that the average number of pesticides found in the carpet dust samples was 12, compared to 7.5 in air samples collected in the same residences. Moreover, in all residences sampled, 13 pesticides were found in carpet dust that were not detected in the air. Diazinon, a neurotoxic insecticide, was detected in nine of 11 carpets tested.[9] In our survey, diazinon was used in 34% (16) of the surveyed school districts.

Exposure may be further exacerbated when carpets are cleaned, allowing pesticides to become airborne again and available for inhalation.[10]

Not all of the residues in dust stem from the indoor use of pesticides. One study showed residues of 2,4-D and dicamba, herbicides used by 15% (7) of the surveyed California schools, can be tracked in from outside on shoes. Even areas which were not treated, including lawn area and carpets, showed levels of 2,4-D after the spraying—most likely the result of spray drift during application. Researchers estimated that residues of 2,4-D can persist in household carpet dust for as long as one year.[11]

## Children are exposed to pesticides through ventilation systems.

A building's ventilation system may also contribute to greater pesticide exposure. Some pesticides can become airborne and spread throughout heat and air conditioning systems, potentially causing a repeating source of exposure.

In 1994, the insecticide propoxur was evidently distributed through a California school via the building's air conditioning system. A teacher's aide entered the building immediately after application and became ill with nausea, headache, nose and eye irritation and breathing difficulty.[12]


1 Wargo, J., *Our Children's Toxic Legacy: How Science and Law Fail to Protect Us from Pesticides*, Yale University Press, New Haven, CT, 1996.

2 National Research Council, *Pesticides in the Diets of Infants and Children*, National Academy Press, Washington, DC, 1993.

3 Wyatt, R., "Intolerable Risk: The Physiological Susceptibility of Children to Pesticides," *Journal of Pesticide Reform*, Fall 1989.

4 Mott, L., *Our Children at Risk: The Five Worst Environmental Threats to Their Health*, Natural Resources Defense Council, November 1997, p. 5 citing Principles for Evaluating Health Risks from Chemicals during Infancy and Early Childhood. (no author or date provided) , p. 56; see also Schettler, T., op cit., p. 50.

5 Mott, L., op. cit.

6 U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, *Questions and Answers: Chlorpyrifos*, February 1997.

7 Schettler, T. , *Generations at Risk: How Environmental Toxins May Affect Reproductive Health in Massachusetts*, Greater Boston Physicians for Social Responsibility and MASSPIRG, Boston, MA 1996, p. 51, citing Whitmore, R. et al., "Non-occupational exposures to pesticides for residents of two U.S. cities," *Archives of Environmental Contamination and Toxicology* , Vol. 26, pp.1-13, 1993. See also, Roberts, W. et al., "Development and Field Testing of a High Volume Sampler for Pesticides and Toxics in Dust," *Journal of Exposure Analysis and Environmental Epidemiology*, Vol. 1, No. 2, 1991.

8 Simcox, N., et al., "Pesticides in Household Dust and Soil Exposure Pathways for Children of Agricultural Families," *Environmental Health Perspectives*, Vol. 103, No. 12, December 1995, pp. 1126-1134.

9 Whitmore, R. W., et al., Non-Occupational Exposure to Pesticides, *Archives of Environmental Contamination and Toxicology*, Vol. 26, 1994, pp. 47-59.

10 Esteban, E., et al., "Association Between Indoor Residential Contamination with Methyl Parathion and Urinary Para-Nitrophenol,"*Journal of Exposure Analysis and Environmental Epidemiology*, 1996, p. 384.

11 Nishioka, M. et al., "Measuring Transport of Lawn-Applied Herbicide Acids from Turf to Home, Correlation of Dislodgeable 2,4-D Turf Residues with Carpet Dust and Carpet Surface Residues," *Environmental Science and Technology*, Vol. 30, No. 11, 1996.

12 Mehler, L., *Case Reports Received by the California Pesticide Illness Surveillance Program in Which Health Effects were Attributed to Pesticide Exposure Identified by the Word "School" in the Narrative Summary or by SIC Code 8211 and Including all Cases that Reference Cases so Identified: 1992-1994*, California Environmental Protection Agency, Department of Pesticide Regulation, November 14, 1997. DPR staff would not disclose the name of the school.

# III. Least-Toxic Pest Management Strategies are Effective but Not Used in California Schools

Least-toxic pest management is a decision-making process for managing pests that uses monitoring to determine pest damage levels and combines biological, physical and chemical tools to minimize health, environmental and financial risks.[19] The method uses extensive knowledge about pests, such as infestation thresholds, pest life histories, environmental considerations and natural enemies to complement and facilitate biological and other natural control of pests. Improved sanitation, mechanical exclusions, inspections, traps and baits, and natural substances, beneficial organisms, freezing and flame treatments, among others, are all examples of least-toxic pest control strategies. Pesticides not identified as carcinogens, reproductive toxins, endocrine disruptors or cholinesterase inhibiting nerve toxins are used only as a last resort and then only in serious, pre-defined conditions. Least-toxic pest management is often called Integrated Pest Management (IPM) though some IPM programs do not fully embrace these methods.

Laws and ordinances encouraging IPM in schools have sprouted up across the country, both locally and through state implementation. Texas, Michigan and Florida have adopted policies mandating schools to adopt IPM programs designed to reduce pesticide use. Montana now requires that school pest control applicators pass an IPM certification course.[20]

Unfortunately, the Wilson Administration has not moved California schools in the direction of least-toxic pest management. In late 1993, the Department of Pesticide Regulation surveyed all 1,002 school districts in California by mail to determine the extent to which California schools have adopted IPM. The Department requested each school district to provide its pest management plan or policy, if available. Of the 556 school districts that responded to the state survey, only 2% (12) submitted plans or policies which the Department identified as meeting IPM criteria;[21] 62% of the responding school districts had no pest management plan or program.[22]

**Of 556 school districts that responded to a state survey in 1993, only 2% demonstrated model IPM plans or programs.**

The picture does not look much brighter in 1997. Of the school districts surveyed for this report, 93% (43) reported using toxic pesticides; only three school districts reported "no pesticide" policies, with exceptions for extreme situations. Invoices and record keeping provided by surveyed school districts also indicate that 30% (14) apply pesticides on a regular monthly, bi-monthly or quarterly basis. So-called "calendar spraying" practices are incompatible with least-toxic pest management programs in which pesticide spraying should be a measure of last resort, and used only under certain carefully evaluated contingencies. Because 60% (28) of the surveyed school districts provided records which do not indicate the presence, or absence, of calendar spraying, the actual number applying pesticides on a calendar basis may be much higher.

Calendar spraying may result in the application of toxic pesticides even when pests aren't present. For example, invoices of Terminix visits to Alameda Unified School District show that the company sprayed two to three quarts of the nerve toxin insecticide Tempo® (cyfluthrin) despite the noted absence of any pest. Calendar spraying with no pest present was also documented in records provided by Alhambra School District and Modoc Joint Unified School District. All three school districts employ commercial applicators for calendar service visits.

Schools that contract with commercial applicators are unlikely to receive least-toxic pest management. Neither federal nor state law requires commercial applicators to be trained in IPM or least-toxic methods of pest management. In fact, neither state nor federal agencies have ever formally developed a definition of Integrated Pest Management, despite publicized support for the concept.

### Least-toxic pest management is proven to be effective

The efficacy of least-toxic alternatives for urban pest management has already been proven in California and around the nation.

**Twenty-five years ago, the California PTA issued a resolution urging members to "develop an awareness and respect for the dangers inherent in pesticides and promote the use of alternate methods of pest control."**

Three of the school districts surveyed for this report are currently managing pest problems without toxic chemicals. Placer Hills Union School District in Meadow Vista "has a pesticide use committee and policy which favors prevention measures to eliminate the use of pesticides."[23] Mendocino Unified school district's Board policy states "sanitary measures shall be enforced and buildings regularly cleaned and repaired in order to prevent infestations, minimize the use of pesticides and eliminate routine spraying." The school district is required to try every other method available to manage pests, "even to the point of no action," and has found other methods to be successful.[24] Arcata School District's policy bans the use of pesticides, unless authorized by the school board; none were reported sprayed during the survey period.[25]

California school districts practicing pesticide reduction are not alone. A recent survey of 21 Pennsylvania school districts that have adopted IPM finds that alternatives are effective, less than or equal to the cost of using pesticides and may even reduce school absenteeism.[26] School district staff report that IPM methods deal with pest problems in a "more permanent way." Most (86%) districts in the Pennsylvania survey were able to control pests with little or no spraying. The majority of districts reported little or no change in the cost of the pest management program; nearly a quarter reported decreased costs.

### State and national education advocacy organizations support least-toxic alternatives

Several key children's educational associations have issued resolutions over the years in support of reducing children's exposure to pesticides used in schools.

## Pesticide residues are highly persistent indoors

Many school districts frequently attempt to reduce exposure risk by applying pesticides after hours while students are not present.[1] However, numerous studies indicate that pesticides may persist indoors for long periods of time, and may be sources of exposure days, weeks or even months after application.

Because sunlight, rain, and soil microbes are unable to break indoor pesticides down or carry them away, pesticide residues persist much longer indoors than outdoors.[2] Some pesticides can persist in the indoor environment for months or even years after application; indoor air concentrations of several kinds of pesticides may be more than 10 to 100 times higher than outdoor concentrations.[3] Even non-persistent pesticides last much longer indoors where they are not susceptible to degradation from environmental factors.[4]

1 Responses to CALPIRG phone/fax survey, Summer, 1997. Several school districts, including Fresno, Irvine, San Diego, San Franciso, San Jose and Southern Humboldt reported applying pesticides early in the morning before students arrive, in the evenings or over the weekend in attempt to avoid student exposure. See Appendix A: Methodology.

2 Simcox, N., et al., "Pesticides in Household Dust and Soil Exposure Pathways for Children of Agricultural Families," *Environmental Health Perspectives*, Vol. 103, No. 12, December 1995, p. 1126.

