

Rabies Management Training: How-To for Local Health Jurisdictions



State of Montana

September 8, 2021



MONTANA
COMMUNICABLE
DISEASE EPIDEMIOLOGY



Rabies Management: How-To for Local Health Jurisdictions

This course will provide local public health nurses with multiple training modules that can be adapted for further training to those specific target audiences. These modules include a general rabies overview covering epidemiology, pathobiology, laws, roles and responsibilities as well as risk assessment, prophylaxis recommendations and wound treatment for health care providers, animal vaccinations and specimen submissions for veterinarians, and information regarding animal quarantines, bite reporting for law enforcement and animal control. All modules cover rabies relevant materials for public health nurses for education and further distribution.

Presenters

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Resources

1. Montana Code Annotated, Title 50, Chapters 1,2,23
2. Administrative Rules of Montana, 37.114.[101-571]
3. American Public Health Association. Control of Communicable Diseases Manual, 20th Edition, 2015.
4. Centers for Disease Control and Prevention. Human Rabies Prevention --- United States, 2008: Recommendations of the Advisory Committee on Immunization Practices. MMWR
5. Centers for Disease Control and Prevention. Use of a Reduced (4-Dose) Vaccine Schedule for Postexposure Prophylaxis to Prevent Human Rabies, Recommendations of the Advisory Committee on Immunization Practices. MMWR March 19, 2010
6. Journal of the American Veterinary Medical Association. Compendium of Animal Rabies Prevention and Control. March 1, 2016, Vol. 248, No. 5, Pages 505-517

A banner with a central rectangular box containing the word "Agenda" in bold black text. The banner has a light gray background and a black outline. The ends of the banner are folded over, creating a ribbon-like effect.

Agenda

9:30 am	Welcome
9:45 am	Public Health Module – Erika
10:50 am	Break
11:00 am	Healthcare Provider Module – Jen
12:00 pm	Scenarios – Small group discussion
12:30 pm	Lunch
1:00 pm	Veterinarian Module –Anna
2:00 pm	Animal Management Module - Jen
2:45 pm	Break
3:00 pm	Rabies exposure exercise- All
4:00 pm	Adjournment

There is no conflict of interest for any planner or presenter involved with this activity.

Please note, the Montana Board of Veterinary Medicine does not pre-approve any courses or sponsors. Each licensee is responsible for taking courses which relate directly to the scope of practice of veterinary medicine as defined in board statute. Licensees are responsible for selecting quality programs that contribute to their knowledge and competence.

CE hours awarded by various agencies:

- Sanitarians will receive 5.5 CE hours
- Veterinarians can claim 5.5 hours if they choose to do so
- Law enforcement will receive 5.5 POST hours
- Nursing CEs were not sought due to 2020/2021 waiver

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PUBLIC HEALTH MODULE

Rabies Virus

- Belongs to order Mononegavirales
 - Family *Rhabdoviridae*, genus *Lyssavirus*
- Rabies virions are bullet-shaped with 10-nm spike-like glycoprotein peplomers covering the surface.
- The rabies virus genome is single-stranded RNA
- Affects only mammals
 - Highest case fatality rate of any etiological agent
 - Leading viral zoonosis
- 90% of cases occur in wildlife in the US

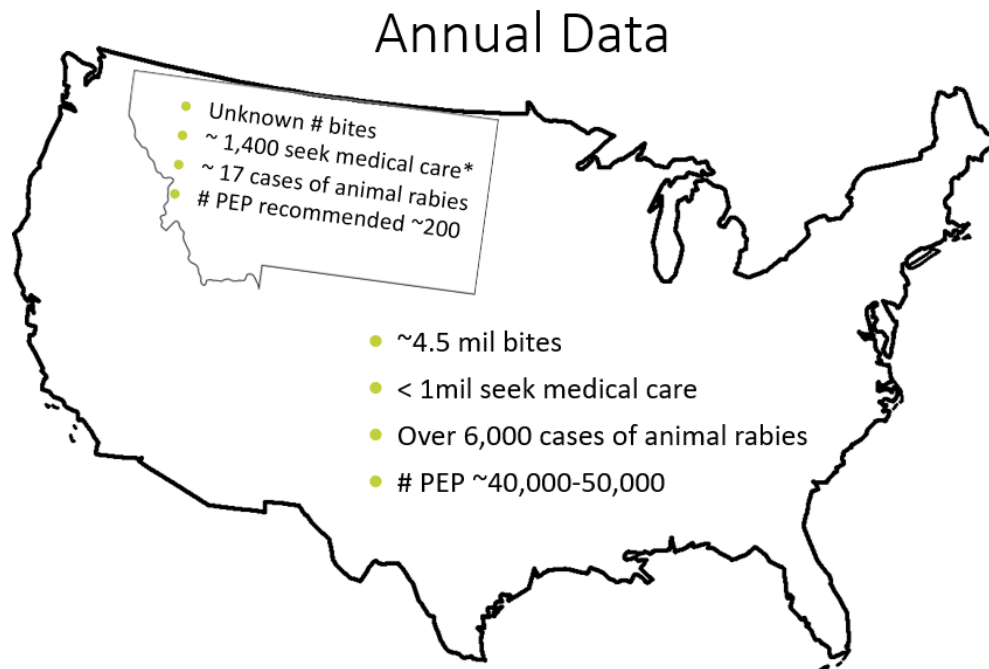
History

One of the oldest described infectious diseases, known for four thousand years

- “Hair of the dog that bit you” was a Greek method to prevent rabies
- In 2300 BC, dog owners in Babylon fined for deaths caused by their dogs biting people
- In 1703, the first case of rabies reported in the Americas ID'd in Mexico

EPIDEMIOLOGY

Why is rabies still a concern?



*Hospital discharge data is provided through the Montana Hospital Discharge Data System courtesy of the Montana Hospital Association. Data from 2010-2018.

Rabies in Montana

In 2020, 423 animals tested (500 a year typical)

- 38% bats
- 26% dogs
- 22% cats
- 7% other wildlife (including skunks)
- 7% other domestic animals
- Most involve human or animal exposure
- 3.1% were positive
- In general, most are bats and skunks
 - 8.7% of bats tested were positive
 - Rarely dog, cat or livestock (one cat so far in 2021)



The winged bullet

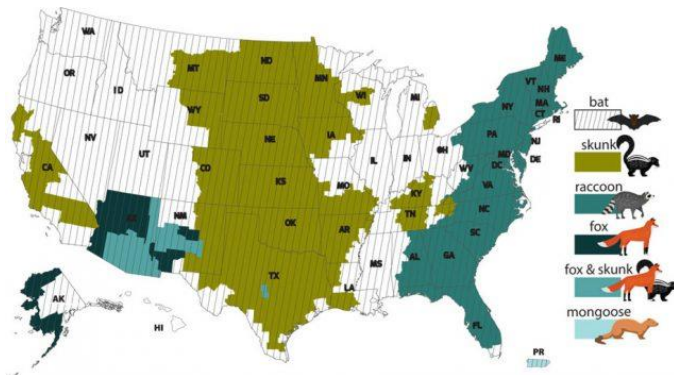


Exposures to bats and international travel require additional evaluation.

Rabies Distribution

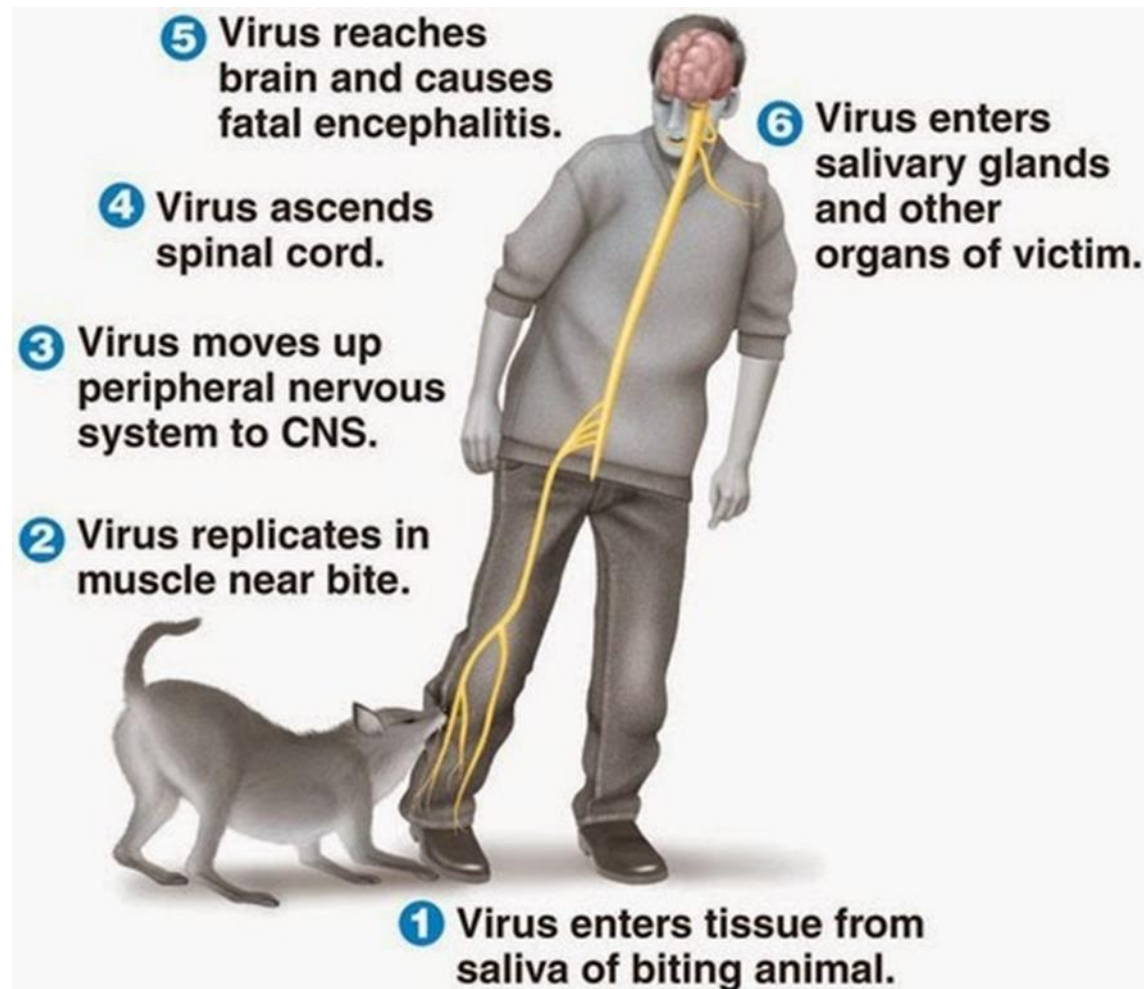
Terrestrial distribution varies by region (raccoon, skunk, fox, coyote)

