

## **MODULE 5: Pests and Contaminates**

### **2 Contact Hours**

Welcome to Module 5 the fifth of our On-Line Training Modules sponsored by the Guilford County Department of Public Health, Children's Environmental Health Section. Before you begin, make sure that you have printed the test and have read the Welcome page for specific instructions on where to mail your test once you have finished the module. If you have not done this, go back to the Main page and select Module 5 Test. You will be answering these questions as you read through the following material.

### **What Type of Pests May Be Lurking In Your Child Care**

What may be hiding in your kitchen and other areas of your child care? What's lurking behind the refrigerator, in the oven, behind the menu on the wall, under the cabinet or just flying around in the air? How about the stuffed animals, soft toys and pillows; what's the problem there? Bed bugs, dust mites, ants, what's next? We will discuss contaminates and other pests found in a center.

#### **Cockroaches**

Let's start in the kitchen. What are other ways to contaminate food in your kitchen, besides not washing your hands and cross contamination? Let's be a kitchen detective and see what types of pests, bacteria and other disease causing organisms abound in the kitchen.

Its 5:00 am, it's dark and you're not quite awake yet. As you open the door and flip on the lights, what is that you see out of the corner of your eye? You investigate. Nothing, "I must still be dreaming," you mutter, and go about getting your day started.

You might have been on to something. Roaches scurry when the lights come on. They are very fast. Cockroaches are the world's most



common insects. They have been around for about 300 million years and there are about 3,500 species. Cockroaches have never been incriminated as the actual carrier of a disease in an outbreak, but their close association with people and food require effective cockroach management. They can carry disease organisms and deposit them along with their feces on food. (See Photo, reference 1)

The American cockroach (also known as the palmetto or water bug) is the largest at about one and one-half. They like to travel from the sewer bringing along all kinds of organisms on their bodies and legs to contaminate the food and work surfaces in your center.

The German cockroach is smaller and about 5/8 inches long. They are the most common type of cockroaches. They like warm, dark cracks and crevices in a moist area. The kitchen is the perfect area with warm ovens, crumbs and water. What more could a roach ask for?

## Mice

Why is the paper towel roll chewed up? Why is my pot holder shredded? What are those little black droppings? You may have mice!! A mouse is an excellent climber and can run up vertical surfaces. They can also jump about a foot. Mice and rats can carry over 35 diseases that may be spread to humans through direct or indirect contact.



Photo of mouse reference 2



Mouse droppings magnified (reference 3)

Direct contact with the rodent or with the feces, urine or saliva and inhalation of dust contaminated by feces, urine or saliva may cause you to

be infected. A rat bite may cause rat bite fever, or the plague. Today, the plague is found in the South western US. It is often transmitted by fleas from an infected rat or mouse but may be spread through the bite of a prairie dog or a squirrel.

Food poisoning, particularly salmonella, may be caused by food, utensils or food contact surfaces coming in contact with the feces, urine or saliva of a contaminated mouse or rat. Leptospirosis is a bacterial disease that affects humans and animals. It is caused by bacteria from contact with feces, urine or saliva. In humans it causes a wide range of symptoms.

Hantavirus pulmonary syndrome (HPS) is a deadly disease from rodents. Humans can contract the disease when they come into contact with infected rodents or their urine and droppings. Although rare, HPS is potentially deadly. Effective rodent control is the primary strategy for preventing Hantavirus infection.

Indirect contact through mites, fleas or ticks that are living on the mouse or rat is another way that diseases may spread to humans. Mites may cause rickettsia pox, similar to chicken pox.

## Flies

Quick, get me the flyswatter!! The house fly is found anywhere that man exists and adapts well to all environments. Flies lay up to 150 eggs at a time. After hatching, the maggots grow into an adult fly in about one week. The public health importance of the fly is highly

related to man and his environment. They feed on contaminated food, decaying food, feces and decomposing matter.



Flies breed in animal feces, garbage and other decaying matter. They are annoying, and can carry over 100 disease causing organisms. Then, they land on food or people and transfer these diseases.

Photo of maggots magnified (reference 4)

Flies eat by sucking liquid foods. They moisten the surface with saliva and liquid vomit to make it easier to suck up. Then, they use their teeth to scrape the food surface.