3 Wilkinson, C. and Baker, S., *The Effects of Pesticides on Human Health*, Princeton Scientific Publishing Co., Princeton, NJ, 1990, citing Lewis, R., and Lee, R., "Air Pollution from Pesticides: Sources, Occurrence and Dispersion," *Indoor Air Pollution from Pesticides and Agricultural Processes*, CRC Press, Boca Raton, FL, 1976, pp. 51-94.

4 Baker, S. R. and Wilkinson, C.F., *The Effects of Pesticides on Human Health*, Princeton Scientific Publishing Co., Princeton, NJ, 1990, p. 83.

Twenty five years ago, the California Parent Teacher Association (PTA) issued a resolution urging the members of the California PTA to "develop an awareness and respect for the dangers inherent in pesticides and promote the use of alternate methods of pest control." They also urged that after determining the identity and toxicity of pesticides used on school property, that the school district should "consider all possible alternatives before using any pesticides; use pesticides only as an emergency measure or when a health hazard has been determined by the public health department; have pesticides applied only by personnel trained in their use; and give appropriate notice when pesticide applications are to be made."[27]

More recently, in 1991, the National Education Association endorsed a statement directing the association to "inform state and local affiliates about Integrated Pest Management policies, which are designed to eliminate or substantially reduce the exposure of students and school personnel to toxic pesticides in the school."[28]

The next year, the National Parent Teacher Association developed a policy supporting Integrated Pest Management and pesticide use reduction in and around schools and child care centers, noting "Pesticides are, by nature, poisons, and exposure— even at low levels—may cause serious adverse effects.... The National PTA is particularly concerned about the use of pesticides in and around schools and day care centers because children are there for much of their young lives."[29]

As a result of lobbying by the community organizations Pesticide Watch and the Bay Area Beyond Pesticide Coalition in San Francisco, city officials there are phasing out use of pesticides in all municipal buildings and parks as part of a tough municipal pesticide reduction program. In the last year, San Francisco has managed to virtually eliminate its use of pesticides that can cause cancer or reproductive effects, and reduced its use of all pesticides by two-thirds with the goal of eliminating use of all pesticides by the year 2000.[30]

### Lack of IPM definition invites "greenwashing"

Many regulators at the federal, state and local level espouse the merits of Integrated Pest Management. However, there is currently no

## Examples of least-toxic pest management

### Ants

Ants invade classrooms and cafeterias for food and water. Good sanitation removes food attractants. Caulking up cracks and crevices reduces entry points. Some classrooms store student lunches in sealed containers to prevent attracting ants. To stop ants from trailing into a room some schools have provided teachers a bottle of water and dish soap to wipe up ant trails and destroy the scent trail until the attractant can be removed.

### Cockroaches

Cockroaches invade rooms for food as well. Prevent entry by repairing, caulking, and sealing points of entry such as cracks and crevices. Remove sources of food and water by cleaning up food waste immediately. Boric acid baits and gels can be used to kill roaches in areas inaccessible to children and pets. Sticky traps can be used selectively to trap roaches and determine where problem areas are.

### Weeds

The first question is what defines a weed problem? One dandelion? Establishing tolerance levels for weeds eliminates the need for some action. Healthy lawns can also out compete weeds—this requires proper grass types, soil aeration and balanced watering and mowing schedules. For areas that need to be weed-free methods include: mulching, competitive interplanting of flowers to conceal weeds, manual and mechanical pulling of weeds; flaming (killing young weeds by searing the tops of the plant with a torch) and soil solarization (covering the soil with clear plastic to raise soil temperatures which kills soil pathogens and annual weeds).

law at either the federal or state level that defines IPM or sets standards that would have to be met to prove IPM is being practiced. Many IPM programs lack firm provisions stating pesticide use reduction goals, limitations on the types and toxicity of pesticides used or even a declaration that pesticides are to be used only as a last resort. Because there are no "bright line" criteria defining IPM programs, any person or institution can claim to be practicing IPM while using highly toxic pesticides.

**Several school districts surveyed for this report have won "IPM Innovator Awards" from the Department of Pesticide Regulation while using numerous highly toxic pesticides.**

For example, several school districts surveyed for this report have won "IPM Innovator Awards" from the Department of Pesticide Regulation while using numerous highly toxic pesticides. DPR has granted Fremont Unified School District, Los Angeles Unified School District, New haven Unified School District and San Diego Unified School District awards since 1994 for practicing and promoting IPM. These schools should be commended for demonstrating leadership in moving toward more sensible pest management programs.[31] However, according to documents provided in response to our survey, these school districts used a surprising assortment of possible and probable human carcinogens, reproductive toxins, hormone mimicking pesticides and acute nerve toxins (See Appendix B: Survey Response Information by School District for District-Specific Pesticide Use).

These findings suggest that some IPM programs may not actually include a system of *least-toxic* pest management and further underscores the need for state officials to define and implement a comprehensive least-toxic IPM program for California schools.

### Commercial pesticide applicators are not trained in least-toxic pest management

Several of the pesticides found in the school districts surveyed for this report are "restricted" by state and federal agencies and may only be applied by a certified applicator or someone under a certified applicator's direct supervision. To get certified, applicators must pass a state-run program mandated by the federal pesticide law, the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA).

Ironically, FIFRA actually *prohibits* testing applicators on the subject of least-toxic pest management as part of the certification program, missing an opportunity to spread vital information that would ostensibly result in pesticide use reduction. The statute says that applicator certification and training programs, which are conducted by the states, must include provisions for "making instructional materials concerning Integrated Pest Management techniques available to individuals at their request...but such plans may *not* require that any individual receive instruction concerning such techniques or be shown to be competent with respect to the use of such techniques."[32]

Analysis of the California Structural Pest Control Board's applicator examination topics shows merely that applicators must have "sufficient knowledge in pesticide equipment, pesticide mixing and formulation, pesticide application procedures and pesticide label directions."[33]

# IV. Parents, Teachers, Students and Public Are Kept in the Dark About Pesticide Use in Schools

### California schools are not required to inform parents or teachers before applying pesticides

California law does not require adequate public notification prior to applying pesticides in schools.[34] Support for prior notification is based on the basic premise that parents and teachers have a right to know about the use of toxic chemicals which may jeopardize their health or the health of their children and enables them to take precautionary measures. Without prior notification, parents, teachers and other community members are prevented from participating in pest management decision-making in their schools.

While no comprehensive information is available indicating the percentage of California school districts that have policies requiring prior notification, a preliminary telephone survey conducted for this report provides some anecdotal information.[35] Esparto Unified School District merely notifies the school staff "as needed." Fresno Unified School District reports providing "verbal notice to the Principal." Glendale Unified provides verbal notification of contracted spraying to the administration. Southern Humboldt Unified, Napa Valley Unified, River Delta Unified and Walnut Creek School Districts provide no prior notification.[36] After a number of meetings with concerned parents and staff of the Environmental Health Coalition, a public interest organization based in San Diego, San Diego Unified School District now sends written warnings to both parents and teachers 48 hours prior to a scheduled application.[37]

While there are no statewide requirements for prior notification, limited regulations exist which require posting of an area after spraying. Commercial applicators are required under California law to post warning signs after applying pesticides only when using highly toxic pesticides for which the state has established a 24 hour re-entry interval.[38] While such notification is useful in the case of protecting the public from exposure to some products, the vast majority of pesticides used in schools do not have re-entry intervals at all. As such, little posting is required by the regulation.

### Monitoring and reporting of school pesticide use is inadequate

California law does not require school districts to systematically monitor and report the use of pesticides in their schools. As discussed in Appendix A: Methodology, school districts that do not have to monitor pesticide use often do not, making it virtually impossible to obtain useful information about school pesticide use. Without this information, parents, teachers and policymakers cannot begin to characterize potential health risks, identify problem school districts or chart progress made by schools practicing least-toxic alternatives.

**Under existing California law, we know more about which pesticides are sprayed on an acre of cabbage than the pesticides used in our classrooms.**

Commercial applicators, who are required to report pesticide use to the state, including pesticides used in schools, are not required to report where they apply these chemicals except within broad categories such as "structural pest control" or "landscape maintenance." Thus even when a school contracts with professional exterminators, pesticides sprayed in and around the school are not identifiably reported to the state. In contrast, agricultural pesticide use must be reported by crop and location, down to square mile. This means that, under existing California law, we know more about which pesticides are sprayed on an acre of cabbage than the pesticides used in our classrooms.

State agencies in California, including the Department of Pesticide Regulation, do not know which pesticides are used in schools and have not tried to find out. In surveying all 1,002 California school districts about IPM programs and plans in 1993, DPR did not ask schools which pesticides were being used.[39]

# V. State Officials Have Failed to Address Pesticide Use in Schools

Both the Governor and the California legislature have demonstrated little willingness to address the problem of pesticides in schools. Under the Wilson Administration, the Department of Pesticide Regulation has continued to permit the use of highly toxic pesticides in our classrooms. Hundreds of different pesticide formulations are available for school use. Many are used throughout schools, in classrooms, cafeterias, playgrounds, fields and even school buses.

**Hundreds of different pesticide formulations are permitted for school use. Many are used throughout schools, in classrooms, cafeterias, playgrounds, fields and even school buses.**

Meanwhile, inadequate or absent regulation has kept parents and teachers in the dark about school pesticide use and ignored or neglected opportunities for promoting least-toxic alternative methods of pest management.

In 1992, State Senator Nicholas Petris (D-Oakland) introduced legislation that would have banned the use of highly toxic pesticides in California schools but his bill was weakened in the legislature to require only that DPR gather a list of the names of pesticides used in schools that can cause cancer and reproductive effects and mail that information to the schools. Despite the overwhelming support for the bill from institutions such as the California Parent Teacher Association, the March of Dimes and a wide array of environmental organizations, Governor Wilson vetoed the measure, stating it was “needlessly burdensome on business.”[40]

# VI. Conclusion and Recommendations

It is time that regulators, elected officials and school managers renew their commitment to protecting our children from the unnecessary risks of using pesticides in schools. While state officials are responsible for addressing pesticide use in schools through comprehensive statewide policy, school managers need not wait for state leadership to implement least-toxic pest management plans. Parents and teachers also have an important role to play in reforming school pesticide use. We urge all of these constituencies to take action:

State policymakers:

- Eliminate the use of pesticides in schools that cause cancer, adverse reproductive and developmental effects, hormone disruption and high nervous system toxicity.
- Develop and provide training, incentives and materials to promote pest prevention and least-toxic pest management.
- Require schools to develop a program for notifying parents, teachers and the public before and after applying pesticides.
- Ensure that school pesticide use is identifiably reported under the state pesticide use reporting system.
- Earmark funds to implement these programs effectively.

