



# INTEGRATED PEST MANAGEMENT GUIDE FOR FAMILY CHILD CARE HOMES



## STEPS TO INTEGRATED PEST MANAGEMENT

California Childcare Health Program, University of California, San Francisco School of Nursing • [cchp.ucsf.edu](http://cchp.ucsf.edu)



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# WHAT IS INTEGRATED PEST MANAGEMENT (IPM)?

Integrated pest management, or IPM for short, is an approach to managing pests that focuses on preventing infestations, monitoring pests, reducing the use of harmful pesticides, and minimizing health risks to people and the environment. An IPM program prevents pest problems by getting rid of the food, water, and shelter that pests need to survive. When you need to manage pests, you use a combination of least hazardous practices such as pest-proofing your house or fixing leaky faucets. IPM works because combined (or integrated) approaches are more effective than a single approach, such as spraying pesticides.

## Why use IPM?

IPM targets the causes of the problem rather than simply killing pests.

### IPM:

- ▶ Is more effective at getting rid of pests than spraying.
- ▶ Prevents pest invasions in the future.
- ▶ Can save time, money, and energy.
- ▶ Reduces short and long-term health problems from pests and pesticide use.

## Where is IPM practiced?

IPM can be used to manage all kinds of pests anywhere, such as in urban, agricultural, and wildland or natural areas. IPM is especially important in family child care homes, child care centers, and schools. Family child care providers can use IPM whether they own or rent a house, apartment, condo or other type of housing unit.

## Steps to successful IPM:

### 1 PREVENT PESTS

- ▶ Keep pests out of areas where you don't want them.
- ▶ Remove pests' access to food, water, and shelter.

### 2 INSPECT YOUR HOME

- ▶ Carefully look around your indoor and outdoor areas for signs of pests, such as droppings, damage by pests, or the pests themselves.

### 3 IDENTIFY PESTS

- ▶ Identify which pests are present in and around your home. This will help you determine the most effective way to deal with the pests. For example, do you have Norway rats or roof rats? You will deal with them differently.

(See *Integrated Pest Management: Rats and Mice* handout).

- ▶ Learn the signs of the pests' presence such as droppings or damage, even when pests are out of sight.
- ▶ Learn about pest habits and traits. What are the pests' food, water, and shelter needs? What is the pests' life cycle?

### 4 MONITOR FOR PESTS

Look for signs of pests around your home and yard to:

- ▶ Identify pest problems early.
- ▶ Decide if and when you need to manage pests.
- ▶ Determine if your management plan is working.

### 5 MANAGE PEST PROBLEMS

- ▶ If pests become a problem, you'll need to do something to manage or get rid of them.
- ▶ Use materials and practices that are effective, safe, and reduce pesticide exposures.
- ▶ You can manage pests without spraying any pesticides.
- ▶ If you must use pesticides, choose the least hazardous pesticides such as bait stations or gels. Baits and gels are pesticides mixed with materials that attract pests. Because these pesticides are hidden and don't evaporate, people are not exposed to them. Combine them with preventive practices so pests won't return.

# PESTS

## What is a pest?

A pest is any living organism that:

- ▶ Causes visual damage, structural damage, or discomfort.
- ▶ Spreads disease.
- ▶ Is a nuisance or simply exists where it is not wanted.







Most insects are not pests. Make sure something is really a pest before you remove it!




## Why are pests a health hazard for young children?

Some pests are simply annoying, but others can cause serious harm to children by triggering asthma attacks, spreading diseases, or contaminating food and surfaces with urine, feces (droppings), or stray hairs.

## What do you need to know about pests?

The health concerns for common pests are listed below. For more details and for information on how to manage these pests, see the corresponding *IPM Handout for Family Child Care Homes* on individual pests.

