Pest Control Management

In this download we are going to look at the different types of pest you may encounter.

We are also going to look at the legal requirements you need to be aware of.

Legal Requirements

We will briefly touch on the legal requirements you need as a food operation, however, the key point, is make sure you appoint and have a reliable PCO. They are the experts in Pest Control. Your role as a manager is to manage the relationship with your PCO and to encourage staff to immediately report any pest sightings.

The **Federal Food Code 2017 Section 6-501.111 and 7-206.11-13** provides minimal guidance regarding controlling pest control and adopting a Pest Control Operator Program (PCO) or Integrated Pest Management (IPM). Please note that we said minimal.

However, your local DOH has written standards outlining the minimum requirements for a pest control program. This includes (but is not limited to):

- A PCO must service your food establishment no less than one time per month (refer to your local jurisdictions requirement)
- Bait boxes are not allowed inside of a food establishment or in a manner where it may be consumed by a human or animal
  - Only "Certified Applicators" can apply any type of insecticide, which includes bug spray, etc.
- Records from the PCO must be kept on file:
  - Certificate of Insurance and Liability
  - Workman's Comp Insurance
  - Sight Map with locations of traps
  - Applicator's valid license
  - SDS sheets for all chemicals used
  - Sighting log
  - Copies of visit summaries

TYPICAL PESTS
Let's have a look at the typical pests that may try to enter your operation.

FLIES

The major flying insects in the restaurant industry include house fly and the fruit fly. The house fly poses the gravest risk of food safety among all of the pests.

Over twenty species of house flies are categorized as "pathogenic" or "disease-causing flies," because they have been proven to carry Shigella, Salmonella, E. coli and other microorganisms that cause food borne illness.

House Flies

Common house flies are also called “filth flies”, as most of their time is spent in or around filth, including human and animal feces. As these flies walk around this filth, the hair on the body and the legs of the fly picks up the fecal matter along with the harmful micro-organisms. Furthermore, when these flies eat some of the waste matter, the harmful micro-organisms enter into their bodies.

Since flies cannot chew the food, they re-gurgitate or throw-up on the food to dissolve or soften it before eating again. It is estimated that one live fly may carry as many as 28 million bacteria on its body alone, and another 5 million inside.

Since the filth fly can travel to all areas of a food establishment relatively quickly and easily, it has the potential to contaminate many foods, food areas and food contact surfaces.

Life Cycle

The life cycle of a house fly consists of four stages: egg, larva, pupa and adult. The female of the species can be seen depositing their eggs on suitable breeding materials. Often, the females can be seen in clusters of up to 50 individuals.

The female house fly lays individual eggs that pile up in masses of 75 to 150 eggs; in her lifetime, a single female house fly may lay up to 900 eggs.

In warm weather, the white pupae (or maggots) emerge from their eggs in 8 to 20 hours.

This larva goes through three stages of development. The total development may take 1 week or less during warmer seasons, but up to 8 weeks during cooler times.

The house fly maggot and eggs depend on damp organic material in which to develop and feed. When it has completed its last stage, the fly maggot will move to a cool dry area in which to pupate. They have been known to travel over 100 feet to locate a suitable place to pupate.

The pupa transforms into an adult in as little as 3 days or as long as 5 weeks. This pupation period varies with temperature and humidity

Habitat

House flies prefer decaying organic materials, such as garbage, animal feces or a mixture of soil and garbage in which to lay eggs.

Good sanitation and refuse management is the most basic and critical step to managing these pests as this will decrease food and breeding sites.

The facility areas where waste is accumulated, dumpsters, etc. must be cleaned regularly.

Trash receptacles need regular washing as flies may find ample breeding media stuck to the sides and bottom of empty containers.

Another good reason sanitation helps manage flies is that fourth stage larva typically leave their breeding area and move away to some distance before they pupate. This behavior removes them from the obvious breeding zones, into less obvious hiding places for safe pupation. Therefore, frequent and thorough cleaning is an extremely important fly management tool.

Control

Vermin-Proof Facility
Tightly fitting screen windows, roof vents and other openings with 18 mesh screens. Doors should be self-closing. The back doors or delivery entrances, if present, must have a screened door.

Drain Cleaning
It is important to realize that food establishments can become breeding grounds for the house flies, especially in colder months.