School managers:

- Adopt a policy which prohibits the use of pesticides in schools which cause cancer, adverse reproductive and developmental effects, hormone disruption and high nervous system toxicity.
- Develop a least-toxic Integrated Pest Management Program that prioritizes pest prevention and non-toxic methods of pest control.
- Halt routine "calendar" pesticide applications.
- Ensure only trained personnel are allowed to apply pesticides on school grounds.
- Keep records of all pest management activities, including any pesticide use; make this information readily available to the public.
- Develop a program for notifying parents, teachers and the public before and after applying pesticides.
- Work toward establishing a more naturalized school landscape that minimizes the need for weed control.

Parents, teachers and students:

- Request information about pesticide use and toxicity in school.
- Monitor school pest management decision-making processes.
- Insist on receiving prior notification before pesticides are sprayed in school.
- Advocate for a district-wide pesticide use reduction program.
- Urge school managers to eliminate the use of highly toxic pesticides and adopt least-toxic pest management strategies.

# Endnotes


1 National Research Council, *Pesticides in the Diets of Infants and Children*, National Academy Press, Washington, DC, 1993.

2 California Department of Pesticide Regulation, *Overview of Pest Management Policies, Programs, and Practices in Selected California Public School Districts*, Sacramento, CA, 1996, p. 39.

3 American Cancer Society, *Cancer Facts and Figures*, Oakland, CA, 1996.

4 Ibid.

5 Cushman, J., "U.S. Reshaping Cancer Strategy as Incidence in Children Rises," *New York Times*, September 29, 1997.

6 Ries, L., edited by Harras, A., Cancer Rates and Risks, National Institutes of Health Publication No. 96-691, May 1996.

7 Gurney, J., et al., "Trends in Cancer Incidence Among Children in the U.S.," *Cancer*, Vol. 78, 1996, pp. 532-541.

8 The scientific literature assessing health risks in schools is extremely meager. In the absence of school-specific epidemiological studies, the authors reviewed several studies focusing on children and pesticides in and around the home since factors such as spray applications and length of time spent in each place are so similar.

9 Lowengart, P., et al., "Childhood Leukemia and Parents' Occupational and Home Exposures," *Journal of the National Cancer Institute*, Vol. 79, No. 1. pp. 39- 45, 1995.

10 Schettler, T., et al., *Generations at Risk: How Environmental Toxins May Affect Reproductive Health in Massachusetts*, Greater Boston Physicians for Social Responsibility and MASSPIRG, Boston, MA, 1996, pp. 52-53.

11 Moses, M., *Designer Poisons: How to Protect Your Health and Home from Toxic Pesticides*, Pesticide Education Center, San Francisco, 1995.

12 Illinois Environmental Protection Agency, "Preliminary List of Chemicals Associated with Endocrine System Effects in Animals and Humans or In Vitro," *IEPA's Endocrine Disruptor Strategy*, February 1997.

13 Benbrook, C., *Growing Doubt: A Primer on Pesticides Identified as Endocrine Disruptors and/or Reproductive Toxicants*, National Campaign for Pesticide Policy Reform, Washington, DC, 1996.

14 Liebman, J., et al., *Rising Toxic Tide: Pesticide Use in California 1991-1995*, Pesticide Action Network, San Francisco, CA, 1997, p. 8.

15 Moses, M., op. cit., p. 167.

16 Sharp, D., et al., "Delayed Health Hazards of Pesticide Exposure," *Annual Review of Public Health*, Vol. 7, 1986, p. 461.

17 Mott, L., et al., *Our Children at Risk: The Five Worst Environmental Threats to Their Health*, Natural Resources Defense Council, November, 1997, p. 56; see also Schettler, T., op. cit., p. 50.

18 Colburn, T., et al., *Our Stolen Future*, Penguin Group, New York, 1996, p. 186, citing Hauser, P. et al., "Attention Deficit-Hyperactivity Disorder in People with Generalized Resistance to Thyroid Hormone," *New England Journal of Medicine*, Vol. 328, No. 14, 1993, pp. 997-1001.

19 Bio-Integral Resource Center, *IPM in Schools: A How-to Manual*, Berkeley, CA, 1997.

20 Northwest Coalition for Alternatives to Pesticides, "Where there's a Will, There's a Way," *Journal of Pesticide Reform*, Vol. 14, No. 4, 1994 and Riley, B., Unpublished database of School IPM policies, 1997.

21 Unpublished data used by DPR to publish Simmons, S., et al., *Overview of Pest Management Policies, Programs and Practices in Selected California Public School Districts*, California Department of Pesticide Regulation, March 1996. DPR staff coded the data to indicate which school districts had submitted model IPM programs or plans but noted that this designation was "subjective" as no written standards defining IPM were used. Personal communication with Sewell Simmons, DPR, September 14, 1997.

22 Simmons, S., et al., *Overview of Pest Management Policies, Programs and Practices in Selected California Public School Districts*, California Department of Pesticide Regulation, March 1996.

23 Personal communication with Ken Poulsen, Superintentent of Placer Hills Union School District, June 30, 1997.

24 Personal communication with Cathy Burt, Business Manager, Mendocino Unified School District, June 26, 1997.

25 Personal communication with David Hochman, Superintendent, Arcata School District, July 30, 1997.

26 Clean Water Action, "Evaluation of Integrated Pest Management (IPM) Use in Pennsylvania School Districts," October 1997.

27 California Parent Teacher Association, *Pesticides*, Adopted May 11, 1972.

28 National Education Association, "Integrated Pest Management Policies," *New Business Adopted by the 1991 Representative Assembly*, National Education Association Handbook, 1991.

29 National Parent Teacher Association, *Position Statement: The Use of Pesticides in Schools and Child Care Centers*, 1992.

30 City and County of San Francisco and Pesticide Watch, *City of San Francisco Cuts Use of Most-Toxic Pesticides to Near Zero*, October 15, 1997.

31 California Environmental Protection Agency, "CAL/EPA Presents Awards for Getting the Bugs out of Schools, Parks, Golf Courses and Fine Art," *News Release*, October 18, 1994 and "IPM Innovator Award Winners 1994-1996," DPR website: www.cdpr.ca.gov.

32 Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), Section 11(c), Washington, DC.

33 California Code of Regulations, Section 8564.5.5, Examination for Unlicensed Employees of Registered Companies, p. 66.

34 Except as required under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Under this statute, prior warning must given before causing exposure of "significant risk" for chemicals listed under the Act. Only two pesticides found in the 46 surveyed school disticts, oxadiazon and methyl bromide, are listed under Proposition 65.

35 The telephone survey was abandoned after surveying fewer than half of the 46 school districts which responded to a written Public Records request because interviewed school staff often could not provide specific pesticide-related information.

36 Responses from listed school districts, Summer 1997.

37 Personal communication with Ray Palmer, San Diego Unified School District, Summer 1997.

38 California Food and Agricultural Code, Section 12978: Pesticide applications on specified public property; posting of warning signs in English and Spanish; application of section.

39 Simmons, S., op. cit.

40 Statement by Governor Pete Wilson on Senate Bill 926, *Senate Journal*, October 2, 1992.

# Appendix A

## Methodology: Assessing Pesticide Use in the Face of Inadequate Use Reporting

In the summer of 1997, the CALPIRG Charitable Trust conducted a survey to characterize the use of pesticides in California schools. We identified 54 school districts from around the state, randomly selected within three categories to ensure representation from urban, suburban and rural school districts.[1] Survey data provided by DPR was used to determine the appropriate category for each school district. Schools were randomly selected from the California Public School Directory and the selected school's district was added to our survey list until each category was filled.[2] Because the directory lists schools individually, larger school districts had a greater chance of being selected.

We initially attempted to contact school district staff directly by telephone to assess pesticide use, pest control decision making processes and to discuss obstacles and opportunities related to the implementation of least-toxic alternatives. Unfortunately, this effort proved ineffective and was abandoned after surveying approximately 12 school districts. Obstacles included: reluctance of school staff to discuss potentially controversial issues; lack of knowledge by school staff about the types, locations, amounts and frequency of pesticide applications; multiple pest management decision-makers within school districts and the lack of centralized pest management programs within school districts.

Our survey effort then resorted to a request under the California Public Records Act for pesticide invoices and purchase receipts for each of the 54 school districts for the first five months of 1997. Unfortunately, few school districts responded to this request even though a response was legally required within ten days. The CALPIRG Charitable Trust then consulted with an attorney who issued a second request under the Public Records Act, informing the selected school districts that legal action could be taken to obtain the requested materials. Over a period of approximately four months, the CALPIRG Charitable Trust received 46 responses.

Even after this extraordinary effort, the information received was by no means adequate. Several responding school districts provided only photocopies of Material Safety Data Sheets, purchase invoices or simply wrote out a list of pesticide products used. For the purposes of this analysis, we assumed that these pesticides were actually used by the submitting school district. Obviously, these documents do not permit any analysis of the quantity, frequency or location of the pesticides used.

Other school districts provided invoices from the visits of commercial applicators or use logs maintained by school staff. In many instances, these too were inadequate for assessing the amounts and locations of pesticides used—or if pests were actually present. Such records might indicate the use of one " box" of a particular product, with no way to determine the size, weight or concentration of the box or product. Even for those schools that provided records bearing the pesticide name and amount used, a quantitative analysis was all but impossible because of inconsistent units (reported by weight, volume, pellet, "can," etc.) and unreported concentrations. All of these problems highlight the need to apply existing pesticide use reporting requirements to school pesticide use.