PEST IMAGE	PEST	HEALTH CONCERNS
	Ants	The most common ant in California is the Argentine ant. Most ants in California are not a health risk and they even help control other pests. Harvester ants and fire ants are species that bite or sting in California. Fortunately, they live outdoors. The most aggressive stinging ant is the red imported fire ant, mostly found in southern California.
	Bed Bugs	Bed bugs don't spread disease, but their bites can cause swelling, redness, and itching (although some people don't react at all). Bites can be found singly or in groups and can get infected from frequent scratching.
	Cockroaches	There are several species of cockroaches. Some live indoors and others live outdoors. German cockroaches are the most common indoor cockroach in California. Saliva, shed skins, and droppings from roaches can trigger asthma attacks, especially in young children. Some cockroaches also spread bacteria as they crawl through sewers and then over food preparation and dining areas.
	Fleas	Fleas on cats or dogs in California are most likely cat fleas. Flea bites may appear as a small red spot surrounded by a red halo, usually without too much swelling. Cat fleas can serve as hosts of tapeworms. Cats, dogs, and occasionally children, can get tapeworms if they swallow adult fleas that contain a cyst of the tapeworm. Cat fleas can spread cat flea rickettsiosis, a flu-like illness, as well.
	Flies	Of the thousands of species of flies, only a few are common pests in and around the home, including the house fly, fruit fly, and filth fly. Flies breed in animal waste and rotting materials and can spread disease when they walk or feed on people's food. Some flies associated with livestock, such as stable flies, also bite humans.
	Gophers	Pocket gophers can damage lawns, plants, plastic water lines, and sprinkler systems. The openings of their burrows can create a tripping hazard.

PEST IMAGE	PEST	HEALTH CONCERNS
	Ground Squirrels	Ground squirrels can spread diseases harmful to humans. A major concern is bubonic plague, which can be transmitted by fleas that live on infected squirrels. If you find unusual numbers of dead squirrels or other rodents, notify public health officials. Do not handle dead squirrels.
	Head Lice	Head lice are bloodsucking insects that are commonly spread among young children. Head lice don't transmit infectious diseases, but they're bothersome and cause itching.
	Mosquitoes	Mosquito bites can cause allergic reactions, pain, irritation, redness, and itching. Children who scratch their bites with dirty fingernails may also develop infections. In some areas, mosquitoes spread serious diseases such as West Nile virus and Western equine encephalomyelitis virus. These diseases are rare but can be serious in young children and can lead to death.
	Pinworms	Pinworms are tiny, irritating worms that commonly infect children and live in the lower intestine. Although not dangerous, pinworms are contagious and require treatment by a health care provider.
	Rats and Mice	The most common urban rodents are the house mouse, roof rat, and Norway rat. Rats and mice can cause direct damage by gnawing, urinating, defecating, and nesting. Because they gnaw on hard objects such as plastic electrical boxes and electrical wires, they can cause fires. Rats bite more than 4,000 people a year, mostly young children. The urine, droppings, saliva, and dead skin cells of rats and mice may also cause asthma attacks. House mice may spread diseases or cause salmonellosis, a form of food poisoning.
	Scabies	Scabies is a skin infection caused by mites, which are tiny relatives of spiders that burrow into the skin and cause an itchy, allergic rash. Scabies is contagious and requires treatment by a health care provider.
	Slugs and Snails	Snails and slugs are harmless to humans, but they can be pests in the garden.
	Spiders	Most spiders are harmless and are beneficial predators. They do not transmit diseases. Only a few have jaws strong enough to bite through skin, and even fewer, such as the black widow, can inject toxin that may cause illness. Brown recluse spiders do not live in California.
	Yellowjackets	Yellowjackets – sometimes called meat bees, although they aren't bees – can be persistent and aggressive when searching for food in late summer and fall. They're more likely to sting when swatted or if their nest is threatened. They can sting repeatedly, unlike honey bees, which sting only once.

# PESTICIDES

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## What is a pesticide?

A pesticide is a poison that kills, repels, or prevents living things such as weeds, insects, rodents, germs, or anything that you do not want to live in your home or yard. Roach and ant spray, flea bombs, rat poison, weed killer, and mothballs are all examples of pesticides. Most pesticides are potentially harmful to human health and should be used as a last resort. However, some forms of pesticides, such as baits and gels, are safer than sprays and foggers because they are used in protected places where children aren't exposed to them. ***Pesticide sprays and foggers are especially harmful and should be avoided in child care programs.***

## Where are pesticides used?

Pesticides are used inside homes and outside on lawns and gardens. Pesticides used indoors, or tracked inside on shoes, can remain for weeks, months, or even years inside because pesticides settle into carpets and collect in dust.

## What types of pesticides are there?

There are several types of pesticides sold under different trade names to kill specific pests. For example, an herbicide, which kills weeds, is a pesticide, even when combined with fertilizers (weed and feed products). Sanitizers and disinfectants are also considered pesticides because they kill bacteria and viruses. For more on pesticides and the type of pests they kill, see the table at the end of the *Glossary*.