Drains should be free of any buildup that can attract or provide breeding grounds. We must recognize the importance of humidity and warm temperatures for flies' growth. Ensuring that there are no damp areas in a food facility, and improving drainage will often aid fly management.

The floor drains, for example, especially clogged, can provide an excellent damp environment for the flies to breed in. The fly breeding areas can be eliminated by keeping all drains clear and through regular sanitation.

Fly Traps
Traps can be an additional management tool to prevent solitary flies from wandering in and contaminating food areas.

Electric Fly Traps
There are two kinds of electric fly traps. Both kinds of traps use ultra violet light to attract flies. However, one electrocutes the fly through the use of electric grid, ("fly zapper"), whereas the other merely stuns and traps the fly in a glue trap affixed to the bottom of the trap ("fly catcher").

The use of fly zappers in a food establishment is a very high-risk activity and prohibited, because when the flies are electrocuted, the fly parts can become airborne and fall on exposed food or food areas.

The use of "fly catcher" on the other hands is relatively safe as the flies are merely stunned and trapped on the glue trap that can be replaced from time to time.

Trap Placement
Proper trap placement is extremely important. Whenever using traps outdoors, they should be placed strategically to attract flies away from the facility. When installed inside, install them so that they cannot be seen from the outside. If the flies can see these traps from outside, they'll be automatically attracted to the food facility. Do not place these traps above food or food contact surfaces.

Poisonous Baits
The use of poisonous fly baits can be extremely dangerous in a food establishment. This product can only be used by a licensed pest control officer.

Although these are able to rapidly kill a large number of flies, their effectiveness may be short-lived. Work closely with your PCO as these applications inside the facility require special care.

- Remove or cover all food and ingredients.
- Cover food contact surfaces before application.
- Food contact surfaces may have to be cleaned prior to facility start up. (Remember chemical contamination from the spray)

Air Curtains
Air curtains, depending on the season, are simply a blast of steady cold or hot air that flows from a device installed above

doorways. Originally designed to cut down on energy costs, these can prove to be effective against flying insects of all sorts, as the flying insects cannot pass through the air barrier.

When placed and used correctly, in addition to flying insects, these can also be effective in keeping out dust and hot or cold air from outside.

Fruit Fly

Fruit flies are very small flies that measure about 1/8 inch in length. The red eyes of the fruit fly are key identifying characteristics. The head and thorax are tan in color with the abdomen somewhat darker. The fruit fly breeds in as well as feeds on over-ripe fruits and vegetables, as well as moist, decaying organic matter.

As the name implies, fruit flies generally tend to be a nuisance when fruits and vegetables are improperly stored or allowed to decay.

Garbage that contains fruit peels also will be a frequent target of these flies. When searching for fruit fly breeding sources, look for the decaying moist organic matter. Some of the obvious places to check are fruits or vegetables that are decaying or are stored outside of refrigerators.

Other areas to inspect include garbage cans, underneath and behind low laying kitchen equipment.

In food service establishments, even small amounts of organic matter can often be found where the equipment legs, tables or cabinets touch the floor. These tiny spaces can harbor thousands of fly larvae. All small cracks and crevices at floor level need to be inspected and thoroughly cleaned.

Once, one of the breeding sources has been located, continue to look for more. Fruit flies easily follow air currents and usually have several breeding places in any structure. Keep an eye on outside environment as fruit flies will also come in from nearby dumpsters, outdoor garbage cans or even damp compost piles where fruits and vegetables are disposed.

Fruit fly larvae living in fruit which is eaten can cause intestinal discomfort and diarrhea

Control

Good housekeeping and a good sanitation program will be highly effective in the long-term elimination of this annoying pest.

By removing the breeding areas, taking care of the trash, and ensuring proper storage of fruits and vegetables, this problem can be easily eliminated.

COCKROACHES

The presence of roaches in food establishments is a serious public health problem. Roaches carry disease-causing bacteria on their bodies and deposit them on the food through their excreta and body contact. They have been linked to allergies in humans and many people with asthma are allergic to “roach dust” - roach body parts and roach droppings. Roach dust is a very strong asthma “trigger”.

There are two main types of cockroaches in the US: German cockroach and American cockroach.

German Cockroach:

Adult German cockroaches are light brown except for the shield behind the head marked with two dark stripes, which run lengthwise on the body. Young roaches are wingless and nearly black with a single light stripe running down the middle of the back, and the adults are about 5/8-inch long.

