

# Rabies in Indiana

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Melissa Justice, DVM

Director of Small Animal Health Programs





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# What is Rabies?

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- Neurotropic Viral Infection – Lyssavirus
- Essentially 100% fatal once clinical signs noted
  - Human Post-Exposure Prophylaxis (rPEP) is generally curative if administered BEFORE clinical signs
- Incubation period is 3 weeks to 12 weeks.



Photo Credit : CDC PHIL Image ID 5611

# What is Rabies?

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- All mammals are susceptible to rabies
- Only a few species are important reservoirs for infection
  - Bat
  - Skunk
  - Fox
  - Raccoon
- Small prey animals (squirrels, field mice, etc.) do NOT typically carry rabies



# Transmission of the virus

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Transmission occurs through  
**DIRECT** contact with saliva or nervous tissue  
from an infected animal

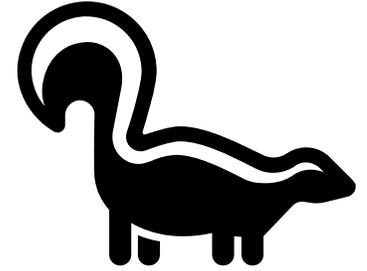
# Rabies in Indiana

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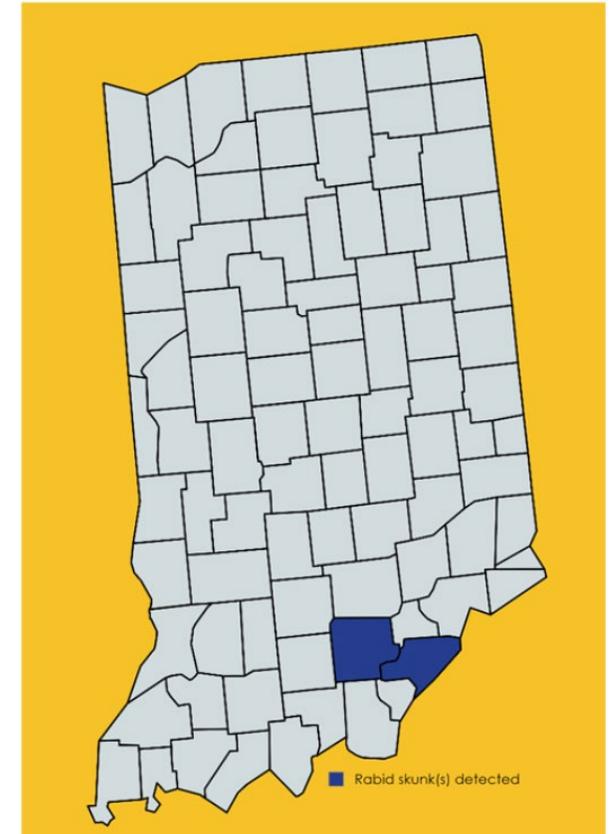
- Bats are the primary reservoir for Rabies in Indiana
  - Approximately 15 – 25 bats are diagnosed each year
  - Rabies positive bats can be found in all 92 Indiana counties
  - Only 1 – 3 % of the Indiana bat population is positive



