“P” is for Poison

Update on Pesticide Use in California Schools

Teresa M. Olle, Toxics Policy Advocate, Staff Attorney
CALPIRG Charitable Trust

One in a series of reports by Californians for Pesticide Reform

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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 use of the most dangerous pesticides in California and reduce overall pesticide use; and 3) promote sustainable pest control solutions for our farms, communities, forests, homes and yards; and 4) hold government agencies accountable for protecting public health and Californians' right to know about pesticide use and exposure.

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California Public Interest Research Group Charitable Trust

California Public Interest Research Group (CALPIRG) Charitable Trust is the 501(c)(3) sister organization of CALPIRG, a non-profit, nonpartisan research and advocacy organization working on behalf of consumers and the environment. With over 50,000 members and 14 offices statewide, CALPIRG is the largest consumer advocacy group in California.

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Other Reports in the CPR Series

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Toxics on Tap: Pesticides in California Drinking Water Sources, California Public Interest Research Group Charitable Trust, 1999

Hooked on Poison: Pesticide Use in California, 1991–1998, Pesticide Action Network, 2000

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Executive Summary

A new California Public Interest Research Group (CALPIRG) Charitable Trust survey of school pesticide use finds that California school children face possible exposure to pesticides that have been linked to cancer, reproductive and developmental effects, endocrine (hormone) disruption, acute systemic and nervous system damage. This is the second CALPIRG Charitable Trust analysis of school pesticide use. A 1998 survey also found widespread use of these toxic chemicals.

The survey results are particularly alarming in light of the heightened national awareness of children's special vulnerability to pesticides. In June 2000, the U.S. Environmental Protection Agency (U.S. EPA) announced that chlorpyrifos, one of the most widely used insecticides for the past 30 years, poses unacceptable health risks to children. Given U.S. EPA's reassessment of the chemical, chlorpyrifos will be eliminated from use in homes, schools, day care centers, and other places where children may be exposed. Although chlorpyrifos use will continue on many agricultural crops, it will be sharply curtailed on apples, grapes and tomatoes, in order to reduce children's exposure through fruit juices and staple foods such as tomato sauce.[1]

For years, children's health advocates, medical professionals and scientists have advocated restricted use of pesticides like chlorpyrifos, citing the same risks U.S. EPA now refers to for its restrictions. With few exceptions, those years saw little action taken to reduce children's exposure. In the aftermath of U.S. EPA's belated action on chlorpyrifos, we must ask how much longer we will permit children's health to be put on hold pending incontrovertible evidence of harm. Rather, we should adopt the precautionary principle, which in this case would dictate that in the face of uncertain, but suspected, harm, we protect children from exposure to potentially dangerous pesticides until exposure is proven safe. Chlorpyrifos brings home the lesson, much as DDT did with birds and fish, that by inverting the age-old adage "look before you leap," we have unnecessarily exposed our children, our most valued resource, to poisons.

Chlorpyrifos is one of many toxic pesticides used in California schools. To determine the extent of school pesticide use, CALPIRG Charitable Trust surveyed the 15 most populous school districts in California, accounting for over 1.5 million students, or 26.4% of all children in California public schools.[2] The data, collected throughout the months of March and April 2000, reveal the following information about school pesticide use, pest management decision-making, notification and record keeping in California schools.[3]

Of the 13 most populous school districts responding to our request, all 13 used one or more of 42 particularly hazardous pesticides that can cause cancer, reproductive or developmental effects, endocrine (hormone) disruption, acute systemic or nervous system damage in 1999. Eight of the 13 responding districts used chlorpyrifos.

Highly toxic pesticides are still being used in California schools

Of the 13 most populous school districts responding to our information request, all 13 used one or more of 42 particularly hazardous pesticides that can cause cancer, reproductive or developmental effects, endocrine (hormone) disruption, acute systemic or nervous system damage in 1999. Eight of the 13 responding districts used chlorpyrifos. The number of surveyed schools districts using each of these types of pesticides is summarized in Table A on the next page.

Toxic pest control practices predominate, with few exceptions; the majority of California schools have failed to adopt and implement less-toxic means for pest control

All 13 responding districts reported using toxic pesticides. Combined, the districts used over 70 pesticide active ingredients in over 180 product formulations. Our latest survey confirms that the handful of districts using least-toxic pest control methods is the exception that proves the rule: school pesticide use is as rampant as ever.

Alternatives work

Many school districts, including San Francisco Unified, Ventura Unified and Los Angeles Unified, have adopted policies and are implementing programs to use alternative methods of pest control. These school districts are not sitting idly by, and should be commended for their forward-thinking policies. Unfortunately, they remain the exception to the rule.

School districts are often unable or unwilling to produce basic information about pesticide use in schools; parents, teachers and policymakers are left in the dark

Although pesticide use records are technically public information that should be available for teachers, parents and the public to review, in practice, school districts are often unwilling or unable to share even the most basic information. We believe these records are crucial to ensuring the health and safety of our children's learning environment. Unfortunately, many districts delayed their response to our request, and two failed to respond entirely.[4] In many cases, even the districts that did respond provided inadequate or incomplete records, further inhibiting the compilation of full information. As we learned in researching our earlier report, *Failing Health*,[5] lack of uniformity among districts' responses does not permit us to determine the amount of pesticides used in all reporting districts or at any particular school. The most comprehensive information this report can present is simply the types of pesticides used in the 13 responding districts during the year beginning January 1, 1999, and ending January 1, 2000. This report does not begin to address where the pesticides were used, how often, or whether children were present during applications. The foregoing deficiencies highlight a fundamental problem with the issue of pesticide use in California schools: lack of easy access to full information. If a school district needs an entire month to respond to a simple request about pesticide use, how can parents, teachers and staff become and stay informed about the pesticides to which students and staff are exposed on a daily basis?

Despite numerous rights California grants parents with respect to their children's schools, no law requires notification of parents or teachers before pesticides are applied in schools. Similarly, schools need not report overall pesticide use to a central repository of information, making it next to impossible to find comprehensive information. Without notification or record keeping, parents, school officials, state regulators and the public are denied a tool essential to ensuring protection of our children's health.

Table A: School District Toxic Pesticide Use

Health Effect Category	Responding School Districts Reporting Pesticide Use (Number)
A. "Known" or "probable" carcinogens	(11) Capistrano Unified, Elk Grove Unified, Fresno Unified, Garden Grove Unified, Long Beach Unified, Los Angeles Unified, Riverside Unified, Sacramento City Unified, San Diego Unified, Santa Ana Unified, Stockton Unified
B. "Possible" human carcinogens	(13) See Category A districts, plus San Francisco Unified and San Juan Unified
C. Reproductive and developmental toxins	(11) See Category A districts, plus San Juan Unified, and less Capistrano Unified
D. Hormone mimicking pesticides (endocrine disruptors)	(13) See Category A districts, plus San Francisco Unified and San Juan Unified
E. U.S. EPA Category I Extremely High Acute Toxicity/Systemic Pesticides Labeled "Danger/Poison"	(11) See Category A districts, plus San Francisco Unified and San Juan Unified, less Capistrano Unified and Riverside Unified
F. Cholinesterase inhibitors (organophosphate or carbamate nerve toxins)	(11) See Category A, plus San Juan Unified, less Stockton Unified

Background

Two years ago, CALPIRG Charitable Trust released *Failing Health: Pesticide Use in California Schools*. *Failing Health* examined pesticide use in 46 California school districts, accounting for approximately 25% of California public school children. The startling fact emerged that 87% of reporting districts used toxic pesticides in the schools or on school grounds. Results for the most toxic pesticides were particularly disturbing: 20% of schools used "probable" or "known" carcinogens, 70% "possible" human carcinogens, 52% developmental and reproductive toxins, 26% pesticides listed by U.S. EPA as Category I Acute Systemic Toxins, and 41% pesticides listed by U.S. EPA as Category II Systemic Toxins, most of which are cholinesterase-inhibiting nerve toxins.

The intervening years since *Failing Health* have witnessed the issue of school pesticide use gain increasing prominence in California and across the country. In November 1999 the U.S. General Accounting Office (GAO) released *Pesticides: Use, Effects, and Alternatives to Pesticides in Schools*. Despite evidence that schools use a wide range of carcinogens, reproductive and developmental toxins, endocrine disruptors and nerve toxins, GAO concluded that comprehensive information on the amount of pesticides used in the nation's public schools is not available.[6] Further, GAO found only limited data on short-term illnesses linked to school pesticide exposure, and virtually none on long-term effects.[7] Although these poisons can have long-term health consequences, school districts do not provide information to parents, and often fail to keep proper records.

As this report details, school pesticide use is of significant concern for children: their behavior increases risk of exposure while their physiology heightens susceptibility to toxins' effects. Unlike adults, children face exposure to hormone-mimicking and nervous system-altering pesticides during the critical period of growth and organ development.

Distressing trends in children's health continue to mount: with about 8,000 children diagnosed each year, cancer remains the leading cause of disease-related death of non-infants under age 19, often in the forms of leukemia and brain cancer.[8] Asthma, the leading chronic childhood illness and number one cause for student absenteeism, annually strikes an estimated 4.8 million children under age 18—one in 15.[9] Moreover, asthma rates for children under five have increased 160% in the last 15 years.[10] In 1990, the cost of asthma was estimated at $6.2 billion.[11] Pesticide exposure has been linked to all of these ailments and more.

Recommendations

Unfortunately, the more things change, the more they stay the same when it comes to pesticide use in California schools. Despite many available non-toxic and less-toxic alternatives to control pests, our children continue to confront highly toxic chemicals while parents remain unaware—and therefore unable—to act.

CALPIRG Charitable Trust and the statewide coalition of Californians for Pesticide Reform urge parents, schools and policymakers to combine efforts to protect our children's health from exposure to dangerous pesticides.

- Policymakers should eliminate school use of pesticides that cause cancer, adverse reproductive and developmental effects, hormone disruption or nervous system damage; require prior notification of parents and school staff before pesticide application; provide training, incentives, materials and quantifiable reduction goals to promote pesticide reduction in schools; and ensure that school pesticide use is identifiably reported under the state pesticide use reporting system.
- School districts should implement policies that eliminate use of pesticides that cause cancer, adverse reproductive and developmental effects, hormone disruption or nervous system damage; provide prior notification of parents and school staff before pesticide application; and maintain complete records of all pesticide use in a manner easily accessible to the public.
- Parents, teachers and students should request information about pesticides used in and around schools and participate in school pest management decision-making; and advocate strong policies that ban use of pesticides that cause cancer, adverse reproductive and developmental effects, hormone disruption or nervous system damage.

Many school districts, including San Francisco Unified, Ventura Unified, and Los Angeles Unified, have adopted policies and are implementing programs to use alternative methods of pest control. Unfortunately, they remain the exception to the rule.

Notes

1 "E.P.A., Citing Risks to Children, Sharply Limits a Chief Insecticide," *New York Times*, 9 June 2000; see also U.S. Environmental Protection Agency (U.S. EPA), Office of Pesticide Programs, "Administrator's Announcement on Chlorpyrifos," http://www.epa.gov/pesticides/.