Egg capsules are light tan and usually yield about 36 baby cockroaches.

German cockroaches are the most common roaches found in houses and restaurants.

Most cockroaches have a flattened, oval shape, spiny legs, and long, filamentous antennae. Immature roaches are smaller, have undeveloped wings and resemble the adults.

They eat food of all kinds and may hitchhike into the food service establishments on egg cartons, soft drink cartons, sacks of potatoes or onions, used furniture or appliances, beer cases, etc.

Once they find their way into the food establishments, German roaches generally develop their population in kitchens and bathrooms.

During the day, these roaches may be found hiding behind baseboard moldings, in cracks around cabinets, drawers or pantries, and in and under stoves, microwave ovens, refrigerators, dishwashers, water heater insulation and other restaurant equipment.

The presence of German roaches during the daytime is usually an indication of a severe roach infestation. Most roaches like to live very near- within five feet or less, the food and water source.

German cockroach females, unlike the American roaches, carry the egg capsule protruding from their abdomen until the eggs are about to hatch. During the last three or four days prior to dropping her egg case, the female German cockroach does not seek any food or water. The case is then placed in a secluded location, with the nymphs emerging sometimes within the hour or as long as a week.

A female may produce four to six cases during her lifetime, each containing 30 to 50 eggs. Eggs hatch in 28 to 30 days, and nymphs develop in 40 to 125 days. Female roaches live about 200 days, with males living not quite as long. The German roach produces more eggs and has more generations per year (three to four) than other roaches.

American Cockroach:

Adult American cockroaches are 1 and 1/2 inches long (38mm), making them the largest of the house-infesting cockroaches. With reddish brown, fully developed wings, the American cockroaches have a yellowish margin on the thorax or body region behind the head. When disturbed, they may run rapidly and adults may fly. Immature cockroaches resemble adults except that they are wingless.

American cockroaches generally live in moist areas. They prefer warm temperatures (around 85°F) and do not tolerate cold temperatures. In food establishments, these cockroaches live in basements, around pipes and sewers, and may move outdoors into yards during warm weather.

These cockroaches are common in basements, crawl spaces, cracks and crevices of porches, foundations, and walkways adjacent to buildings.

Because of their fondness for sewers, large populations of American cockroaches will be seen in many cities after heavy rains or flooding.

Due to the large size and slow development of American cockroaches, large infestations of these insects are not common within food establishments. However, during certain times of the year, these cockroaches may move inside food establish-

ments from outside sources. For example, in winter these cockroaches may move indoors, seeking warmer temperatures and food.

Cockroaches may enter food establishment through sewer connections, under doors, around utility pipes, air ducts, or other openings in the foundation.

It is difficult to prevent the invasion of a food establishment with insects, especially roaches that may come from an adjoining building or in packages delivered to the premises. The emphasis must be placed on elimination of harborage and breeding places within the establishment as well as extermination.

All cracks and holes in the floor, walls and ceilings should be eliminated by filling with cement, plaster, putty or plastic wood. Seams in fixtures and equipment should receive the same treatment.

Equipment and fixtures should be placed flush against the wall and floor; if not, then a sufficient distance away from the wall and above the floor to facilitate cleaning around it.

Wherever possible, wooden fixtures should be replaced with metal.

All potential insect-breeding places, such as rubbish, debris and stagnant water, should be eliminated. Garbage should be kept in tightly covered metal cans, and the cans should be thoroughly cleaned after being emptied. The room, in which garbage is kept, prior to removal, should be constructed of impervious washable material, preferably cement, and should have facilities to wash garbage cans. If this room can be refrigerated, the cold temperature will prevent insects from breeding, and odors from decomposing garbage will be reduced.

Sanitation and good housekeeping are very important factors in insect control. The food establishment and equipment therein should be completely cleaned each night before closing, not only for good sanitation, but to remove all grease, food encrustation, and food particles on which the insects can feed.

In addition, roaches can be destroyed with effective insecticides applied by a licensed pest control operator.

Cockroaches and Allergies
Cockroaches, particularly German cockroaches, have been identified as the most common source of cockroach allergy in the USA. There are close to a dozen proteins linked to cast skins, droppings or frass or whole bodies that can cause allergies in humans.

The allergens are heat stable. One study showed that 40-60% of people with asthma also have a serious allergy to cockroaches. Women seem more likely to be allergic to cockroaches than men

Rodents

Norway rat

The most common rodent in most major cities in the US, is a burrowing mammal.

