Bites, Zoonotic Diseases & Stings

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When Fido Isn’t So Friendly

• Beware of fenced and gated yards.
• If disposition is unknown, don’t take a chance.
• Involve dog’s owner.
• If bitten and skin broken, determine if dog has had rabies shots. If not inoculated or unknown, dog must be tested (fatal) and if positive, you get rabies shots!
Rabies Inoculations

Three types of rabies inoculation or vaccine:

• One is a standard vaccine that prevents infection if given before infection.
• Another is used to treat someone who has already been exposed to the virus.
• The third type is used on animals to prevent outbreaks.
Rabies Inoculations

• The standard rabies vaccine is given to people who are likely to come into contact with the rabies virus (i.e., veterinarians, wildlife workers and rabies researchers).

• If exposure is likely, it should be reinforced with a regular booster.

• It does not make you completely safe, but it makes an infection much more likely to be survivable.

• Cost of inoculation: $500 - $800 each
Rabies Inoculations

• The post-exposure vaccine is given to people who have been bitten by a positively or potentially infected animal.

• It involves a course of injections and is usually effective in stopping progression of the disease.
Human Health Concerns in Dealing with Wildlife

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Human Health Concerns in Dealing with Wildlife

- Pathogens associated with nuisance wildlife saliva & excreta
- Precautionary measures
Rabies

- Pathogen: *Lyssavirus* spp.
- Raccoons, skunks, coyotes, ferrets, mink, foxes, bats (4-6% of bats tested), and occasionally groundhogs
- Mode of transmission: bite / saliva
- Early symptoms: apprehension, intimidation, headache, mild fever, sensory discomfort -- visual and auditory sensitivity
- Advanced symptoms: disorientation, agitation, hallucination, aggression, difficulty swallowing, hypersalivation, paralysis, respiratory failure, death
Raccoon Roundworm

- Pathogen: *Baylisascaris procyonis*
- Raccoon feces may contain eggs of this parasitic roundworm.
- Mode of transmission: exposure to feces or contaminated soil / oral
- Moderate: fever, blood disorders, lung conditions similar to pneumonia
- Severe: central nervous system disease, acute sensitivity to light, loss of vision, sometimes fatal to children
Histoplasmosis

- Pathogen: *Histoplasma capsulatum*
- Soil contaminated with feces of birds (esp. pigeons & geese) and bats; also accumulations of bird and bat feces in roosting areas
- Mode of transmission: Inhalation of fungal spores
- Mild: occasional dry cough
- Severe: frequent hacking cough (tuberculosis-like); sometimes fatal to untreated infected children
Chlamydiosis
(aka ornithosis, psittacosis, parrot fever)

• Pathogen: *Chlamydiophila psittaci*

• Feces of certain birds (esp. pigeons & mallards)

• Mode of transmission: Contact with (ingestion or inhalation of) **bacterial spores**

• Early: fever, headache, chills, upper respiratory infections

• Advanced: enlarged spleen and liver, vomiting, diarrhea, depression, disorientation and delirium
Echinococcosis
(aka Hydatidosis)

- Pathogen: *Echinococcus* spp.
- Foxes and coyotes
- Mode of transmission: oral -- accidental ingestion of larval cystic stage of tapeworms
- Less severe: allergic reaction if antigens leak from cysts in liver, lungs, kidneys or spleen
- More severe: formation of abscesses; compromised organ function; anaphylaxis and shock if cysts rupture
Leptospirosis

- Pathogen: *Leptospira interrogans*
- Urine of raccoons, skunks, opossums, Norway rats, mice, white-tailed deer
- Mode of transmission: oral & cuts -- ingestion / introduction of bacteria from contaminated water, food and soil
- Early: fever, headache, chills, weakness, vomiting, muscle pain, conjunctivitis (inflammation of eyelids)
- Advanced: jaundice, kidney damage, blood disorders, hemorrhages of the skin and mucous membranes, death
Toxoplasmosis

- Pathogen: *Toxoplasma gondii*
- Feces of feral cats
- Mode of transmission: oral – accidental ingestion of single-celled parasite from feces and feces-contaminated soil
- Mild: no symptoms
- Moderate: swollen lymph glands and muscle aches (flu-like symptoms)
- Severe: damage to the brain, eyes and other organs, especially in people with weak/compromised immune systems
Salmonellosis

- Pathogen: *Salmonella enteriditis*
- Feces of pigeons, house sparrows, mallards, opossums, Norway rats, house mice, deer mice, white-tailed deer
- Mode of transmission: oral – accidental ingestion of *bacteria* from feces and feces-contaminated surfaces
- Moderate: headache, abdominal pain, diarrhea, nausea, vomiting
- Severe: dehydration, fever, bacterial septicemia (blood poisoning), damage to heart, liver or kidneys
Lymphocytic Choriomeningitis