- Bats with rabies found in every state but Hawaii



PATHOBIOLOGY

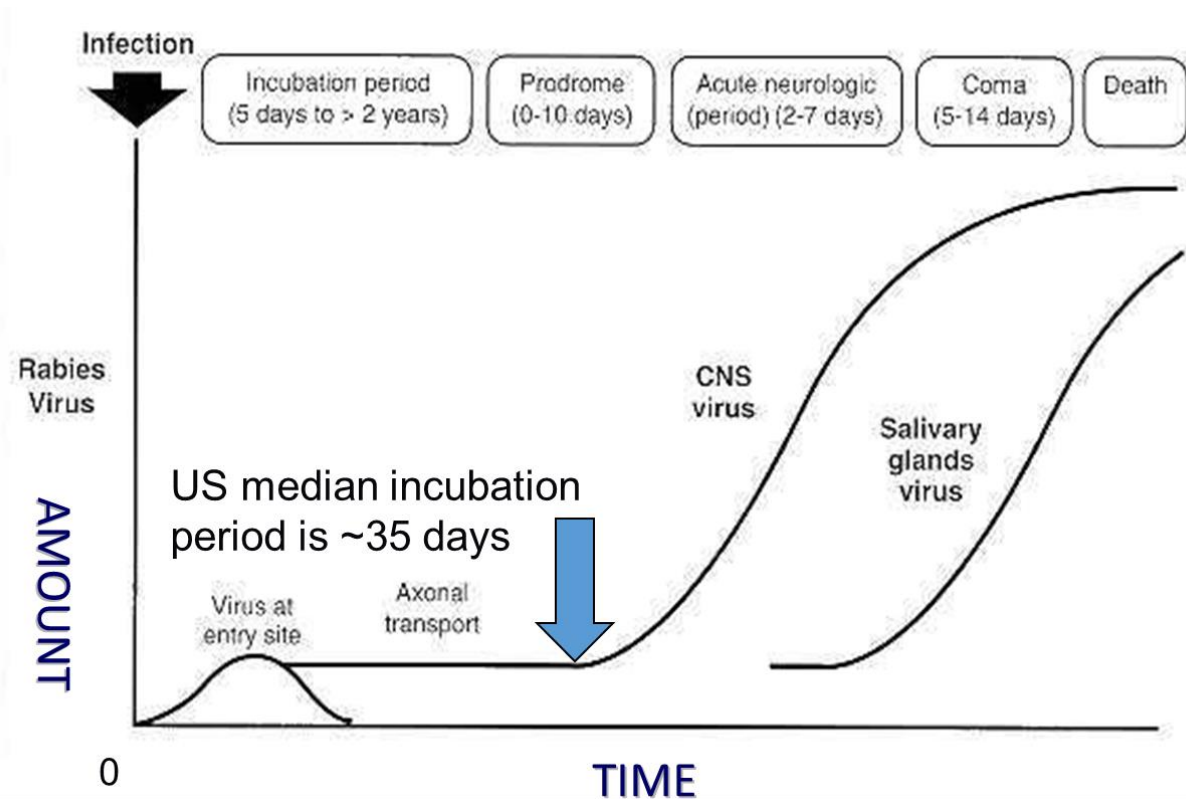
Transmission/ Pathogenesis



How long does it take to develop symptoms?

Answer: _____

Scheme of Rabies Virus Pathogenesis



Neuronal retrograde viral transport is estimated at ~50 - 100 mm/day (Tsiang et al., 1991)
Five day incubation period not observed in US.

Table 1: Signs and Symptoms of Rabies in Animals and Humans

Animal [domestic]	Animal [wildlife]	Human
<ul style="list-style-type: none"> • Fearfulness • Aggression • Excessive drooling • Difficulty swallowing • Staggering • Seizures • Depression • Self-mutilation • Light sensitivity 	<ul style="list-style-type: none"> • Any of domestic animal • Unusual behavior <ul style="list-style-type: none"> • Nocturnal animal active during day • Lose fear of humans 	<ul style="list-style-type: none"> • Early symptoms are non-specific <ul style="list-style-type: none"> • Fever • Headache • General malaise • Progresses to encephalitis or myelitis <ul style="list-style-type: none"> • Autonomic instability • Dysphagia • Hydrophobia • Paresis or paresthesia • Progressive worsening neurologic signs • Negative test for other etiologies of encephalitis

Rabies Human Deaths

World	United States	Montana
<ul style="list-style-type: none">• ~55,000 deaths• 40-70% <15years old• One death every 15 minutes	<ul style="list-style-type: none">• Avg. 3 deaths/yr• 70% domestic (bats, organ transplant, raccoon)• 30% imported (mainly dog bites)• Deaths often due to unawareness of exposure and lack of seeking medical attention	<ul style="list-style-type: none">• No deaths in 23 years!• 2 deaths: 1996 & 1997• Both bat variant• Unaware of exposures (one case reportedly chased bats out of house one month prior illness onset)• Missoula & Blaine County

PUBLIC HEALTH LAW

Montana Code Annotated (MCA)

- 37-2-301 Duty to report cases of communicable disease
- 50-1-1 Definitions (8) *Local Health Officer*
- 50-2-116 Powers and duties of local boards of health
- 50-2-118 Powers and duties of local health officers
- 50-2-120 Assistance from law enforcement officials
- 50-2-122 Obstructing local health officer in the performance of duties unlawful

Administrative Rules of Montana (ARM)

- 37.114.102 Local Board Rules
- 37.114.105 Incorporation by Reference
- 37.114.201 Reporters
- 37.114.203 Reportable Conditions
 - Rabies in a human or animal; exposure to a human by a species susceptible to rabies infection;
- 37.114.204 Reports and Report Deadlines
- 37.114.314 Investigation of a case
- 37.114.571 Rabies exposure

Additional reporting requirements through Department of Livestock (ARM 32.3.1201 through 32.3.1207) describe management of animals and complement DPHHS rules.

How might you hear about a potential rabies exposure?

Answer: _____

What to do when a potential exposure is identified?

37.114.571 Rabies Exposure

- (1) **Control measures** outlined in the Control of Communicable Diseases Manual must be applied for confirmed or suspected exposures to a human by a species susceptible to rabies infection.
- (2) The local health officer must **investigate each report of possible rabies exposure** and gather, at a minimum, information about the circumstances of the possible rabies exposure; nature of the exposure; name, age, and address of the exposed individual; vaccination status of the animal in question; treatment of the exposed person; and eventual outcome for both animal and person involved.
- (3) As soon as possible, after investigating a report of possible rabies exposure, the local health officer must inform the exposed person or the individual responsible for the exposed person if that person is a minor **whether or not treatment is recommended** to prevent rabies and provide a referral to a health care provider.
- (4) Whenever the circumstances involve a **dog, cat, or ferret**, the local health officer must:
 - (a) **arrange for the animal to be observed** for signs of illness during a ten-day quarantine period at an animal shelter, veterinary facility, or other adequate facility, and ensure that any illness in the animal during the confinement or before release is evaluated by a veterinarian for signs suggestive of rabies; and
 - (b) if the symptoms observed are consistent with rabies, order the animal euthanized and the head sent to the Department of Livestock's diagnostic laboratory at Bozeman for rabies analysis. The local health officer may also order an animal euthanized subsequent to isolation, and the brain analyzed.

History: 50-1-202, 50-2-118, MCA; IMP, 50-1-202, 50-2-118, MCA; NEW, 1987 MAR p. 2147, Eff. 11/28/87; AMD, 2000 MAR p. 2528, Eff. 9/22/00; TRANS, from DHES, 2002 MAR p. 913; AMD, 2013 MAR p. 967, Eff. 6/7/13.

Reporting to DPHHS

37.114.204 Reports and Report Deadlines

- (4) For any animal bite to a human by a species susceptible to rabies infection, the local health officer must report by secure electronic means to the department documentation of a rabies post-exposure prophylaxis recommendation and/or administration on a form provided by the department within seven calendar days of the recommendation or administration.

