Am I Bugging You? 
Summer Diseases

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Learning Objectives

• Recognize various summer plants and animals that can cause or transmit human illnesses
• Introduce various zoonoses that result from exposure to various environmental pests
• Review precautions and treatments for these vector-induced or borne illnesses
• Stimulate further interest in this topic
Poisonous Plants

Poison Ivy, Oak, Sumac

- Poison ivy is a vine with clusters of 3 leaves that is common in Eastern, Southern, and Midwestern U.S.
- Poison oak also clusters in 3 leaves that are oak leaf shaped and is common in the Western U.S.
- Sumac is a woody shrub with 7-13 leaves in groups of 2, common in wet swampy areas
- All can cause an allergic rash that can become secondarily infected
- Treat mild symptoms with cool compresses, water, or milk and itching with topical calamine or oatmeal-based lotion, and oral diphenhydramine
- Serious reactions may require prescription topical steroid, oral steroids, antibiotics, and treatment for anaphylaxis
Poisonous Caterpillars

Most poisonous caterpillars live in deciduous trees such as oaks and willows but also reside on shrubs and forested trees. Most cause stinging or burning with redness of the skin, but some have poisonous barbs or spines that can penetrate the skin and need to be removed to alleviate symptoms. Antihistamines help.
Poisonous Caterpillars

Buck Moth Caterpillar

Flannel Moth Caterpillar

Hag Caterpillar

Io Moth Caterpillar
Poisonous Caterpillars

Saddleback Caterpillar

Spiny Oak-Slug Caterpillar

Tussock Caterpillar

Puss Caterpillar
Poisonous Caterpillars

Puss Caterpillar

Puss caterpillar (woolly slug, or asp) is the most toxic caterpillar in the U.S.

- found mostly in Southern states
- about 2.5 mm long and furry
- venomous spines are camouflaged by long hairs
- feeds on shade trees such as elm, oak, and sycamore, or bushes such as holly
Poisonous Caterpillars

Puss Caterpillar Sting

Symptoms of puss caterpillar bite:
- immediate waves of intense pain
- itchy rash
- nausea and vomiting
- restlessness
- fever
- muscle cramps
- symptoms of shock
- Treatment: remove the broken-off spines by using cellophane tape or a commercial facial peel. Apply an ice pack and take antihistamines to relieve itching.
Bee, Hornet, Wasp, Yellow Jacket
Bee, Hornet, Wasp, Yellow Jacket

The stings of bees, wasps, hornets, and yellow jackets can cause severe reactions in people who are allergic to their stings. Normal reactions include pain, redness, and swelling around the site of the sting.

In all cases, remove the stinger if possible to avoid receiving more venom, and clean the sting area with antiseptic. Use antihistamines for itching or hives, and NSAIDs for pain and inflammation.
Fire Ants

The red imported fire ant, *Solenopsis invicta*:
- found mainly in Southern US
- reddish brown to reddish black with stinger
- build large dirt mounds, usually in sunny areas
- bite usually is painful, and will cause an itchy, raised hive, followed by a pus-filled blister
- severe allergic reactions can develop
Fire Ant Sting

Symptoms and treatment:
• itchy hive
• blister filled with pus can form hours later
• use over-the-counter pain relievers and antihistamines
• do not break the blisters, and keep the area clean to avoid secondary infection.
• topical or systemic steroids may be needed for severe allergic reactions
• antibiotics may be needed for secondary infections
Flea is not just the bassist for the RHCP or a pet infestation; they can bite humans.

- 2.5 mm long
- reddish-brown in color
- can jump large distances
- suck blood from their host to feed
Fleas

Some people may develop an allergic reaction to a flea bite. Scratching an itchy flea bite can cause the skin on and around the bitten area to break open, which can lead to infection.

Make sure all pets are on flea preventative products, keep the home clean, and treat any flea infestations that may occur.

Treat secondary infections by keeping skin clean with soap and water and use of topical or oral antibiotics.
Ticks are often found in plants and brush, and can attach to and bite people and animals. Most tick bites are not harmful; however, ticks can carry serious diseases including:

- Tularemia
- Ehrlichiosis
- Lyme disease
- Rocky Mountain spotted fever
Ticks attach to warm, moist, hairy areas, including the scalp, armpits, and groin.

- ticks must be removed properly with tweezers to minimize the chances of infection
- wear appropriate clothing outdoors to reduce exposure
- use tick repellant with DEET
- check for ticks if you spend time in the woods
Tularemia

Tularemia is caused by a gram-negative, nonmotile, pleomorphic intracellular coccobacillus, Francisella tularensis.