A Burrow is a hole or tunnel dug into the ground by the rodent to create a space suitable for habitation. This small mammal is not indigenous to the United States, but is believed to have come on the ships from Central Asia around 1700s.

Adult Norway rats weigh an average of about 1 pound. Their fur is coarse and the upper body is usually brownish or reddish-gray, while the belly is whitish-gray. Blackish rats may also be present in some locations.

Habitat
The Norway rats live closely with people. They make their nests by making burrows in the ground. Their burrows can usually be found in parks or near vegetation, under buildings and other structures, beneath concrete slabs, along stream banks, in garbage dumps, and at other locations where suitable food, water, and shelter are present.

They may also make their burrows beneath sidewalks and along the building foundations. Additionally, an unkempt open space with clutter may also prompt rats to make their burrows. However; being opportunistic, they will also make their nests in between walls, and other open spaces.

The rat burrows are typically located within 25 to 125 feet radius of the food source. Most rats remain in and around the food establishments and yards which provide their necessities, and unless they are disturbed, they do not move to greater distances.

Norway rats can and will eat pretty much any food. However, when given a choice, they select a nutritionally balanced diet.

Their preferable diet includes meats, fish, grains, nuts and cereals. Water is essential for their survival and they require about ½ to 1 ounce of water daily. The water requirement, however, is dependent on the type of food being consumed. Moist foods, whenever available, will lower their water need. They can easily detect stale and contaminated foods, and often choose fresh items over contaminated ones.

Tip:
Pay close attention to garbage as it offers a very balanced diet and also satisfies their water needs.

A Rat's Life
A typical city rat living outdoors has a maximum life span of about one year.

The total time for gestation is roughly 21 to 22 days and litters of 8 to 12 pups are born. Newborn pups grow rapidly. They can eat solid food when they're 2 to 3 weeks old. They become completely independent at about 3 to 4 weeks and become sexually active at 3 months of age, sometimes as early as 8 weeks.

Female Norway rats may come into heat every 4 or 5 days, and they may mate within a day after a litter is born. The average female rat has 4 to 7 litters per year and may reproduce as many as 60 to 70 or more offspring annually. Even though most of these pups will not survive, but on average, about 20 or so are successfully weaned.

Like most rodents, Norway rats are nocturnal. They usually become active at night, when they start looking for food and water. However, rats may become active at day time when rat population is high; their nests are disturbed (due to rain or construction), or when they are starving.

Rats do not see the same ways as we do. They have poor eyesight and cannot see beyond 2-3 feet. They're also color blind. However, their other senses are more acute and they depend more on their hearing and their excellent senses of smell, taste and touch. Norway rats are very sensitive to motion up to 30-50 feet away.

Rats use their sense of smell to locate food items and apparently to recognize other rats. An average rat urinates over 100 times a night and each micro droplet of urine contains various markers or messages. In this manner, the Norway rats, relying on their sense of smell, can recognize pathways, locate foods from previous excursions, members of the opposite sex who are ready to mate, and differentiate between members of their own colonies and strangers from other rat colonies.

Norway rats use hearing to locate objects to within a few inches. This highly developed sense combined with their touch sensitivity can pinpoint the location of the object to within six inches. Norway rats have a highly developed sense of touch due to very sensitive body hairs and whiskers which they use to explore their environment.

Rat feels very much at home in food service establishments due to the familiarity with the areas. Their movement in an area relies heavily on their senses of touch and smell to direct it through movements learned by exploration and knowledge of its terrain.

Rodents, due to their poor vision, also like to rub their bodies against a wall when moving from one location to another. This fact can aid in designing control of this pest, as the grease tracks can be located along floor-wall junctions. Their sense of taste is also highly developed and they can detect impurities or contaminants in the food quite easily. This fact must be kept in mind when selecting appropriate baits.

House Mouse (Mus Musculus)

The house mouse or Mus musculus is a small and slender rodent. When fully grown, an adult mouse weighs about 2-5 ounces. The fur of a house mouse is generally grayish-brown. This mammal lives very closely with the humans.

Habitat

House mouse lives in and around food service establishments, homes, as well as in any cluttered locations. They are capable of living outdoors, however; must seek shelter indoors when cold weather arrives.