- Rabies PEP is 100% transitioned to reporting in MIDIS

EXPOSURE RISK ASSESSMENT

Should Anti-Rabies Prophylaxis be administered?

1. Validity of exposure:
 - a. Was there a bite, scratch or open wound?
 - b. Was a bat found in a bedroom?
 - c. How did the person have contact to the animal?
2. Animals species:
 - a. High or low risk?
3. Animal behavior:
 - a. Did the animal act normal?
 - b. Was the bite provoked?
4. Likelihood of quarantine/testing:
 - a. Can the animal be captured and observed?
 - b. Can the animal be tested for rabies?
5. Epidemiology:
 - a. Where did the exposure occur?
 - b. What animals are high risk in that area?
 - c. Travel?

Was there an exposure?

- A bite (penetration of the skin by teeth) from a known or suspect rabid animal
- Scratches, abrasions, open wounds (bleeding within 24 hrs), or mucous membranes (eyes) contaminated with saliva or other potentially infectious material from a known or suspect rabid animal
- Organ transplant, laboratory accidents (rare)
- Special consideration for bats!

A word on bats...

- About 92% of bats tested are not rabid in MT
- About 7 in 10 cases of human rabies acquired in US. are bat-associated strains as of 2019.
- Bat acquired rabies (1990-2007) (N=34)
 - 23% bite
 - 44% physical contact, but no bite
 - 32 % no bat contact
- Bite wounds from bats are extremely small and may be nearly undetectable within hours.












Exposed to bat... or not?

- Reasonably sure a bite, scratch or mucous membrane exposure did not occur ☑ No PEP
- Persons who may not be able to make that assessment:
 - Deeply sleeping person (naturally or due to sedating medication)
 - Unattended child
 - Mentally disabled person
 - Intoxicated person
- Normal roosting and flying activity less likely to create an undetected exposure

Other considerations

- Contact such as petting an animal or contact with urine, feces or skunk spray does not constitute an exposure
- Not spread via fomites
- Virus inactivated by
 - Desiccation, Ultraviolet irradiation, Other environmental factors
 - If material is dry, considered non-infectious
- Does not persist in environment

Risk categories for animals in Montana

<u>HIGH RISK</u>	<u>MEDIUM RISK</u>	<u>LOW RISK</u>	<u>ALMOST NO RISK</u>
<ul style="list-style-type: none">• Bat• Skunk	<ul style="list-style-type: none">• Fox• Dog – feral• Wolf Hybrid• Cat - feral• Other non-rodent wild animals species (raccoon, opossum, bear, deer, coyote)• Groundhog*	<ul style="list-style-type: none">• Dog - owned• Cat – owned• Livestock	<ul style="list-style-type: none">• Squirrel, chipmunk• Rat• Mouse, vole• Indoor small caged pet rodent• Lagomorph
	  	  	 

*From 1990 through 1996, in areas of the country where raccoon rabies was enzootic, woodchucks (groundhogs) accounted for 93% of the 371 cases of rabies among rodents reported to CDC.

Normal or abnormal behavior?

- Was the bite provoked?
 - Feeding considered provoked
- Nocturnal vs. diurnal
- Wild vs. tame
- Stressed/ injured/ sick animal



Can The Biting Animal Be Confined & Observed?

1. Healthy dogs, cats and ferrets may be confined and observed for 10 days
2. No observation period for livestock:
 - a. Exposures need case-by-case assessment
3. Raccoons, skunks, fox, groundhogs and other wildlife may excrete rabies virus while asymptomatic for extended periods and cannot be safely confined & observed.
 - a. Assumed rabid unless testing proves negative
 - b. Otherwise prophylaxis of bite victim is usually recommended

Epidemiology

- Distribution of rabies in MT, U.S., World: Terrestrial rabies distribution
- Travel considerations

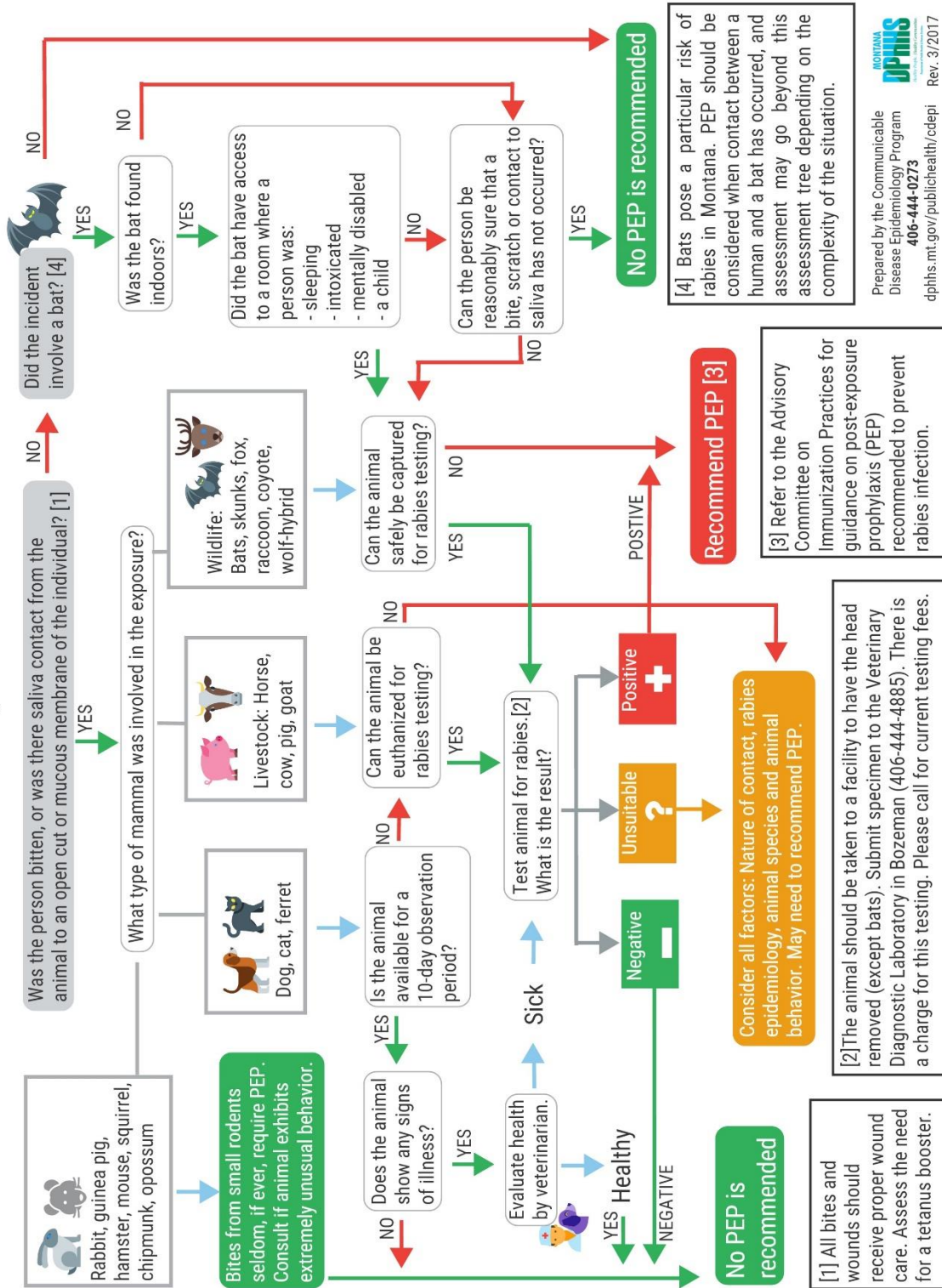
Before Administering PEP.... Consider:

- Medical urgency, not emergency
- Consult with LHJ
- Animal species and risk of infection
- Exposure evaluation
- Likelihood and timing for animal capture for confinement or testing
- Epidemiology of rabies in your area
 - Requires advanced knowledge of rabies reservoirs
 - International travel considerations

Humans Rabies Prevention: General Population

- Pre-exposure vaccination of domestic animals & individuals at high-risk exposures
- Avoid contact with wildlife reservoirs
- Prompt recognition and reporting of potential exposures to public health and medical community
- Public education: messaging, avoid exposures, vaccinate pets
- Public policy: Vaccination requirements, ordinances

Montana Rabies Exposure Assessment Tree



HEALTH CARE PROVIDER MODULE

BEFORE RABIES EXPOSURES OCCUR

Pre-exposure Vaccination (Humans)

- Recommended for:
 - Veterinarians and veterinary technicians
 - Animal control officers/shelter workers
 - Rabies laboratory personnel
 - Persons working with wildlife
- Provides protection from unapparent exposures and when treatment is delayed
- Simplifies and reduces cost of post-exposure prophylaxis
- Also recommended for certain travel destinations and activities

CDC Recommended Pre-Exposure Vaccine Series

- 3-dose series 1.0 mL intramuscular regimen

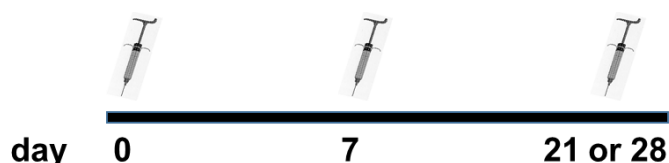


TABLE 6. Rabies pre-exposure prophylaxis guide — United States, 2008

Risk category	Nature of risk	Typical populations	Pre-exposure recommendations
Continuous	Virus present continuously, often in high concentrations. Specific exposures likely to go unrecognized. Bite, nonbite, or aerosol exposure.	Rabies research laboratory workers; rabies biologics production workers.	Primary course. Serologic testing every 6 months; booster vaccination if antibody titer is below acceptable level.*
Frequent	Exposure usually episodic, with source recognized, but exposure also might be unrecognized. Bite, nonbite, or aerosol exposure.	Rabies diagnostic laboratory workers, cavers, veterinarians and staff, and animal-control and wildlife workers in areas where rabies is enzootic. All persons who frequently handle bats.	Primary course. Serologic testing every 2 years; booster vaccination if antibody titer is below acceptable level.*
Infrequent (greater than population at large)	Exposure nearly always episodic with source recognized. Bite or nonbite exposure.	Veterinarians and animal-control staff working with terrestrial animals in areas where rabies is uncommon to rare. Veterinary students. Travelers visiting areas where rabies is enzootic and immediate access to appropriate medical care including biologics is limited.	Primary course. No serologic testing or booster vaccination.
Rare (population at large)	Exposure always episodic with source recognized. Bite or nonbite exposure.	U.S. population at large, including persons in areas where rabies is epizootic.	No vaccination necessary.

