

COCKROACHES AND ASTHMA

PROBLEM STATEMENT

Cockroach infestations have been indicated as a major contributor to asthma throughout the world. Cockroach allergens are derived from several sources such as saliva, fecal material, secretions, cast skins, debris, and dead bodies. The National Cooperative Inner City Asthma Study (1997) confirmed that the association of sensitization and exposure to cockroach allergens is a major risk factor for morbidity caused by asthma in children from large cities in the United States. Cockroach allergen is one of the most prominent allergens in inner city homes, and children who are allergic to the cockroach allergen and are then exposed to high levels of the allergen are more likely to have unscheduled medical visits and hospitalizations¹. Cockroach allergy is strongly linked to socioeconomic factors and it occurs wherever living conditions favor cockroach infestation. Before the widespread use of cockroach baits, Koehler et al (1987) reported that populations of 20,000 cockroaches in a single apartment unit were not uncommon. In the northwest, American and German cockroaches are the most common.

BACKGROUND

Cockroaches have become well adapted to living with and near humans, and their hardiness is legendary. In light of these facts, cockroach control may become a homeowner (or renter's) most difficult task because of the time and special knowledge it often involves. The cockroach is an allergen source and an asthma trigger for residents. The sight of cockroaches can cause considerable psychological or emotional distress in some individuals. They do not bite, but they do have heavy leg spines that may scratch. Roaches live in colonies, so if one brings back insecticide, it can kill the others.

As a group, they tend to prefer a moist, warm habitat because most are tropical in origin. Cockroaches will eat a great variety of materials, including cheese and bakery products, but they are especially fond of starchy materials, sweet substances and meat products. Cockroaches are usually found when food is not stored properly in sealed containers, in food waste and unwashed accessible dishes, etc. They also live off of crumbs and grease from the stove. They also need water so may be found wherever leaks or condensation exist, drip pans under the refrigerator, etc.

Cockroaches tend to travel at the edges of rooms. Signs of roach infestation include: sightings of roaches, stains on the walls from feces/eggs. They can live without food for 2 weeks. Cockroaches are primarily nocturnal. Daytime sightings may indicate potentially heavy infestations. They tend to hide in cracks (as small as the width of a dime) and crevices and can move freely from room to room or adjoining housing units via wall spaces, plumbing and other utility installations. Entry into homes is often accomplished through food and beverage boxes, grocery sacks, animal food and household goods carried into the home. Source: *Healthy Housing Inspection Manual*

The use of Integrated Pest Management (IPM) is the key to the elimination of or reduction of roaches. Integrated Pest Management (IPM) techniques are necessary to reduce the number of pests that threaten human health and property. This systems approach to the problem relies on more than one technique to reduce or eliminate pests. Four Management strategies exist for controlling cockroaches.

1. **Prevention** This strategy includes inspecting items being carried into the home and sealing cracks and crevices in kitchens, bathrooms, exteriors and windows.
2. **Sanitation** This denies cockroach's food, water and shelter. These efforts include quickly cleaning food particles from shelving and floors; timely washing of dinnerware; and routine cleaning under refrigerators, stoves, furniture and similar areas. If pets are fed indoors, pet food should be stored in tight containers and not left in bowls overnight. Litter boxes should be cleaned routinely. Access should be denied to water sources by fixing leaking plumbing, drains, sink traps. Hiding places should be eliminated by purging clutter such as stacked papers and soiled clothing and rags.
3. **Trapping** commercially available traps can be used to capture roaches and serve as a monitoring device. The most effective trap placement is against vertical surfaces, primarily corners and under sinks, in cabinets, basements and floor drains.
4. **Chemical Control** The use of chemicals typically indicates that the other three strategies have been applied incorrectly. Numerous insecticides are available and appropriate information is obtainable from the EPA. (Use this strategy only if sanitation and trapping fail.)

Source: *Health Housing Inspection Manual*

ASSESSMENT

Conduct this protocol if evidence of roaches are observed or reported at baseline, or if the child is allergic to roaches which is determined by allergy testing..

1. Ask caregiver if they have observed any roach activity, especially at night.
2. Explain that even if you haven't seen roaches, they can be present.
3. Observe any roach activity or see if droppings or body parts are present.
4. Assess prior education received by caregiver and assess knowledge.
5. Assess for caregiver's willingness to change behavior by eliminating cockroach attractants.
6. Explain that the next step is to see if roaches are in the home by setting up roach traps.
7. Place roach traps. Document location on reporting form.
8. Give caregiver the cleaning checklist and discuss the steps needed to prepare for the roach elimination visit.