They prefer seeds and grains, although may eat a variety of different foods. These are very curious mammals and are not hesitant to sample a different variety of foods items. They are considered "nibblers" as they nibble on every food in their path, thus leading to the contamination and destruction of many food items. A Mouse only needs 2-3 grams of food daily and can survive on very little amount of water as most of the water is derived from the food it eats.

A Mouse's Life

Like the rats, house mice are also nocturnal. However, it's not uncommon to see them foraging during the day time. Their appearance during the day time does not necessarily indicate an infestation.

Like the rats, mice also have poor eyesight, and depend more on their senses of smell, taste and touch. When shelter inside the food establishment becomes scarce, house mice can also dig and may burrow into the ground in yards or around building structures.

Typically, a mice nest consists of fibrous material in the shape of a ball. These nests are usually 4 to 6 inches in diameter. Litters of 4 or 6 are born 19 to 21 days after mating. They grow rapidly and after 2 to 3 weeks, they begin to make short trips from the nest and start eating solid food. Mice are sexually mature as early as when they are 6 to 10 weeks old.

Mice may breed year-round and a female may have 5 to 10 litters per year. Mouse populations can therefore grow rapidly under good conditions. Typically, a mouse normally travels no more than 10-30 feet from its nest to the source of food. They do not compete well with rats and therefore, are not likely to be present in areas frequented by rats. If a food establishment has a rat problem in the basement, it is unlikely that a mouse problem will also exist in the basement. They are more likely to occupy the kitchen on the first floor, living in spaces between walls and baseboards.

One area that is constantly overlooked when rodent survey is conducted is the drop ceiling. The ceiling with its insulation provides an ideal nesting area for colonies of mice. A mouse constantly explores its environment, memorizing the locations of pathways, obstacles, food and water, shelter and other elements in their domain. They quickly detect new objects in their environment, but they do not fear new objects.

Rodent Control-Integrated Pest Management(IPM)

The integrated pest management (IPM) is a system that combines preventive and control measures to eliminate pest infestations. Each year millions of dollars are spent on costly and dangerous rodenticide pesticides to combat rodent infestations which can also expose humans as well as pets to these poisonous substances. The IPM system combats the rodent problem by using a combination of different techniques, thus reducing exposure to dangerous chemicals.

The IPM works on three principles:

- Starve them
- Build them out
- Destroy them

However, for Integrated Pest Management to be successful, the key support principle is the thorough inspection of the facilities to identify the problem. A thorough inspection of your facility will give you a better indication of the nature and the severity of the infestation, as well as the common routes taken by the rodents. This will allow you or the licensed pest control officer to set up proper traps and baits to intercept them.

There are a lot of signs that could indicate the nature and severity of the problem. These include:

Rodent Droppings:
The physical state of the droppings may or may not indicate recent or old infestation. Soft, moist droppings usually indicate live rodent activity, while hard and dry ones indicate old. However, this may not work all the time. The location of the droppings, whether in dark corner or near an area with plenty of sunlight or heat may affect the appearance of scat. Amount of droppings indicate heavy or light infestation. The size of pellets will show if the rodents are large or small; and if different sizes are present, it indicates litters of young are being reared.

Gnawing:
Rodents spend about 2% of their life gnawing on various materials. This is done to sand down the front gnawing teeth that constantly grow.

Rodent Runs:
Rat runs are difficult to tell by appearance if they are new or old. Use white chalk or paint on suspected rat runs. The rodents are creatures of habit and will continue to use the same pipe or beam or floor-wall junction. It will leave marks caused by dirt or grease on feet or fur.

Other signs include Burrows, runways, rodent odors, urine stains, rodent sounds, and live or dead rodents.

Starve Them
The main purpose of rodents' entry in a food establishment is to seek food and water. There are many sources of food in a food establishment and by depriving rodents of food and water; we can significantly reduce their population.

The food storage containers must be made of material that is impervious to rodent gnawing. Food containers made of metal, glass or smooth hard plastic is ideal for storage of food items.

There are many opportunities for food particles to spill over on to the floors, behind equipment and other hard to reach places during a normal workday in a typical food establishment. Every effort must be made to pick up spilled-over food to ensure that rodents will not have a steady supply of food. Rats need water for survival; eliminating any standing water and other sources of water will also help control their populations.

Improperly stored garbage also provides a steady source of food for rodents. All garbage containers must be made of metal or hard smooth plastic with tight fitting lids. Garbage removal must be done on a daily basis.