* Minimum acceptable antibody level is complete virus neutralization at a 1:5 serum dilution by the rapid fluorescent focus inhibition test. A booster dose should be administered if the titer falls below this level.

Source: CDC. *Human rabies prevention—United States, 2008: recommendations of the Advisory Committee on Immunization Practices. MMWR 2008*

AFTER AN EXPOSURE OCCURS

A patient presents to the ER or urgent care clinic with an animal bite:

- Wash the wound well with soap and water.
 - Irrigation with a virucidal agent, such as diluted povidone-iodine, is also recommended.
 - Quaternary ammonium compounds are not considered superior to soap and water.
 - Wound cleansing can greatly reduce the risk of contracting rabies.
- Assess need for tetanus booster, wound management
- Gather information regarding bite for reporting

How Can Public Health Help Medical Providers with Rabies PEP?

Animal bites require assessment of a provider to:

- Assess damage to tissues
- Clean the wound
- Primary wound closure when indicated
- Collect a vaccination history in regards to rabies vaccination and tetanus status
- Refer to other providers when indicated (ortho, plastic surgeons for severe bites)

Rabies PEP in the ER or Urgent Care

In the vast majority of instances, rabies PEP can wait:

- It may be unnecessary if the animal is successfully confined (only applies to dogs, cats, and ferrets)
- It gives time to locate the animal in cases of strays
- It gives time to test other animals, like bats and skunks
- It is a medical urgency, not emergency

Public Health Consultation for the ER and Urgent Care

Consultation with public health can include the following benefits (aside from being required by law):

- Can help reduce unnecessary PEP=Reduced cost for facility and patient
- Coordination of animal follow-up
- Identify additional exposures
- Many times, public health can administer the remainder of the series after the HRIG and first dose of vaccine

Other Considerations

- Vaccine and human rabies immune globulin (HRIG) shortages
- Insurance companies may not pay unless public health is consulted prior to administration
- Once you start the rabies PEP, the timeline must be followed
- Other entities may recommend rabies PEP to providers or patients
 - Even in these occasions, contact public health prior to administration

Post-exposure prophylaxis for rabies

Rabies Post-Exposure (PEP) for Previously Vaccinated Patients

After cleansing the wound and public health consult, only vaccine is administered.

Do not administer HRIG-this may interfere with rabies antibodies already present from the prior vaccination!

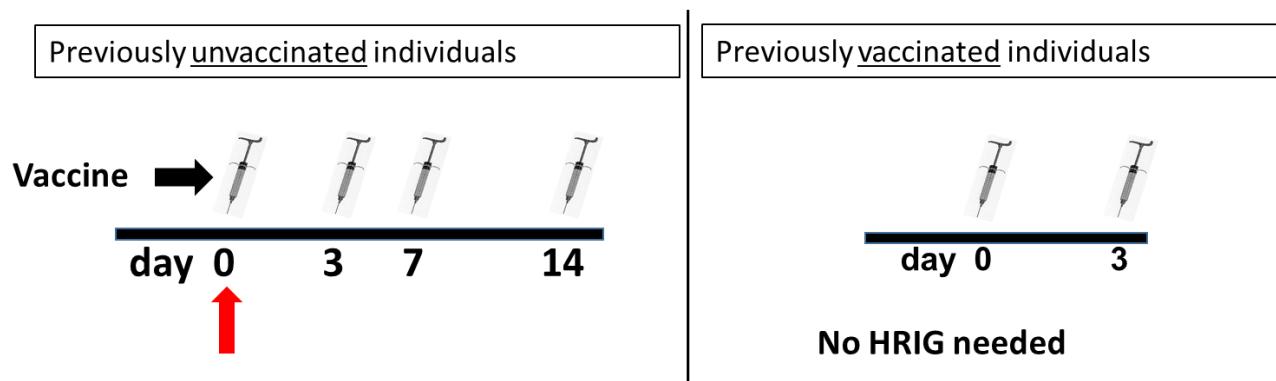
Rabies Post-Exposure (PEP) for Unvaccinated Patients

After cleansing the wound and public health consult, two biologics are administered:

1. (HRIG) – confers immediate protection with antibodies for rabies virus
2. Rabies Vaccine - patient develops antibodies over a 2 to 4 week period

CDC Recommended PEP Schedule*

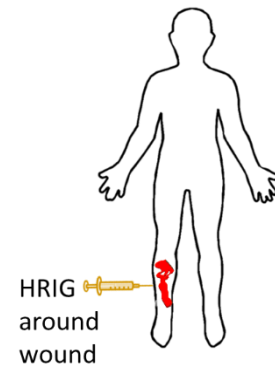
- Standard intramuscular regimen.
- One dose into deltoid on each of days:



*Reduced dose regimen recommended in 2010. Five dose series still used for some situations with doses on days 0, 3, 7, 14, and 28.

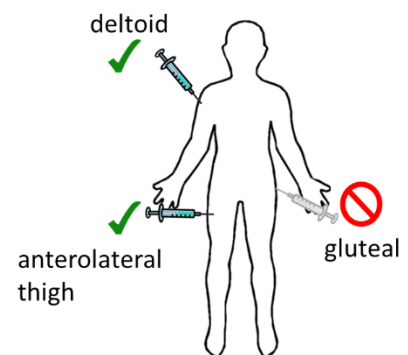
Where to administer immunoglobulin?

- HRIG around or inside wound
- Remaining volume IM at site distant from vaccine
- 20 IU/kg body weight
- Never use same syringe as vaccine
- Do not administer more than necessary
- Do not administer after day 7 or dose 3 of vaccine
- In cases of exposures without a wound (i.e.-mucosal exposures to fluids), inject away from vaccination site
- Some sites less than ideal (nose, toes, fingers, etc)



Where to administer rabies vaccine?

- Deltoid only acceptable site for adults and older children
- Younger children anterolateral thigh okay
- Opposite of HRIG site
- Never at same site of HRIG
- Never in gluteal area: Doses given here will not count!
- Dose is not decreased for children
- Intradermal administration not recommended in US



Adverse Effects

Rabies Vaccine

- Site reactions (mild)-soreness, redness, swelling, or itching where the shot was given (30% - 74%)
- Systemic reactions (mild)-headache, nausea, abdominal pain, muscle aches, dizziness (5% - 40%)
- Hives, pain in the joints, fever have been reported (about 6% of booster doses)
- Four cases of Guillain-Barre Syndrome have been reported post-vaccination, but it is so rare, it's unclear if it was due to rabies vaccination

Immune Globulin

- Severe headaches have been reported
- Moderate systemic (headache and malaise) reactions
- Site Reactions (mild)-tenderness, pain, erythema, induration, pruritus, regional adenopathy

Allergic reactions have been reported for both agents, and can be severe.

Deviations from the Schedule

- If deviation occurs, maintain original interval.
- Deviations of few days forgivable, longer needs assessment
- Example:
 - If a patient misses the dose scheduled for day 7 and presents for vaccination on day 10, the day 7 dose should be administered that day and the schedule resumed, maintaining the same interval between doses.
 - When substantial deviations from the schedule occur, immune status should be assessed by performing serologic testing 14 days after administration of the final dose in the series.