2 See *Enrollment in California Public School Districts Ranked by Highest Enrollment, 1998-99*, http://www.cde.ca.gov/demographics/reports/district/rank/rnk98100.htm.

3 See Appendix F for survey methodology.

4 Oakland Unified, San Bernardino Unified.

5 CALPIRG Charitable Trust wrote *Failing Health: Pesticide Use in California Schools* in 1998. This study presented the first comprehensive data on school pesticide use in California, profiling 46 California school districts, which accounted for approximately one quarter of all California public school children. *Failing Health* is one in a series of reports on pesticide use by CPR.

6 U.S. General Accounting Office (GAO), Resources, Community, and Economic Development Division, *Pesticides: Use, Effects and Alternatives in Schools*, GAO/RCED-00-17, November 1999.

7 *Pesticides: Use, Effects and Alternatives in Schools*, GAO/RCED-00-17, 2

8 U.S. EPA, Office of Children's Health Protection, *Childhood Cancer*, http://www.epa.gov/children/cancer.htm; American Cancer Society, "Childhood Cancer," *Facts and Figures 2000*, http://www.cancer.org/statistics/cff2000/special.html.

9 U.S. EPA, Office of Children's Health Protection, *Asthma and Upper Respiratory Illnesses*, http://www.epa.gov/children/asthma.htm.

10 U.S. EPA, *Asthma*, http://www.epa.gov/children/asthma.htm.

11 U.S. EPA, *Asthma*, http://www.epa.gov/children/asthma.htm.

1 Introduction: The Problem with Children and Pesticides

Children are not simply "little adults." Early developmental stages of their organs, nervous systems and immune systems; greater rates of cell division; and lower body weight increase their susceptibility to pesticide exposure.

A growing consensus has developed over the last several years among health professionals, school professionals, public health advocates and even many legislators, that school pesticide use can grievously affect children's health. Since its pioneering resolution in 1972, the California State Parent Teacher Association has been joined by the National Parent Teacher Association, the National Education Association and many other organizations in its call for reduced school pesticide use. The California Medical Association and the American Academy of Pediatrics, District IX, passed resolutions in 1999 recommending school pest control programs that preclude use of highly toxic pesticides, reduce overall pesticide use and involve parents in pest management decision-making.[1] Unfortunately, no matter how credible the advocate's voice, policy changes have been few and inadequate, as policymakers prove recalcitrant.

Those in the best position to evaluate children's health effects, such as scientists and health professionals, agree on the hazards of exposing children to pesticides.

Children are uniquely susceptible to pesticide exposure

Children are not simply "little adults." Early developmental stages of their organs, nervous systems and immune systems; greater rates of cell division; and lower body weight increase their susceptibility to pesticide exposure.[2] Pesticide concentrations in their fatty tissues may be greater because their fat as a percentage of total body weight is lower than for adults.[3]

A 1993 report by the National Research Council of the National Academy of Sciences shows that children are more susceptible than adults to the health effects from low-level exposures to some pesticides over the long-term.[4] Animal studies also suggest that the young are more vulnerable to the effects of some toxic chemicals. A review of 269 drugs and toxic substances, including a number of pesticides, reveals lower lethal doses in newborn rodents than in adult rodents in 86% of cases.[5]

Children are likely to receive relatively greater pesticide exposure than adults

In addition to being more vulnerable to pesticide toxicity, children's behavior and physiology make them more likely than adults to encounter pesticides. For example, most pesticide exposure is through the skin—the largest organ—and children have much more skin surface area for their size than adults.[6] Similarly, their higher respiratory rate means they inhale airborne pesticides at a faster rate.[7]

Children's characteristic contact with floors, lawns and playgrounds also increases exposure. Very young children who put fingers and other objects in their mouths risk even greater exposure. The breathing zone for children is usually closer to the floor, where pesticides re-enter the air after floor surfaces are disturbed. Finally, children may be bringing home more than their homework—children can track pesticides used in their schools into their homes, presenting an additional opportunity for exposure.

Pesticide residues in dust and carpets

Although pesticides contaminate air, soil, food, water and surfaces, studies that examine children's pesticide exposure indicate that the largest number of chemicals and highest concentrations often accumulate in household dust.[8]

Carpets are long-term reservoirs for pesticides sprayed indoors.[9] A study assessing pesticide exposure from home carpet dust found an average of 12 pesticides in carpet dust samples, compared to 7.5 in air samples from the same residences. Moreover, 13 pesticides found in the carpet dust were not detected in the air. Diazinon—a neurotoxic insecticide used in eight of our surveyed school districts—appeared in nine of 11 carpets tested.[10] Carpet cleaning may send pesticides airborne again, once more available for inhalation.[11]

Pesticide residues are highly persistent indoors

School districts frequently attempt to reduce exposure risk by applying pesticides after hours while students are not present.[12] However, numerous studies indicate that pesticides may remain potent indoors for days, weeks or even months after application. Sunlight, rain, and soil microbes are not present to break down or carry away indoor pesticides, which thus persist much longer than in the outdoor environment.[13] Some pesticides can linger indoors for months, even years; indoor air concentrations of several kinds of pesticides may be more than 10 to 100 times higher than outdoor concentrations.[14] Even non-persistent pesticides last much longer indoors where they are not susceptible to environmental degradation.[15] For example, one study detected air levels of diazinon 21 days after application at 20% of levels found immediately after application.[16]

Not all indoor dust residues stem from indoor use. One study showed residues of 2,4-D and dicamba, herbicides used by one of our surveyed California districts, could be tracked inside on shoes. Untreated areas, including lawn area and carpets, showed levels of 2,4-D, most likely due to spray-drift from nearby applications. Researchers estimated that residues of 2,4-D can persist in household carpet dust as long as one year.[17] Another study showed that after a single spray application in an apartment, chlorpyrifos—used in eight responding districts—continued to accumulate on children's toys, both plush and hard plastic, as well as on surfaces, for two weeks.[18]

Ventilation systems

Finally, because ventilation systems may send pesticides airborne, heat and air conditioning systems potentially serve as sources of repeated pesticide exposure.

Pesticide poisoning incidents: The tip of the iceberg

In November 1999, the U.S. General Accounting Office (GAO) researched pesticide use in the nation's schools. Its report, *Pesticides: Use, Effects, and Alternatives to Pesticides in Schools*, found information on short-term pesticide exposure incidents extremely limited, and information on long-term exposure virtually non-existent.[19] U.S. EPA analysis of Poison Control Center data documents 2,300 reported cases of pesticide exposure involving individuals at schools between 1993 and 1996:[20] 329 persons were seen at health care facilities, 15 hospitalized, and four treated in intensive care units.[21] In addition, pesticide registrants reported 80 incidents between 1992 and 1997 involving one or more individuals at schools.[22] The California Pesticide Illness Surveillance Program, which requires doctors to report any illnesses that may be caused by pesticide exposure, reported 998 potential or confirmed poisonings of workers, teachers and students in 1998, the latest year for which information is available.[23] What little data we do have indicate that nearly every incident is wholly unnecessary and avoidable.

However, these numbers likely misrepresent the actual incidence of adverse health effects from pesticide exposure.[24] Symptoms of pesticide illness frequently mimic symptoms associated with the flu or other common childhood ailments. In the event parents seek medical attention, inadequate doctor training in identifying pesticide illnesses makes correct diagnosis unlikely. In addition, because under the California reporting program, it is through workers' compensation programs that most physicians are reimbursed for preparing reports, doctors lack incentive to report non-worker pesticide illnesses (such as those children suffer).[25] Government reporting programs do not even attempt to capture pesticide-related illnesses with immeasurable effects, such as learning disorders, or that may

Some pesticides can linger indoors for months, even years; indoor air concentrations of several kinds of pesticides may be more than 10 to 100 times higher than outdoor concentrations.

not be manifested until years after exposure, such as cancer and reproductive and developmental effects.

Linking pesticide exposure to deleterious health effects is thus difficult, even when effects are dramatic and grave. Often, by the time pesticides are identified as causal, long-lasting and profound damage has already occurred. A recent Northwest Coalition for Alternatives to Pesticides report highlights the problem. *Unthinkable Risk: How Children Are Exposed and Harmed When Pesticides Are Used at School* profiles nearly 100 pesticide poisoning incidents from across the country, 35 from California.[26] In one incident, numerous students suffered unusual symptoms after they began attending Jurupa Hills Elementary School.[27] One five-year-old developed rashes and blisters where his body contacted classroom surfaces, a smoker-like cough, diarrhea, stomach pains and shortness of breath. Another kindergarten student suffered head blisters and hair loss after starting school. One fifth-grader suffered fatigue and stomach pains requiring hospitalization; she missed months of school. Concerned parents investigated and to their horror discovered that the school was automatically dispensing pyrethrins-containing pesticides every 15 minutes in a mist over their children's heads. Though the applications were legal and despite school district assurances that pesticide exposure could not cause the children's illnesses, the school stopped use.

Linking pesticide exposure to deleterious health effects is difficult, even when effects are dramatic and grave. Often, by the time pesticides are identified as causal, long-lasting and profound damage has already occurred.

In 1997, a Fontana eighth-grader stopped breathing and collapsed while playing baseball at a local park.[28] She died six days later, having never regained consciousness. In addition to numerous visits to the school nurse complaining of dizziness, nausea and headaches, twice before the girl had inexplicably stopped breathing and collapsed at school. An abnormal heart rhythm was detected by electrocardiogram (EKG) tests taken after one of the episodes and during her coma. Exposure to nerve-poisoning pesticides, such as organophosphates and pyrethrins, can disrupt proper nervous system functioning, causing heart rhythm abnormalities such as rapid heartbeat and heart palpitations. In addition to RoundUp, several nerve-poisoning pesticides, including chlorpyrifos, cyfluthrin, cypermethrin and diazinon, were applied regularly at the school. Other pesticides and herbicides were used at the park where the girl collapsed. After much research, expert consultation, and even genetic testing, the family and their cardiologist now believe that exposure to nerve-poisoning pesticides sprayed at school and in the park is the only likely cause of the arrhythmia that caused the young girl's death.