## Why are pesticides a health hazard for young children?

Children are more vulnerable to pesticides in their environment than adults because they:

- ▶ Eat, drink, and breathe more per pound of body weight, compared with adults.
- ▶ Have more skin surface relative to size and their skin is more absorbent.
- ▶ Spend most of their time indoors.
- ▶ Have frequent contact with the ground or floor where pesticide residues settle.
- ▶ Have a still developing brain and some pesticides can interfere with a child's developing brain.

Even though pesticides are registered with the U.S. Environmental Protection Agency (EPA), they can still be dangerous to children and adults. Typically, the harmful effects of a pesticide depend on:

- ▶ **How poisonous** or toxic the pesticide is; some are more poisonous than others.
- ▶ **How long** a person is in contact with the pesticide; this is called exposure.
- ▶ **How much** of the pesticide gets inside the body.
- ▶ **How a person is exposed** to the pesticide. Pesticides can be swallowed, breathed in through the lungs, or absorbed through the skin.

Exposure to some pesticides can cause immediate poisoning or health effects. Exposure to pesticides over a long time may cause illness or affect development. ***The best way to avoid these health hazards is to avoid using pesticides.***

## What are the acute and chronic health effects of pesticides?

### ACUTE HEALTH EFFECTS (Short-Term Exposure)

- ▶ Cough or difficulty breathing
- ▶ Nausea or vomiting
- ▶ Stomach pain
- ▶ Diarrhea
- ▶ Headache
- ▶ Blurred vision or irritated eyes
- ▶ Dizziness
- ▶ Rash or other skin irritation
- ▶ Confusion

### POSSIBLE CHRONIC HEALTH EFFECTS (Long-Term Exposure)

- ▶ Asthma
- ▶ Low birth weight and length
- ▶ Birth defects
- ▶ Learning disabilities
- ▶ Cancers
- ▶ Hormonal changes (disruption of the endocrine system)

## OTHER HAZARDS OF USING PESTICIDES

- ▶ Pesticides are poisonous not only to pests, but to people, animals, and the environment. Pesticides can get into the soil and drain into streams, rivers, and lakes that provide drinking water to humans and animals.
- ▶ Pesticides can make pest problems worse. Over time, pests often become resistant to pesticides so the pesticides stop working, and stronger ones are needed to manage pest problems.
- ▶ While pesticides kill pests, they can also kill beneficial insects and mites that keep pests in check.

## How do I store pesticides?

All pesticides, including baits, organic pesticides, and disinfectants must be stored and disposed of appropriately:

- ▶ Store all pesticides in locked cabinets out of children's reach.
- ▶ Keep pesticides in their original containers with complete label information. Do not pour leftover pesticides into your own bottles or jars!
- ▶ Try not to purchase more than you'll use in a short time to avoid problems with storage and disposal.
- ▶ Dispose of leftover pesticides at your local household hazardous waste disposal site.
- ▶ If you hire a pest management professional (PMP), he or she will store or dispose of any leftover pesticides.

## How do I choose a safer pesticide?

Some pesticides have less risk of exposure than others do. Pesticides that are contained have lower risk than pesticides that are sprayed.

### Use pesticides registered for use by the U.S. EPA and DPR

Except for a few products that are made from food-grade materials, all pesticides must be registered by the U.S. Environmental Protection Agency (EPA) and the California Department of Pesticide Regulation (DPR) to be sold or used in California.



Be sure you only use registered products that have a U.S. EPA registration number on the label.

Always avoid illegal pesticides which are pesticide products that are sold or distributed without a valid U.S. EPA registration (other than certain minimum risk products that are exempt from registration). Illegal pesticides may be sold on the street or in small neighborhood stores.

### Illegal pesticides:

- ▶ Are often very toxic
- ▶ Have not undergone the strict safety testing required for U.S. EPA-approved (registered) pesticides.
- ▶ Can be counterfeit or copy-cats made to look like U.S. EPA-approved products.
- ▶ Often do not have important safety information, such as warnings about keeping children and pets away from the product.

### Examples of illegal pesticides that are highly toxic and dangerous to use:

- ▶ **Illegal naphthalene moth repellents**, or mothballs, are white or colorful balls that look like candy or toys to children.

- ▶ **Illegal insecticide chalk**, also called Miraculous Chalk or Chinese Chalk, is usually imported illegally from China and looks like simple blackboard chalk.