SPECIAL CONSIDERATIONS

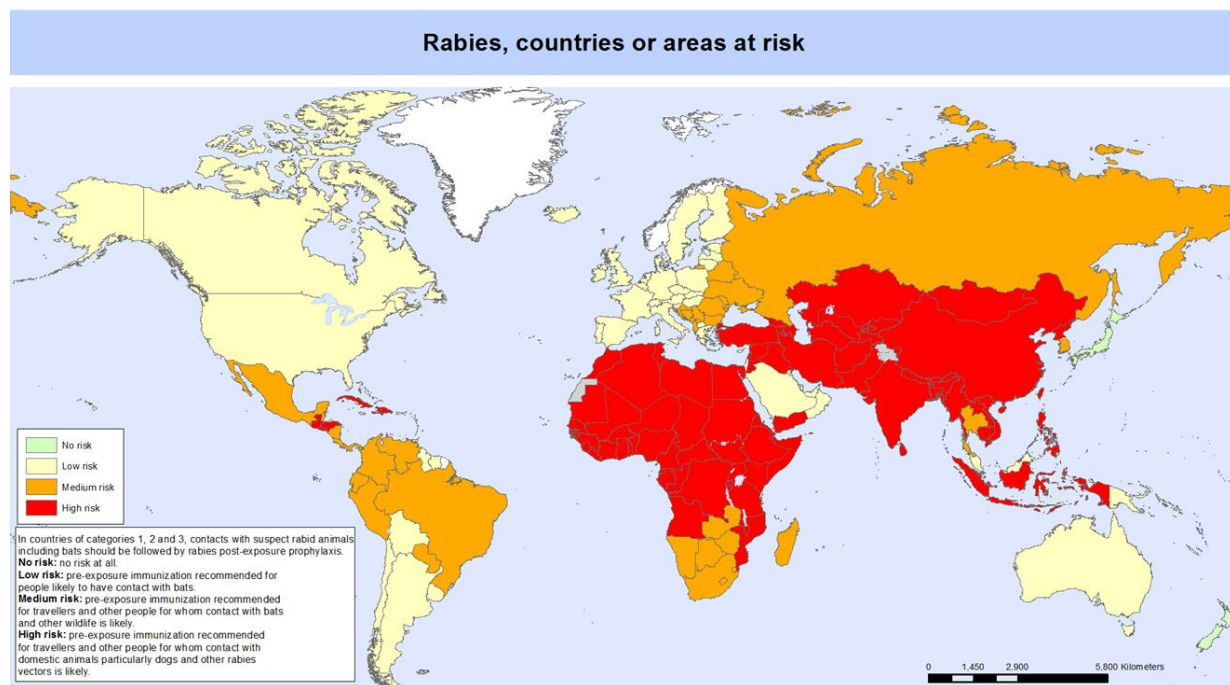
Rabies PEP and the Immunocompromised

Considerations for pregnancy

- Randomized studies are not ethical to conduct with rabies PEP
- Pregnancy category C
- No known teratogenic effects
- No live virus present, HRIG is passive immunity
- Consider PREP for appropriate individuals prior to pregnancy

Considerations for the immunocompromised

- Corticosteroids and other immunosuppressive agents can interfere with antibody formation
- For these individuals, consider PREP prior to start of therapy, if indicated
- If rabies PEP is needed, consult provider and hold immunosuppressive agents, if possible
- Use 5 dose vaccine regimen
- Titers should be checked in these situations
- If they fail to seroconvert, consult public health



Travel and Rabies Exposures

Treatment Overseas

- There are a number of products and regimens available internationally
- Most of these regimens are not interchangeable with US products
- Vaccine handling can be an issue
- Consult with CDEpi if there is a question about the regimen

Treatment when they return

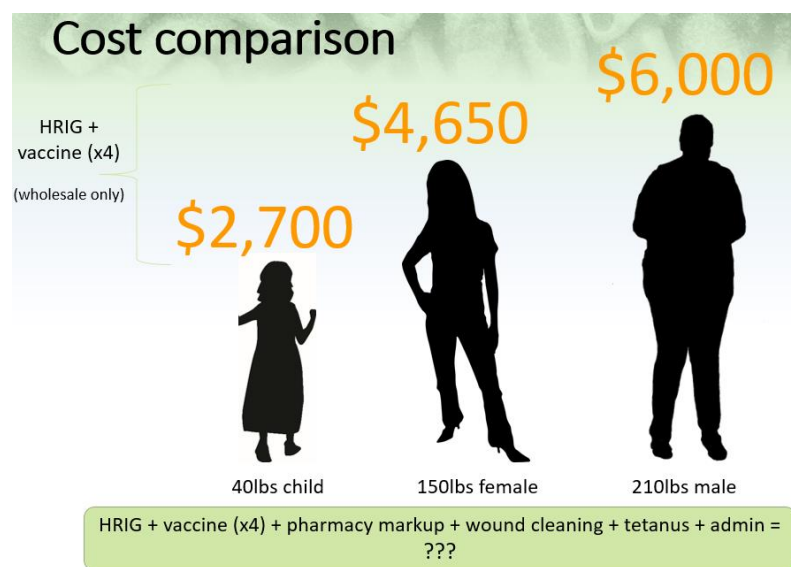
- Find out what animal species and exactly where they were exposed (whether in US or internationally)
- Ascertain what wound treatment was given, if any
- Consult with CDEpi regarding next steps

RABIES VACCINE AND COST

2017 Average Charges of PEP per person*

Amount charged for HRIG only	Amount charged for rabies vaccine	Amount charged for complete PEP
\$9,738	\$730	\$10,748
(as high as \$32,499)	(as high as \$2,839 per dose)	(as high as \$36,669)

*Data from Medicaid rabies 1/1/2014 to 2017 with a diagnosis code (071, 979.1, E949.1, V01.5, V04.5) or procedure code (90375, 90376, 90675, 90676, 90726, J2750) or ICD-9 surgical procedure code (09944), and the ICD-10 codes A82.0, A82.1, A82.9, and Z29.14.



Rabies PEP Data, Cascade County, 2017

- 296 Incidents of potential rabies exposures
- Rabies PEP was recommended to be given in 29 of those incidents after public health follow-up
- Average cost per person of \$10,748 in 2017
- If all 296 received rabies PEP, costs could average around \$3.2 million just in rabies HRIG and vaccine

Rabies HRIG and Vaccine Sources

1. Bavarian Nordic
 - Rabavert-vaccine
 - Hyperrab-HRIG (produced by Grifols)
2. Kedrion Biopharma
 - Kedrab-HRIG
3. Sanofi Pasteur
 - Imovax-vaccine
 - Imogam-HRIG

Uninsured and Underinsured

Patient assistance programs that provide medications to uninsured or underinsured patients are available for rabies vaccine and Immune globulin.

1. Sanofi Pasteur's Patient Assistance Program (providing Imogam[®] Rabies-HT and Imovax[®] Rabies as well as other vaccines) is available through the Sanofi Patient Connection Website.
2. Grifols' Patient Assistance Program for HyperRAB[®] human rabies immune globulin is available for some uninsured patients and can be accessed by calling 1-833-504-9983. Please note that an application for assistance must be completed and approved prior to administration of product.
3. Kedrion Biopharma's Patient Assistance Program for KEDRAB[®] human rabies immune globulin is administered through Medmonk. Patients who are uninsured can apply for assistance by calling 1-866-234-3732 or by visiting the KEDRAB Patient Assistance Program website

SUSPECT HUMAN RABIES CASES

- Clinical Presentation of Human Rabies
- Rabies can be difficult to distinguish from other forms of encephalitis
- S/S initially include:
 - Sense of apprehension
 - Headache
 - Fever
 - Malaise
- Condition will continue to degenerate, and symptoms typically are:
 - Aerophobia
 - Hydrophobia
 - Delirium
 - Muscular spasms/convulsions
 - Partial paralysis
- Almost universally fatal



If a provider suspects rabies:

- Please have them notify you via the local 24/7 number, and collect the following information:
 - Potential exposures to rabies and if they were recently treated with rabies PEP or PREP
 - Clinical information (i.e.-infectious disease doc suspects rabies and why)
- Notify MT DPHHS through our 24/7 line, and ask to speak to one of the CDEpi staff
- CD Epi may set up a clinical consult with the CDC regarding testing and treatment of the patient

Patient Management

- Milwaukee Protocol may be a possibility
 - This protocol is controversial in the medical community
 - Public Health cannot make this recommendation, but the CDC Consult can help the doctor decide if it is appropriate and how to get started
- For staff caring for the patient:
 - Standard precautions-saliva and cerebrospinal fluid are considered infectious
 - Exposure to urine, blood, or feces is not considered a rabies exposure

Rabies is 100% Preventable

- Avoid animal bites
- Recognize signs of rabies in animals
- Vaccinate animals and at-risk humans
- Support appropriate testing
- Seek immediate wound care and treatment
- Role of medical professional
 - Coordinate with local or state public health
 - Encourage patients to seek treatment for even minor bites

Notes for Rabies Scenario Discussion:

Weird Phone Call on A Friday Afternoon at 4:59 pm: A gentleman calls you to find out if he needs rabies post-exposure prophylaxis. He has a couple puncture wounds on his arm and wants you to look at it to see if it was caused by a bat. He saw a bat outside a few days ago, and thinks it somehow got inside and bit him.

Hamburger Mishandling: An anxious young man calls you to find out if he needs rabies post-exposure prophylaxis. He was handling raw hamburger for a barbecue and cut his hand in the process. Later, he read on the internet that cows could potentially have rabies, so he reasons by handling the raw hamburger that he could have exposed himself to the virus if the cow was rabid.

Sleeping with the Enemy: A traveler from out of state was staying at a Montana hotel. The first night was uneventful. After the day was through, she returned to their hotel and found a bat in the curtains. She is uncertain how long it has been there, nor how it got in.

Why Limit Happy to an Hour?: A woman teetered out of the bar at 1 am, and wisely decided to walk home instead of drive. Her path home takes her by a wooded area on an established walking path. In the morning, she knows she walked home since her car is still at the bar, but has a bite wound on her leg. She has no memory of encountering an animal.