1 The San Diego and Los Angeles Unified school districts were deliberately included because they have been identified by DPR as "IPM Innovators" and because they represent the two largest school districts in the state according to the California Department of Education, *Enrollment in California Public School Districts Ranked by Highest Enrollment*, October 1996.

2 California Department of Education, *California Public School Directory*, Bureau of Publications, Sacramento, CA, 1992.

# Appendix B
## Survey Response Information by School District

### Data Matrix Key

U/R/S:

- U = Urban School District
- S = Suburban School District
- R = Rural School District

Class:

- I = Insecticide
- H = Herbicide
- R = Rodenticide
- M = Molluscicide
- F = Fungicide
- Fm = Fumigant
- IF = Insecticidal fumigant

Toxicity:

- a = "Known" or "probable" carcinogens
- b = "Possible" human carcinogens
- c = Developmental and reproductive toxins
- d = Hormone mimicking pesticides (endocrine disruptors)
- e = U.S. EPA Category I Extremely High Acute Toxicity/Systemic Pesticides Labeled "Danger/Poison"
- f = Category II organophosphate or carbamate nerve toxins

Sources:

a. "Known to the State of California to cause cancer" (oxadiazinon): California Environmental Protection Agency, Department of Pesticide Regulation, *Chemicals Known to the State to Cause Cancer or Reproductive Toxicity,* May 1, 1997. "Probable human carcinogens" (fenoxycarb, propoxur): U.S. Environmental Protection Agency, *List of Chemicals Evaluated for Carcinogenic Potential,* February 19, 1997.

b. U.S. Environmental Protection Agency, *List of Chemicals Evaluated for Carcinogenic Potential,* February 19, 1997.

c. U.S. Environmental Protection Agency, *Federal Register,* Vol. 59, No. 229, 61436, November 30, 1994 and California Environmental Protection Agency, *Chemicals Known to the State to Cause Cancer or Reproductive Toxicity,* May 1, 1997 (methyl bromide).

d. Illinois Environmental Protection Agency, *IEPA's Endocrine Disruptor Strategy: Preliminary List of Chemicals Associated with Endocrine System Effects in Animals and Humans or In Vitro,* February 1997. We have included "possible" and "probable" endocrine disruptors from this list.

e. Meister, *Farm Chemicals Handbook*, 1997, DPR online Product/Label Data Base: www.cdpr.ca.gov./docs/database.html. Only Category I pesticides bearing the label "Danger/Poison," the designation reserved for highly toxic systemic (toxic through ingestion, absorption or inhalation) toxins, were included. The same active ingredient may have several different classifications. Only those active ingredients used in products designated with a "Danger/Poison" label are included in this table.

f. Meister, *Farm Chemicals Handbook*, 1997. EPA Category II pesticides must carry the "Warning" label. Several school districts reported using the same active ingredients which are listed above as requiring a "Warning" label, but because the chemical is formulated into a weaker concentration, it does not require such a listing and as such is not included here. Only those products designated with a "Warning" label are included in this table.

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Alameda | Alameda | U | 15 | 10,055 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Glue boards | | | |
| Glue traps | | | |
| Maxforce Ant killer bait | hydramethylnon | b, c | I |
| Maxforce roach bait | hydramethylnon | b, c | I |
| Mice tray | | | |
| Snap Traps | | | |
| Talon G | brodifacoum | | R |
| Tempo | cyfluthrin | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Alhambra | Los Angeles | S | 13 | 10,782 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| BP-100 | piperonyl | | I |
| BP-100 | pyrethrins and | | I |
| Demon | cypermethrin | b, d | I |
| Dursban Pro | chlorpyrifos | | I |
| "Dursban, Empire 20" | chlorpyrifos | | I |
| Empire 20 | chlorpyrifos | | I |
| Enforcer | brodifacoum | | R |
| Hot shot fogger | tetramethrin | b | I |
| Real Kill | chlorpyrifos | | I |
| Tempo | cyfluthrin | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Arcata | Humboldt | R | 3 | 995 |

No pesticides used

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Big Valley | Lassen | R | 4 | 368 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| RoundUp | glyphosate | | H |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Cajon Valley | San Diego | S | 24 | 18,373 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| ? | | | |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Chico | Butte | S | 19 | 13,447 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Catalyst | propetamphos | f | I |
| Demon | cypermethrin | b, d | I |
| Empire 20 | chlorpyrifos | | I |
| Gentrol | hydroprene | | I |
| Round Up Plus | glyphosate | | H |
| Round Up Pro | glyphosate | | H |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Conejo Valley | Ventura | S | 26 | 17,587 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| 5481-91 | metaldehyde | | M |
| 7173-188 | bromadiolone | | R |
| Demon TC | cypermethrin | b, d | I |
| Diazinon | diazinon | c | I |
| Diazinon | diazinon | c | I |
| Drione | piperonyl butoxide | b | I |
| Drione | pyrethrins and | | I |
| Drione | silica gel | | I |
| Fumitoxin | aluminum phosphide | e | IF |
| Fusilade II | fluazifop-P-butyl | | H |
| Gentrol | hydroprene | | I |
| PCQ | diphacinone | | R |
| Round Up | glyphosate | | H |
| Rozol | chlorophacinone | | R |
| Safrotin | propetamphos | f | I |
| Simazine-y-l | simazine | b, c | H |
| Surrian | oryzalin | b | H |
| Tempo 20WP | cyfluthrin | | I |
| Trimec | "2,4-D multi AI" | d | H |
| Trimec | dicamba and | c | H |
| Trimec | mecoprop multi AI | | H |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Davis | | | | |

Did not respond

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Downey | Los Angeles | S | 18 | 17,160 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| chloropicrin | chloropicrin | e | I |
| Cynoff | cypermethrin | b, d | I |
| Diazinon | diazinon | c | I |
| Dragnet | permethrin | b, d | I |
| Drione | piperonyl butoxide | b | I |
| Drione | pyrethrins and | | I |
| Drione | silica gel | | I |
| Eptam | EPTC | c | H |
| Florel | ethephon | | I |
| Fumitoxin | aluminum phosphide | e | IF |
| Fusilade II | fluazifop-P-butyl | | H |
| Grotard II | diethanolamine | | ? |
| Grotard II | mefluidide | | |
| Makr | methyl bromide | c | I |
| Manage | halosulfuron-methyl | | H |
| Merit | imidacloprid | | I |
| Pendulum | pendimethalin | b | H |
| PT 270 | chlorpyrifos and | f | I |
| Rodeo | glyphosate | | H |
| Round up | glyphosate | | H |
| Strychnine | strychnine | | R |
| Subdue | metalaxyl | | F |
| Tempo | cyfluthrin | | I |
| Tempo | cyfluthrin | | I |
| Timbor | disodium octaborate tetrahydrate | | H |
| Turflon | triclopyr | | H |
| Vikane | sulfuryl fluoride | e | Fm |
| Weed hoe | MSMA | | H |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Esparto | Yolo | R | 3 | 876 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Ant & Roach Spray | | | |
| CGK 89 | calcium acid methanearsenate | | H |
| Ferrate | ferrous sulfate heptahydrate | | |
| Glue Board | | | |
| Misty Fog It | piperonyl butoxide | b | I |
| Misty Fog It | pyrethrins and | | I |
| No Crab | calcium propanearsonate | | H |
| Rat-Tat-Tat | bromadiolone | | R |
| Roundup | glyphosate | | H |
| Swat II Insect Bomb | pyrethrins | | I |
| Wasp & hornet Spray | | | |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Fort Sage | Lassen | | | |

Did not respond

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Fremont | Alameda | S | 39 | 28,928 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Ant Kill | ? | | |
| Boric Powder | boric acid | | I |
| C638 | ? | | |
| Fumitoxin | aluminum phosphide | e | IF |
| No Foam | ? | | |
| Pendulum | pendimethalin | b | H |
| Rat traps | ? | | |
| Round Up Pro | glyphosate | | H |
| Round Up Pro | glyphosate | | H |
| RoundUp | glyphosate | | H |
| Rozol | chlorophacinone | | R |
| Tempo | cyfluthrin | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Fresno | Fresno | U | 81 | 76,200 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Borid | boric acid | | I |
| BP-100 | piperonyl | | I |
| BP-100 | pyrethrins and | | I |
| Catalyst | propetamphos | f | I |
| Cynoff EC | cypermethrin | b, d | I |
| Cynoff W5B | cypermethrin | b, d | I |
| Dragnet FT | permethrin | b, d | I |
| Drax Gel | boric acid | | I |
| Drione | piperonyl butoxide | b | I |
| Drione | pyrethrins and | | I |
| Drione | silica gel | | I |
| Dual Choice | sulfluramid | | |
| Dursban | chlorpyrifos | | I |
| Dursban 2.5G | chlorpyrifos | | I |
| Gentrol IGR Conc | hydroprene | | I |
| Glue board | | | |
| Inspection only | | | |
| Kicker | piperonyl butoxide | b | I |
| Kicker | pyrethrins and | | I |
| Maxforce Ant Killer G Bait | hydramethylnon | b, c | I |
| Mice Tray | | | |
| Promot Plus | fermentation of trichoderma | | I |
| PT 230 | piperonyl butoxide | b | I |
| PT 230 | pyrethrins and | | I |
| PT 230 | silica gel | | I |
| PT 240 | boric acid | | I |
| PT 565 | piperonyl butoxide | b | I |
| PT 565 | pyrethrins and | | I |
| Rat Tray | ? | | |
| Roundup | glyphosate | | H |
| Tempo | cyfluthrin | | I |
| Tempo 20 WP ( power-pack) | cyfluthrin | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Glendale | Los Angeles | U | 27 | 28,637 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Catalyst | propetamphos | f | I |
| Cynoff | cypermethrin | b, d | I |
| Dragnet | permethrin | b, d | I |
| Glue Board | | | |
| RoundUp | glyphosate | | H |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Imperial | Imperial | R | 5 | 1,870 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| CB 405 Insect Fogger | | | I |
| MistyAnt Roach | piperonyl butoxide | b | I |
| MistyAnt Roach | propoxur | a | I |
| MistyAnt Roach | pyrethrins and | | I |
| Roach Flush | piperonyl butoxide | b | I |
| Roach Flush | pyrethrins | | I |
| Talon | brodifacoum | | R |
| Tempo | cyfluthrin | | I |
| Waxie Bug-Off Ant and Roach Killer | propoxur | a | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Inglewood | Los Angeles | U | 18 | 16,379 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Catalyst | propetamphos | f | I |
| Empire | chlorpyrifos | | I |
| Glue Traps | | | |
| Knoxout | diazinon | c | I |
| Roundup | glyphosate | | H |
| Strikeforce | chlorpyrifos | | I |
| Tempo 20WP | cyfluthrin | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Irvine | Orange | | 29 | 21,519 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Bait Blocks | diphacinone | | R |
| Dursban | chlorpyrifos | | I |
| Fusilade | fluazifop-p- butyl | | H |
| HS 167 | mecoprop | | H |
| Montar | cacodylic acid | | H |
| Orthene | acephate | b | I |
| Ramik | diphacinone | | R |
| Round-Up | glyphosate | | H |
| Scythe | pelargonic acid | | H |
| Subdue 2E | metalaxyl | | F |
| Tempo | cyfluthrin | | I |
| Vikane | sulfuryl fluoride | e | Fm |
| Waxie Bug-Off Ant and Roach Killer | propoxur | a | I |
| XL 2G | benefin and | | H |
| XL 2G | oryzalin | b | H |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Jurupa | Riverside | S | 15 | 16,514 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Dursban 50 | chlorpyrifos | f | I |
| Fumitoxin | aluminum phosphide | e | IF |
| Killer | magnesium chloride | | I |
| Roundup | glyphosate | | H |
| Surflan | oryzalin | b | H |
| Tempo 20WP | cyfluthrin | | I |
| Waxie Bug- Off | chlorpyrifos | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Kerman | Fresno | R | 6 | 3,206 |