- ▶ **Tres Pasitos** is a colorful pesticide used to kill rats and is often illegally imported from Mexico and other Latin American countries.

## Use safer sanitizers and disinfectants

Use safer products to protect against bacteria and viruses. Sanitizing and disinfecting products that kill bacteria and viruses are antimicrobial pesticides. All products used to sanitize or disinfect must be registered by the U.S. EPA. For more information on choosing safer sanitizing and disinfecting products, see *Green Cleaning, Sanitizing, and Disinfecting* handout.



## Choose the least-risk pesticide

LESS RISK OF EXPOSURE	MODERATE RISK	HIGHER RISK OF EXPOSURE
<ul style="list-style-type: none"> <li>▶ Baits, gels, and traps placed out of reach of children</li> <li>▶ Safer U.S. EPA-registered sanitizers and disinfectants</li> </ul>	<ul style="list-style-type: none"> <li>▶ Desiccating or drying dusts, such as diatomaceous earth or boric acid, applied out of reach of children</li> </ul>	<ul style="list-style-type: none"> <li>▶ Insect growth regulators</li> <li>▶ Bleach poured with a funnel</li> <li>▶ Sprays and foggers</li> <li>▶ Illegal pesticides such as mothballs, insecticidal chalk, and Tres Pasitos</li> <li>▶ High concentration bleach and other disinfectants</li> </ul>

## What about an organic, green, or natural product?

Use caution when choosing organic, green, or natural products. Pesticide products may be advertised as such to make them seem safer. Only *organic* has an official definition. All pesticides, including organic or so-called green pesticides, should only be used as a last resort.

### Organic pesticides:

- ▶ Must be derived from natural sources and cannot be synthesized using chemical reactions.
- ▶ Can still have adverse effects on people, animals, and the environment.
- ▶ Can cause respiratory problems if used in areas with poor ventilation.



## How do I learn more about the safety of pesticides?

- ▶ If you decide to use a pesticide, obtain a safety data sheet (SDS) for the product. These documents contain information on potential hazards and safety precautions for a product. SDS forms are available from pesticide suppliers or found through an internet search.
- ▶ You can also look up the pesticide's health effects on the user-friendly web site of the National Pesticide Information Center (NPIC) [npic.orst.edu](http://npic.orst.edu) where you can search by the active ingredient of the pesticide, which you can find on the product label.



# STEPS TO INTEGRATED PEST MANAGEMENT (IPM)

## 1 PREVENTION

### Keep pests out

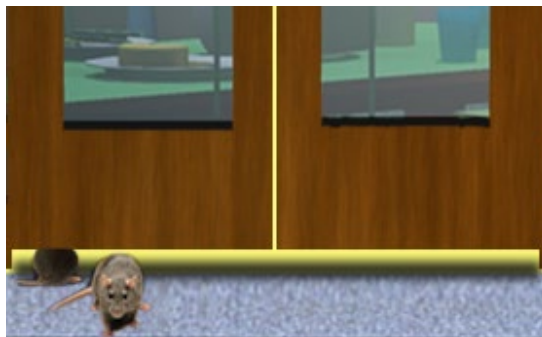
Close off entryways so pests cannot get into your home. Keeping pests out is always the best way to manage them.

#### How to keep pests out:

- ▶ Make sure window screens and panes are free of damage.
- ▶ Seal cracks and crevices around the bases of cabinets and baseboards.

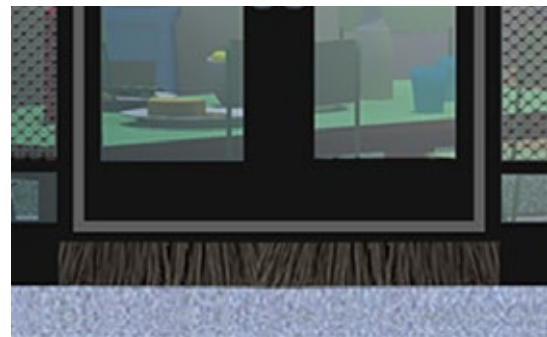
- ▶ Screen vents or other large openings with  $\leq$  ¼-inch hardware cloth.
- ▶ Use wire mesh in combination with sealant to fill bigger holes where pipes go through the wall, ceiling, or floor so that pests cannot re-enter by chewing through the sealant.

### PROBLEM



Space between the door and floor invites pests like cockroaches, mice, and rats to visit.