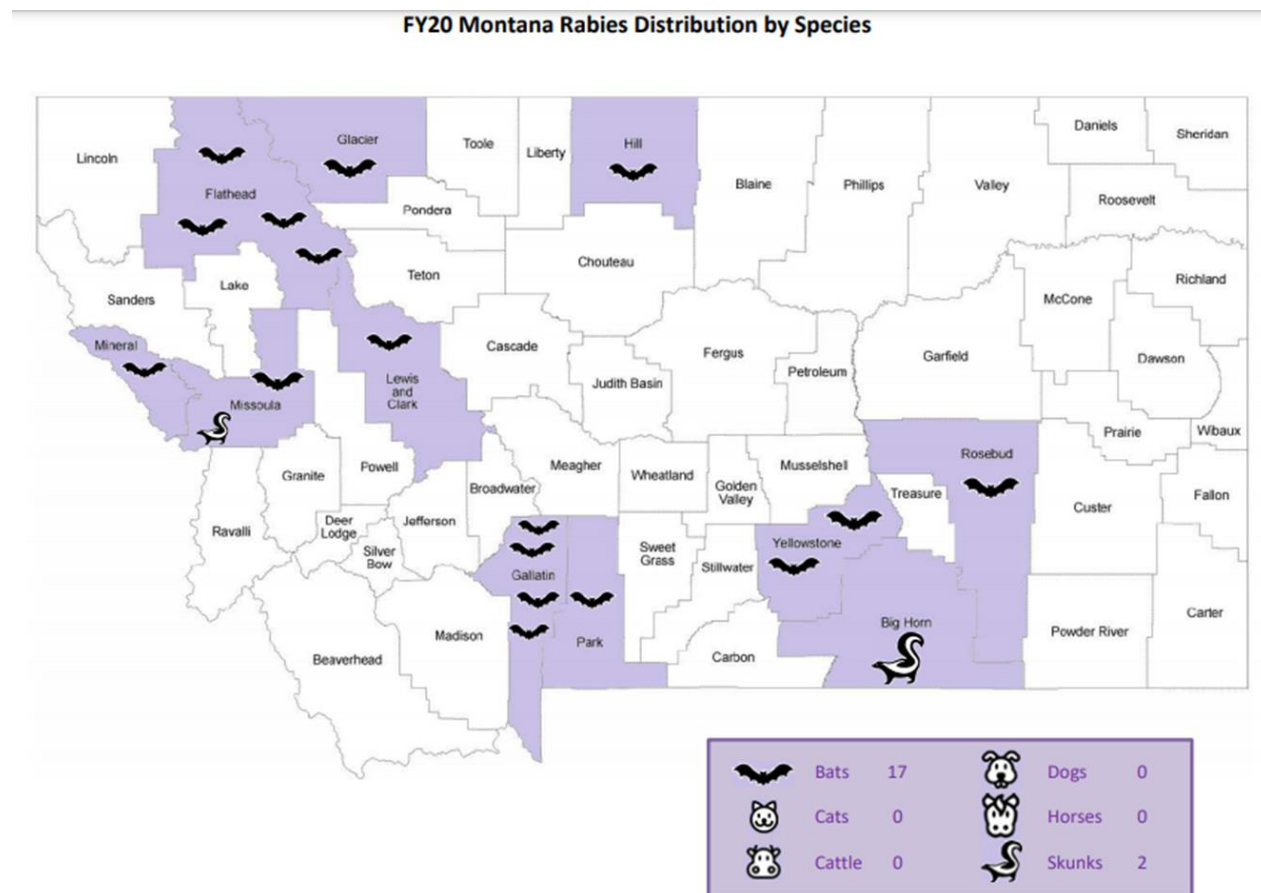
VETERINARIAN MODULE

Our role in Rabies program

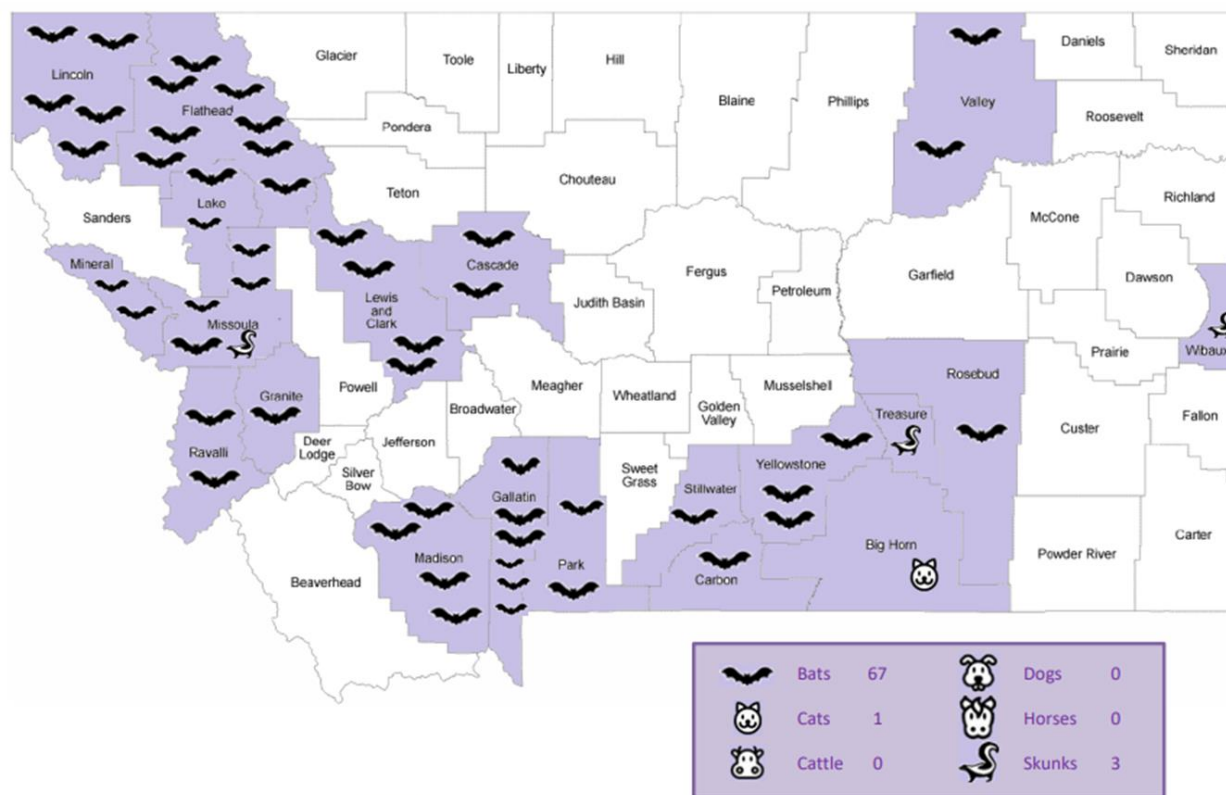
- Veterinary education
- Oversight of animal exposures
 - Quarantine
 - Public outreach
- Testing – Montana Veterinary Diagnostic Laboratory
- Resource for local health officials.
- Cooperation with public health on human exposures.

RABIES IN MONTANA

Montana law references the Compendium of Animal Rabies Prevention and Control (2016).



2015-2019 Montana Rabies Distribution by Species



RABIES LAWS

32.3.1201 Reporting rabies

- (1) Any person having knowledge of an animal known to have or suspected of having rabies shall report an accurate description immediately to the state veterinarian or to a deputy state veterinarian.
- (2) Any person having knowledge of any animal or person having been bitten by a dog or other animal known to have or suspected of having rabies shall report an accurate description immediately to the nearest health officer and to the state veterinarian or a deputy state veterinarian.

32.3.1202 Rabies quarantine

(1) When rabies is known to exist within an area... MDOL ... shall ... establish a rabies quarantine area and shall define the boundaries of the quarantine area and specify the animals subject to quarantine.

(2) The area shall be quarantined for a period of not less than 60 days from the date of the last known case of rabies or as much longer as in the judgment of the Board of Livestock seems reasonable and necessary; provided that any dog or other animal under quarantine having been properly immunized against rabies under official supervision may be released from the quarantine area after a period of 28 days from date of vaccination.

32.3.1203 Isolation of rabid or suspected rabid animals

(1) Any rabid or clinically suspected rabid animal must be isolated in strict confinement under proper care and under observation of a deputy state veterinarian, in a pound, veterinary hospital, or other adequate facility in a manner approved by the state veterinarian. If professional veterinary evaluation warrants, the animal may be humanely destroyed and the brain or other appropriate tissues handled in accordance with ARM 32.3.1207. ... must be handled in accordance with the ... compendium of animal rabies control ...

32.3.1204 Isolation of biting animals

(1) Upon consideration of the discretion and advice of the local health officer as defined in ARM 37.114.101, any dog, cat, or ferret, regardless of current rabies vaccination status, which bites or otherwise exposes a person must be confined and observed at an animal shelter, veterinary facility, or other adequate facility for ten days from the date of exposure.

(2) If any sign of illness develops in the isolated animal, it is to be evaluated by a licensed veterinarian and if in their judgment it is warranted, the animal may be humanely destroyed and the brain or other suitable tissue tested in a qualified laboratory for rabies. Any stray or unwanted wild or domestic animal that bites a person may be killed immediately and the head submitted to a laboratory for a rabies examination.

(3) Any dog, cat, or ferret that is subject to confinement and observation under (1) and that does not have a current rabies vaccination, may not be vaccinated during the ten-day confinement period.