Did not respond

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Linden | San Joaquin | R | 5 | 2,165 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| DemonCup | cypermethrin | b, d | I |
| Dragnet | permethrin | b, d | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Lompoc | Sta. Barbara | R | 15 | 10,756 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Aqua A | ? | | |
| Blitzem (assumes not Blitzem II) | piperonyl butoxide | b | |
| Blitzem (assumes not Blitzem II) | propoxur | a | |
| Blitzem (assumes not Blitzem II) | pyrethrins and | | |
| Dead Sure | d-trans allethrin and | | I |
| Dead Sure | permethrin | b, d | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Los Angeles | Los Angeles | U | 607 | 635,163 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| ? | pyrethrins | | I |
| Avert | avermectin | | I |
| Conquer | esfenvalerate | d | H |
| Contrac | bromadiolone | | R |
| Demize | linalool | | I |
| Demize | piperonyl butoxide and | b | |
| Diphacinone | diphacinone | | R |
| Dragnet | permethrin | b, d | I |
| Drax Ant Bait | boric acid | | I |
| Drione | piperonyl butoxide | b | I |
| Drione | pyrethrins and | | I |
| Drione | silica gel | | I |
| Dursban | chlorpyrifos | | I |
| Empire Lo | chlorpyrifos | | I |
| Epoleon/Epolian | | | |
| Ficam | bendiocarb | | I |
| Gentrol | hydroprene | | I |
| Knox Out | diazinon | c | I |
| MAGB/DAGB? | ? | | |
| Maintain | maleic hydrazide | | H(PCR) |
| Max Force | hydramethylnon | b, c | I |
| Niban | boric acid | | I |
| Orthene | acephate | b | I |
| PT 270 | chlorpyrifos | f | I |
| PT 515 Wasp Freeze | d-trans allethrin and | | I |
| PT 515 Wasp Freeze | phenothrin | | I |
| PT 565 XLO | d-trans allethrin and | | I |
| PT 565 XLO | piperonyl butoxide | b | I |
| PT 565 XLO | pyrethrins | | I |
| Safrotin | propetamphos | f | I |
| Talon | brodifacoum | | R |
| Tempo | cyfluthrin | | I |
| Baygon | propoxur | a | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Madera | Madera | R | 15 | 14,899 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Contrac | bromadiolone | | R |
| Dursban 50% W | chlorpyrifos | f | I |
| Eaton Mouse/Rat Trap | ? | | |
| Glue Trap | | | |
| Princep DF | simazine | b, c | H |
| Ronstar | oxadiazon | a, b, c | H |
| Round Up | glyphosate | | H |

| | | | |
|---|---|---|---|
| Surflan | oryzalin | b | H |
| Tox II | piperonyl butoxide | b | I |
| Tox II | propoxur | a | I |
| Tox II | pyrethrins and | | I |
| Trimec | 2,4-D (multi AI) | d | H |
| Trimec | dicamba and | c | H |
| Trimec | mecoprop (multi AI) | | H |
| Victor T | boric acid | | I |
| Victor TL | boric acid | | I |
| Weed B-Gon | | | |
| Weed Hoe 108 | MSMA | | H |
| Wilco Gopher Getter I | strychnine | e | R |
| Wilco Gopher Squirrel Bait | strychnine | | R |
| Dursban Pro | chlorpyrifos | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Manteca | San Joaquin | S | 16 | 14,290 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| BP-300 | piperonyl butoxide | b | I |
| BP-300 | pyrethrins and | | I |
| Contrac | bromadiolone | | R |
| Cynoff | cypermethrin | b, d | I |
| Dragnet | permethrin | b, d | I |
| Fumitoxin | aluminum phosphide | e | IF |
| Gentrol | hydroprene | | I |
| Kicker | piperonyl butoxide | b | I |
| Kicker | pyrethrins and | | I |
| Knox out 2FM | diazinon | c | I |
| Maxforce | hydramethylnon | b, c | I |
| Pathfinder | triclopyr | | H |
| Precor | methoprene | | I |
| PT 3-6-10 | piperonyl butoxide | b | I |
| PT 3-6-10 | pyrethrins and | | I |
| PT-270 | chlorpyrifos | f | I |
| PT-565 Plus | piperonyl butoxide | b | I |
| PT-565 Plus | pyrethrins | | I |
| Round Up | glyphosate | | H |
| Tempo WP | cyfluthrin | | I |
| Trimec | "2,4-D (multi AI)" | d | H |
| Trimec | dicamba and | c | H |
| Trimec | mecoprop (multi AI) | | H |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Mendocino | Mendocino | R | 6 | 1,011 |

No pesticides used

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Modoc | Modoc | R | 7 | 1,208 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Conquer | esfenvalerate | d | H |
| Dursban 2E | chlorpyrifos | f | I |
| Dursban G | chlorpyrifos | | I |
| Dursban Pro | chlorpyrifos | | I |
| Enforcer | brodifacoum | | R |
| Tempo 20WP | cyfluthrin | | I |
| TKO | diazinon | c | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Mojave | Kern | R | 7 | 3,037 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Borid | boric acid | | I |
| BP-300 (ULD) | n-octyl bicycloheptene dicarboxamide | | I |
| BP-300 (ULD) | piperonyl butoxide | b | I |
| BP-300 (ULD) | pyrethrins and | | I |
| Cynoff WSB | cypermethrin | b, d | I |
| Cynoff WSB | cypermethrin | b, d | I |
| Dursban 2.32G | chlorpyrifos | | I |

| | | | |
|---|---|---|---|
| Dursban 50W | chlorpyrifos | f | I |
| Kicker | piperonyl butoxide | b | I |
| Kicker | pyrethrins and | | I |
| Maxforce | hydramethylnon | b, c | I |
| Maxforce ant killer granules bait | hydramethylnon | b, c | I |
| PT 3-6-10 aerocide | piperonyl butoxide | b | I |
| PT 3-6-10 aerocide | pyrethrins and | | I |
| PT 515 Wasp Freeeze | d-trans allethrin and | | I |
| PT 515 Wasp Freeeze | phenothrin | | I |
| Safrotin | propetamphos | f | I |
| Tempo | cyfluthrin | | I |
| Tempo 20WP | cyfluthrin | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Monterey | Monterey | U | 20 | 12,163 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Aluminum Phosphide | aluminum phosphide | e | IF |
| Borid | boric acid | | I |
| Catalyst | propetamphos | f | I |
| Dragnet FT | permethrin | b, d | I |
| Drione | piperonyl butoxide | b | I |
| Drione | pyrethrins and | | I |
| Drione | silica gel | | I |
| Dursban | chlorpyrifos | | I |
| KnoxOut | diazinon | c | I |
| Maxforce | hydramethylnon | b, c | I |
| Precor IGG Concentrate | propetamphos | f | I |
| PT 515 | d-trans allethrin and | | I |
| PT 515 | phenothrin (multi AI) | | I |
| Strychnine (non-restricted) | strychnine | | R |
| Talon | brodifacoum | | R |
| Tempo 20WP | cyfluthrin | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Napa | Napa | S | 26 | 14,886 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Direx 4L | diuron | c | H |
| Gallery | isoxaben | b | H |
| RoundUp | glyphosate | | H |
| Scythe | pelargonic acid | | H |
| Surflan | oryzalin | b | H |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| New Haven | Alameda | S | 11 | 12,941 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| RoundUp | glyphosate | | H |
| Trimec | "2,4-D (multi AI)" | d | H |
| Trimec | dicamba and | c | H |
| Trimec | mecoprop (multi) | | H |
| Turflon | triclopyr | | H |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Oakland | Alameda | U | 85 | 51,532 |

Did not respond

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Pajaro | Santa Cruz | S | 24 | 17,187 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| bait traps | | | |
| Roundup | glyphosate | | H |
| Roundup | glyphosate | | H |
| Tempo | cyfluthrin | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Placer Hills | Placer | R | 2 | 1,597 |