- Clinical presentations start in 3-5 days and include:
  - ulceroglandular (75%)
  - glandular
  - oropharyngeal
  - pneumatic
  - oculoglandular
  - typhoidal
- Additional symptoms include fever, lethargy, anorexia, flushing, lymphadenopathy, sepsis, and possibly death
- Treat with Doxycycline
Ehrlichiosis is caused by an intracellular bacterium: *Ehrlichia chaffeensis*, *Ehrlichia ewingii*, or an *Ehrlichia* species provisionally called *Ehrlichia muris-like* (EML).

- transmitted by the lone star tick, *Amblyomma americanum*
- symptoms occur within 1-2 weeks following a tick bite and include:
  - fever
  - headache
  - fatigue
  - muscle aches
- treatment is Doxycycline
Ticks

**Blacklegged Deer Tick**

*Anaplasmosis* caused by the bacterium *Anaplasma phagocytophilum*. Treated with Doxycycline.

*Babesiosis* caused by a protozoan, *Babesia microti*. Treated with Atovaquone + Azithromycin; or Clindamycin + Quinine

*Borrelia miyamotoi borreliosis* caused by spirochete bacterium, *Borrelia miyamotoi*. Treated with Doxycycline for 2 - 4 weeks

*Powassan disease* caused by *Powassan* (POW) virus. Treated with respiratory support, IV fluids, and medications to reduce swelling in the brain

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Ticks

Lyme Disease

**Lyme disease** is caused by a spirochete bacterium, *Borrelia burgdorferi*, that is carried in the blacklegged deer tick, *Ixodes scapularis*.

- tick must be attached 36-48 hours to spread Lyme disease
- circular, red, expanding "bullseye" rash is one of the first symptoms but not always present
- other symptoms include fatigue, chills, fever, headache, muscle and joint aches, and swollen lymph nodes
- treatment in the early stages with Doxycycline is generally effective
Rocky Mountain spotted fever (RMSF) is a tickborne disease caused by the bacterium *Rickettsia rickettsii*. This organism is a cause of potentially fatal human illness in North and South America, and is transmitted to humans by the bite of infected tick species. In the United States, these include:

- American dog tick (*Dermacentor variabilis*)
- brown dog tick (*Rhipicephalus sanguineus*)
- Rocky Mountain wood tick (*Dermacentor andersoni*)
Ticks

American Dog Tick

Where found: Widely distributed east of the Rocky Mountains. Also occurs in limited areas on the Pacific Coast.

Transmits: Tularemia and Rocky Mountain spotted fever.

The highest risk of being bitten occurs during spring and summer. Dog ticks are sometimes called wood ticks. Adult females are most likely to bite humans.
Ticks

Brown Dog Tick

Where found: Worldwide.

Transmits: **Rocky Mountain spotted fever** (in the southwestern U.S. and along the U.S.-Mexico border).

Dogs are the primary host for the brown dog tick in each of its life stages, but the tick may also bite humans or other mammals.
Ticks

Rocky Mountain Wood Tick

Where found: Rocky Mountain states and southwestern Canada from elevations of 4,000 to 10,500 feet.

Transmits: Rocky Mountain spotted fever, Colorado tick fever, and Tularemia.

Adult ticks feed primarily on large mammals. Larvae and nymphs feed on small rodents. Adult ticks are primarily associated with pathogen transmission to humans.
Ticks

Symptoms of RMSF:
• typically begin 2-14 days after the bite of an infected tick
• tick bite is usually painless and unnoticed
• disease frequently begins as a sudden onset of fever and headache
• other symptoms are not always present, but include rash, headache, nausea, vomiting, abdominal pain, myalgia, anorexia, conjunctival injection
• treatment with Doxycycline
Lice

Head lice are about 2-3 mm long, and they infest the head and neck area, usually hidden in hair.

- spread through direct contact with the hair of a person infested with head lice
- most common among preschool and elementary school-aged children, and members of the household of children who are infested with head lice
- do not spread disease
- may cause itching and scratching that may lead to infection
Lice

Head Lice

Treatment includes Pediculicides:

- pyrethrins
- permethrin 1% shampoo
- may require repeat treatment in 9 days for newly hatched eggs
- wash all clothing and bedding used by the person infested with head lice
- family members also be treated at the same time to prevent further head lice infestation
Spiders

Poisonous Black Widow

Black widow spiders:
- about 10-12 mm wide
- shiny, black, globular
- abdomen has distinctive red hourglass on the underside
- only the female of the species bites humans
- they live throughout the U.S., but most are found in the southern regions
Spiders

Black Widow Bite

Black widow spider bite symptoms:

- start 20 - 60 minutes following the bite
- pain, though not all people experience pain
- other symptoms include muscle cramps and spasms, abdominal pain, tremors, weakness, or a rise in blood pressure.
- treatment includes antivenin (which counteracts the spider toxin) and pain medications if necessary
Spiders

Black Widow Bite

Day 3

Day 6

Day 10

Black widow spider bite may progress to cause skin and deep tissue necrosis that may require surgical debridement.
Spiders

Brown recluse spiders:
- extremely poisonous, and bites can cause infection and illness
- found in the Midwestern and Southeastern U.S.
- yellowish-tan to dark brown in color with darker legs
- about 6-11 mm in length
- characteristic violin pattern on their back.
Spiders

Brown Recluse Bite

The bite of a brown recluse spider is usually painless, but may feel like a mild bee sting.

Symptoms include:

- severe pain at the site of the bite that develops in about four hours
- followed by severe itching, nausea, vomiting, fever, and muscle pain
Similar to black widow bites, the skin necrosis may progress to deeper tissues and require surgical debridement.
Mites

Itchy Chiggers

Chiggers are a type of mite from the family known as *Trombiculidae*.

- barely visible to the naked eye
- in their larval form, they can bite humans
- Chiggers found in the U.S. do not spread disease, but their bites can cause intense itching and small red bumps
Mites

Symptoms from chigger bites:

• itching is most intense 1 - 2 days following the bite
• this is when the chigger falls off and can leave red welts that may resemble a blister or pimple
• scratching can lead to a secondary infection
• use antihistamine creams to help relieve itching and prevent scratching
• prescribe antibiotics for secondary infection
Mites

Scabies

While scabies can infest pets, they are species-specific and cannot be transmitted from pets to cause human infestation.

Scabies are mites that burrow into the skin, causing intense itching. Scabies spread by close contact with a person infested with scabies, or by sharing towels, sheets, and other personal items with a person infested with scabies.

Treatment includes washing all clothing, sheets, and towels in hot water because they can live on flaked skin for 2-3 days.
Mites

Symptoms and treatment:
• severe itching or rash can take weeks to develop after the scabies mites burrow into the skin
• small blisters or sores and eczema
• intense itching is usually worse at night
• itching is between the fingers, on the outside of the elbows or armpits, around the waistline, or on the buttocks
• treatment includes premethrin 5% cream, or oral ivermectin
• family members may also need treatment
• repeat treatment in 5-7 days may be needed to treat hatched eggs

Scabies Rash
Scorpions

Deadly Scorpions

Scorpions are related to spiders and mites, and are found mostly in the Southern and Western U.S.

- range in length from 9 - 21 cm, and the last tail segment contains the stinger that transmits a toxin
- most scorpions are harmless, but some can be lethal
- symptoms include pain, swelling, and itching at the sting site
- severe symptoms include numbness, difficulty swallowing, blurred vision, seizures, and difficulty breathing
- treatment is symptomatic with cool compresses and analgesics, and anti-venom

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Poisonous Snakes

The most common poisonous snakes in the U.S. are the coral snake, rattle snake, water moccasin, and copperhead, although there are many others.

- symptoms may include severe burning pain at the bite site, swelling that spreads out from the bite, weakness, trouble breathing, and changes in heart rate
- treatment is symptomatic and anti-venin through poison control centers and FabAV
Deer flies are about the same size as houseflies, and they are yellow or black in color, with patterned wings.

- mostly active on warm, sunny days with little wind
- thrive in areas such as beaches, lakes, or woods near damp areas
- bites are usually painful, but not severe
- can rarely transmit Tularemia
- prevent deerfly bites by wearing protective clothing and using insect repellent
Flies

House Fly

The housefly is a pest that is gray-colored and about 5-6 mm long:

- attracted to trash, manure, carrion, and moist areas
- can spread bacteria from those areas to home
- can spread diseases such as food poisoning and dysentery
- proper sanitation is essential to manage houseflies
- keep trash and food in sealed containers
Roaches

Cockroaches can be found all over the world and:

• carry diseases such as salmonella
• can cause allergic reactions
• symptoms include itchy skin, scratchy throat, itchy eyes and nose, and even asthma
• prevent cockroach infestation and manage allergic reactions by keeping home clean and in good repair, keeping trash covered, and use pest control if needed
• treatment is symptomatic
Mosquitoes

For the most part, mosquitoes cause itchy hives when they bite.

- can carry diseases such as West Nile virus, dengue fever virus, malaria, zika, and others
- scratching mosquito bites can also cause infection
- prevent mosquitoes by using netting, window screens and draining standing water
- use insect repellent when outdoors, wear protective clothing, and avoid being outdoors during peak mosquito hours of dawn and dusk
Mosquitoes

Chikungunya

The first case of locally acquired *chikungunya* virus, which is transmitted by the bite of a mosquito, has been reported in the United States. The case involved an unidentified man from Florida.