32.3.1205 Animal contacts

- (1) Animals that have been exposed to a confirmed rabid or suspected rabid animal shall be managed according to vaccination status as per the Compendium. Additional consideration can be given to severity of exposure, current health status, and local rabies epidemiology.
- (2) Currently vaccinated animals shall be revaccinated immediately and observed for 45 days.
- (3) Dogs and cats overdue for a booster vaccination with appropriate documentation of previous vaccination shall be managed as per (2).
- (4) Animals without appropriate documentation of previous vaccination shall either be:
 - (a) ordered destroyed by the state veterinarian, or
 - (b) quarantined in strict isolation in a place and manner approved by the state veterinarian for a period not to exceed six months and rabies vaccine administered within 96 hours of exposure.
- (5) Dogs and cats overdue for a booster vaccination and with a documented amnestic response to vaccination through serologic monitoring at the owner's expense may be managed as per (2).

50-23-102 Prohibition of possession of wild animals --- exceptions

No person may possess a wild animal unless he possessed it for at least 6 months prior to January 1, 1982, or it is used in a fur-bearing enterprise, contained in a zoological exhibition in such a manner that it may not come in physical contact with members of the public, or acquired by an educational institution for scientific research.

Wild animal = skunk, fox, raccoon, or bat

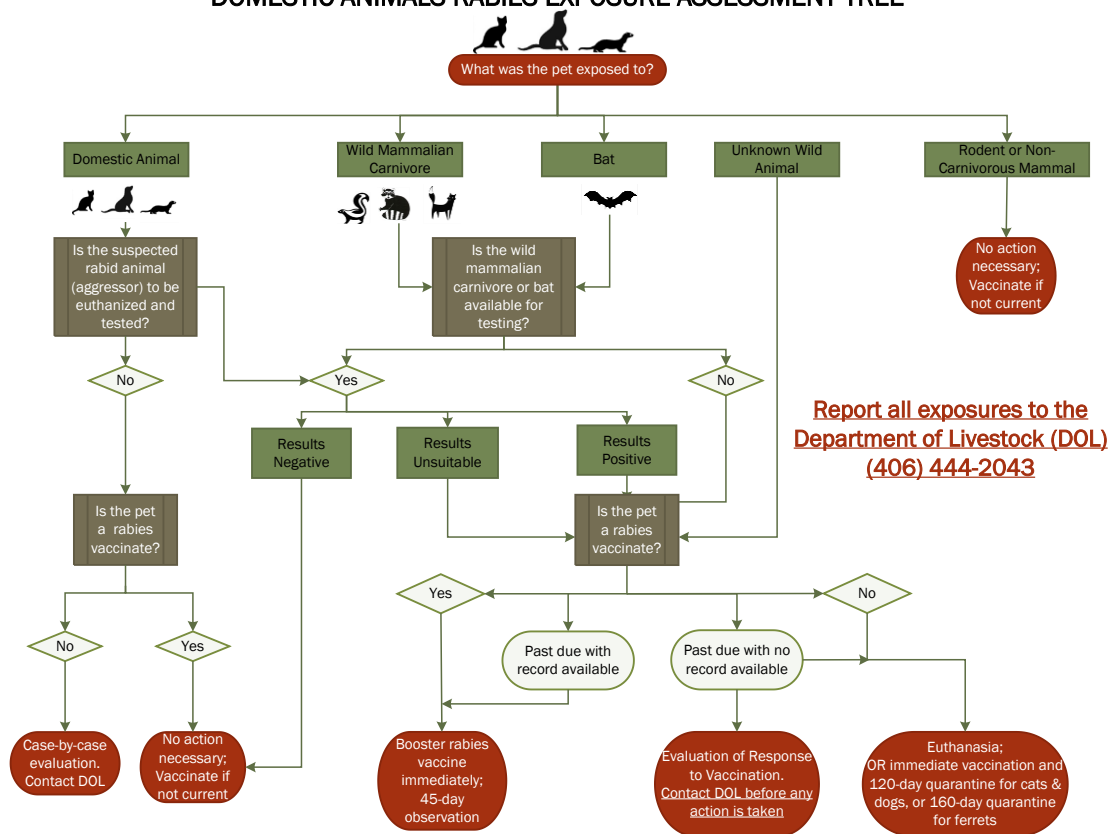
50-23-103 Quarantine – destruction -- testing

1. Whenever a person unlawfully possesses a wild animal, the department of public health and human services or the department of livestock may impound the animal and take any other action considered reasonable to protect public health.
2. If a wild animal, whether unlawfully or lawfully in the possession of a person, has bitten or otherwise exposed a person to the possibility of contracting rabies, the animal may be impounded by the department of public health and human services, the department of livestock, or a local health officer and either quarantined or destroyed and the animal's brain may be tested for rabies.
3. A lawfully possessed wild animal that is quarantined pursuant to subsection (2) and found not to be rabid must be returned to its owner.

Management of rabies

10 days	→	Quarantine for dogs, cats, and ferrets that expose humans.
28 days	→	Days for protective immune response following vaccination.
45 days	→	Observation period for vaccinate exposed to a rabies positive animal.
60 days	→	Length of county quarantine following positive terrestrial rabies case.
120 days	→	Quarantine for non-vaccinates exposed to a positive animal.

Montana Department of Livestock DOMESTIC ANIMALS RABIES EXPOSURE ASSESSMENT TREE



What is the veterinarian's role?

1. 45 day observation
 - a. Communication with and education of client
2. 4 month quarantine
 - a. Contact DOL
 - b. Vaccination of animal at beginning of quarantine period
 - c. Monthly examination of animals under quarantine
 - d. Communication with and education of client
3. Vaccination/education
4. Mandatory Reporter
 - a. 37.114.201 ...any person, including, but not limited to a physician, dentist, nurse, medical examiner, other health care practitioner, administrator of a health care facility or laboratory, public or private school administrator, or laboratory professional who knows or has reason to believe that a case exists of a reportable disease or condition defined in ARM 37.114.203 must immediately report to the local health officer the information specified in ARM 37.114.205(1) and (2).

Vaccination

- No state law requiring rabies vaccination
- Vaccination requirements are set by city and county ordinances.
- Vaccination certificates should be consistent with the vaccine label

Can someone other than a veterinarian administer the rabies vaccination?

32.3.2301 CONTROL OF BIOLOGICS

(5) The sale of any rabies biologic except to a licensed veterinarian or public health agency is prohibited.

Compendium of Animal Rabies Prevention and Control, 2016

Preexposure Vaccination and Management. Parenteral animal rabies vaccines should be administered only by or under the direct supervision of a licensed veterinarian on the premises. Rabies vaccinations may also be administered under the supervision of a licensed veterinarian to animals being held in animal control shelters before release. The veterinarian who signs the rabies vaccination certificate must ensure that the person administering vaccine is identified on the certificate and is appropriately trained in vaccine storage, handling, administration, and in the management of adverse events. This practice ensures that a qualified and responsible person is held accountable for properly vaccinating the animal.

Human Exposure

MDOL and DPHHS will work with the individual, the local veterinarian, animal control and local public health officials to determine case management.

- Human bitten by animal:
 - Contact animal control and public health
 - 37.114.203 Reportable Diseases and Conditions (at) Rabies in a human or animal; exposure to a human by a species susceptible to rabies infection...
 - 10 day quarantine regardless of vaccination status
 - Do not euthanize animal without permission & without testing!

RABIES SUBMISSIONS

Specimens

- Submission protocol can be found at:
https://liv.mt.gov/docs/Lab/5_7_100_600%20MVDL%20Rabies%20Sampling%20and%20Submission%20Supplement.pdf**FRESH BRAIN TISSUE ONLY**
- Small animals – decapitated head away from base of skull with entire, intact brain in skull (or whole carcass)
- Large animals – entire, intact brain with cerebellum and brain stem
- Small mammals (bats and mice) – entire carcass
- DO NOT SHIP LIVE BATS!
- Helpful tip: Starter fluid (ether) can be used to euthanize a bat!
- Brain/head should be removed by licensed veterinarian
- Intact, chilled fresh brain
 - Cross-section of brain stem and cerebellum is required to test
- Rabies laboratory testing fees
 - Small animal: \$35
 - Large animal with histopathology: \$65
 - Carcass disposal fee if whole animal is received
 - Excludes bats/small rodents

What may make a specimen unsuitable?

- Specimen in Formalin
- Anatomic sites not identifiable (i.e. shot, mangled, improper submission)
- Desiccated or 'missing' brain (bats)
- Frozen specimen might be too gooey when thawed

Unsuitable because not enough information to call it negative. May result in unnecessary PEP recommendation.

Please allow pathologists at Vet Lab to determine if the specimen is suitable!

Good to know...!

- Rabies tests are run 5 days a week
- If specimen arrive by 11am (noon for urgent cases), run same day, results by afternoon (4 hour test).
- Do not ship specimen via UPS or FedEx on Friday (will sit at dock).
 - Encourage FedEx and UPS overnight whenever possible
- OVERNIGHT mail (USPS) is an option. Laboratory personnel are available to pick up USPS mail on Saturday.
- Ship fresh specimen cold (not frozen), double bagged to prevent leaks, and with the submission form.
- If specimen sits over weekend, remove head (to avoid decomposition) and refrigerate.



Submit entire brain to lab-fresh, not fixed!