(photo reference 5)

Some of the common diseases flies carry and spread are:

Dysentery	Stomach infection
Cholera	Infection of the intestine
Pinkeye	Inflammation of the white part of the eye
Tuberculosis	Lung infection
Small pox	Highly contagious virus
Myiasis	Infestation of tissue with maggots

## Ants

The ants go marching two by two, hurrah, hurrah! They march around your kitchen and right into your food. Ants have been around

for more than 100 million years and can be found most anywhere on the planet. There are many different kinds of ants that may invade your childcare, such as the carpenter, little black, thief, house, yellow, red and the crazy ant to name a few. There are about 20,000 species of ants and for this reason; they are called the earth's most successful species.<sup>6</sup>

Ants can lift 20 times their body weight, and live about 45-60 days. They use their antennae for touch and smell. Adults cannot chew and swallow solid food so they squeeze the juice out and toss away what's left.

Ants are a nuisance, but are not known to carry diseases, as they are meticulous in their grooming. Their saliva has many microbial agents that reduce the growth of bacteria, and their bodies are not made to carry bacteria. We would be lucky if we were as sterile and disease-free as an ant.<sup>7</sup>

## Mosquitoes

The female mosquito sucks the blood from humans and other animals spreading any diseases from one species to another. This has made them the most deadly disease vector known, killing millions of people over thousands of years and continuing to kill millions more. A vector is an organism that does not cause a disease itself, but which transmits infection by carrying germs from one host to another. Mosquitoes have been known to transmit West Nile virus, encephalitis, malaria and yellow fever.

## Ticks and Mites

Ticks and mites are the second most diverse group of animals on the earth today. Ticks and mites can be a parasite, can carry disease and produce allergens. Dust mites and ticks are found virtually everywhere.

Dust mites carry out an invisible existence, from the backyard to geothermal springs of Yellowstone and to our very own hair follicles.



Dust mites are not insects. They are more closely related to spiders and ticks. They live in couches, bedding, carpet, stuffed animals and clothing. They don't live in air ducts as many people think. Photo of a dust mite magnified 1,000 times (reference 8)

Dust mites feed on dead skin particles that fall off of humans and animals. The shedding skin of growing dust mites and their feces become airborne and may be inhaled when the dust is disturbed. This is what causes some children and people to have an allergic reaction.

Ticks are a very efficient carrier of diseases. They love to hide in grass and shrubs. When you brush past the grass and shrubs they can latch on to you and suck your blood. It may take several days for a tick to feed and they can go virtually unnoticed. Two of the most well know diseases of ticks are Lyme disease and Rocky Mountain spotted fever. (Photo magnified reference 9)



## Bed Bugs

Have you heard the old saying “Sleep tight and don't let the bed bugs bite”? Research has shown that bed bugs have lived with people for centuries. Unfortunately, in the past few years bed bugs are on the rise

Bed bugs are small wingless insects. A female bed bug can lay up to 500 eggs in her lifetime. They breed year round indoors where they like the warmth. Bed bugs feed on blood! This is usually done at night while a person is asleep. They may survive many months without food. They like to hide in a tight location and the bed is just the place to hide. The area between the mattress and the box springs are an ideal space, as well as under labels, trim and buttons.



(Photo magnified, reference 10)

They like to travel and will come home with you in your luggage from a hotel, another home or even a child care. They also like to live in used furniture and mattresses. When a bed bug feeds it takes small bites often in a straight line. Once it is done feeding the bites will start to itch, because of the saliva injected into the skin. Bed bugs do not carry disease, but the bites may become infected.

## Lice

Itchy, inflamed scalp? Could be lice. Lice are a wingless, parasitic insect. They are not dangerous and they don't spread disease, but they are highly contagious and very annoying! Lice are contracted by coming in contact with either lice or their eggs.

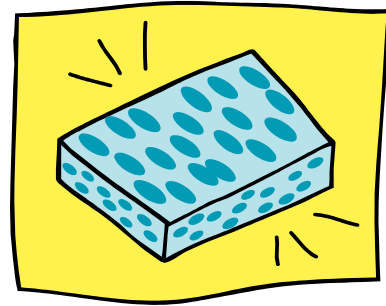
Lice can't fly or jump, but they can crawl. Lice are not spread by pets, but by head-to-head contact, sharing clothing, headphones, combs and brushes, hats, towels, pillows, blankets and stuffed toys. Storing contaminated clothing next to each other such as on hooks, side-by-side or touching may spread lice. Even lying on a bed or couch that

has been contaminated may spread lice. Lice can live for up to two days off the body.