No pesticides used

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| River Delta | Sacramento | R | 9 | 2,405 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Drione Dust | piperonyl butoxide | b | I |
| Drione Dust | pyrethrins and | | I |
| Dursban | chlorpyrifos | | I |
| Tempo WP | cyfluthrin | | I |
| TKO | diazinon | c | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Riverside | Riverside | U | 38 | 33,607 |

Did not respond

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Rowland | Los Angeles | S | 21 | 18,659 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Cynoff EC | cypermethrin | b, d | I |
| Cynoff WP | cypermethrin | b, d | I |
| Diazinon | diazinon | c | I |
| Dursban Pro | chlorpyrifos | | I |
| Gopher Getter (3602-1) | strychnine | e | R |
| RoundupPro | glyphosate | | H |
| Squirrel Bait (6128-W-L-1) | chlorophacinone | | R |
| Tempo | cyfluthrin | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Sacramento | Sacramento | U | 73 | 49,997 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| BP-100 *ULD) | piperonyl | | I |
| BP-100 *ULD) | pyrethrins and | | I |
| Dexol | diquat dibromide | | H |
| Diazinon | diazinon | c | I |
| Drax | boric acid | | I |
| Drione | piperonyl butoxide | b | I |
| Drione | pyrethrins and | | I |
| Drione | silica gel | | I |
| Dursban | chlorpyrifos | | I |
| Holiday Fogger (475-286) | n-octyl bicycloheptene dicarboxamide | inactive? | I |
| Holiday Fogger (475-286) | permethrin and | b, d | I |
| Holiday Fogger (475-286) | pyrethrins and | inactive? | I |
| Knox Out | diazinon | c | I |
| Lo Ban | chlorpyrifos | f | I |
| Maxforce | hydramethylnon | b, c | I |
| Mop-Up | disodium of octaborate tetrahyrdrate | | |
| PT 400 | chlorpyrifos and | | I |
| PT 400 | fenoxycarb | a, c | I |
| R & C Spray | phenothrin | | I |
| Talon G | brodifacoum | | R |
| Vikor | cypermethrin and | b, d | I |
| Vikor | esbiothrin (multi) | | I |
| Vikor | piperonyl butoxide and | b | |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| San Diego | San Diego | S | 151 | 127,087 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Ant Kill Gel | | | |
| Baygon | propoxur | a | I |
| Borid | boric acid | | I |
| BP 300 (ULD) | n-octyl bicycloheptene dicarboxamide | | I |
| BP 300 (ULD) | piperonyl butoxide | b | I |
| BP 300 (ULD) | pyrethrins and | | I |
| Dexol Weed and grass | diquat dibromide | | H |
| Dipel 2x | bacillus thuringiensis var. kurstaki | | I |
| Dragnet | permethrin | b, d | I |
| Florel | ethephon | | I |
| Fusilade II | fluazifop-P-butyl | | H |
| Granular Bait | | | |
| Knoxout | diazinon | c | I |
| m-pede | mecoprop (MCPP) | | H |
| Maxforce roachkiller baitgel | hydramethylnon | b,c | I |
| Mecomec | mecoprop | | H |
| National Deadline | metaldehyde | | M |
| Ornamec | fluazifop-p-butyl | | H |
| Orthene | acephate | b | I |
| Ortho Supreme Spray | | | |
| Princep 80W | EPTC and | c | H |
| Princep 80W | simazine | b, c | H |
| PT 170A | pyrethrins | | I |
| PT 240 | boric acid | | I |
| Rose Defense | neem | | I |
| Roundup | glyphosate | | H |
| Simazine 80W | simazine | b, c | H |
| Spike | tebuthiuron | c | H |
| Surflan | oryzalin | b | H |
| Trimec | "2,4-D and" | d | H |
| Trimec | dicamba and | c | H |
| Trimec | mecoprop (multi) | | H |
| XL2G | benefin and | | H |
| XL2G | oryzalin | b | H |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| San Francisco | S. Francisco | U | 105 | 61,631 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| "Baits (Avert Gel/PT 320, Avert/PT, Drax Gel, Dual Choice)" | avermectin | | I |
| Borid | boric acid | | I |
| Empire | chlorpyrifos | | I |
| Knox-Out 2FM | diazinon | c | I |
| Precor IGR Concentrate | propetamphos | f | I |
| PT 240 | boric acid | | I |
| PT 265A | diazinon | c | I |
| PT 515 | d-trans allethrin and | | I |
| PT 515 | phenothrin | | I |
| Tempo 20 WP | cyfluthrin | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| San Jose | Santa Clara | U | 41 | 30,905 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Ant Bait | ? | | |
| Bait Box | ? | | |
| Baygon 2% Bait | propoxur | a | I |
| Diazinon | diazinon | c | I |
| Diazinon | diazinon | c | I |
| Dragnet | permethrin | b, d | I |
| DRI-DIE | silica aerogel/ammonium fluosilicate to 3% flourine | | |
| Dursban TC | chlorpyrifos | f | I |
| Fumitoxin tablets | aluminum phosphide | e | IF |
| Gentral | hydroprene | | I |
| KnoxOut | diazinon | c | I |
| Large Glue Board | | | |
| Maxforce | hydramethylnon | b | I |
| Mouse Bait station | | | |
| Mouse trap (snap) | | | |
| Mouse/rat sticky board | | | |
| Pioneer Bee Spray | | | |
| Pioneer Lice Killer [EPA 33176-19-151] | piperonyl butoxide | b | I |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Pioneer Lice Killer [EPA 33176-19-151] | pyrethrins and | | I |
| Rat trap | ? | | |
| Roach Bait | ? | | |
| Roundup | glyphosate | | H |
| Roundup Plus | glyphosate | | H |
| Surflan | oryzalin | b | H |
| Talon | brodifacoum | | R |
| Tempo | cyfluthrin | | I |
| Tempo 20WP | cyfluthrin | | I |
| Trimec | "2,4-D and" | d | H |
| Trimec | dicamba and | c | H |
| Trimec | mecoprop (multi) | | H |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| San Marino | Los Angeles | S | 4 | 2,827 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Catalyst | propetamphos | f | I |
| Dursban Pro | chlorpyrifos | | I |
| Insecticide | ? | | |
| RoundUp | glyphosate | | H |
| Surflan | oryzalin | b | H |
| Tempo 20WP | cyfluthrin | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| San Mateo | San Mateo | U | 17 | 9,915 |

Did not respond

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| San Rafael | Marin | S | 7 | 2948 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| RoundUp | glyphosate | | H |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Santa Monica -Malibu | Los Angeles | S | 13 | 9,997 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Cynoff | cypermethrin | b, d | I |
| Dragnet | permethrin | b, d | I |
| Drax Ant Bait Gel | boric acid | | I |
| Fumitoxin | aluminum phosphide | e | IF |
| Knoxout | diazinon | c | I |
| PCQ | diphacinone | | R |
| Roach & Bait | ? | | |
| Strychnine | strychnine | | R |
| Tempo | cyfluthrin | | I |
| Zinc Phosphide | zinc phosphide | | R |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Shasta | Shasta | R | 3 | 4,495 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Blitz waterborn residual | diazinon and | c | I |
| Blitz waterborn residual | piperonyl butoxide | b | I |
| Blitz waterborn residual | pyrethrins | | I |
| Bolt Ant Spray | ? | | |
| Mor- Act | Foaming Adjuvant | | |
| Remedy | triclopyr | | H |
| Round-Up | glyphosate | | H |
| Surflan | oryzalin | b | H |
| Tempo 20 WP | cyfluthrin | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Siskiyou | Siskiyou | R | 4 | 890 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| FT Termiticide | permethrin | b, d | I |
| RoundUp | glyphosate | | H |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Sonoma | Sonoma | R | 7 | 4,942 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Pyrethrum Contact Insecticide | pyrethrins | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Southern Humboldt | Humboldt | R | 9 | 1,603 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Ace Anti roach killer | tralomethrin | | I |
| Ant Traps | ? | | |
| Hornet & Wasp killer | ? | | |
| Hornet Killer | ? | | |
| Jacket Trap | | | |
| Mouse traps | | | |
| Raid Ant | permethrin and | b, d | I |
| Raid Ant | pyrethrins | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Stockton | San Joaquin | U | 37 | 34,251 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Bivert | petroleum distillate | | |
| BP 100 Insecticide | piperonyl | | I |
| BP 100 Insecticide | pyrethrins and | | I |
| Hi-Light Liquid | ? | | |
| HS 167 | mecoprop | | H |
| IC 232 | pyrethrins | | I |
| Knox Out | diazinon | c | I |
| MaxForce | hydramethylnon | b, c | I |
| Maxforce Bait Stations | hydramethylnon | b, c | I |
| No Retreat | | | |
| ProControl IV Aerosol | | | |
| Ronstar Granular | oxadiazon | a, b, c | H |
| Roundup | glyphosate | | H |
| Surflan | oryzalin | b | H |
| Tri-Power Herbicide | dicamba and | c | H |
| Tri-Power Herbicide | MCPA (multi AI) | | H |
| Tri-Power Herbicide | mecoprop (multi AI) | | H |
| Wasp Freeze II | sulfluramid | | |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Vallejo | Solano | U | 24 | 19,818 |

Did not respond

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Ventura | Ventura | S | 23 | 15,409 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Dexol hornet killer | diquat dibromide | | H |
| PCQ Rodent Cake | diphacinone | | R |
| PT-270 | chlorpyrifos | f | I |
| Round Up | glyphosate | | H |
| Talon-G | brodifacoum | | R |
| Tempo | cyfluthrin | | I |
| Weed-Be-Gone | "2,4-D and" | d | H |
| Wilco Gopher Getter I | strychnine | e | R |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Vista | San Diego | S | 18 | 21,851 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Maxforce | hydramethylnon | b, c | I |
| Round up | glyphosate | | H |
| Rozol | chlorophacinone | | R |
| squirrel bait | ? | | |
| type 2 gopher bait | ? | | |
| XL | benefin and oryzalin (inactive) | | |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Walnut Creek | C'tra Costa | U | 6 | 2,930 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Dursban | chlorpyrifos | | I |
| Roundup | glyphosate | | H |
| Rozol Gopher Bait | chlorophacinone | | R |
| Tempo | cyfluthrin | | I |
| Turflon | triclopyr | | H |
| unidentified over-the-counter insecticides | | | I |

| District | County | U/R/S | # Schools | # Students |
|---|---|---|---|---|
| Woodland | Yolo | S | 15 | 8,725 |

| Product | Active Ingredient | Toxicity | Class |
|---|---|---|---|
| Catalyst | propetamphos | f | I |
| Knox out | diazinon | c | I |
| Safrotin | propetamphos | f | I |
| Tempo WP | cyfluthrin | | I |