Mice need even smaller amount of food and very little water to survive. They can acquire most of the water from the food. Although it is difficult to completely eliminate all food for mice, because of their lesser food requirements. However, an abundant supply of food will certainly lead to a bigger infestation.

Build Them Out
One of the reasons rodents exist in buildings is because of favorable conditions that permit them to hide, nest and breed. They will not remain where safe shelter or food is not available.

To combat infestation in your premises, it is necessary to be able to recognize rodent harborage or hiding places, both

actual and potential as they are the conditions favoring rodent life and propagation.

There are three general types of rodent harborage:

- Temporary
- Incidental
- Structural

Temporary Rodent Harborage
These are conditions arising out of failure to maintain premises in a clean and sanitary condition, or faulty methods of operation, housekeeping or storage of stock.

Example:

- Mass storage of office supplies and old records, materials for repairs, food products or other store merchandise; boxes, crates, or cartons that are left undisturbed for periods of time and not rotated in use (using up older stock first).
- Unused or obsolete fixtures or equipment, especially those having drawers, compartments or other hollow enclosures.
- Miscellaneous junk, trash, odds and ends placed in closets, cellars, boiler rooms or out-of-the-way places, or portions of premises not in daily use having very little or no light.
- Garbage cans left uncovered overnight or having poorly fitting covers or in a defective, leaking condition.
- Passageways used in transporting or storing garbage cans for removal, with spilled particles of food on floors, especially in corners.
- Accumulations of rubbish at bottom of air-shafts, dumbwaiter or elevator shaft pits, under sidewalk or cellar window gratings or other parts of premises not cleaned regularly.

Prevention
Unused materials should be stored neatly and away from walls, allowing enough space for an individual to pass through during cleaning and should preferable by stored sufficiently high above the floor to permit cleaning underneath. The amount stored should be minimized as much as possible, and it should be disturbed or its position changed at least every three weeks to prevent nesting of rodents.

Avoid mass storage by arranging in rows with 2' wide aisles. If stock is placed on shelves, raise the lowest shelf about 6" to 8" above the floor. Remove all rubbish that usually accumulates about unused materials.

Promptly clean up food scrapes that spill from garbage cans or fall under or behind slop sinks, equipment and stock bins. Rodents feed more readily on these than on bagged or packaged food supplies. Store all garbage in non-leaking metal receptacles with tight-fitting lids.

Place soiled linen into suitable containers. Maintain clean and sanitary conditions at all times.

Incidental Rodent Harborage
These are conditions arising from installation of fixtures or equipment incidental to their use on the premises, in such a manner that hollow spaces, enclosures, and inaccessible places are formed.

Example:

- Fixtures, refrigerators, ovens, etc. not installed flush against walls but leaving a small space that is too narrow for proper inspection and cleaning.
- Narrow spaces left between bottoms of counters, back bars or other fixtures or equipment and the floor.
- Small spaces existing between ceilings and tops of fixtures, clothes lockers, refrigerators, closets and cabinets, large overhead pipes and ventilating ducts suspended a few inches from ceiling.
- Hollow partitions (double wall space).
- Hollow furniture of fixtures with inaccessible enclosures.
- Boxed-in casings or sheathing around pillars, pipes, radiators, etc. forming hollow enclosures.
- Bottom shelves, stock platforms or skids that are not set directly on the floor but allow a space of a few inches to exist underneath.
- Defective insulated sections of large refrigerators or pipe coverings (hollow enclosed spaces formed by damage to cork or asbestos).
- Loose foods stored in low, thin, wooden food bins, boxes, cartons, burlap bags, etc.
- Partially enclosed spaces behind open metal grills used on housing of motors or other mechanical equipment.

Prevention

- Eliminate narrow, inaccessible spaces behind fixtures or equipment by placing flush against wall or leaving a space wide enough for inspection and cleaning.
- Solidly block out narrow spaces underneath, or install flush on floors or raise high enough for cleaning.
- Avoid providing undisturbed rat runways in narrow space between ducts or long hoods and the ceiling. Ducts should be placed flush against ceilings and preferably be found in shape, instead of square.
- Remove decorative boxing-in around radiators, columns, etc. to avoid hollow enclosures, or protect gnawing margins with metal flashing extending at least 6" above the floors. If they've just been sheathed for appearance, use sheet metal.
- Repair and securely close all breaks in insulation around pipes, refrigerators or cooling cabinets.
- Line interiors of wooden bins with sheet metal, or store foods in rodent-proof containers.
- Eliminate hollow spaces formed by false bottoms in counters, lockers, cabinets, back bars, etc.
- Alter hollow fixtures so that enclosures are exposed for easy cleaning.