ERADICATION

1. Check to see if the home has been thoroughly cleaned. (see cleaning procedure below in CHW actions)
2. If any cleaning tasks remain, or if any dirt, filth or clutter is observed, inform the caregiver that you will return when they are ready.
3. Reassess in 1 week to see how many roaches have been caught and the location of infestation.
4. If roaches are present either by client report, CHW observation or trapping, have patient conduct elimination actions mentioned below.
5. Once the home is satisfactory and landlord is notified of the issue, perform the roach elimination protocol. (Source may be outside of a unit.)
6. Have patient or landlord:
 - Apply gel and set bait stations in areas where roaches are present.
 - Return in 1 week.
 - Place roach traps to see if roaches are still present even if the number of roaches has been reduced.
 - If roaches are present, advise the caregiver to again prepare for roach elimination at the next visit by thoroughly cleaning the home and eliminating all clutter and unwanted items.
 - After the home has been cleaned, repeat the roach elimination actions and:
 - review food handling and cleaning
 - check to see if all cracks are caulked and any remaining holes are plugged
 - check for leaky pipes and fixtures and repair
 - replace bait smears with new ones
 - apply boric acid to cracks and crevices if not done previously

Once roaches are eliminated, inform the caregiver that the house needs to be again thoroughly cleaned to remove the remaining cockroach waste and allergens. (Refer to Cleaning Checklist under CHW actions.)

EDUCATIONAL MESSAGES

An important key to pest management is to remove places in the home for pests to hide and to eliminate sources of food and water. But remember, pesticides you may spray to prevent pests are not only toxic to pests, they can harm people too. Try to use pest management methods that pose less of a risk.

- Roaches are common indoor pests found in all types of homes. Many homes have roaches, no matter how clean they seem.

- Cockroach allergen is known to come from feces, saliva and the bodies of these insects.
- Getting rid of roaches from the home can help control asthma, especially if you are allergic to roaches.
- It is important to figure out why there are roaches in the home in order to help get rid of them.
- Household members can take useful measures to reduce or totally eliminate roaches from a home.

Important strategies include:

- Removing sources of water in the home by repairing leaky pipes, roofs, drains and broken plumbing.
- Making food inaccessible to roaches by placing food in insect proof containers at all times, except when actually preparing and eating the food.
- Eliminating hiding places for roaches. This includes removing clutter and caulking cracks.
- Trapping and baiting hard to reach places.

It is important to eliminate cockroaches from the entire home. Start with the kitchen and bathroom.

FOR CHILDREN WITH ASTHMA

- Clean the child's play and sleeping areas first.
- Keep roach bait out of children's reach.

ACTIONS

CHW ACTIONS	CAREGIVER ACTIONS
<p>How to place roach traps:</p> <ul style="list-style-type: none"> • Advise patient where to purchase traps. • Place traps near food and water sources in the kitchen, bathroom and laundry area, if present: <ul style="list-style-type: none"> • under the sink in the back of cupboards • in back of and alongside of the refrigerator • in back of or beside the stove • In back of the toilet, washer, dryer and under laundry tub • On vanity shelves • Near areas of moisture • Place traps in child's bedroom 	<p>Water sources:</p> <ul style="list-style-type: none"> • Repair leaky faucets, pipes and drains. <p>Food:</p> <ul style="list-style-type: none"> • Store all food in sealed containers. • Clean up food spills and crumbs immediately. • Encourage eating only at a table, such as in the kitchen or dining room, if possible. • Avoid bringing food into rooms other than the kitchen/dining room and discourage