# Appendix C
# Active Ingredients Found in Surveyed California School Districts

**(Total: 73 active ingredients)**

| Active Ingredient | Toxicity Category |
|---|---|
| 2,4-D | d |
| acephate | b |
| aluminum phosphide | e |
| avermectin | |
| bacillus thuringiensis var. kurstaki | |
| bendiocarb | |
| benefin | |
| boric acid | |
| brodifacoum | |
| bromadiolone | |
| cacodylic acid | |
| calcium acid methanearsenate | |
| calcium propanearsonate | |
| chlorophacinone | |
| chloropicrin | e |
| chlorpyrifos | f |
| cyfluthrin | |
| cypermethrin | b, d |
| d-trans allethrin | |
| diazinon | c |
| dicamba | c |
| diethanolamine | |
| diphacinone | |
| diquat dibromide | |
| disodium octaborate tetrahydrate | |
| diuron | c |
| EPTC | c |
| esfenvalerate | d |
| ethephon | |
| fenoxycarb | a, c |
| fermentation of trichoderma | |
| ferrous sulfate heptahydrate | |
| fluazifop-butyl | |
| glyphosate | |
| halosulfuron-methyl | |
| hydramethylnon | b, c |
| hydroprene | |
| imidacloprid | |
| soxaben | b |
| linalool | |
| magnesium chloride | |
| maleic hydrazide | |
| MCPA | |
| mecoprop | |
| methfluidide | |
| metalaxyl | |
| metaldehyde | |
| methoprene | |
| methyl bromide | c |
| MSMA | |
| n-octyl bicylcoheptene dicarboximide | |
| neem | |
| orthoboric acid | |
| oryzalin | b |
| ioxadiazon | a, b, c |
| pelargonic acid | |
| pendimethalin | b |
| permethrin | b |
| phenothrin (multi AI) | |
| piperonyl butoxideb | |
| potassium salts of fatty acids | |
| propetamphos | f |
| propoxur | a |
| pyrethrins | |
| silica aerogel | |
| simazine | b, c |
| strychnine | e |
| sulfluramid | |
| sulfuryl fluoride | e |
| tebuthiuron | c |
| tetramethrin | b |
| tralomethrin | |
| trichloro 2-pyridyl phosphorothiaote | |
| triclopyr | |
| zinc phosphide | |

Toxicity:

- a = "Known" or "probable" carcinogens
- b = "Possible" human carcinogens
- c = Developmental and reproductive toxins
- d = Hormone mimicking pesticides (endocrine disruptors)
- e = U.S. EPA Category I Extremely High Acute Toxicity/Systemic Pesticides Labeled "Danger/Poison"
- f = Category II organophosphate or carbamate nerve toxins

Sources:

a. "Known to the State of California to cause cancer" (oxadiazinon): California Environmental Protection Agency, Department of Pesticide Regulation, *Chemicals Known to the State to Cause Cancer or Reproductive Toxicity,* May 1, 1997. "Probable human carcinogens" (fenoxycarb, propoxur): U.S. Environmental Protection Agency, *List of Chemicals Evaluated for Carcinogenic Potential,* February 19, 1997.

b. U.S. Environmental Protection Agency, *List of Chemicals Evaluated for Carcinogenic Potential,* February 19, 1997.

c. U.S. Environmental Protection Agency, *Federal Register,* Vol. 59, No. 229, 61436, November 30, 1994 and California Environmental Protection Agency, *Chemicals Known to the State to Cause Cancer or Reproductive Toxicity,* May 1, 1997 (methyl bromide).

d. Illinois Environmental Protection Agency, *IEPA's Endocrine Disruptor Strategy: Preliminary List of Chemicals Associated with Endocrine System Effects in Animals and Humans or In Vitro*, February 1997. We have included "possible" and "probable" endocrine disruptors from this list.

e. Meister, *Farm Chemicals Handbook,* 1997, DPR online Product/Label Data Base: www.cdpr.ca.gov./docs/database.html. Only Category I pesticides bearing the label "Danger/Poison," the designation reserved for highly toxic systemic (toxic through ingestion, absorption or inhalation) toxins, were included. The same active ingredient may have several different classifications. Only those active ingredients used in products designated with a "Danger/Poison" label are included in this table.

f. Meister, *Farm Chemicals Handbook,* 1997. EPA Category II pesticides must carry the "Warning" label. Several school districts reported using the same active ingredients which are listed above as requiring a "Warning" label, but because the chemical is formulated into a weaker concentration, it does not require such a listing and as such is not included here. Only those products designated with a "Warning" label are included in this table.

# Appendix D Resources for Further Information

For further information on ordering this report or for other pesticide-related information, contact:

### California Public Interest Research Group (CALPIRG) Charitable Trust

450 Geary Street
San Francisco, CA 94102
tel: (415) 292-1487 fax: (415) 292-1497
email: jkaplan@igc.org

The CALPIRG Charitable Trust is the 501(c)(3) sister organization of the California Public Interest Research Group (CALPIRG), a non-profit, non-partisan research and advocacy organization working on behalf of consumers and the environment. With over 70,000 members and 14 offices statewide, CALPIRG is the largest consumer group in California.

### Californians for Pesticide Reform

116 New Montgomery, Suite 800
San Francisco, CA 94105
tel: (415) 495-1149 or (888) CPR-4880
fax: (415) 495-1141
email: pests@igc.org
website: www.igc.apc.org/cpr/

CPR is a coalition of public interest organizations committed to protecting public health and the environment from the proliferation of pesticides. CPR provides: information on pesticides, reports on pesticide use in the state and resources on how individuals can work to eliminate pesticide use. CPR also publishes the quarterly newsletter "CPResources."

Other organizations to contact:

## Children's Health and Pesticides

### Children's Environmental Health Network

5900 Hollis Street, Suite E
Emeryville, CA 94608
tel: (510) 450-3818 x 117 fax: (510) 450-3773
email: cehn@aimnet.com
website: www.cehn.org.

CEHN has a wide variety of information on the effects of toxic chemicals on children. The organization recently published the first national resource guide on children and environmental health.

### Mothers & Others for a Livable Planet

870 Market Street, Suite 654
San Francisco, CA 94102
tel: (415) 433-0850 fax: (415) 433-0859
or call the New York headquarters (888) ECO-INFO
email: mothers@igc.org
website: www.mothers.org/mothers

Mothers & Others publishes *"the Green Guide"* newsletter on such issues as childhood asthma and pesticides in schools.

## Information on Pesticides and Alternatives

### Bio-Integral Resource Center

P.O. Box 7414
Berkeley, CA 94707 tel: (510) 524-2567
fax: (510) 524-1758
website: www.igc.apc.org/birc/

BIRC publishes two journals: *The IPM Practicioner* and *Common Sense Pesticide Control Quarterly*. The organization also publishes the *Annual Directory of Least-Toxic Pest Control Products* and recently wrote *IPM in Schools: A How-to Manual*, available for $45 plus $5 postage/handling from BIRC. BIRC is available for consultation and training in IPM.

### National Coalition Against the Misuse of Pesticides

701 E Street, SE
Washington, DC 20003
tel: (202) 543-5450 fax: (202) 543-4791
email: ncamp@ncamp.org
website: www.ncamp.org

NCAMP has information on individual pesticides, pesticide policy and alternative methods of pest management. The organization publishes the quarterly "Pesticides and You" journal and the monthly "Technical Report" newsletter and hosts an annual organizing conference. NCAMP also offers "Pesticides and Schools: A Collection of Policies and Articles" ($15).

### Northwest Coalition for Alternatives to Pesticides

P. O. Box 1393
Eugene, OR 97440
tel: (541) 344-5044 fax: (541) 344-6923
email: info@pesticide.org
website: www.efn.org/~ncap

NCAP provides information on pesticides and pest management alternatives, including information on risks of pesticides used in school settings, and strategies for reducing their use. Specific publications include "Getting Pesticides Out of Our Schools," ($5 ppd.). Their website includes such school related documents as a list of school pesticide incidents, a model school pest management policy, the "Safer School Pest Control Pledge," "School Pesticide Use Questionnaire," "Steps Parents and Teachers can Take to Reduce School Pesticide Use" and "Interview Questions." NCAP also publishes the quarterly *Journal of Pesticide Reform.*

### Pesticide Action Network

116 New Montgomery Street, Suite 810
San Francisco, CA 94105
tel: (415) 541-9140 fax: (415) 541-9253
email: panna@panna.org
website: www.panna.org/panna

PAN publishes the quarterly journal *Global Pesticide Campaigner* and "PANUPS," a weekly online news service highlighting pesticides and sustainable agriculture. Their website has over 100 links to other useful sites as well as up-to-date information on PAN's campaigns and information resources. PAN most recently published the report *Rising Toxic Tide* which documents the dramatic increase in pesticide use in California between 1991 and 1995 ($5 ppd. or available online).

### Pesticide Education Center

Dr. Marion Moses
P.O. Box 420870
San Francisco, CA 94142-0870
tel: (415) 391-8511
email: pec@igc.org

The PEC offers the book *Designer Poisons: How to Protect Your Health and Home from Toxic Products*. The organization also makes presentations, develops curricular materials, and provides other services targeted to the need of average citizens and workers concerned about health risks of pesticide exposure.