Structural Rodent Harborage

These conditions are due to design or construction of a building that are defective from a rodent-proof standpoint or that developed during occupancy from failure to make proper repairs or to use rodent-proof materials.

Example:

- Openings made in outside building walls, around beams, or in interior walls, floors or ceiling for installation of pipes, cables or conduits. They are made by plumbers, electricians or other workmen. The openings are usually larger than necessary and the unused portions of holes are not closed up. Holes, large cracks, loose bricks or other openings in floors, walls or ceilings are other examples.
- Hollow spaces in double walls, between floor and ceiling of lower story, and in double ceilings of cellars.
- Enclosed hollow spaces formed by sheathing the undersides of stairways, by installation of false floors in toilets, or by raised wooden floors over earthen floors of cellars.
- Entrance and cellar doors that are not tight-fitting or not provided with a proper door sill or saddle, permitting openings over 1/4" to exist and not protected around gnawing edges with metal flashing at least 6" above floor level.
- Openings around ceiling or floor beams, or risers, where they pass through partitions.
- Openings of fans, ventilators, and louvers on the outside of buildings, or fancy metal grills with openings over 1/4". Cellar floors of earth, enabling rodents to burrow underneath.

Prevention

- Promptly seal up all holes or openings around pipe lines or cables where they enter the building, with concrete mortar or cement mortar to which ground glass may be added for better results.
- Place tight-fitting metal collars or flanges around pipes and risers. Provide escutcheon plates for all risers where they pass through floor slabs, unless same are waterproof by pockets of mastic.

- Seal up all openings around beams.
- Avoid using double-wall type construction with hollow interior spaces, or hollow tile block, hollow cement block, or similar material for partitions or walls of storage compartments or in cellars.
- Inspect all parts of premises for holes and seal every opening in walls and ceilings with cement plastered smooth. Move away fixtures and stock that may hide holes in floors and use a flashlight so as not to miss any. Look for loose bricks, cracks or other openings in cellar foundation walls. Find all openings before rodents do. Inspect regu larly and repair weak spots before actual breaks occur.
- Block out hollow spaces under raised wooden floors with concrete. Refrigerators, ranges, ovens, etc. should be solidly based on concrete. Protect entrance, cellar doors and windows with metal flashing around gnawing edges and maintain in good repair.
- Replace earthen cellar floors with a floor of concrete at least 3" to 4" thick and tied securely into foundation walls.
- Securely anchor window and door screens to the frames.

Destroy Them

The use of toxic pesticide in a food environment is a dangerous and risky process. This should only be used as a last resort and even then, only with the help of a licensed pest control officer. The New York City health Code makes it illegal to use pesticides in a food establishment unless used or applied by a licensed pest control applicator.

Non- Toxic Control

Trapping

Use of traps is advantageous for many reasons:

- Eliminates the exposure to harmful toxic substance
- Easy to dispose the captured rodent
- Results can be quantified
- Prevents having to deal with odors from dead rodents in hard to reach places

Types of Traps:

Snap Traps

There are many types of traps; among them, the most useful is the snap trap. However, for the snap trap to be effective, following guidelines should be useful:

- Set up large number of traps at one time.
- Do not set up traps for several days to allow rats to become acclimated with the traps, as rats are very skeptical of new things.
- When ready to set the traps, use the "mass trapping" technique. In this method, a large number of traps are set up at once so that a large number of them can be caught before they become "trap-shy".
- The type of baits used is also an important consideration. It is best to use food items that the rodents constantly go after in the food establishment as these foods are more desirable to rodents and also are part of their diet. However, foods high in protein also make good bait. The rodents, especially during the mating season, need a protein rich diet which is usually hard to get. Therefore, using peanut butter, cheese, ground meat or deli meats is usually found to be effective bait. It is important to note that the traps with the bait must be unset until the rodents become comfortable.
- Stale bait must be replaced with fresh bait as rats can detect older foods and avoid it.

Live Traps

Live traps are large cages or boxes that have only one-way entry. The rodents looking for food get trapped inside. Dubbed as a more humane method, a large number of rodents can be caught at one time.