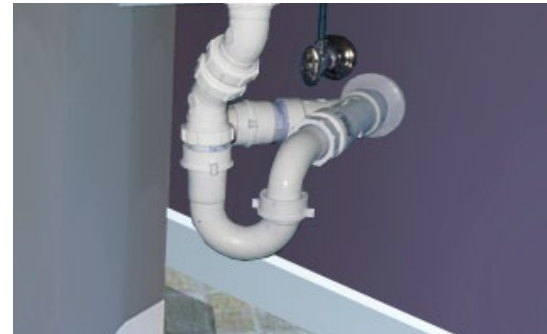
### SOLUTION



Install door sweeps on exterior doors.



Pests can crawl in through tiny gaps, such as around pipes.



Seal gaps around pipes in interior and exterior walls.



Remove food scraps, grease, and sugar.



Store food in sealed containers.



Prevention (continued)

**Remove pests' food, water, and shelter**

Without food, water, and a place to live in your home, pests will go elsewhere to survive.

**How to remove pests' food, water, and shelter:**



- ▶ Drain standing water, unclog sinks, and fix leaking faucets.
- ▶ Avoid stacks of papers and cardboard.

- ▶ Take out garbage and recyclables regularly.

- ▶ Indoor garbage cans should have a tight-fitting lid and a liner.
- ▶ Clean and dry off countertops, shelves, cabinets, and drawers regularly.
- ▶ Remove food scraps, grease, and sugar from stoves, floors, and molding.
- ▶ Sweep, vacuum, dust, and remove cobwebs regularly. Use a flashlight to check for cobwebs under furniture and appliances.

PROBLEM



Organize! Clutter provides hiding spots for pests and covers up their evidence.

SOLUTION



Use rigid containers with tight-fitting lids instead of cardboard boxes.

**2 INSPECTION**

After you make sure you are preventing pests as best as you can, inspect your home's indoor and outdoor areas.

Use the *IPM Checklist* to identify where you may find:

- ▶ Pests.
- ▶ Signs of pests and their damage.
- ▶ Conditions that might attract pests regularly.



**3 IDENTIFICATION**

Identify exactly what kind of pest you have. If you don't know which pests are present, you may use the wrong management approach, choose the wrong treatment, treat too often, or treat at the wrong time.

Once you know what kind of pest it is, learn a bit about how they live. How do the pests get inside? Where do the pests like to hide? What do the pests like to eat? It is also helpful to learn the pests' life cycle, especially for pests that reproduce quickly.



To understand pests' lifecycle, food and shelter, use the *Family Child Care Home Handouts* or the *University of California Statewide Integrated Pest Management Program Pest Notes*: [www.ipm.ucdavis.edu/PDF/PESTNOTES/index.html](http://www.ipm.ucdavis.edu/PDF/PESTNOTES/index.html).

## 4 MONITORING

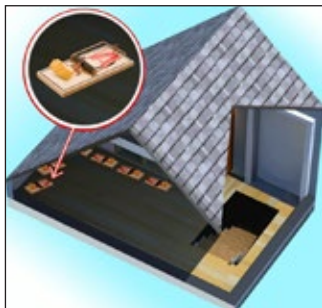
Use observation and pest-specific traps to monitor so that you can find pests before they become a problem. For example, if you had a cockroach infestation, you would place sticky traps in strategic places and note where you caught them. You would continue to monitor their presence and absence on a regular basis until they were no longer a problem. When monitoring, ask:

- ▶ Are there any pests or damage?
- ▶ Are there sources of food, water, and shelter that might attract pests?
- ▶ Where are pests living and breeding?
- ▶ Is treatment necessary? If it is, when and what needs to be done?
- ▶ Are current actions working?

Place baits or traps where pests are present and create a schedule to check and replace them. Use the *IPM Checklist* to keep track of when you do inspections and what pest evidence you find.

## 5 MANAGEMENT

If pests become a problem, you need to get rid of them without exposing children and staff to pesticides. Choose practices that are long-term, easy to carry out safely, and cost-effective. Make sure the practice is matched to the particular pest and its lifecycle.



### 1. Manage pests with non-pesticide practices:

- ▶ Keep pests out and remove their food, water, and shelter (see *IPM Step 1: Prevention* on page 7).
- ▶ Wash the area with plain soap and water.
- ▶ Vacuum with a high-efficiency particulate air (HEPA) or HEPA-equivalent filter.
- ▶ Use non-pesticide traps. Always place out of children's reach. Non-pesticide traps include:
  - ▷ Sticky traps for cockroaches and other crawling insects.