2 Highly Toxic Pesticides Continue To Be Used in California Schools

CALPIRG Charitable Trust surveyed the 15 most populous school districts, which together account for over 1.5 million students, or roughly one quarter (26.4%) of all children in California public schools. All 13 responding districts reported using one or more highly toxic pesticides—chemicals that health authorities suspect can cause cancer, reproductive or developmental harm, endocrine system (hormone) disruption, acute systemic or nervous system damage.[29]

The survey data reveal that 11 of 13 responding school districts used one or more "known" or "probable" carcinogens; all 13 districts used one or more "possible" human carcinogens; 11 used one or more reproductive or developmental toxins; all 13 used one or more pesticides able to mimic hormones and affect the endocrine system; 11 used one or more acutely toxic pesticides classified as EPA Category I and for which "DANGER/ POISON" labeling is required;[30] and 11 used one or more cholinesterase inhibitors, pesticides that affect nerve impulse transmission. Table 1 presents pesticides found in each category and the number of school districts us-

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Table 1: Toxic Pesticides Used in Responding California Districts

Health Effect Category	Pesticide (active ingredients)* (number)		Responding School Districts Reporting Pesticide Use (number)
A. “Known” or “probable” carcinogens[a]	(6) diuron fenoxycarb propoxur pyrethrins silica aerogel sodium cacodylate		(11) Capistrano Unified Elk Grove Unified Fresno Unified Garden Grove Unified Long Beach Unified Los Angeles Unified Riverside Unified Sacramento City Unified San Diego Unified Santa Ana Unified Stockton City Unified
B. “Possible” human carcinogens[b]	(13) acephate bifenthrin carbaryl cypermethrin fipronil hydramethylnon	n-octyl bicycloheptene dicarboximideoryzalin oryzalin oxadiazon pendimethalin permethrin piperonyl butoxide trifluralin	(13) See Category A districts, plus San Francisco Unified and San Juan Unified
C. Reproductive and developmental toxins[c]	(5) fluazifop-butyl hydramethylnon methyl bromide oxadiazon resmethrin		(11) See Category A districts, plus San Juan Unified, less Capistrano Unified
D. Hormone mimicking pesticides (endocrine disruptors)[d]	(17) 2,4D bifenthrin carbaryl chlorpyrifos cyfluthrin cypermethrin d-trans allethrin deltamethrin esfenvalerate	lambda cyhalothrin malathion permethrin phenothrin pyrethrins resmethrin sodium cacodylate trifluralin	(13) See Category A districts, plus San Francisco and San Juan Unified
E. U.S. EPA Category I Extremely High Acute Toxicity/Systemic Pesticides Labeled “Danger/Poison”[e]	(10) 4-aminopyridine aluminum phosphide brodifacoum bromadiolone chlorophacinone	chloropicrin diphacinone methyl bromide propoxur sulfuryl fluoride	(11) See Category A districts, plus San Francisco Unified and San Juan Unified, less Capistrano Unified and Riverside Unified
F. Cholinesterase inhibitors (organophosphate or carbamate nerve toxins)[f]	(8) acephate carbaryl chlorpyrifos diazinon	ethephon malathion propetamphos propoxur	(11) See Category A, plus San Juan Unified, less Stockton Unified

* Some listed chemicals are used in either spray, bait or gel form. We commend school districts that reduce children’s pesticide exposure by utilizing baits or gels as opposed to broadcast spray applications. However, baits and gels still create risk of exposure, either by inadvertent ingestion or volatilization. Therefore, further steps are required to move toward a non-toxic approach to pest management.

Sources:

a. *List of Chemicals Evaluated for Carcinogenic Potential* (Category A, B1 and B2) (U.S. EPA Office of Pesticide Programs, 26 August 1999); *Proposition 65 List of Chemicals Known to the State of California to Cause Cancer* (Sacramento: California Office of Environmental Health Hazard Assessment, 29 December 1999).

b. *List of Chemicals Evaluated for Carcinogenic Potential* (Category C) (U.S. EPA Office of Pesticide Programs, 26 August 1999).

c. *Proposition 65 Chemicals Known to the State to Cause Reproductive and Developmental Toxicity* (Sacramento: California Office of Environmental Health Hazard Assessment, 29 December 1999), http://www.oehha.ca.gov/prop65.html.

d. *Report on Endocrine Disrupting Chemicals* (Illinois EPA, 1997); L. H. Keith, *Environmental Endocrine Disruptors: A Handbook of Property Data* (New York: Wiley Interscience, 1997); T. Colburn et al., *Our Stolen Future* (New York: Penguin Books, 1996), 253; C. M. Benbrook, *Growing Doubt: A Primer on Pesticides Identified as Endocrine Disruptors and/or Reproductive Toxicants* (Washington, DC: National Campaign for Pesticide Policy Reform, September 1996).

e. U.S. EPA categorizes pesticide products according to acute (immediate) toxicity. Categories range from I to IV, Category I being the most toxic. Only Category I pesticides bearing the label “Danger/Poison,” the designation reserved for highly toxic systemic (toxic through ingestion, absorption, or inhalation) toxins, are included. The same active ingredient may have several different classifications, depending on its concentration in the product formulation.

f. *Summary of Pesticide Use Reporting Data, 1998* (Sacramento: California Department of Pesticide Regulation, November 1999).

What Is a Pesticide?

The U.S. Environmental Protection Association defines a pesticide as any substance or mixture of substances intended to prevent, destroy, repel or mitigate any pest. The term includes not only all insecticides, but also all herbicides, fungicides and various other substances used to control pests. Under U.S. law, a pesticide is also any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

By their very nature, most pesticides create some risk of harm to humans, animals or the environment because they are designed to kill or otherwise adversely affect living organisms. Biologically based pesticides, such as pheromones and microbial pesticides, are becoming increasingly popular and often are safer than traditional chemical pesticides.

Adapted from U.S. EPA, Office of Pesticide Programs, "What Is a Pesticide?"

ing them. Complete information for each school district appears in Appendix A: Survey Response Information by School District.

Nervous system toxins

Of the 13 responding school districts, 11 used pesticides identified as cholinesterase inhibitors. Cholinesterase inhibitors, which include organophosphates and many carbamates, are pesticides designed to disrupt the cholinesterase enzymes that control insect nervous systems. Because humans have these same enzymes, they interfere with human nerve impulse functions, posing a priority health concern.[31]

Ironically, school use of these toxins 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.[32] Scientists who studied 56 men exposed to organophosphates found disturbed memory and difficulty in maintaining alertness and focus.[33] Low doses of chlorpyrifos—used by eight responding districts—given to newborn rats and rat embryos have been shown to cause brain death and dysfunction.[34] Few pesticides have been evaluated for their ability to cause permanent damage to children's developing central nervous systems, but several researchers suggest that harmful effects are likely.[35] This lack of research gives special importance to a current study— by the School of Public Health at the University of California at Berkeley, in conjunction with the Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS)—to assess in utero and postnatal organophosphate exposure and its health effects on neurodevelopment, growth, and symptoms of respiratory illness in children.[36]

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

An estimated 3–5% of school-age children suffer symptoms of hyperactivity and attention deficit disorder, making it difficult for them to pay attention and learn. Researchers who studied two "sister" communities in Mexico whose primary difference was high pesticide use in one and low use in the other demonstrated that children who lived in the high pesticide use area suffered greater impairment of memory, fine motor skills and visual perception.[37]

Carcinogens in California schools

As noted in Table 1, 6 pesticides identified as "known" and "probable" carcinogens were used in 11 of the 13 responding California school districts. All 13 districts reported using "possible" carcinogens. U.S. EPA evaluates pesticide ingredients for carcinogenicity. Those with tumor-causing effects are classified into three categories, those known to cause cancer in humans ("known" human carcinogens), those known to cause cancer in animals but not yet definitely shown to cause cancer in humans ("probable" human carcinogens), and those that may be human carcinogens ("possible" human carcinogens). The California Office of Environmental Health Hazard Assessment also maintains a list of chemicals known to the state to cause cancer.[38]

The prevalence of carcinogenic chemicals is of particular concern as cancer remains the leading cause of disease-related death among children in the U.S. under the age of 19.[39] An estimated 12,400 children under the age of 19 will develop cancer in the year 2000, and about 2,300 children will die from cancer this year alone.[40] Between 1974 and 1991, overall incidence of childhood cancer increased ten percent.[41] Accounting for one-third of all cancers in children, leukemia is the most common form of cancer in children under age 15.[42]

Scientific studies suggest a connection between pesticide exposure and childhood cancer. For example, several link use of home and garden pesticides to increased risk of leukemia.[43] The most recent of these investigated household pesticide use by 224 Los Angeles mothers of children with brain tumors. The risk of brain cancer was found to be 10.8 times greater for children who had prenatal exposure to spray and fogger pesticides. A 1995 study shows a strong positive correlation between pest strip use and leukemia.[44] Home pesticide use also increases risk of brain cancer. One research study implicates use of sprays or foggers to dispense flea and/or tick treatments in an increased incidence of brain tumors.[45] Yard pesticide treatments have been linked to an increase in soft-tissue sarcomas.[46]

Reproductive and developmental toxins

Of the 13 responding surveyed school districts, 11 reported using one or more pesticides identified as a reproductive or developmental toxin by the State of California under Proposition 65.[47] Exposure to these chemicals may jeopardize a child's physical and mental development, increasing risk of behavioral and neurological disorders, immune system suppression and an impaired reproductive system. Unborn children carried by pregnant teachers may also face heightened risk of a variety of physical and mental birth defects.[48] Low birth weight, spontaneous abortion or miscarriage, and sterility or infertility also may result.[49]

Hormone-mimicking pesticides

Thirteen responding school districts reported using pesticides whose active ingredient has been shown to disrupt the proper functioning of human hormones by blocking, mimicking or otherwise interfering with the endocrine system.[50] Hormones—chemical messengers that trigger a wide array of highly complex and sensitive biological processes—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 they can "switch" on and off biological processes at extremely low levels, hormone-mimicking pesticides may be harmful at very low levels of exposure.[51]

U.S. EPA Category I acute systemic toxins

Eleven of the 13 responding districts used one or more pesticide products containing Category I acute toxins. U.S. EPA categorizes pesticide products according to their acute (immediate) toxicity. Categories range from I to IV, with Category I being the most toxic. The California Department of Pesticide Regulation breaks down Category I materials further into two groups: those that cause acute systemic (i.e., whole body) toxicity, which carry the warning "DANGER/POISON" and show a skull and crossbones on the product label and were considered by this report; and those that cause acute toxicity to skin and eyes, which carry the warning "DANGER" on the label and were not considered. Materials[52] bearing the "DANGER/POISON" label are lethal to laboratory animals when they eat less than 50 mg per kg of body weight, inhale air containing a concentration of the substance less than 50 mg per liter of air, or are exposed through the skin to levels less than 200 mg per kg of body weight. In other words, for a 150-pound person, consumption of as little as 0.1 ounce can be fatal. Given that most school children weigh substantially less than 150 pounds, Category I acute systemic toxins pose a significant threat to children's health at very low doses.

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The risk of brain cancer was found to be 10.8 times greater for children who had prenatal exposure to spray and fogger pesticides.

Top Five Most Commonly Used Pesticides in Responding School Districts: Biographies

Active Ingredient: pyrethrins

Products: Drione, Pro-Control, CB-40, CB-80, Kicker, PT 175, PT 230 Tri-die, PT 565, PT 505, ULD BP 100, ULD BP 300, Knockdown, Safer, Ortho Wasp, Holiday Fogger
Number of School Districts Using: 10
Use: insecticide
Toxicity Information: Pyrethrins are derived from dried chrysanthemum flowers and are designed to paralyze pests quickly. Pyrethrins contain allergens that cross-react with ragweed and other pollens. They are absorbed most easily through ingestion or inhalation.[1] Pyrethrins can cause male reproductive effects by binding with androgen (a male sex hormone) receptors, disrupting normal function.[2] Because pyrethrins degrade quickly, they are often used with other ingredients that may be more toxic.