## SPONGES AND CUTTING BOARDS

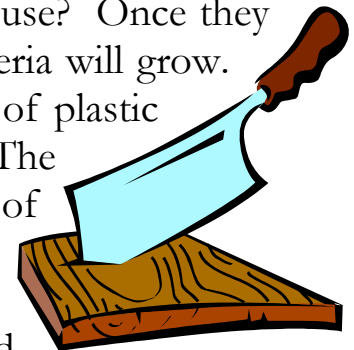
One of the most common ways to spread disease throughout your childcare from the kitchen, bathroom or other areas is through the use of a sponge.

At an American Society for Microbiology meeting several researchers found that most of the 75 dish rags and 325 sponges tested from kitchen homes contained large numbers of virulent bacteria. Cellulose sponges are a “very hospitable environment for bacteria”. The bacteria are able to survive, because they can easily cling to the surface, there is a steady supply of food particles, and of course, there is moisture. On a moist surface bacteria can live for at least two days. On a dry surface they can survive for no more than a few hours, but that is long enough to contaminate a person’s hands or the countertop where food will be laying.<sup>11</sup>



It is also surprising to know that bacteria will even grow on stainless steel according to Edmund Zottola of the University of Minnesota. If left to find a site to grow, the microbes will produce a type of sticky goop with tendrils that will cement the cells to the surface. A spray of water, a weak detergent and a light rubbing will not remove them. The key is to not let bacteria get a hold in the first place by not having any nooks or crannies in which they can settle.

Have you ever thought about the cutting boards you use? Once they develop an accumulation of scars and deep cuts bacteria will grow. It is easier to recover live bacteria from the surface of plastic boards than from the surface of wooden ones. The difference is in the moistness of the boards, Carl Batt of Cornell University and his colleagues discovered. In wood cutting boards the bacteria hide about one and one-half millimeters under the surface. The dry wood



of a cutting board will draw the bacteria into it by capillary action. Think of dipping the corner of a paper towel in water. The water is slowly absorbed or wicked up into the paper towel. This is capillary action.<sup>12</sup>

## Carpets

If all of this isn't enough, have you ever thought about what types of soiling and other conditions the carpet in your classroom or down the hall is subject to? It collects and filters almost every spilled material, airborne contaminant and tracked contaminate that enters your center. As a matter of fact, carpet is designed to hide soiling. By the time a carpet looks dirty it can have a great deal of contamination collected in it. People are unaware of the dangerous micro-organisms such as bacteria, viruses, fungi, dust mites and molds in the carpet that they live with every day, year after year.

### Carpet Contaminants

sand/dirt	dust mites	pet dander
chemicals (fertilizers, pesticides)		food particles
skin cells	allergens	insect parts
grease and oil	hair	insect excrement
mold, bacteria, fungi		asphalt
VOC's (volatile organic compounds)		

According to the Environmental Protection Agency (EPA), all of the above are linked to; rhinitis, sinusitis, conjunctivitis, pneumonia, asthma and eczema.

But what does it all mean? Quite simply, your carpet acts like a sink, in that it collects and filters contaminants from the indoor and outdoor environment. This collection process allows carpet to trap contaminants within the carpet. Like any filter, you carpet needs



to be cleaned periodically. Hard surface floors do not trap contaminants like carpets but may allow them to roam through out the indoor environment.

If these contaminants are in your childcare, they could be contributing to the children's and staff's health and allergy problems. Bacteria, pollutants and allergens trapped in your carpet can contribute to an unhealthy indoor environment.

### What's a Provider to do?

We'll give you some suggestions as to how to control these nuisances and pests through prevention, and integrated pest management. Some of these methods may not be suitable for your child care center.

### Integrated Pest Management

Pesticides are poisonous chemicals. Children are more sensitive to these chemicals because of their small, still developing bodies. Pesticides could cause serious risk at the time of application and in the future. Integrated pest management might be an option.

Hiring a pest control company with a Certified Pest Applicator to do Integrated Pest Management (IPM) is an effective way to control pests and protect the environment. What is IPM? IPM is an effective and environmentally friendly method of controlling pests. With an IPM program the use of life cycles and pest interaction with their environment help to control the population with the least amount of hazard to people, pets and the environment.

Pesticides should be used as a last resort and should be the least toxic available. “**Household Use Only**” pesticides may **not** be used in a child care setting. Pesticides are required to be certified by the EPA for use in institutional, school or child care settings. When using a pesticide, be sure it is the right product for the job, used, stored and disposed of according to manufacturer's instructions.