Glue Boards

Contrary to the popular belief, the use of glue boards has the lowest success rate. Glue boards should only be used as part of the pest control survey. Typically, these traps end up catching baby mice and rat pups. This is because rodents' whiskers or vibrissae are highly developed sensory devices and can usually detect the sticky substance on the glue traps and avoid it. The younger populations of rodents haven't fully developed this sense, and hence get caught.

Important note: It is important also to note that proper disposal of rodents when caught is also very important. Safety precautions must be taken to ensure personal safety of the person handling the dead rodents.

For example, avoid handling dead rodents with bare hands to prevent contact with diseased animals; when cleaning rodent excreta, spray the area with sanitizing solution prior to sweeping; clean and sanitize any exposed food contact surfaces.

Control through Pesticide
The use of pesticide in the food environment is a very dangerous and risky proposition. The Federal Food Code does not permit the use of pesticide in a commercial facility unless done by a licensed pest control officer. Therefore, it is important to obtain the services of a reputable pest control officer (PCO). Be wary of PCOs that promise a quick fix.

Dangers of Tracking Powder
The use of rodenticide tracking powder is banned in a commercial food establishment. The rodenticide tracking powder has the same ingredients as any other bait being used. However, because the ingredients are mixed with talcum powder or other similar powder carrier, the concentration of toxins are many times higher; in some cases, as high as 40 to 50 times. The tracking powder is not absorbed or inhaled by the rodent, rather, the powder sticks to the feet and the fur of the rodent. As the rodent starts grooming itself or others, it ingests the anticoagulant in the tracking powder and because the concentration is much higher, dies within a day or two.

Safe and Effective Pest Control Required
The presence of insects and rodents, or conditions that allow them to flourish, are among the most common violations cited during food service establishment inspections. Pests can contaminate food, making customers sick.

The use of chemicals to control pests creates other problems: pesticides can cling to surfaces and many are dangerous.

To keep restaurants insect- and rodent-free, the Health Code now requires establishments to:

- Clean up refuse and other material in or on which pests hide or nest.
- Seal cracks, gaps or holes that permit easy movement of pests.
- Eliminate water leaks, drips and standing water as these allow pests to thrive.
- Install door sweeps or other barriers on doors leading to the outside. Any gap must be less than an eighth of an inch to prevent entry.
- Throw out food garbage, clean food scraps and grease stains, and store food in containers that close tightly.
- Inspect the premises and incoming packages each day for signs of pests.

BIRDS

Birds are wary of humans and usually feed on waste outside the premises. However, they carry pathogens on their bodies and droppings. Birds are also known to carry Salmonella.

Detection:
Very easy to spot.

Prevention:
Outside garbage containers must have close fitting lids and no trash should be left in sacks outside. Netting and bird spikes on ledges will deter perching and nesting.

Threat:
They only pose a real threat if they manage to enter the food preparation area.

Ants

Ants can easily enter a building through the smallest of gaps and will quickly appear if there is any food spillage left on a floor.

Detection:
Look for obvious ant lines to food sources and spillages. The best prevention is to keep a clean kitchen and clear up any spills as they happen.

Prevention:
If they start to become a constant visitor to your operation, talk to your PCO.

Other Insects
Many varied insects can be found in dry and stored food ingredients.

These include beetles, weevils, mites, and moths. Many do not carry pathogenic bacteria, but they can damage foods. and are unwelcome and an unpleasant surprise.

Detection:
Look for signs of discoloration of dry ingredients, and visible small insects in food.

Prevention:
The best way to prevent infestation is to use plastic, sealable, airtight containers, store dry, bulk food items in a dry place. Do not overstock and have a good rotation policy.

Once infested those ingredients must be thrown away.

SERVICE ANIMALS

Section 6-501.115 Prohibiting Animals of the FDA Food Code 2017 Code prohibits live animals from being "kept, housed or permitted to enter or remain in a food service establishment or non-retail food processing establishment." This provision does not apply to service animals accompanying and trained to assist disabled persons. The Food Code, by virtue of this provision, acknowledges the rights of disabled persons accompanied by service animals to access public accommodations.

Therefore, a service animal that accompanies a person with a disability should not be denied access to a food service establishment; and the service animal's presence is not a violation of 6-501.115 Prohibiting Animals of the FDA Food Code 2017.