- Pathogen: *LCM Arenavirus*
- Feces, urine and saliva of house mice
- Mode of transmission: oral – accidental ingestion of *virus* particles from excreta, saliva and contaminated food, surfaces and nesting materials
- Early: headache, fever, malaise, lack of appetite, muscle aches, nausea and vomiting
- Advanced: meningitis, stiff neck, drowsiness, confusion, sensory disturbances, motor abnormalities, hydrocephalus and myelitis (inflammation of the spinal cord)
Hantavirus Pulmonary Syndrome

- Pathogen: *Hantavirus* spp.
- Feces, urine and saliva of deer mice and white-footed mice
- Mode of transmission: oral – inhalation of virus particles from excreta, saliva and contaminated nesting materials
- Early: fever, headache, myalgia (muscle pain) and dry cough
- Advanced: acute pulmonary insufficiency (pneumonia-like); fluid accumulation in lungs; respiratory failure (in ~60% of cases)
Precautionary Measures

- **Personal protective equipment:**
  - Disposable gloves
  - Disposable coveralls
  - HEPA respirator

- **Risk-reducing practices / habits**
  - Frequent washing/sanitizing of hands
  - Sanitizing of clothing and leather gloves
  - Sanitizing service vehicle cargo bed
  - Sanitizing traps

*Sanitizers can be soap/detergent-based, alcohol-based, bleach-based or combination.*
Stinging Insects

Yellowjackets

> 16+ species in the U.S.
> 2 common Ohio species
> Reproductives emerge in late summer and mate.
> Mated females (new queens) overwinter in tight cavities and insulated voids.
> Queens establish starter nests in early June
Stinging Insects

Yellowjackets

- German yellowjacket (*Vespula germanica*)
  > One of the most economically important species in the world.
  > Abundant in the eastern and Midwestern U.S.
Stinging Insects

Yellowjackets

German yellowjacket nest in soffit

> Annual nests in the North; perennial nests in warm climates

> Occupy larger structural voids

> Tens of thousands of individuals in nest by October.
Stinging Insects

Yellowjackets

- Eastern yellowjacket (*Vespula maculifrons*)
- Another abundant species in the eastern and Midwestern U.S.
Stinging Insects

Yellowjackets

- Baldfaced or white-faced hornet
  \((Dolichovespula maculata)\)

> Not a true hornet; actually a species of yellowjacket
Stinging Insects

Yellowjackets

Baldfaced hornet

nest

> Nests on trees, shrubs and sheltered recesses of buildings

> Usually 250 – 500 individuals per mature colony / nest
Inside a baldfaced hornet nest
Stinging Insects

Yellowjackets

Baldfaced hornet nest

> Nests on trees, shrubs and sheltered recesses of buildings

> Usually 250 – 500 individuals per mature colony / nest
Stinging Insects

*Polistes* paper wasps

> 17+ species in the U.S.

- Northern paper wasp (*Polistes fusca*ta*)

> Previously the most common species in the Midwest and North
Stinging Insects

*Polistes* paper wasps

- Metricus paper wasp
  
  (*Polistes metricus*)
Stinging Insects

Polistes paper wasps

• European paper wasp
  (Polistes dominula)
  > Looks like a yellowjacket
  > Introduced to the U.S.
    east coast in 1981
  > First noticed in Ohio in 1992
  > Anticipated distribution coast to coast
More on the European paper wasp

> Extremely alert to motion within several feet of nest
> Less discriminating than most other paper wasps in choosing nesting sites
> Vertical anchoring surfaces commonly used for nests
> Nests established earlier in spring than those of native species
> Numbers increase at greater rate

Photo courtesy of Gene White
Stinging Insects

*Polistes* paper wasp nests

- Umbrella-like shape
- Attached by one or more paper stalks
- Exposed developmental cells
Stinging Insects

Mud daubers

> Provision larvae with paralyzed spiders

• Organpipe mud daubers

  (Trypoxylon politum, T. clavatum)
Stinging Insects

Mud daubers

Organpipe mud dauber nest

> Developmental cells arranged end to end within each “pipe”
Stinging Insects

Mud daubers

• Black and yellow mud dauber
  \textit{(Sceliphron caementarium)}

Photo: The Audubon Society
Stinging Insects

Mud daubers

Black and yellow mud dauber nests

> Developmental cells arranged side by side
Honey bees

( *Apis mellifera*)

> Gentle strains from Europe and Asia

➢ Often construct perennial hives (layers of wax honeycombs) in structural voids

➢ Some strains are dark (e.g., German & Russian)
Stinging Insects

Honey bees
( *Apis mellifera* )