- ▷ Snap traps or electrocution devices for mice and rats.
- ▷ Fly paper and ultraviolet light traps for flies.
- ▷ Cone traps for yellowjackets or flies.

### 2. If non-pesticide practices don't work well enough, choose the least hazardous pesticides.

Use pesticides only where necessary and combine them with preventive practices so pests won't come back. Least hazardous pesticides are contained in a bait station or applied in cracks or gaps rather than sprayed. They should be effective against the target pest and have little or no impact on other living things, especially humans and the pest's predators.

Examples of least hazardous pesticides registered in California are:

- ▶ **Baits and Gels** are formulations of pesticides mixed with pest food or other materials that attract pests. Baits are a key tool for managing ants and cockroaches. Baits are available in prepackaged stations or in refillable bait stations. Gels are squeezed into cracks and crevices using a syringe-type applicator.
- ▶ **Desiccating dusts** are pesticide powders that kill insects by dehydration. Apply these behind wall voids, inside light switches, and other hard-to-reach places.
- ▶ **Pheromones** (insect sex attractant) and other attractants prevent mating and are incorporated into sticky traps for pests such as pantry moths.
- ▶ **Repellents** send pests away temporarily.

### 3. Department of Pesticide Regulation (DPR) School "HELPR" Web Page

This is a guide to choosing the best pest management action, depending on the situation. This guide can also help you choose products that contain less harmful pesticides. You can find it online at: [apps.cdpr.ca.gov/schoolipm/health\\_issues/main.cfm?#usehelper](https://apps.cdpr.ca.gov/schoolipm/health_issues/main.cfm?#usehelper).

### 4. Hire a pest management professional (PMP)

A pest management professional (PMP) can help you implement an effective IPM program.

**HIRING A PMP WITH IPM TRAINING**

1. All pest management professionals (PMPs) must be licensed by the State of California. You can verify whether a company or an individual has a license issued by the Structural Pest Control Board at [www.pestboard.ca.gov](http://www.pestboard.ca.gov).
2. PMPs should be trained in IPM for schools and child care. The UC Statewide IPM Program offers a free online course for PMPs titled *Providing IPM Services in Schools and Child Care Settings*. Ask your PMP to take the course, which can be found here: [www.ipm.ucanr.edu/training/school-and-child-care-ipm.html](http://www.ipm.ucanr.edu/training/school-and-child-care-ipm.html).
3. Consider hiring a PMP with a third party certification, such as EcoWise, GreenPro, or Green Shield. See the *Resources* handout for web sites and information.

**DON'T BE AFRAID TO ASK A PMP:**

- ▶ Specifically if they practice IPM.
- ▶ If they include inspection, monitoring, and written recommendations on prevention.
- ▶ Whether they routinely use baits, gels, and traps rather than sprays.
- ▶ If they have worked in family child care programs, child care centers, or schools.
- ▶ For references from other clients.

**EASY WAYS TO TELL IF YOUR PMP IS PRACTICING IPM CORRECTLY**

- He or she:
- ▶ Is responsive and communicative about IPM.
  - ▶ Carries a flashlight.
  - ▶ Uses traps and checks them regularly.
  - ▶ Asks where you have seen pests.
  - ▶ Includes recommendations for preventive practices.

**WHAT FAMILY CHILD CARE PROVIDERS CAN EXPECT FROM PMPs:**

- ▶ Know the IPM policy, and develop an action plan using IPM principles.
- ▶ Manage pests as well as pesticides.
- ▶ Recognize that family child care homes are unique and usually care for infants, the most vulnerable children.
- ▶ Communicate what is done, seen, and recommended on a regular basis.
- ▶ Educate family child care providers on pest management options.
- ▶ Be dependable, trustworthy, and professional.

**WHAT PMPs CAN EXPECT FROM FAMILY CHILD CARE PROVIDERS:**

- ▶ Learn about IPM and show active interest and participation. Remember IPM is a cooperative effort.
- ▶ Look for more than the lowest bid in hiring a PMP.
- ▶ Recognize that not all PMPs can do IPM. Check licensing and IPM certifications, references, and experience.
- ▶ Help educate your staff, teachers, and families about the IPM program.
- ▶ Log pest sightings, and act on PMP recommendations.
- ▶ Understand that inspecting and monitoring is pest management. PMPs practicing IPM will only spray pesticides as a last resort.