*Chikungunya* virus causes high fevers, joint pain and swelling, headaches and a rash. For some people, the pain can last even after other symptoms disappear.

*Chikungunya* can be fatal, although that's quite rare.
Mosquitoes

Zika

Zika virus is transmitted by *Aedes aegypti* or *albopictus* mosquitoes.

Symptoms of Zika are up to 1 wk:
- Fever
- Rash
- Joint pain
- Conjunctivitis
- Myalgias & headache are less common

Serious complication:
- Microcephaly with pregnancy
- No known treatment
Ceratopogonidae are a family of small flies (1–4 mm long) in the order Diptera that are also known as noseeums, midgies, sand flies, sand gnats, or punkies.

- live in warm aquatic areas of the world; more in evening
- leave large, red itchy bumps that may turn into a rash
- rash is several times as itchy as mosquito bites, and tend to last longer as well
- some transmit leishmaniasis, Bartonella and pappataci fever
Jellyfish are the major non-polyp form of the phylum *Cnidaria*, containing nematocysts that release venom.

- jellyfish sting may cause intense pain, rash, and welts that may progress to vomiting and muscle spasms
- severe reactions can cause respiratory failure, coma, and death
- pouring vinegar on area helps deactivate the nematocysts
- seek medical care to remove tentacles and nematocysts
- treatment with NSAIDs and rescue therapy for anaphylaxis may be necessary
Stingrays are cartilaginous fish related to sharks in the order *Myliobatiformes*, and have a tail with serrated venomous spines that can cause cuts and puncture wounds when accidentally stepped upon.

- symptoms include sharp pain, bleeding, vomiting, chills, paralysis, or death
- immerse the injured area in hot water to deactivate venom, remove the stingers, and scrub the wound with soap and fresh water
- apply pressure to stop the bleeding
- pain control with local anesthesia or IV narcotics may be needed
- wound care with irrigation, antibiotics, and possible surgical debridement
Bedbugs are reddish brown, and <1 - 5 mm in size. They are frequently found in bedding, but can also be found in areas of clutter, or in old furniture.

Bedbugs are parasitic insects of the *cimicid* family that feed exclusively on blood. *Cimex lectularius*, the common bed bug, is the best known, as it prefers to feed on human blood.
Most of the time, the reaction to a bedbug bite is mild, and usually in the form of small, red, itchy bumps. Treatment includes over-the-counter cortisone creams and antihistamines to relieve the itching. Excessive scratching can cause a secondary infection.
Goodnight & don’t let bedbugs bite!
American College of Allergy, Asthma & Immunology: “Insect Sting Allergy”; http://acaai.org/allergies/types/insect-sting-allergies
Centers for Disease Control and Prevention: ”Ehrlichiosis”; http://www.cdc.gov/ehrlichiosis/
Centers for Disease Control and Prevention: “Leishmaniasi”; http://www.cdc.gov/parasites/leishmaniasi/
Centers for Disease Control and Prevention: "Lice - Head Lice"; http://www.cdc.gov/parasites/lice/head/
Centers for Disease Control and Prevention: "Lyme Disease”; http://www.cdc.gov/lyme/index.html
Centers for Disease Control and Prevention: ”Rocky Mountain Spotted Fever”; http://www.cdc.gov/rmsf/index.html
Centers for Disease Control and Prevention: ”Tularemia”; http://www.cdc.gov/tularemia/
eMedicineHealth: "Black Widow Spider Bite”; http://www.emedicinehealth.com/black_widow_spider_bite/article_em.htm
eMedicineHealth: “Chiggers”; http://www.emedicinehealth.com/chiggers/article_em.htm#chiggers_quick_overview
eMedicineHealth: “Summer Skin Hazards”; http://www.emedicinehealth.com/slideshow_summer_skin_hazards_pictures/article_em.htm

Illinois Department of Public Health: “The House Fly and Other Filth Flies”; http://www.idph.state.il.us/envhealth/pcfilthflies.htm


Purdue University Medical Entomology: “Horse and Deer Flies”; http://extension.entm.purdue.edu/publichealth/diseases/tabanid.html

University of Florida: "Deer Flies, Yellow Flies, and Horse Flies"; http://entnemdept.ufl.edu/creatures/livestock/deer_fly.htm

University of Florida; “Stinging Caterpillars”; http://edis.ifas.ufl.edu/in014


WebMD Medical Reference: "Avoid Mosquito Bites and West Nile Virus"; http://www.webmd.com/a-to-z-guides/avoid-mosquito-infection