Active Ingredient: chlorpyrifos

Products: Dursban, Strikeforce, PT 270, others
Number of School Districts Using: 8
Use: insecticide
Toxicity Information: This organophosphate nerve toxin inhibits cholinesterase, an enzyme critical to nervous system function. Organophosphates are the most widely used insecticides,[3] and among them, chlorpyrifos is the toxin of choice. More than 800 products contain chlorpyrifos, including pet collars, pest control products, and lawn and garden insecticides.[4] Chlorpyrifos can cause headaches, dizziness, mental confusion and inability to concentrate, blurred vision, vomiting, stomach cramps, uncontrolled urination, diarrhea, seizures,[5] birth defects and multiple chemical sensitivity.[6] This insecticide has been linked to organophosphate-induced delayed neuropathy, a nervous system disorder resulting in weakness or paralysis of the extremities.[7] In children, acute exposure most often generates seizures and mental changes such as lethargy and coma.[8] Chlorpyrifos is easily absorbed through inhalation, ingestion or the skin.[9] Symptoms may not be evident for up to one to four weeks after exposure.[10] Chlorpyrifos is frequently detected in indoor air, and levels have actually been found to increase over time.[11] The estimated half-life (the period by which half of the product is expected to have broken down) of chlorpyrifos is 30 days,[12] but studies find that it can persist up to eight years after application.[13] In June 2000, U.S. EPA recognized the danger of children's exposure to chlorpyrifos and announced severe restrictions on its use in settings where children face exposure, such as homes, schools and day care centers, and on crops commonly eaten by children, such as apples, grapes and tomatoes.

Active Ingredient: diazinon

Products: KnoxOut, TKO, Diazinon, Turf Supreme, others
Number of School Districts Using: 8
Use: insecticide
Toxicity Information: This organophosphate nerve toxin inhibits cholinesterase, an enzyme critical to nervous system function. Acute symptoms include headache, muscle twitching, hypersecretion (increased sweating and/or salivation), muscle weakness, tremor and incoordination, abdominal cramps, nausea, vomiting, loss of consciousness, blurred vision, wheezing, coughing and pulmonary edema (swelling in the lungs).[14] Symptoms develop within minutes or hours of acute exposure, most quickly when inhalation is the means.[15] Diazinon also has long-term effects. Tests show reproductive effects in laboratory animals[16] and use by farmers in Iowa, Minnesota and Nebraska has been linked to increased risk of non-Hodgkin's lymphoma.[17] An epidemiological study of workers at a diazinon production facility found that chromosome aberrations (genetic damage) were more common among exposed than non-exposed workers.[18] Two U.S. EPA surveys found diazinon to be the sixth most frequent cause of both accidental death due to pesticides and pesticide-related illnesses.[19] One study detected residues of diazinon in the urine of pest control operators who had sprayed diazinon, despite use of protective clothing.[20] 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.[21]

Active Ingredient: glyphosate

Product: Roundup
Number of School Districts Using: 9
Use: herbicide
Toxicity Information: Exposure to glyphosate can irritate the eyes, skin and upper respiratory tract.[22] Acute symptoms include the foregoing, as well as cardiac depression, gastrointestinal pain, vomiting and accumulation of excess lung fluid.[23] Glyphosate can drift off-site during ground applications, potentially exposing children in classrooms far removed. Studies show that 14–78% of glyphosate can drift off-site[24] as far as 1,300 feet downwind.[25] Glyphosate can persist in soil from three days to a year.[26] Misleading advertising has led many applicators to consider glyphosate nearly non-toxic. Although the New York State attorney general won an injunction in 1996 against the chemical's manufacturer, Monsanto, for falsely claiming that the pesticide is as safe as table salt,[27] its undeserved reputation as non-toxic is tenacious.

Active Ingredient: hydramethylnon

Products: Siege, Maxforce products

Number of School Districts Using: 8

Use: insecticide

Toxicity Information: Hydramethylnon is typically used in bait or gel formulations, which, although preferable to sprays, still pose exposure risk through inadvertent ingestion or volatilization. A possible human carcinogen, this insecticide has been shown to create adverse reproductive or developmental effects.[28]

Notes

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11 C. Cox, "Chlorpyrifos, Part 2: Human Exposure," *J. Pesticide Reform* 15 ([1996]1), citing C. Wright et al., "Chlorpyrifos in the air and soil of houses four years after its application for termite control," *Bull. Env. Contam. Toxicol.* 46 (1991): 686–89.

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14 U.S. EPA, *Recognition*, 34, 38.

15 U.S. EPA, *Recognition*, 38.

16 U.S. EPA, Federal Register 59 ([30 November 1994]229), 61435.

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26 Cox, "Glyphosate," citing U.S. EPA, *Reregistration eligibility decision (RED): Glyphosate*, Washington DC (1993).

27 Press release from NY Attorney General's Office, presiding Attorney General Dennis C. Vacco, The Capitol, Albany, 25 November 1996.

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"Inert" Ingredients: Packaging Poison with Poison

Pesticide products actually comprise a mixture of "active ingredients"—chemicals intended to kill the pest—and "inert" ingredients—chemicals to enhance potency or ease-of-use. "Inert" ingredients often make up the bulk of an applied pesticide, commonly 99%.

However, "inert" ingredients are often toxic as well—in a few cases more so than active ingredients. Moreover, many inert ingredients are themselves used as pesticides: At least 382 chemicals on the U.S. EPA list of pesticide inert ingredients are currently or were once registered as pesticide active ingredients.[1] Eight inert ingredients are considered by U.S. EPA to be "Of Toxicological Concern" and another 64 are "Potentially Toxic."[2]

Obscuring matters still more, the precise formulation of many pesticides is "proprietary" business information that manufacturers are not required to disclose on the pesticide label. Concerned consumers thus cannot identify the ingredients that constitute the bulk of a product to determine total toxicity.

1 H. Knight, "Hidden Toxic 'Inerts': A Tragicomedy of Errors," *J. Pesticide Reform* 17 ([1997]2): 10–11.

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3 Least-Toxic Integrated Pest Management: Words and Deeds

Least-toxic Integrated Pest Management (IPM) is a decision-making process for managing pests that focuses on prevention of pest problems before they occur. Integral is the idea that in the vast majority of circumstances, pests can be managed without toxic chemicals, and that only after all other methods have been tried and failed should toxic pesticides be considered.

Least-toxic IPM involves a progression of steps:

Least-toxic Integrated Pest Management is a decision-making process for managing pests that focuses on prevention of pest problems before they occur.

- Prevention is the first line of defense. Improved sanitation (removal of the attractant) and mechanical exclusion (caulking, screens) can accomplish significant pest control. Modification of pest habitats (vegetation-free buffer zones against buildings) can deter pests and minimize infestations. IPM involves extensive knowledge about pests, such as infestation thresholds, pest life cycles, environmental considerations and natural enemies.
- Monitoring is critical to identifying initial pest problems and areas of potential concern, as well as determining decisions and practices that may affect future pest populations. It must be ongoing to prevent a small pest problem—easily controlled with least-toxic means—from becoming an infestation.
- Threshold tolerance levels of pest populations are established to determine the point at which pests become a problem requiring treatment.
- Treatment, finally, prioritizes non-chemical means, and if necessary, those chemicals that pose the least possible risk of toxicity to humans and the environment. Traps and enclosed baits, beneficial organisms, freezing and flame or heat treatments, among others, are all examples of least-toxic pest control strategies. A good IPM program prohibits use of known and probable carcinogens, reproductive or developmental toxins, endocrine disruptors, cholinesterase-inhibiting nerve toxins, and the most acutely toxic pesticides.

In other words, IPM establishes a hierarchy of appropriate responses to a pest problem, with monitoring and prevention at the top and toxic pesticides at the very bottom. IPM *does not* mean that in the event of a pest problem, all available pest control methods receive equal consideration.[53]

Some California school districts have adopted written IPM policies, others have written pest control policies but also claim to adhere to IPM principles, and still others lack written policies, but follow mandatory internal IPM protocols. Several districts, among them Los Angeles Unified and San Francisco Unified, have dramatically reduced toxic pesticide use after implementing IPM programs.[54]

Unfortunately, our research also shows that many districts that report adherence to IPM policies and procedures have not reduced reliance on toxic pesticides. For example, Fresno Unified pesticide use appears to have held constant despite adoption of an IPM policy. Its policy does not mandate consideration of least-toxic before toxic means.

Lacking a uniform definition of IPM among districts, it is not surprising that we found varying outcomes. As stated above, the principle of IPM includes commitment to least-toxic pest control. In practice, least-toxic IPM means that carcinogens, acute nerve toxins and reproductive and developmental toxins are never used and other synthetic chemicals only as a last resort and under predefined conditions. Also, a written policy is critical to ensure that standards are maintained from one administration to another and that parents, school staff, and policymakers can make informed, standardized decisions. Thorough records aid program evaluation against an established benchmark.

IPM in other states

Because IPM means many things to many people, it is difficult to determine which states have enacted laws mandating policies incorporating least-toxic IPM principles. Several states, including Minnesota, Connecticut, Maryland, Oregon, Texas, West Virginia, and most recently, Massachusetts, require schools to adopt IPM programs.[55] Still other states have laws that encourage IPM adoption. For example, Illinois law requires school districts to adopt an IPM program if economically feasible. If such adoption would be more expensive than current policy, the district must submit a report outlining the programs' relative costs to the Department of Health for review.[56] Several other states have laws defining IPM, some in ways that do not prioritize non-toxic or low-toxic methods over toxic methods.[57]

Least-Toxic IPM Policies in California

A number of California schools or school districts have implemented effective least-toxic IPM programs, including the following:

San Francisco Unified

- Bans U.S. EPA Category I and II pesticides; California Proposition 65 pesticides; and U.S. EPA known, probable and possible carcinogens.
- If pesticides are used, posting is required three days before and after with written parental notification before all non-bait applications.
- Distributes fact sheets for parents at beginning of the year.

Ventura Unified

- Bans U.S. EPA Category I and II pesticides; California Proposition 65 pesticides; U.S. EPA known, probable and possible carcinogens; neurotoxins; and endocrine disruptors. Establishes a list of approved least-toxic products.
- If products not on the approved list are used, posting is required three days before and after with written parental notification 72 hours prior.
- District to maintain a registry of chemically sensitive students and staff for personal notification two weeks before any planned pesticide use.

Los Angeles Unified

- Policy establishes a list of approved least-toxic products, to be posted year-round in the main office of each site. Approved products are not associated with the following health effects: cancer, nervous system disruption, birth defects, genetic alteration, reproductive harm, immune system dysfunction, endocrine disruption, and acute poisoning.
- District provides annual parental notification in the "Registration Packet," which includes the IPM Policy Statement, list of approved products, and method for parents to request notification of all pesticide applications.
- If products not on the approved list are used, posting is required three days before and five half-lives after application, with written parental notification 72 hours before application.

Other districts with policies adhering to IPM principles: Fresno Unified, Mendocino Unified, San Jose Unified and Sulphur Springs School District. School districts that operate without a formal policy, but with strict internal IPM guidelines: Fremont School District, Novato School District, Placer Hills School District, and San Diego Unified.