## GLOSSARY

DPR = Department of Pesticide Regulation

HSA = Healthy Schools Act

IPM = Integrated Pest Management

NPIC = National Pesticide Information Center

PMP = Pest Management Professional

SDS = Safety Data Sheet (formerly MSDS, or Material Safety Data Sheet)

U.S. EPA = United States Environmental Protection Agency

**ACTIVE INGREDIENT.** The ingredient in a pesticide product that kills the pest. Some products contain two or more active ingredients.

**ACUTE HEALTH EFFECTS.** Harmful effects within a short period following a dose or exposure, usually 96 hours or less. Effects include sudden eye irritation, breathing problems, stomach pains, and rashes.

**ALLERGIC REACTION.** An overreaction of the body's defense or immune system to an allergen. Allergic reactions can include hives, breathing difficulties, sneezing, itchy and watery eyes, rapid loss of blood pressure, or loss of consciousness.

**ANTIMICROBIAL PESTICIDE.** A pesticide used to kill microbial pests such as viruses, bacteria, algae, and protozoa. Antimicrobials are used to disinfect or sanitize.

**BENEFICIAL INSECT.** An insect that provides benefits to humans—for example, an insect that reduces pest numbers by feeding on them (otherwise known as a predator). A lady beetle reduces pests by feeding on them. Honey bees are also beneficial because they provide honey and help pollinate foods that we eat.

**CHRONIC HEALTH EFFECTS.** Long-term health effects that are delayed, possibly for years. Examples include birth defects, cancer, and hormonal disruption.

**EXPOSURE.** Contact with a substance through different routes such as the skin or eyes, inhalation, or swallowing.

**HARDWARE CLOTH.** Stiff metal screening often used to seal house vents. It resembles chicken wire, except that the holes of hardware cloth are smaller and square, and the wire used is a thicker gauge.

**HEALTHY SCHOOLS ACT.** In January 2001, the Healthy Schools Act put into place right-to-know requirements such as notification, posting, and record keeping for pesticides used at public schools and child care facilities. In January 2007, the law expanded to protect children in private child care centers. Family child care homes are exempt.

**ILLEGAL PESTICIDE.** A pesticide that's either not registered in California, or is registered but repackaged. It's best to purchase pesticide products in stores, not at flea markets or on the Internet. Avoid using a pesticide that's been stored for a long time. It may have lost its registration, meaning that it's now illegal to use.

**INFESTATION.** The presence of pests such as rodents or cockroaches. Sometimes the pests themselves cannot be seen, but you'll notice the damage they cause (e.g., gnawing) or evidence they've left (e.g., droppings).

### HIGH EFFICIENCY PARTICULATE AIR (HEPA) VACUUM CLEANER OR

**HEPA-EQUIVALENT.** A vacuum cleaner with a special filter that can remove very small particles from floors, window sills, and carpets. To qualify as HEPA by U.S. government standards, an air filter must remove from the air that passes through, 99.97% of particles that have a size of 0.3 µm.

**LIFE CYCLE.** The different stages of growth and development of a living organism. Individual life stages may be spent in different environments or feeding on different resources. For example, immature mosquitoes live in water and feed on bacteria and algae, while adult female mosquitoes fly around looking for blood. Knowing this about mosquitoes can help you focus on managing the immature so very few of them develop into adults. Understanding the life cycle of a pest will help you develop an effective management strategy.

**MICROFIBER.** A fine synthetic fiber woven into cleaning cloths and lightweight mops that are ultra-absorbent and use less cleaning solution. Microfibers have a positive charge. Dust, dirt, and microbes are not only attracted to the microfiber's positive charge, but are held tightly and not redistributed around the room.

**MONITORING.** Checking the status of a pest infestation on a regular basis, often done with sticky traps. For example, you might monitor a cockroach infestation with special sticky traps for cockroaches and look at them every few days. You can then note numbers and whether you're catching immature roaches. As an essential part of IPM, monitoring helps you know when to treat or whether you should treat at all.

**NEUROTOXIC.** Poisonous to the brain, nerves or nerve tissue.

**ORGANIC PESTICIDE.** Pesticides derived from natural sources, such as plants, animals, microorganisms, or minerals and not synthesized using chemical reactions.

**PEST MANAGEMENT PROFESSIONAL (PMP).** The people formerly known as exterminators. For several years they've gone by the title of pest control operator or PCO, and many still use that name. More recently there's been a national trend to change the job title to pest management professional.