### Pesticide Watch Education Fund

450 Geary Street
San Francisco, CA 94102
tel: (415) 292-1488 fax: (415) 292-1497
email: pestiwatch@igc.org

Pesticide Watch works with individuals and community groups to assist in local efforts to reduce the use of pesticides and promote safer methods of pest management. The group provides educational materials, organizing skills trainings, strategy consultation, technical referrals and networking opportunities so groups do not have to re-invent the wheel. They have prepared several organizing kits including: *Parks are for People, Not Poisons; Reducing Pesticide Use in Schools;* and *A Pesticide Drift Kit.*

## School Organizations

### California Parent Teacher Association

930 Georgia Street
P.O. Box 15015
Los Angeles, CA 90015-0100
tel: (213) 620-1100
fax: (213) 620-1411
website: www.capta.org

California State PTA announced its support for reducing the use of pesticides in schools and prior notification of any treatments 25 years ago.

### National Parent Teacher Association

700 North Rush Street
Chicago, IL 60611-2571
tel: (312) 787-0977
fax: (312) 787-8342
website: www.pta.org

In 1992, the National PTA announced its support for Integrated Pest Management to lower children's exposure to pesticides in schools.

### National Education Association/Health Information Network

Suite 521
1201 16th Street, NW
Washington, DC 20036-3290
tel: (800) 718-8387
fax: (202) 822-7775
website: www. nea.org\hin

The Health Information Network arm of NEA disseminates information on indoor air quality (IAQ) as well as other health issues. HIN has a packet "IAQ and You" with information on various indoor air contaminants and pollutants, including pesticides. For a copy of the Healthy School Handbook, contact the NEA Professional Library (800) 229-4200 or write P.O. Box 509, West Haven, CT, 06516 (21.95 plus 2.50 shipping and handling).

## State and Federal Agencies

### California Environmental Protection Agency

Department of Pesticide Regulation (DPR)
1020 N Street
Sacramento, CA 95814-5624
tel: (916) 445-4300
website: www. cdpr.ca.gov

DPR regulates the use of pesticides in California. In 1996, DPR published "Pesticides in Schools," and annually grants "IPM Innovator" awards to institutions in both urban and agricultural settings. DPR's website provides access to information on all the formulations of pesticides registered for use in the U.S.

### U.S. Environmental Protection Agency

Office of Pesticide Programs
401 M Street, SW
Washington, DC 20460
website: www.epa.gov

Provides information on individual pesticides. Copies of *Pest Control in the School Environment: Adopting Integrated Pest Management*. (EPA 735-F-93-012) are available by calling (800) 490-9198, EPA's National Center for Environmental Publications and Information.

# Appendix E
## The Top Five Pesticides Used in Surveyed School Districts

Of the 46 school districts responding to our survey, the most frequently reported pesticides were chlorpyrifos, cyfluthrin, diazinon, glyphosate and pyrethrins. Only two of the five pesticides, chlorpyrifos and diazinon, were given toxicity categories in our tables and charts (see Appendix B) since they appear on the state and federal lists that we consulted to determine such categories. However, there are numerous studies in the scientific literature addressing concerns with the remaining three pesticides which suggests that these chemicals may also pose health risks when used around children.

Active Ingredient: chlorpyrifos
Products(s): Dursban, Empire, PT 270, Strikeforce, Waxie Bug-Off, others
Surveyed School Districts Using: 43%
Use: insecticide
Toxicity Information: Chlorpyrifos is an organophosphate nerve toxin that inhibits cholinesterase, an enzyme critical to nervous system function. Several chlorpyrifos formulations found in responding school districts records are considered Category II pesticides, EPA's second highest ranking for acute toxicity. Chlorpyrifos can cause headaches, dizziness, mental confusion and inability to concentrate, blurred vision, vomiting, stomach cramps, uncontrolled urination, diarrhea, seizures,[1] birth defects and multiple chemical sensitivities.[2] This insecticide has also been associated with peripheral neuropathy, a nervous system disorder resulting in burning and tingling in the limbs, muscle weakness and decreased coordination.[3] In 1994, chlorpyrifos ranked third for highest number of poisoning-related incidents reported to the state.[4]

Chlorpyrifos is easily absorbed via inhalation, ingestion or through the skin[5] though symptoms may not be evident for as long as one to four weeks after exposure.[6] It is frequently detected in indoor air, and levels have actually been found to increase over time.[7] The estimated half-life (the period by which half of the product is expected to have broken down) of chlorpyrifos is 30 days,[8] but studies have shown the insecticide can persist up to eight years after application.[9]

In 1995, EPA fined manufacturer DowElanco $876,000 for failing to report to EPA more than 250 incidents involving chlorpyrifos. In January 1997, EPA and DowElanco agreed that the chemical would no longer be allowed for many uses including indoor fogging. Final Agency review of chlorpyrifos is not scheduled until 1998.[10]

Active Ingredient: cyfluthrin
Products(s): Tempo
Surveyed School Districts Using: 58%
Use: insecticide
Toxicity Information: Cyfluthrin can harm the human nervous system causing coordination loss, muscle trembling, jerky movements, behavioral changes and convulsions.[11] It can also cause irritation of the nose, throat and upper respiratory tract[12] leading manufacturer Mobay Corp. to state that "Persons with a history of asthma, emphysema, or hyperactive airways disease may be more susceptible to exposure."[13] Testing in laboratory animals suggests reproductive toxicity including miscarriages.[14] There is also concern that cyfluthrin can bind with receptors in the testes potentially affecting the action of hormones.[15] Between 5% and 100% of cyfluthrin residues are not removed by machine washing, presenting an exposure threat to applicators.[16]

Cyfluthrin breaks down into 4-fluoro-3-phenoxybenzoic acid which is more acutely toxic than the parent compound.[17] In the formulation Tempo WP, cyfluthrin is also mixed with piperonyl butoxide, a possible human carcinogen (liver cancer).[18]

Active Ingredient: diazinon
Products(s): KnoxOut, TKO, Diazinon, PT 265
Surveyed School Districts Using: 37%
Use: insecticide
Toxicity Information: Diazinon is an organophosphate nerve toxin and inhibits the action of cholinesterase, an enzyme critical to nervous system function. Acute symptoms include headaches, dizziness, nausea, weakness, blurred vision, vomiting, wheezing, coughing and pulmonary edema (swelling in the lung).[19] Diazinon ranked eleventh in the number of poisoning-related incidents reported to the state.[20]

Diazinon also poses long-term effects. Tests show diazinon can cause reproductive effects in laboratory animals[21] and use of diazinon by farmers in Iowa, Minnesota and Nebraska has been linked to increased risk of one type of cancer, non-Hodgkin's lymphoma.[22] An epidemiological study of workers at a diazinon production facility found that chromosome aberrations (genetic damage) were more common than in a group of non-exposed workers.[23] Two EPA surveys found diazinon to be the sixth most frequent cause of both accidental death due to pesticides and pesticide-related illnesses.[24] In one study, residues of diazinon were found in the urine of pest control operators workers who had sprayed diazinon, despite their use of protective clothing.[25] Another study, monitoring a crack and crevice treatment in a school dormitory, showed that diazinon can persist indoors for as long as 42 days after application.[26]

Diazinon has proven to be highly toxic to birds feeding on lawns, sod farms, and golf courses which mistake diazinon granules for seeds. After reports of several massive bird-kills, US. EPA forced manufacturer Ciba Geigy to halt the use of diazinon on golf courses and sod farms, yet the Agency continues to permit its use on lawns and turf. [27]

**Active Ingredient:** glyphosate
**Products(s):** Roundup
**Surveyed School Districts Using:** 58%
**Use:** herbicide
**Toxicity Information:** Glyphosate can cause acute symptoms including eye and skin irritation, cardiac depression, gastrointestinal pain, vomiting and accumulation of excess fluid in the lungs.[28] California statistics show that in 1994, glyphosate ranked tenth in the state for numbers of reported poisoning incidents.[29]

Glyphosate can also drift off-site during ground applications, potentially exposing children in classrooms far from the point of application. Studies show that from 14%-78% of glyphosate can drift off-site[30] as far as 1300 feet downwind.[31] Once on the ground, glyphosate can persist in soils from three days to a year.[32]

The surfactant used in Roundup, polyethoxylated tallowamines, or POEA, is more acutely toxic than glyphosate itself and the combination of the two is even more toxic. POEA is irritating to eyes and skin and causes gastrointestinal irritation, nausea, vomiting, and diarrhea.[33] Another chemical, isopropylamine is also added to Roundup despite the fact that it is "extremely destructive to tissue of the mucous membranes and upper respiratory tract," with inhalation able to cause fatal spasms, chemical pneumonia, and excess fluids in the lungs. In addition, isopropylamine exposure can cause headaches, dizziness, nausea and burns.[34]

Misleading advertising has led many applicators to consider glyphosate nearly non-toxic. In 1996, the New York State Attorney General won an injunction against the chemical's manufacturer, Monsanto, for falsely claiming that the pesticide is as safe as table salt. [35]

**Active Ingredient:** pyrethrins
**Products(s):** Blitz, BP-100, Drione, PT-565, others
**Surveyed School Districts Using:** 41%
**Use:** insecticide
**Toxicity Information:** Pyrethrins are derived from dried chrysanthemum flowers. They have a rapid action designed to quickly paralyze the pest and contain allergens that cross-react with ragweed and other pollens. Pyrethrins are absorbed most easily through ingestion or inhalation.[36] People with asthma can have severe reactions to pyrethrins.[37]

Pyrethrins can also cause male reproductive effects by binding with the androgen (a male sex hormone) receptors, disrupting the normal function of the hormone.[38]

Because pyrethrins degrade quickly, they are often used with other pesticides which may be more toxic. Examples include piperonyl butoxide, a possible human carcinogen, n-octylbicycloheptene dicarboximide (MGK 264), a possible human carcinogen[39] and chemical capable of causing reproductive damage,[40] and chlorpyrifos (see above). One product discovered in a surveyed school district combined pyrethrin with propoxur, a probable human carcinogen.[41]


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