Prevention is the key. Prevention is the best way to control insects and unwanted pests. Controlling your environment is up to you. The web site [www.PESTed.org](http://www.PESTed.org) has great information on IPM and other “green” tips on pest reduction.

## Cockroaches

Cockroach management and control includes sanitation, entry prevention and harborage elimination. Cockroaches may be carried into the center in cardboard boxes and paper bags. Cockroaches need food and water to live. By reducing these resources, you reduce their ability to survive. Do not leave food out: clean up spills immediately, clean up crumbs and food debris, repair leaky faucets and take out the garbage daily. Remove any clutter, such as boxes, bags and newspapers. Also, seal any cracks and crevices where cockroaches may enter the premises.

## Mice

A mouse will eat about anything and needs little water. They multiply rapidly and will nest in walls, ceiling, boxes, drawers and under appliances. They are most active at night. In order to keep mice out, close up any openings to the outside, keep doors and windows tightly sealed and keep food in tightly closed containers. Keep debris from accumulating around your center.

Traps, glue boards and IPM are effective control methods. Eliminating food, water and shelter is the best defense against getting any mice in your center. Avoid handling the mice and wear gloves when cleaning up urine and feces. A disinfectant solution of bleach and water may be used. Be sure to wash hands thoroughly.

## Flies

If you eliminate the breeding sites you can reduce the population. Keep garbage cans and dumpster areas clean. Screen your doors and windows. Insecticides, resin strips, bug zappers and baits are

commonly used to control flies. Be sure to choose the right product for your center.

## Ants

Ants will come into a building looking for food, water and shelter. This is especially true as a refuge from hot weather or wet, flooded conditions or when other food sources become scarce. As with so many of the pest that can invade your center, prevention is the key. Don't keep food out; keep it in tightly sealed containers. Caulk any openings to the outside. Ants may be controlled with insecticide, IPM, or baits. There are many natural methods posted on internet websites.

## Mosquitoes

The following will help to control mosquitoes around your center. Remove their habitat (where they live and breed) by:

- Eliminating standing water in rain gutters, buckets, plastic covers, toys or any other container where mosquitoes can breed.
- Emptying and changing the water in bird baths, fountains and plant trays at least once a week to destroy potential mosquito habitats.
- Draining or filling temporary pools of water with dirt.
- Making sure window and door screens are "bug tight."
- Tip and Toss any standing water every seven days to eliminate breeding areas.

## Ticks

Keep weeds cut and the grass mowed to prevent ticks from living around your center. Do not allow debris to accumulate around the center.

## Mites

Control of dust mites may be difficult. Use allergen and dust proof mattress covers. Wash bedding often in hot (130°F) water and dry in the dryer. Be sure stuffed animals are washable. Avoid carpeting and

upholstered furniture. Vacuum often with a HEPA (High efficiency purifying air) filtration system. Lower the humidity to less than 50%. There is no way to completely eliminate the dust mite population but, you can reduce the population to reduce the allergens it produces.

## Bed Bugs

Once established, control of bed bugs is also difficult. Cleaning the bedding and decreasing the clutter will help. The mattresses may need to be discarded. In severe cases, a professional may need to be called.

## Lice

If you have lice at your center;

- Wash all bedding in hot (130°F) water.
- Wash all stuffed animals in hot (130°F) water or place in an airtight bag for two weeks.
- Wash all dress up clothing in hot (130°F) water.
- Vacuum carpets and upholstered furniture.
- Keep hair and personal care items separated.
- Do not share bedding.

If you are into “green” methods of controlling pests in your center, the internet is a great place to get ideas and information. Please check with your local health department if you have questions on implementing any of these control methods.

## Review

We covered a lot of information on pests and contamination on the childcare setting. We hope that you would take a moment to review your pest management policies and see where you might be able to implement some “green solutions” to any pest problems you have.

We all want a safe and pest free classroom to work and play in. So let's start working towards achieving the goal!

This ends Module 5. Please make a copy of your test for your records and mail us the original. Be sure to include a self addressed stamped envelope with your test so we can mail you your certificate. Good Luck!

We appreciate your participation and welcome your comments and feedback by filling out the evaluation at the bottom of your test.

## REFERENCES

- 1) [www.dupaghealth.org/ehs/ch/img/cockroaches.jpg](http://www.dupaghealth.org/ehs/ch/img/cockroaches.jpg)
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