MONTANA DEPARTMENT OF LIVESTOCK PO BOX 997, BOZEMAN MT 59711 PH: (406) 994-4883 FAX: (406) 994-6344		<input type="checkbox"/> ROUTINE MAIL <input checked="" type="checkbox"/> TELEFAX <input type="checkbox"/> COPY TO OWNER <input type="checkbox"/> EMAIL	
SPECIES <input type="checkbox"/> BOVINE <input type="checkbox"/> EQUINE <input type="checkbox"/> PORCINE <input type="checkbox"/> AVIAN <input checked="" type="checkbox"/> OTHER & SPEC		ANIMAL INFORMATION NAME OR I.D. Breed: <u>Bat</u> Age: <u>2</u> Sex: <u>?</u> Date Animal Died: <u>9/16/11</u> Date Specimen Taken: <u>9/1</u> Previous Case No.: <u>9-19-11</u>	
SUBMITTER: Signature: _____ Print: _____ Address: _____ City/State: _____ Zip Code: _____ Country: _____		OWNER: Signature: _____ Print: _____ Address: _____ City/State: _____ Zip Code: _____ Country: _____	
SPECIMENS SUBMITTED Tissues: <input checked="" type="checkbox"/> FRESH <input type="checkbox"/> FIXED Animal: <input type="checkbox"/> ALIVE <input type="checkbox"/> DEAD <input type="checkbox"/> FETUS Block: <input type="checkbox"/> WHOLE <input type="checkbox"/> CLOTTED <input type="checkbox"/> SERUM Urine: <input type="checkbox"/> CYSTIC <input type="checkbox"/> FRESH CATCH <input type="checkbox"/> BLEEDER <input type="checkbox"/> FLUID <input type="checkbox"/> TISSUE <input type="checkbox"/> SWAB (Specimen Source) <input type="checkbox"/> OTHER (Specify)		FRESH/FIXED TISSUES SUBMITTED: HISTORY and DIFFERENTIAL DIAGNOSIS: <u>Rabies testing</u> <u>to found dead in dog blankets</u> <u>Thane</u>	
LABORATORY TESTS Pathology: _____ Bacteriology: _____ Necropsy: _____ Source: _____		VIROLOGY Virus (s) Suspected: _____ Tissue: _____ Abortion Study Routine Abortion Work-Up (Sampling, bacteriology) Additional Tests: _____	

ANIMAL MANAGEMENT MODULE

REPORTING REQUIREMENTS

Administrative Rules of Montana

- Report “exposure to a human by a species susceptible to rabies infection” to local health department (37.114.203)
- Local health officer must investigate a potential rabies exposure and inform individual whether or not treatment is recommended (ARM 37.114.571)
 - Must also arrange for observation of dogs, cats, ferrets
- The Health Officer may designate an authorized representative to perform these tasks (MCA 50-1-1)
- Additional requirements through Department of Livestock (ARM 32.3.1201 through 32.3.1207) describe management of animals and complement DPHHS rules.

How to respond to an exposure?

- Persons bitten by a domestic pet should immediately wash the bite wound with soap and water and consult with a physician.
- Gather information about the potential exposure
- Report incidence to local public health department

What information should be collected?

- Location and date of bite
- Name and demographics of bite victim
- Severity of bite (i.e.-scratch, deeply torn tissue) and area of body bitten
- Type of animal
- Physical description of animal (color, breed, identifying characteristics)
- Name, vaccination records, and current health status of animal
- Demographics of animal owner, if applicable
- Name and contact info of animal’s veterinarian
- Current location of animal

Ways to report

- Phone call to the local health jurisdiction’s 24/7 line
- Fax bite report to the local health jurisdictions fax line
- Timeliness is an issue
- If the worker is unable to complete a written report before going off shift, call it in to public health

OBSERVATION

If the incident involves a...

Dog, cat or ferret

- Holding the live animal for a ten day period with the day of the bite being day zero
- All expenses incurred during observation, impounding or destroying and testing a domestic dog, cat or ferret are the responsibility of the animal owner.
 - Unless your jurisdiction supports some aspects of this

Other (Bat, skunk, monkeys, livestock, wild animals, rabbits etc.)

- If possible, keep the animal in a secure area to prevent escape until further instructions can be provided.
- Wild animals that bite an individual cannot be held for observation, testing the animal's brain will be needed to rule out rabies.

Domestic Dogs, Cats & Ferrets: Observation

- Observation must be instituted regardless of vaccination status
- Do not vaccinate during observation period if unvaccinated
- Do vaccinate animal upon release
- Date of the bite is day zero
- Observation is complete on day ten
- Any signs or symptoms of consistent with rabies, or if death occurs, during observation needs evaluation by vet (37.114.571)

Where can the animal be observed?

- An animal shelter, veterinary facility, or other adequate facility may be used for observation period
- Home observation is at the discretion of the local health officer.
- Consider the following to determine other adequate facility (i.e. home):
 - Vaccination status
 - Epidemiology of Rabies
 - Reliability of pet owner
 - Pet owner education

Note: The Health Officer is responsible for arranging this observation, but may delegate this task to partners, depending on local designation of roles and responsibilities.

Why do we observe cats, dogs, and ferrets regardless of vaccination status?

From 1997-2001, 264 rabid dogs and 840 rabid cats were studied:

- 13 (4.9%) rabid dogs had a history of vaccination, 2 were current
- 22 (2.6%) rabid cats had a history of vaccination, 3 were current

No vaccine is 100% effective and rabies is almost universally fatal.

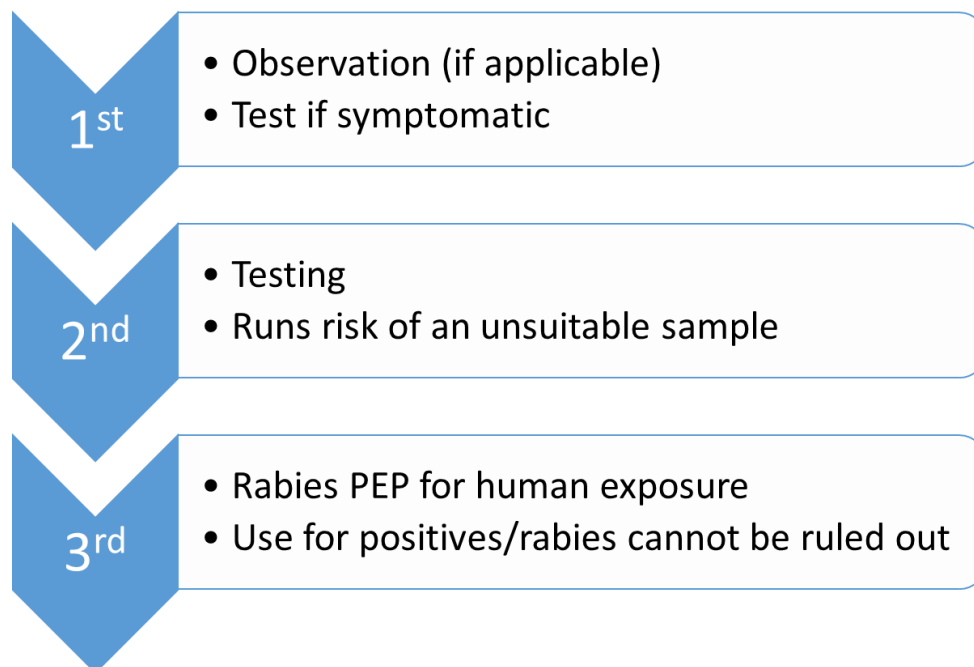
Exposures from Wildlife

- If the animal must be put down, don't shoot it in the head
- May still be able to test an animal with damage to the cranium, so if accidentally shot in the head or neck, still have the head collected for testing and keep specimen cool
- Bats and rodents should be sent whole-make sure they are dead

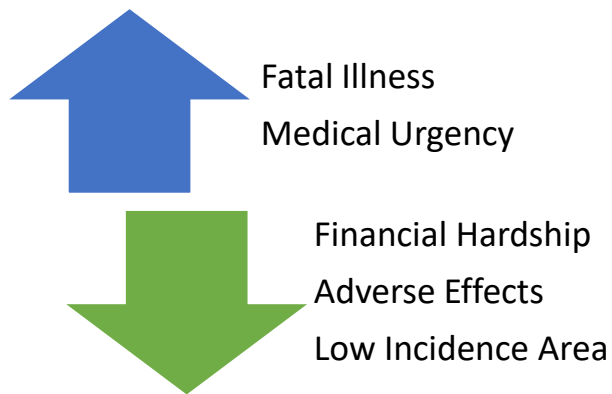
Exposures from Livestock and Exotic Animals

- Was the behavior in the circumstances natural?
- Contact local public health
- Local public health can consult with CDEpi regarding rabies risk for the implicated species
- Keep animal in secure area to prevent escape until further instruction is available
- Decision to test will have to be made based on several factors

Preferred Management if the Animal



Balance the risk of rabies with the needs of the patient:



What can coordination achieve?

- It can help prevent a case of human rabies
- Avoids unnecessary PEP recommendations
- It can help raise awareness for rabies vaccination in pets
- It helps raise vaccination rates for pets
- One person can't do it all!

[DISCUSSION QUESTIONS ANIMAL OBSERVATION](#)

Room for notes.

RABIES EXERCISE-ROOM FOR NOTES