4 Current California Laws and Regulations Are Inadequate To Inform Parents, Teachers and Students about Pesticide Use

Prior written notification and posting

If pesticides are used on school grounds, those who risk exposure should at the very least be made aware. The best method to inform parents, school staff and students about school pesticide use is prior written notification. Notification should describe what pesticide is to be used, and how and why it is to be applied. Prior written notification is best used in conjunction with on-site posting of the same information, thereby enabling students, staff or parents to avoid treated areas.

Prior notification is not required, and therefore, rare

Current California law does not require school districts to notify parents, teachers or the public prior to pesticide application. Not surprisingly, as Table 2 illustrates, very few districts bother to notify. Ten responding school districts reported that they provide no written notification to parents or teachers before applying pesticides in their schools or on school grounds. Because some survey responses were unclear on this question, the number may be much higher. Even more startling, at least eight responding districts do not even post warnings on treated areas. Rather, four districts reported "site notification," such as verbal (including telephone) contact, sometimes with the site administrator. Elk Grove Unified claimed that notice is provided "as necessary," while Stockton City Unified and Sacramento Unified both stated vaguely that "verbal" notification was employed, but did not specify of whom or when.

Current California law does not require school districts to notify parents, teachers or the public prior to pesticide application.

Notification, in writing and in advance, provides key information that concerned persons have a right to know in order to make informed decisions and take precautionary measures to protect themselves and their children from exposure to toxic chemicals. Equally important, prior notification enables parents and teachers to participate in pest management decision-making in their schools.

Posting regulations typically do not cover school applications

Current posting regulations are inadequate to inform parents and teachers of school pesticide use. Commercial applicators must post warning signs after applying pesticides only when using highly toxic pesticides for which the state has established a 24-hour re-entry interval.[58] This exempts the vast majority of pesticides used in schools and on school grounds.

California has no system for statewide monitoring

California does not require school districts to track pesticide use or report such use to the state. Without a comprehensive system of tracking, it is virtually impossible to determine the overall prevalence of pesticide use in California schools.[59] Concerned parties must instead attempt to obtain information one district at a time. As discussed previously, such a process is time-consuming, laborious, and ultimately often yields incomplete and inconsistent results.

Inadequate monitoring and reporting of school pesticide use stands in stark contrast to monitoring and reporting of agricultural applications. Whereas agricultural use must be reported by crop and location, down to the square mile, other commercial applicators are required only to report whether the applica-

Table 2: School District Notification and Posting Practices

School District	Written Notification to Parents & Teachers	Posting
Los Angeles Unified	Yes	Yes
San Diego Unified	No; only site administrator notified	Yes, for indoor applications only
Long Beach Unified	No; only site administrator notified	Yes
Fresno Unified	No; only verbal notification to principal or office manager	No
San Francisco Unified	Yes	Yes
Santa Ana Unified	No; only sites are notified of spraying	No
Sacramento Unified	No; "verbal notification" —not specified of whom	No
San Juan Unified	No	No
Garden Grove Unified	No	No
Elk Grove Unified	No; advance notice provided "as necessary"	No
Capistrano Unified	No; site administrator notified via telephone	No
Riverside Unified	No	Yes, displayed for five days
Stockton City Unified	No; "verbal notification" —not specified of whom	No

tion fell within a broad category, such as "structural pest control" or "landscape maintenance." Such reporting obscures whether applications occur in a school, a home or an office building. As *Failing Health* noted, under existing law, we know more about which pesticides are sprayed on an acre of cabbage than are used in our classrooms.[60]

In addition, nine of the 13 responding school districts reported that at least part of their pest management is conducted by district staff, not commercial contractors. Thus, even were commercial contractors required to identify school applications, arguably a large percentage of pesticide use would remain unreported. The only sensible method of monitoring and reporting must begin at the school district level.

Addressing the problem: Some policymakers take note

Some state legislatures around the country and in Washington, DC, have taken up the challenge to protect our children's health. On May 18, 2000, Massachusetts passed landmark legislation banning use of spray pesticides indoors at schools and day care centers, banning all use of carcinogenic pesticides, establishing parental and staff notification of pesticide applications, and requiring school districts to adopt least-toxic IPM programs.[61] Pending legislation in California encourages adoption of IPM programs, requires parental and staff notification prior to pesticide applications, and requires tracking of school pesticide use.[62] In addition, U.S. Senator Barbara Boxer recently introduced an amendment to legislation on the Senate floor that would require parental notification before pesticides are applied in schools.[63] Senators Robert Torricelli and Patty Murray have introduced the School Environmental Protection Act, which addresses pesticide use as one of many environmental safety hazards in our children's schools. Across the border, a Canadian parliamentary committee recently called for tighter regulations on pesticides and a ban on their use on lawns and in parks.[64]

5 Recommendations

The best approach to protect children from dangerous pesticides is a precautionary approach. We commend the handful of California school districts that have adopted least-toxic IPM programs, as they provide working models for safer pest control. To ensure that least-risk pest control is adopted in all schools, concerned persons should do the following.

Parents

- Advocate district-wide least-toxic IPM programs that eliminate use of highly toxic pesticides.
- Request information about pesticide use and toxicity in your children's schools.
- Learn about policies that may already be in place to govern pest control, and monitor school pest management decision-making.
- Insist on notification before pesticides are sprayed in your children's school.
- For more information, contact Pesticide Watch Education Fund (see Appendix D), which assists parents and community groups working with school districts to reform pest control programs. Pesticide Watch can provide information, expert resources, and strategy assistance for organizing in your school district.

School managers

- Adopt a least-toxic IPM policy that
  1. Prohibits use of pesticides that cause cancer, adverse reproductive and developmental effects, hormone disruption and nervous system effects;
  2. Prioritizes pest prevention and non-toxic pest control over toxic pesticide use;
  3. Provides parental and staff notification prior to pesticide application; and
  4. Mandates maintenance of pesticide use records, easily understandable and readily accessible to the public (see Appendix E for a model policy).
- Halt routine "calendar" pesticide applications.
- Ensure that only trained personnel apply pesticides on school grounds.

State policymakers

- Eliminate school use of pesticides that cause cancer, adverse reproductive and developmental effects, hormone disruption and nervous system damage.
- Develop and provide training, incentives and materials to promote pest prevention and least-toxic pest management.
- Require school districts 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.

Endnotes

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18 Gurunathan et al., "Accumulation of chlorpyrifos on residential surfaces and toys accessible to children," *Env. Health Persp.* 106 (1998): 9–16.

19 U.S. General Accounting Office (U.S. GAO), Resources, Community, and Economic Development Division, *Pesticides: Use, Effects and Alternatives in Schools*, GAO/RCED-00-17, November 1999, 6.

20 U.S. GAO, 6.

21 U.S. GAO, 6.

22 U.S. GAO, 7.

23 California Department of Pesticide Regulation, Pesticide Illness Surveillance Program, *Summary of Results from the California Pesticide Illness Surveillance Program*, February 2000.

24 U.S. GAO, 6.

25 Northwest Coalition for Alternatives to Pesticides (NCAP), *Unthinkable Risk: How Children Are Exposed and Harmed When Pesticides Are Used at School*, 16 (April 2000).

26 NCAP, *Unthinkable Risk*, 16.

27 NCAP, *Unthinkable Risk*, A3*;* see also NCAP, *Unintended Casualties: Five Children Whose Lives Were Profoundly Affected by Pesticide Exposure at School* (April 2000).

28 NCAP, *Unintended Casualties*; see also NCAP, *Unthinkable Risk*.

29 Note that although San Francisco Unified's survey response indicated no use of toxic pesticides in schools or on school grounds, subsequent telephone conversations with Director John Bitoff of Facilities Management of San Francisco Unified established that he must authorize pesticide use in spray form only: District contractor APM Pest Management has authority under the IPM program to apply certain pesticides in gel or bait form without authorization. What pesticide use information we were able to obtain from APM, covering use during the months of March through August 1999, is included in this report.

30 U.S. EPA Category I toxins are those EPA considers lethal at very small doses. See Table 1, Highly Toxic Pesticides Used in Responding California Districts, note E, *infra*.

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

32 M. Moses, *Designer Poisons: How To Protect Your Health and Home from Toxic Pesticides* (San Francisco: Pesticide Education Center, 1995), 167.

33 D. Sharp et al., "Delayed Health Hazards of Pesticide Exposure," *Annual Review of Public Health* 7 (1986): 461.

34 T. Slotkin, "Developmental cholinotoxicants: nicotine and chlorpyrifos," *Env. Health Persp.* 107 ([1999] Supp. 1): 71–80.

35 Mott, *Our Children at Risk*, 56; see also Schettler, *Generations at Risk*, 50.

36 B. Eskenazi et al., *Exposures of Children to Organophosphate Pesticides and Their Potential Adverse Health Effects* (Berkeley: Center for Children's Environmental Health Research, School of Public Health, University of California).

37 E. Guillette et al., "An anthropological approach to the evaluation of preschool children exposed to pesticides in Mexico," *Env. Health Persp.* 106 (1998): 347–53; see also T. Colburn et al., *Our Stolen Future* (New York: Penguin Group, 1996), 186, citing P. Hauser et al., "Attention deficit-hyperactivity disorder in people with generalized resistance to thyroid hormone,*" New Eng. J. Med.* 328 ([1993]14): 997–1001.

38 *Proposition 65 List of Chemicals Known to the State of California to Cause Cancer* (Sacramento: California Office of Environmental Health Hazard Assessment, 29 December 1999), http://www.oehha.ca.gov/prop65.html; see also *Safe Drinking Water and Toxic Enforcement Act of 1986* (*Prop. 65*).

39 American Cancer Society (ACS), "Childhood Cancer," *Facts and Figures 2000*, http://www.cancer.org/statistics/cff2000/special.html.

40 ACS, "Childhood Cancer," *Facts and Figures 2000*, http://www.cancer.org/statistics/cff2000/special.html.

41 L. Ries, *Cancer Rates and Risks*, ed. A. Harras, National Institutes of Health Publication No. 96–691, May 1996.

42 ACS, "Childhood Cancer," *Facts and Figures 2000*, http://www.cancer.org/statistics/cff2000/special.html.

43 Y. M. Mulder et al., "Case-control study on the association between a cluster of childhood haematopietic malignancies and local environmental factors in Aalsmeer, The Netherlands,*" J Epidemiol. Comm. Health* 48 ([1994]2): 161–65; R. Meinert et al., "Childhood leukemia and exposure to pesticides: Results of a case-control study in Northern Germany," *Eur. J. Cancer* 32A ([1996]11): 1943–48; J. L. Daniels, A. F Olshan, and D. A. Savitz, "Pesticides and childhood cancers," *Env. Health Persp.* 105 ([1997]10): 1068–77; R. Lowengart et al., "Childhood leukemia and parents' occupational and home exposures,*" J. Natnl. Cancer Inst.* 79 ([1995]1): 39–45.

44 J. K. Leiss and D. A. Savitz, "Home pesticide use and childhood cancer: A case-control study," *Am. J. Public Health* 85 ([1995]2): 249–52.