<ul style="list-style-type: none"> • Under bed against wall • In closet on floor • On shelves or adjacent to dressers or storage boxes • Use 2-4 glue traps per room, as needed • Use the Roach Bait Placement Form (see attached) and indicate the exact location of the traps, and the date the trap was placed. If repeat trapping is necessary, new traps can be placed in the same location. Results of multiple trapping may be compared to determine effectiveness of cockroach abatement. • It is important for the caregiver to NOT move the traps! And NOT let children play with them or place in area where pets are present. • Caregiver must prepare for the cockroach elimination visit in order for it to be effective: <p>They must follow the following steps:</p> <ul style="list-style-type: none"> • Ask caregiver to prepare for roach elimination. • Explain that when the home is clean, the roaches will be more easily attracted to the bait and not to other food sources. • Explain that caregiver needs to do a thorough cleaning of their home to eliminate insect harborage and so that roach bait can be used. • Advise caregiver to wear gloves for the entire cleaning procedure. • Give the CLEANING CHECKLIST to the child/caregiver. Explain that it includes: <ul style="list-style-type: none"> • Mopping the kitchen floors with detergent • Scrubbing all kitchen surfaces with detergent solution, including stove top and counters • Vacuuming all carpeted floors 	<p>eating other living areas, especially the bedrooms.</p> <ul style="list-style-type: none"> • Clean up dishes immediately after use or, if that as not possible, place them in soapy water. • Keep inside garbage in tightly closed containers and place the garbage into an outside garbage can or dumpster every evening. • Immediately clean up grease and spills on stove and in the oven. <p>Hiding places:</p> <ul style="list-style-type: none"> • Eliminate clutter such as empty boxes, cans, bottles, bags, books and newspapers. • Discard unwanted and unused clothes and personal items. • Seal cracks in the walls. • Repair leaks. <p>Conduct all the steps in the cleaning checklist:</p> <ul style="list-style-type: none"> • mop the kitchen floor with detergent • scrub all kitchen surfaces with detergent solution, including stove top and counters • vacuum all carpeted floors • scrub all hard floors and woodwork with detergent • scrub all walls and inside kitchen cabinets with detergent.
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<ul style="list-style-type: none"> • Scrubbing all hard floors and woodwork with detergent • Scrubbing all walls and inside kitchen cabinets with detergent • Keeping any garbage and food waste in tightly closed containers and placing all garbage into the outside garbage can or dumpster every night. Remove all visible traces of the roaches, including droppings, dead roaches and fecal material (black or brown specks that stain indoor surfaces). • Advise caregiver to vacuum up any visible roaches just before the roach elimination visit. • Roaches can be vacuumed up with the crevice attachment. • After vacuuming, take the vacuum cleaner outside, remove the vacuum bag, place it in a sealable bag, and discard it in the outdoor trash. Take a damp cloth and wipe down the entire vacuum cleaner. • Caregiver must always vacuum or kill any roaches they see. • The resident should request the stove and refrigerator be moved away from the wall before any roach elimination visit. • For gas stoves, move it out only enough to be able to reach behind it. • For some stoves, if there is a bottom drawer, it is possible to reach under the stove if the drawer is removed. • Advise caregiver to empty food cabinets before the roach elimination visit and place the food in plastic bags. • Advise caregiver to wear gloves for the entire cleaning procedure. 	
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How to perform roach elimination activities with the caregiver:

- Identify leaky pipes, fixtures and drains and state the caregiver or landlord must repair them. Check back to see that this was done.
- Repair small holes by plugging around pipes with steel wool, foam and mesh.
- Apply boric acid in cracks and seal cracks afterwards with caulking.
- Show the caregiver how to apply boric acid.
- Together with the caregiver apply boric acid inside the cracks with applicator such as the bulb syringe.
- Together with the caregiver use a caulking agent to seal up these cracks.
- Do the kitchen as the top priority, followed by bathroom(s), and laundry area and the child's bedroom(s) in that order. Ultimately, the whole home should be treated.

How to apply roach baits:

Roach baits attract and kill roaches. Roaches die about 1-3 days after eating the bait and it usually takes 7-10 days for residents to notice fewer roaches.

Show the caregiver how to apply cockroach bait and apply smears (or 10 to 15 bait stations) in the kitchen:

- Under the kitchen sink
- Behind the stove*
- Behind the refrigerator*
- In upper kitchen cabinets
- In lower kitchen cabinets
- In cabinets above refrigerator

Also apply bait or bait stations

<ul style="list-style-type: none"> • In bathroom (behind toilet, under the sink, and in the vanity additional 5 smears (or two bait stations) per room in the bedroom, basement, living/TV room and other rooms in which cockroach activity has been • Observed or roaches trapped • *Note: if it is not possible to get behind stove or refrigerator, sprinkle boric acid on folded cardboard or paper and slip the cardboard behind or under these appliances, away from children and pets. Inform child/caregivers that boric • Acid is poisonous and that it should only be used in cracks that will be sealed or in places inaccessible to children. • Place bait near food and water sources, but not in places where it will get wet. • Keep bait out of reach of children and pets. • Tell residents NOT to move baits. • Replace baits when they are consumed by cockroach 	
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FOLLOW-UP VISITS

SUPPLIES (NEED TO INCLUDE LOCATIONS AND BRANDS)

- Roach Glue Traps
- Flashlight
- (Cockroach Bait and applicator) (Bait stations)
- Boric acid and applicators such as bulb syringe and cardboard
- Silacone Caulk & caulk gun
- Foam and wire mesh, gloves, wire cutters, hammer, staples
- Cockroach Protocol and Roach Bait Placement Form

EDUCATION HANDOUTS

- Cleaning checklist for caregiver to prepare for roach elimination

ⁱ Arbes et al, 2003