> Barbed sting pulls out along with venom sac and bee bleeds to death
> All other bees and wasps can sting repeatedly

Source: Zach’s Bee Photos
Stinging Insects

Honey bees
( *Apis mellifera*)

- Springtime swarms are commonplace
- Beekeepers often collect exposed swarms at no cost
- Keep a list of local beekeepers handy
... but once a swarm moves inside a structure, usually it’s up to a pest management professional!
Stinging Insects

Eastern carpenter bee

*(Xylocopa virginica)*

> Excavate tunnels in soft structural wood in which to rear their larvae

> One generation per year in the North

> Adults overwinter in galleries
Stinging Insects

Eastern carpenter bee

> Similar to bumble bees (Bombus species) except for shiny, naked abdomen and larger (more muscular) head and jaws
Stinging Insects

Eastern carpenter bee
damage to pine
fascia board
Carpenter Bee Entry Hole Variability

Bottom surface of board

Hidden inside surface of board

Lower inside and outside surfaces of board

Hidden outside surface of board

- roof
- fascia board
- gutter
- soffit
Other Carpenter Bee Evidences

- Eastern carpenter bee fecal and pollen stains indicative of hidden entry hole into fascia board.

- Woodpecker damage to carpenter bee-infested fascia board.
Stinging Insects

Personal protective equipment:
Traditional beekeeper helmet, veil, coveralls, & gloves.

Personal protective equipment:
Specialty garments (e.g. Sting Guard®)
Stinging Insects

**Anaphylactic shock / anaphylaxis:**
A sudden, severe allergic reaction / hypersensitivity characterized by a sharp drop in blood pressure, urticaria, and asthma-like breathing difficulties caused by exposure to a substance, such as a foreign protein or insect venom, after a preliminary or sensitizing exposure. The reaction may be fatal if emergency treatment, including epinephrine injections, is not given immediately.
Stinging Insects

- **Personal protective equipment:**
  - Sting pain reliever product (i.e., topical anesthetic, ammonia solution, MSG solution)
  - Emergency kit with epipen to buy time until sting victim can be attended by a health care professional / EMS.
All spiders have venom but few are dangerous to humans.
Hourglass Spiders
(Theridiidae)

Black (southern) widow
*Latrodectus mactans*

Northern widow
*Latrodectus variolus*

Neurotoxic venom-affect central nervous system
Brown / Violin Spiders (Sicariidae)

Brown recluse
*Loxosceles reclusa*

Mediterranean recluse
*Loxosceles rufescens*

Cytotoxic venom - tissues killed, causing lesion
Brown Spider Diagnostic Features:

> 6 eyes arranged in 3 groups of 2 (diads)

> violin pattern on carapace
Conditions That Have Been Misdiagnosed as Recluse Bites:

**Bacterial infections:**
- *Streptococcus* spp.
- *Staphylococcus* spp.
- Methicillin-resistant *Staphylococcus aureus* (MRSA)
- *Herpes simplex*
- *Herpes zoster* (shingles)
- Diabetes ulcer
- Fungal infection

**Erythema multiforme**
**Pyoderma gangrenosum**
**Lymphomatoid papulosis**
**Localized vasculitis**
**Squamous cell carcinoma**
**Syphilitic chancre**
**Lyme disease**
**Chemical burns**
**Poison ivy / oak dermatitis**

**Insect bites:**
- Assasin bug
- Bed bug
- Fleas

Best de-bunking website:
http://spiders.ucr.edu/
Harvestmen
(Opiliones: Phalangiidae)

Are daddy-longlegs spiders?
Are they venomous?

No and No.
Snakes

Most snakes encountered in Ohio are non-venomous.
Snakes

- Don’t be fooled by saddle-like patterns along the length of the body. Many harmless snakes are multi-colored, including:
  - juvenile black rat snakes,
  - northern water snakes,
  - fox snakes,
  - milk snakes,
  - corn snakes,
  - king snakes,
  - garter snakes and others
Snakes

Eastern fox snake

Eastern milk snake

Corn snake

Eastern garter snake
Snakes

- The few venomous species, pit vipers, that occur in Ohio are the Massasauga or pygmy rattlesnake, timber rattlesnake (both rarely encountered in mostly undisturbed, wild settings) and the copperhead (found near creeks and streams in rural, wooded settings)
Snakes

- If bitten by a non-venomous snake, wash bite area. An ensuing infection is possible.
- If bitten by a venomous snake, keep calm but seek immediate medical attention. Contact Nationwide Children’s Hospital / Central Ohio Poison Center: (http://www.nationwidechildrens.org/poison-center; 800-222-1222).
- Antivenin may be available for treatment.
If only I had worn my PPE!