45 J. M. Pogoda and S. Preston-Martin, "Household pesticides and risk of pediatric brain tumors," *Env. Health Persp.* 105 ([1997]11): 1214–20.

46 J. L. Daniels et al., "Pesticides and childhood cancers," *Env. Health Persp.* 105 ([1997]10): 1068–77.

47 *Proposition 65 Chemicals Known to the State to Cause Reproductive and Developmental Toxicity*, http://www.oehha.ca.gov/prop65.html.

48 Schettler, *Generations at Risk*, 52–53.

49 Moses, *Designer Poisons*.

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

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

52 For this report we rely on the analysis provided in *Hooked on Poison: Pesticide Use in California, 1991–1998*, which analyzes pesticide active ingredients according to the same guidelines of lethality.

53 See Department of Pesticide Regulation, *IPM Innovators*, www.cdpr.ca.gov/docs/ ipminov/guidelns.htm.

54 Lack of complete and uniform information provided by school districts for this report impairs side-by-side comparison of use reported in *Failing Health* and in this report. However, Pesticide Watch Education Fund, which works with school districts to adopt and implement IPM programs, attests to overall reduced pesticide use, as well as reduced use of the most highly toxic pesticides and more dangerous spray formulations.

55 *"The Schooling of State Pesticide Laws: Review of State Pesticide Laws Regarding Schools,"* Pesticides and You, 18 ([1998]3): 20 and Addendum, http://www.beyondpesticides.org/School_report_addendum.pdf (Beyond Pesticides/ National Coalition Against the Misuse of Pesticides, Washington DC 1998); see also *The Massachusetts Children's and Families' Protection Act*, S. 2134, signed into law 18 May 2000.

56 *"Schooling,"* 20 and Addendum.

57 *"Schooling."*

58 *California Code of Food and Agriculture*, § 12978.

59 DPR requires pesticide tracking reports from school districts involved in its Alliance Program, but provides no public access.

60 *Failing Health: Pesticide Use in California Schools* (San Francisco: CALPIRG Charitable Trust, 1998), 11.

61 *The Massachusetts' Children's and Families' Protection Act*, S. 2134.

62 *The Healthy Schools Act of 2000*, AB 2260 (Shelley).

63 D. Sandretti, *Senate Approves Boxer Amendment on Pesticide Use in Schools*, *Requires Schools to Give Parents 24-hour Notice before Spraying with Toxic Compounds*, Press Release, 3 March 2000, Washington, DC.

64 17 May 2000, http://www.planetark.org/dailynewsstory.cfm?newsid=6699.

Appendix A
Survey Response Information by School District

Capistrano Unified

Active Ingredient	Product Name
Unknown	Gopher Getter
2,4-D	Turf Supreme w/ Trimec
Acephate	Orthene
Bifenthrin	Talstar Lawn & Tree
Chlorpyrifos	Dursban
Diazinon	Diazinon
Dicamba	Turf Supreme w/ Trimec
Diquat dibromide	Reward Aquatic and Noncrop Herbicide
Fenoxycarb	Award
Glyphosate, Monoammonium Salt	RoundUp
MCPP	Turf Supreme w/ Trimec
Oryzalin	Surflan

Elk Grove Unified

Active Ingredient	Product Name
Unknown	Lontrel Herbicide
Unknown	Turf Fertilizer
Amorphous silica gel	Dri-Die
Avermectin	Avert Gel
Bifenthrin	Talstar Lawn & Tree
Boric acid	Borid
Boric acid	Niban-FG
Boric acid	Terro
Brodifacoum	Final Blox
Bromethalin	Vengence
Chlorophacinone	Rozol
Chlorpyrifos	Dursban
Chlorpyrifos	Kilmaster II
Crystalline silica as quartz	Ronstar (Chipco)
Cyfluthrin	Intruder HPX
Cyfluthrin	Tempo 20 WP
Cypermethrin	Cynoff
D-trans allethrin	PT 515
Deltamethrin	Delta Dust
Diazinon	Diazinon Products
Diazinon	Knox Out 2FM
Diphacinone	Diphacin 110
Diphacinone	Eaton's Bait Blocks
Diphacinone	Liqua-Tox II
Esfenvalerate	Conquer WP
Fipronil	MaxForce Ant Station
Fipronil	MaxForce Roach Station
Glyphosate	RoundUp Pro
Hydramethylnon	MaxForce Ant Killer Granular Bait
Hydramethylnon	MaxForce Roach Gel
Hydroprene	Gentrol
Kerosene	Kerosene
Lambda cyhalothrin	Demand CS
Linalool	Demize EC
Malathion	Malathion 57E
Methoprene	Precore
Muscalure	Flytex
N-octyl bicycloheptene dicarboximide	PT 565
Oryzalin	Surflan
Oxadiazon	Ronstar (Chipco)
Permethrin	Dragnet
Phenothrin	PT 515
Piperonyl butoxide	Demize EC
Piperonyl butoxide	PT 565
Propetamphos	Catalyst
Propoxur	Baygon
Pyrethrins	BP 300
Pyrethrins	CB-80
Pyrethrins	PT 565
Triclopyr, butoxyethyl ester	Turflan

Fresno Unified

Active Ingredient	Product Name
Benefin	XL 2G
Boric acid	Borid
Boric acid	PT 240 Perma Dust
Bromadiolone	Contrac
Chlorophacinone	Rozol Ground Squirrel Bait
Chlorophacinone	Wilco Gopher Getter Ground Squirrel Bait
Chlorpyrifos	PT 270
Crystalline silica as quartz	Ronstar (Chipco)
Cyfluthrin	Tempo 20 WP
Cypermethrin	Cynoff
Cypermethrin	Demon WP
Cytokinin	CytoGro
Diazinon	Diazinon 4E
Diquat dibromide	Reward Aquatic and Noncrop Herbicide
Fipronil	MaxForce FC
Fluazifop-butyl	Fusilade
Glyphosate	RoundUp Pro
Halosulfuron	Manage Turf Herbicide
Imidacloprid	Premise 75 WP
Oryzalin	Surflan
Oryzalin	XL 2G
Oxadiazon	Ronstar (Chipco)
Pendimethalin	Pendulum 2G
Permethrin	Dragnet FT
Petroleum distillates	Whitmire PT 230 Tri-Die
Piperonyl butoxide	Whitmire PT 230 Tri-Die
Pyrethrins	Whitmire PT 230 Tri-Die
Silica aerogel	Whitmire PT 230 Tri-Die
Sodium chlorate	Oxy Monobor - Chlorate

Garden Grove Unified

Active Ingredient	Product Name
Unknown	0.5% Dragnet SFR
Unknown	Bait Stations for Pigeons
Unknown	Bug Off
Unknown	Cherry Roach and Ant Spray
Unknown	Pre Bait for Pigeons
Unknown	Rodent Control
Unknown	Suspend
Unknown	Turf Fertilizer
Unknown	Weed Killing Supply Stock
4-aminopyridine	Avitrol
Aluminum phosphide	Fumiphos 60%
Bromadiolone	Contrac All-Weather Blox
Crystalline silica as quartz	Ronstar (Chipco)
Deltamethrin	Delta Dust
Diazinon	50% Diazinon
Glyphosate	RoundUp Pro
Hydramethylnon	Maxforce Ant
Hydramethylnon	Maxforce Gel
Hydramethylnon	Maxforce Roach
Lambda cyhalothrin	Demand CS
N-octyl bicycloheptene dicarboximide	Knockdown
N-octyl bicycloheptene dicarboximide	ULD BP 100 Insecticide
Oxadiazon	Ronstar (Chipco)
Pendimethalin	Pendulum (Wdg) Preemergence
Permethrin	Dragnet Ft
Phosphoric acid	Demand

Active Ingredient	Product Name
Piperonyl butoxide	Knockdown
Piperonyl butoxide	ULD BP 100 Insecticide
Propetamphos	Catalyst
Propoxur	Knockdown
Pyrethrins	Knockdown
Pyrethrins	ULD BP 100 Insecticide

Long Beach Unified

Active Ingredient	Product Name
Unknown	15.5-0-0 Calcium Nitrate Hydro
Unknown	3M Resp Pesticide 53p71
Unknown	Invigorate
Unknown	Protecta Rat Bait Station
Unknown	Sticky Aphid Whitefly Glue Trap
Unknown	Terminator
Acephate	Orthene Turf, Tree
Aluminum phosphide	Fumiphos Bags
Aluminum phosphide	Fumiphos Pellets
Aluminum phosphide	Fumiphos Tablets
Brodifacoum	Talon-G Rodenticide Bait Pack
Bromadiolone	Contrac
Chlorophacinone	Wilco Gopher Getter Bait Type II
Chlorophacinone	Wilco Gopher Getter Ground Squirrel Bait
Chlorpyrifos	Dursban TC
Chlorpyrifos	Strikeforce 5% Dursban
Chlorpyrifos	Whitmire Intern PT 278 Residual Injection Systems
Crystalline silica as quartz	Ronstar (Chipco)
Cyfluthrin	Tempo 20 WP
D-trans allethrin	Whitmire PT 515 Wasp-Freeze
Diazinon	Agrevo Diazinon 5G
Diazinon	Prentox Diazinon 4E
Diazinon	Prentox Diazinon 5G
Diazinon	TKO
Dikegulac sodium	Atrimmec
Disodium octaborate tetrahydrate	Mop-Up
Esfenvalerate	CB Total Release PCO Fogger
Ethephon	Florel Fruit Eliminator
Ethephon	Florel Pistill
Fipronil	MaxForce FC Ant Bait Station
Fipronil	MaxForce FC Roach Bait Station
Fluazifop-butyl	Fusilade
Glyphosate	RoundUp Pro
Glyphosate, isopropylamine salt	No Mix Delete Herbicide
Halosulfuron-methyl	Manage Turf Herbicide
Imidacloprid	Merit 0.5 G
N-octyl bicycloheptene dicarboximide	CB Total Release PCO Fogger
N-octyl bicycloheptene dicarboximide	ULD BP 100 Insecticide
Oryzalin	No Mix Delete Herbicide
Oryzalin	Surflan
Oxadiazon	Ronstar (Chipco)
Petroleum distillates, Refined	Sun Spray Ultra-Fine Spray Oil
Phenothrin	Whitmire PT 515 Wasp-Freeze
Piperonyl butoxide	CB Total Release PCO Fogger
Piperonyl butoxide	ULD BP 100 Insecticide
Potash soap	M-Pede
Pyrethrins	CB Total Release PCO Fogger
Pyrethrins	ULD BP 100 Insecticide
Sodium cacodylate	Montar
Sulfuryl fluoride	Vikane