**RISK.** A combination of how toxic (poisonous) a substance is and one's exposure to it. (Risk = toxicity x exposure.) Exposure to a pesticide usually depends on its placement and how likely it is to cling to surfaces or evaporate.

**SAFETY DATA SHEET (SDS).** A form, formerly known as a Material Safety Data Sheet (MSDS), that contains information about the properties of a particular substance, intended to provide workers and emergency personnel with ways to handle or work with that substance in a safe manner. The SDS includes information on the substance's health effects, toxicity, first aid, storage, disposal, protective equipment, and how to handle accidental spills. The occupational safety and Health administration (OSHA) requires that the SDS for any potentially harmful substance handled in the workplace must be available to employees.

**WEED.** A wild plant growing where it is not wanted and in competition with cultivated plants.

TYPES OF PESTICIDE	PURPOSE
Algaecides	Control algae in swimming pools, water tanks, and cooling towers.
Antimicrobials	Kill microorganisms (such as bacteria, fungi, and viruses). They include sanitizers, disinfectants, and sterilants.
Attractants	Traps containing a pesticide and food to lure insects or rodents inside.
Baits	Pesticides mixed with materials that attract pests looking for food. They are a key tool for managing ants and cockroaches.
Borates	Used in bait stations for ants and cockroaches.
Desiccating Dusts	Powders that kill insects by drying out their waxy coating, causing them to die of dehydration.
Disinfectants	Kill 99.999% of disease-producing microorganisms (bacteria and viruses) on hard, non-porous surfaces such as in the kitchen and bathroom.
Fumigants	Produce gas or vapor intended to destroy pests in the house or in the ground.
Fungicides	Kill fungi (including blights, mildews, molds, and rusts).
Gels	Insecticides mixed with materials that attract pests (another form of baits). Gels are squeezed into cracks and crevices using a syringe type applicator.
Herbicides	Kill weeds.
Insect Growth Regulators	Interfere with insect growth.
Insecticides	Kill insects and other arthropods.
Miticides	Kill mites that feed on plants and animals.
Microbial Pesticides	Microorganisms that kill or inhibit pests, including insects or other microorganisms. Sometimes microorganisms get rid of pests simply by growing larger in numbers, using up the pests' food supply, and invading the pests' environment.
Molluscicides	Kill snails and slugs.
Nematicides	Kill nematodes (microscopic, worm-like organisms that feed on plant roots).
Pesticidal Soaps & Oils	Act by suffocating insects, usually those attacking plant surfaces. These come in liquid and spray forms and would not commonly be used on indoor pests.
Pheromones	Biochemicals used to disrupt the mating behavior of insects.
Repellents	Repel pests, including insects (such as mosquitoes) and birds.
Rodenticides	Kill mice, rats, and other rodents.
Sanitizers	Reduce, but do not necessarily eliminate, microorganisms (bacteria and viruses) to levels considered safe as determined by public health codes or regulations.

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## CONTRIBUTORS

**Abbey Alkon**, California Childcare Health Program, UCSF

**Dana Cox**, Child Care Health Consultant

**Nita Davidson**, California Department of Pesticide Regulation

**Kimberly Hazard**, California Childcare Health Program, UCSF

**Belinda Messenger**, California Department of Pesticide Regulation

**Debra Moser**, Child Care Health Consultant

**Bobbie Rose**, California Childcare Health Program, UCSF

**Michelle Stephens**, California Childcare Health Program, UCSF

**Andrew Sutherland**, UC Statewide Integrated Pest Management Program (UC IPM)

## TEAM PARTNERS

**Linda Asato**, California Child Care Resource and Referral Network

**Domenica Benitez**, California Child Care Resource and Referral Network

**Asa Bradman**, Center for Environmental Research and Children's Health, UC Berkeley

**Elizabeth Cook**, Alameda County Healthy Homes Department

**Rosie Kennedy**, Family Child Care Alameda Network

**Graphic Design:** Robin Brandes Design, [www.robinbrandes.com](http://www.robinbrandes.com)

**Photography:** Vickie Leonard, [www.vickieleonardphotography.com](http://www.vickieleonardphotography.com)

**Illustrations:** Noa P. Kaplan, [www.noapkaplan.com](http://www.noapkaplan.com)

**Volunteer:** Hollis McLellan-Unruh

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