Los Angeles Unified

Active Ingredient	Product Name
Unknown	Epoleon
Unknown	Sulfur Gas Cartridge
Unknown	Suspend SC
Avermectin	Advance Bait
Avermectin	Avert Gel
Boric acid	Borid
Boric acid	Drax Ant Bait
Boric acid	PT 240
Chlorpyrifos	PT 270
D-trans allethrin	PT 515
Deltamethrin	Delta Dust
Diazinon	Knox Out
Disodium octaborate tetrahydrate	Tim-Bor
Esfenvalerate	Conquer WP
Hydramethylnon	MaxForce Ant Killer Granular Bait
Hydramethylnon	MaxForce Roach Gel
Hydroprene	Gentrol IGR
Hydroprene	Point-Source
Linalool	Demize EC
Metarhizium anisopliae, Var. anisopliae, Strain Esf1	Bio-Blast
N-octyl bicycloheptene dicarboximide	PT 505
N-octyl bicycloheptene dicarboximide	PT 565
Nonanoic acid	Scythe
Phenothrin	PT 515
Piperonyl butoxide	Demize EC
Piperonyl butoxide	PT 505
Piperonyl butoxide	PT 565
Polybutenes	4-The Birds
Potash soap	M-Pede
Propoxur	Baygon
Pyrethrins	PT 505
Pyrethrins	PT 565
Pyriproxyfen	Nylar

Oakland Unified

Did not respond

Riverside Unified

Active Ingredient	Product Name
Unknown	Ant Bait Station
Unknown	Gopher Control
Acephate	PT 280
Avermectin	Avert Gel
Boric acid	Borid
Boric acid	Drax Gel
Boric acid	Terro
Chlorpyrifos	Dursban
Cyfluthrin	Tempo 20 WP
Diazinon	TKO
Glyphosate, monoammonium salt	RoundUp
Hydramethylnon	MaxForce Ant
Hydramethylnon	MaxForce Ant Killer Granular Bait
Hydramethylnon	Maxforce Roach Gel
Lambda cyhalothrin	Demand CS
Phosphoric acid	Demand
Pyrethrins	Drione (Dust)
Pyrethrins	Kicker
Silica aerogel	Drione (Dust)

Sacramento Unified

Active Ingredient	Product Name
Unknown	Ortho Foggers

Appendix A continued

Chlorophacinone	JT Eaton AC 90
Chlorpyrifos	Dursban
Chlorpyrifos	Termi-Chlor
Copper naphthenate	Termin-8
Diazinon	Diazinon
Diazinon	Ortho Wasp
Disodium octaborate tetrahydrate	Mop-Up
Hydramethylnon	MaxForce Ant
Hydramethylnon	MaxForce Ant Killer Granular Bait
Hydramethylnon	MaxForce Bait
Hydramethylnon	MaxForce Roach
N-octyl bicycloheptene dicarboximide	Holiday Fogger
N-octyl bicycloheptene dicarboximide	ULD BP 100 Insecticide
Permethrin	Holiday Fogger
Phenothrin	R&C Spray
Piperonyl butoxide	ULD BP 100 Insecticide
Potash soap	Safer
Propoxur	Black Flag
Pyrethrins	Holiday Fogger
Pyrethrins	Ortho Wasp
Pyrethrins	Safer
Pyrethrins	ULD BP 100 Insecticide

San Bernardino Unified

Did not respond

San Diego Unified

Active Ingredient	Product Name
Avermectin	Avert Gel
Bacillus thuringiensis (Berliner), Subsp. Kurstaki, Serotype 3a,3b	Dipel 2X
Benefin	Team
Boric acid	Borid
Boric acid	Drax Gel
Boric acid	PT 240
Boric acid	Roach Killer Bait Gel
Chlorophacinone	Wilco Gopher Getter Ground Squirrel Bait
Cyfluthrin	Tempo 20 WP
Dikegulac sodium	Atrimmec
Diphacinone	PCQ
Diuron	Direx 80 DF
Fluazifop-butyl	Fusilade II
Fluazifop-butyl	Ornamec
Glyphosate	RoundUp
Glyphosate	RoundUp Pro
Hydramethylnon	MaxForce Ant
Hydramethylnon	MaxForce Ant Killer Granular Bait
Hydramethylnon	MaxForce Roach
MCPP, potassium salt	Mecomec
Methoprene	Precor 2000
N-octyl bicycloheptene dicarboximide	ULD BP 300
N-octyl bicycloheptene dicarboximide	Whitmire Microcare PT 175 Microencapsulated Pyrethrins
Nonanoic acid	Scythe
Oryzalin	Surflan
Permethrin	Dragnet
Permethrin	Precor 2000
Petroleum distillates	ULD BP 300
Piperonyl butoxide	ULD BP 300
Piperonyl butoxide	Whitmire Microcare PT 175 Microencapsulated Pyrethrins
Potash soap	M-Pede
Propoxur	Baygon
Pyrethrins	Drione (Dust)
Pyrethrins	ULD BP 300
Pyrethrins	Whitmire Microcare PT 175 Microencapsulated Pyrethrins
Resmethrin	PT 110
Silica aerogel	Drione (Dust)
Tebuthiuron	Spike 80W
Triclopyr, butoxyethyl ester	Turflan
Trifluralin	Team

San Francisco Unified

Active Ingredient	Product Name
Unknown	Advance Dual Choice Ant Bait
Unknown	Fluorgard
Unknown	Rodent Bait Stations
Avermectin	Advance Bait
Avermectin	Avert Gel
Boric acid	CB Drax Ant Bait Stations
Boric acid	Drax FF
Boric acid	Drax Gel
Bromadiolone	Contrac Blox
Cyfluthrin	Tempo WP
Fipronil	MaxForce FC Bait Stations

San Juan Unified

Active Ingredient	Product Name
Bifenthrin	Talstar Lawn & Tree
Brodifacoum	Final Rodenticide
Chloropicrin	Methyl Bromide
Chlorpyrifos	Dursban PT 270
Chlorpyrifos	Strikeforce Residual Insecticide w/ Dursban
Deltamethrin	Delta Dust
Diphacinone	Eaton's Bait Blocks
Disodium octaborate tetrahydrate	Tim-Bor
Fipronil	MaxForce FC Ant Bait Station
Fipronil	MaxForce FC Roach Bait Station
Glyphosate	RoundUp Pro
Imidacloprid	Premise 75 WP
Lambda cyhalothrin	Demand CS
Methyl bromide	Methyl Bromide
Sulfuryl fluoride	Vikane
Triclopyr	Remedy Herbicide

Santa Ana Unified

Active Ingredient	Product Name
Acephate	PT 280
Avermectin	Avert Gel
Boric acid	Borid
Boric acid	Drax Gel
Bromadiolone	Contrac
Carbaryl	Sevin 5 Bait
Chlorophacinone	Wilco Gopher Getter Bait Type II
Chlorophacinone	Wilco Gopher Getter Ground Squirrel Bait
Cyfluthrin	Tempo 20 WP
Deltamethrin	Delta Dust
Glyphosate	RoundUp
Glyphosate	RoundUp Pro
Hydramethylnon	Maxforce Ant
Hydramethylnon	Maxforce Roach Gel
Lambda cyhalothrin	Demand CS
Pyrethrins	CB-80
Pyrethrins	Drione (Dust)
Silica aerogel	Drione (Dust)

Stockton Unified

Active Ingredient	Product Name
Bromadiolone	Contrac
D-trans allethrin	Whitmire PT 515 Wasp-Freeze
Fipronil	MaxForce FC
Hydramethylnon	MaxForce Ant Killer Granular Bait
Hydramethylnon	Siege
Hydroprene	Gentrol
N-octyl bicycloheptene dicarboximide	CB-40
N-octyl bicycloheptene dicarboximide	Pro-Control
Phenothrin	Prescription Treatment Wasp-Freeze
Phenothrin	Whitmire PT 515 Wasp-Freeze
Piperonyl butoxide	CB-40
Piperonyl butoxide	Pro-Control
Propane	CB-40
Pyrethrins	CB-40
Pyrethrins	Pro-Control

Appendix B Pesticide Active Ingredients Used in Surveyed California School Districts

Active Ingredient	Known/Probable Carcinogen (A)	Possible Carcinogen (B)	Reproductive/ Developmental Toxin (C)	Endocrine Disruptor (D)	Acute Toxin (E)	Cholinesterase Inhibitor (F)
2,4-D				D		
4-Aminopyridine					E	
Acephate		B				F
Aluminum phosphide					E	
Amorphous silica gel						
Avermectin						
Bacillus thuringiensis (Berliner), Subsp. Kurstaki, Serotype 3a,3b						
Benefin						
Bifenthrin		B		D		
Boric acid						
Brodifacoum					E	
Bromadiolone					E	
Bromethalin						
Carbaryl		B		D		F
Chlorophacinone					E	
Chloropicrin					E	
Chlorpyrifos				D		F
Copper naphthenate						
Crystalline silica as quartz						
Cyfluthrin				D		
Cypermethrin		B		D		
Cytokinin						
D-trans allethrin				D		
Deltamethrin				D		
Diazinon						F
Dicamba						
Dikegulac sodium						
Diphacinone					E	
Diquat dibromide						
Disodium octaborate tetrahydrate						
Diuron	A					
Esfenvalerate				D		
Ethephon						F
Fenoxycarb	A					
Fipronil		B				
Fluazifop-butyl			C			
Glyphosate[a]						
Halosulfuron						
Hydramethylnon		B	C			
Hydroprene						

Active Ingredient	Known/Probable Carcinogen (A)	Possible Carcinogen (B)	Reproductive/ Developmental Toxin (C)	Endocrine Disruptor (D)	Acute Toxin (E)	Cholinesterase Inhibitor (F)
Imidacloprid						
Kerosene						
Lambda cyhalothrin				D		
Linalool						
Malathion				D		F
MCPP[b]						
Metarhizium anisopliae, Var. Anisopliae, Strain Esf1						
Methoprene						
Methyl bromide			C		E	
Muscalure						
N-octyl bicycloheptene dicarboximide		B				
Nonanoic acid						
Oryzalin		B				
Oxadiazon		B	C			
Pendimethalin		B				
Permethrin		B		D		
Petroleum distillates						
Phenothrin				D		
Phosphoric acid						
Piperonyl butoxide		B				
Polybutenes						
Potash soap						
Propane						
Propetamphos						F
Propoxur	A				E	F
Pyrethrins	A			D		
Pyriproxyfen						
Resmethrin			C	D		
Silica aerogel	A					
Sodium cacodylate	A			D		
Sodium chlorate						
Sulfuryl fluoride					E	
Tebuthiuron						
Triclopyr[c]						
Trifluralin		B		D		

a = includes the isopropylamine and mono-ammonium salts

b = includes the potassium salt

c = includes the butoxyethyl ester

Appendix C

Biographies of Surveyed Schools

Rank by Enrollment	School District/County	Total Students Enrolled
1	Los Angeles Unified/Los Angeles	695,885
2	San Diego Unified/San Diego	138,433
3	Long Beach Unified/Los Angeles	89,214
4	Fresno Unified/Fresno	78,942
5	San Francisco Unified/San Francisco	61,042
6	Santa Ana Unified/Orange	56,071
7	Oakland Unified/Alameda	54,256
8	Sacramento City Unified/Sacramento	51,378
9	San Bernardino City Unified/San Bernardino	48,907
10	San Juan Unified/Sacramento	47,799
11	Garden Grove Unified/Orange	46,916
12	Elk Grove Unified/Sacramento	42,484
13	Capistrano Unified/Orange	42,196
14	Riverside Unified/Riverside	36,713
15	Stockton City Unified/San Joaquin	36,124
	Total	1,526,360

Appendix D
Resources for Further Information

To order this report or for other pesticide-related information, contact:

California Public Interest Research Group (CALPIRG) Charitable Trust
450 Geary Street, Suite 500
San Francisco, CA 94102
tel: (415) 292-1487
fax: (415) 292-1497
email: t_olle@yahoo.com
website: www.pirg.org/calpirg
CALPIRG Charitable Trust is the 501(c)(3) sister organization of CALPIRG, a non-profit, non-partisan research and advocacy organization working on behalf of consumers and the environment. With over 50,000 members and 14 offices statewide, CALPIRG is the largest consumer and environment watchdog group in the state.

Californians for Pesticide Reform (CPR)
49 Powell Street, Suite 530
San Francisco, CA 94102
tel: (415) 981-3939 or (888) CPR-4880 (in CA)
fax: (415) 981-2727
email: pests@igc.org
website: www.igc.org/cpr
CPR is a coalition of public interest organizations committed to protecting public health and the environment from pesticide proliferation. It provides information on pesticides, reports on pesticide use in the state, and resources for individuals to work to eliminate pesticide use. CPR also publishes the quarterly newsletter *CPResources*.

Pesticide Watch Education Fund (PWEF)
450 Geary Street, Suite 500
San Francisco, CA 94102
tel: (415) 292-1488
fax: (415) 292-1497
email: pestiwatch@igc.org
website: www.pesticidewatch.org
PWEF works with individuals and community groups to assist in local efforts to reduce pesticide use and promote safer methods of pest management. It provides educational materials, organizing skills training, strategy consultation, technical referrals and networking opportunities so that groups do not have to "reinvent the wheel." Its several organizing kits include *Parks Are for People, Not Poisons*; *Reducing Pesticide Use in Schools*; and *A Pesticide Drift Kit*.

Other pesticide reform organizations to contact
(listed in alphabetical order)

Bio-Integral Resource Center (BIRC)
P.O. Box 7414
Berkeley, CA 94707
tel: (510) 524-2567
fax: (510) 524-1758
email: birc@igc.org
website: www.birc.org
BIRC publishes two journals, *The IPM Practicioner* and *Common Sense Pesticide Control Quarterly* . It also publishes the *Annual Directory of Least-Toxic Pest Control Products* and *IPM in Schools: A How-to Manual.* BIRC provides IPM consultation and training.

Children's Environmental Health Network (CEHN)
5900 Hollis Street, Suite R3
Emeryville, CA 94608
tel: (510) 597-1393
fax: (510) 597-1399
email: cehn@cehn.org
website: www.cehn.org
CEHN has a wide variety of information on the effects of toxic chemicals on children. The organization published the first national resource guide on children and environmental health. CEHN's website provides links to numerous other sites that concern children's health.

Children's Health Environmental Coalition (CHEC)
P.O. Box 1540
Princeton, NJ 08542
tel: (609) 252-1915
fax: (609) 252-1536
email: chec@checnet.org
website: www.checnet.org
CHEC has information on environmental issues related to children. Its website lists information on removing toxic materials from communities, schools, playgrounds and homes. It includes a parent's forum to share information.

National Coalition Against the Misuse of Pesticides (NCAMP)/Beyond Pesticides
701 E Street SE
Washington, DC 20003
tel: (202) 543-5450
fax: (202) 543-4791
email: info@beyondpesticides.org
website: www.ncamp.org
NCAMP provides information on individual pesticides, pesticide policy and alternative methods of pest management. It publishes the quarterly *Pesticides and You* journal and the monthly *Technical Report* newsletter, as well as hosts annual organizing conferences. NCAMP offers *Pesticides and Schools: A Collection of Issues and Articles* for $15.

Northwest Coalition for Alternatives to Pesticides (NCAP)
P. O. Box 1393
Eugene, OR 97440
tel: (541) 344-5044
fax: (541) 344-6923
email: info@pesticide.org
website: www.pesticide.org
NCAP provides information on pesticides and pest management alternatives, including facts on risks of school pesticide use, and strategies for reducing use. Publications include *Unthinkable Risk: How Children Are Exposed and Harmed When Pesticides Are Used at School*, profiling nearly 100 pesticide poisoning incidents. Its website provides 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 North America (PANNA)
49 Powell Street, Suite 500
San Francisco, CA 94102
tel: (415) 981-1771
fax: (415) 981-1991
email: panna@panna.org
website: www.panna.org/panna
PANNA publishes the quarterly journal *Global Pesticide Campaigner,* and *PANUPS,* a weekly online news service highlighting pesticides and sustainable agriculture. Its website offers over 100 links to other useful sites as well as up-to-date information on PANNA's campaigns and information resources.

Pesticide Education Center
Dr. Marion Moses
P.O. Box 420870
San Francisco, CA 94142
tel: (415) 391-8511
fax: (415) 391-9159
email: pec@igc.apc.org
website: www.igc.org/pesticides
PEC offers the book *Designer Poisons: How To Protect Your Health and Home from Toxic Pesticides.* It also provides presentations and other services targeted to the needs of citizens and workers concerned about health risks through pesticide exposure.

School organizations to contact

California State Parent Teacher Association (PTA)
930 Georgia Street
Los Angeles, CA 90015-1322
tel: (213) 620-1100
fax: (213) 620-1411
email: info@capta.org
website: www.capta.org
California State PTA announced support for reduced school pesticide use and notification prior to treatment 25 years ago.

National Parent Teacher Association (PTA)
330 W. Wabash Avenue, Suite 2100
Chicago, IL 60611
tel: (312) 670-6782, (800) 307-4782
fax: (312) 670-6783
email: info@pta.org
website: www.pta.org
In 1992 the National PTA announced support for IPM to lower children's exposure to pesticides in schools. In October 1999, it reaffirmed support for reducing school pesticide use by endorsing the School Environmental Protection Act of 1999.

National Education Association (NEA)/Health Information Network (HIN)
1201 16th Street NW, Suite 521
Washington, DC 20036
tel: (800) 718-8387, (202) 822-7570 (automated resource line)
fax: (202) 822-7775
email: info@neahin.org
website: www.neahin.org\hin
The HIN 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.

Government agencies to contact

California Department of Pesticide Regulation (DPR)
830 K Street
Sacramento, CA 95814-3510
tel: (916) 445-4300
fax: (916) 324-1452
website: www.cdpr.ca.gov
DPR regulates pesticide use in California. It published "*Pesticides in Schools*" in 1996 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 (U.S. EPA)
Office of Pesticide Programs (OPP)
Ariel Rios Building
1200 Pennsylvania Avenue NW
Washington, DC 20460
website: www.epa.gov/pesticides
U.S. EPA provides information on individual pesticides.

Appendix E
Model IPM Policy
(Adapted from San Francisco Unified School District's policy)

PREAMBLE

Maintenance of a safe, clean, healthy environment for students and staff is essential to learning and is a goal of the district.

Use of toxic chemicals to control pests and weeds may threaten staff and student health and ability to learn.

The City and County have adopted a model Integrated Pest Management (IPM) policy that ended use of the most toxic pesticides on City and County property and greatly reduced County reliance on chemical pesticides.

Similar programs in other school districts and institutions show that IPM is a viable, cost-effective approach to controlling pests.

POLICY

I. That the District shall establish and follow an IPM policy based on the model policy established by the City and County of San Francisco, containing the following elements:

   A. Monitoring to determine pest population levels.

   B. Use of biological, cultural and physical tools to minimize health, environmental and financial risks from pests.

   C. Use of chemical controls only as a last resort.

   D. Use of chemical controls that pose the least possible hazard to people, property and the environment.

   E. Careful monitoring of treatment to evaluate effectiveness.

II. That, effective immediately, the following categories of highly toxic pesticides shall not be used by District employees or on property the District owns or leases except as specifically exempted by this policy:

   A. U.S. Environmental Protection Agency (U.S. EPA) Acute Toxicity Category I and II pesticides.

   B. Pesticides identified by the State of California as known to cause cancer, developmental effects or reproductive effects pursuant to the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Prop. 65).

   C. Pesticides found by U.S. EPA to show evidence of causing cancer (EPA carcinogenicity categories A, B, and C).

III. That effective January 1, 1999, only pesticides identified by the San Francisco Department of the Environment as "reduced risk pesticides" pursuant to San Francisco Administrative Code 39.8 (g) may be used by District employees or on property the District owns or leases, except as specifically exempted by this policy.

IV. The District and school sites shall, through various communication means, pre-notify students, parents and staff of non-bait pesticide applications. The District shall post all areas to be treated with non-bait pesticide applications three days before to three days after treatment. It shall provide publicly posted notification that identifies areas treated with pesticidal baits. The District shall distribute a fact sheet outlining its IPM program and pest control activities to parents, students and staff at the beginning of the school year. The District and each site shall maintain publicly available records of pesticide use on school grounds.

V. The District shall establish an IPM committee to develop and oversee policy implementation. The committee shall comprise parents, students, teachers, school administrators, district facilities and landscape staff, any pest control company or companies contracted by the District to manage pests, and community environmental and public health organizations.

VI. The District shall designate an IPM coordinator responsible for coordinating District efforts to adopt IPM techniques; communicating goals and guidelines of the IPM program to staff and students, including conducting training; tracking pesticide use; ensuring that related information is available to the public; and presenting an annual report to the school board evaluating progress.

VII. The IPM committee may allow District staff or any company contracted to provide pest control to the District to apply a pesticide otherwise banned under this resolution based upon a finding that public health protection requires use of that pesticide. Such exemptions shall be granted on a per-case basis and apply to a specific pest problem for a limited time. The IPM coordinator may grant emergency exemptions if action is required before the next IPM committee meeting. The IPM coordinator shall report all such emergency exemptions to the IPM committee.

Appendix F: Methodology

Assessing Pesticide Use in the Face of Inadequate School Use Reporting

In March 2000, CALPIRG Charitable Trust surveyed the 15 largest school districts in California, which together account for over one quarter of Califoria's public school children. Our survey comprised two parts, a Public Records Act request and a written survey.
The Public Records Act request sought data relating to pesticide use in the district from 1 January 1999, to 1 January 2000. Specifically, we asked which pesticides were used, and if known, in what quantities and how often. Although by law the district must respond to a Public Records Act request within ten days, very few districts responded without a telephone reminder. Two districts failed to respond even after several calls.

With few exceptions, responding districts submitted information only about types of pesticides used. Information formats varied by district. Several submitted Material Data Safety Sheets; others, invoices from suppliers or pest control companies; and some, simply a written list of pesticides used. For analysis purposes, we assumed that responding districts actually used the pesticides they listed. Clearly, these documents do not permit analysis of quantity, frequency or location of the pesticide used.

The written survey that accompanied the Public Records Act request probed pest control practices, including questions about whether the district handles pest control internally or hires outside contractors, or both; whether it has a written pest control policy; whether and how it notifies parents, school staff or students about pesticide applications; and whether it employs least-toxic means for pest control. Most districts responding to the Records request also returned the written survey. We followed up by telephone to clarify unclear responses.