# Rabies in Indiana

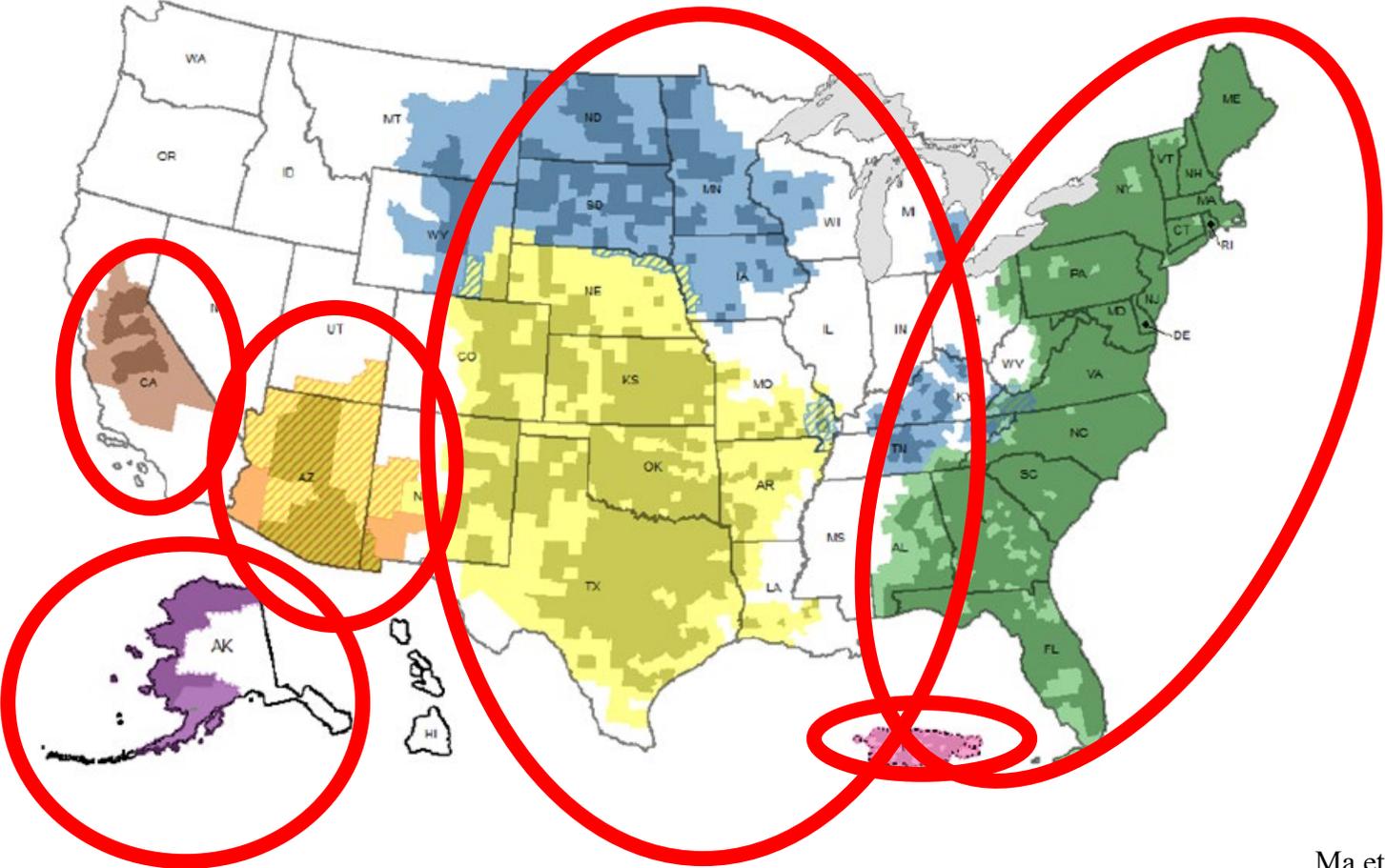


- Skunk variant of Rabies identified in 2024
  - Last diagnosis in Indiana in 2004
  - Variant is present in Kentucky
  - Diagnosed in Clark and Washington counties
  - Enhanced surveillance in four southern Indiana counties



Source: [www.in.gov/rabies](http://www.in.gov/rabies)

# Rabies in the United States



**Rabies Variant Terrestrial Areas**  
RC NC SK SC SK CA SK AZ FX ARC FX MG NC SK & RC NC SK & SC SK AZ FX & SC SK

Ma et al. JAVMA 2021 (in press).

# Human Rabies in the World

	United States	Worldwide
<b>Number of Cases</b>		
Annual	1 - 3	Est 59,000
2009 - 2018	25	
2019 - 2020	0	
2021	<b>5</b>	
<b>Risk Factors</b>		
Age < 15 years	2 (8%)	~236,000 (40%)
International Travel	7 (28%)	Unknown
Animal exposure	Bat (70%)	Dog (99%)

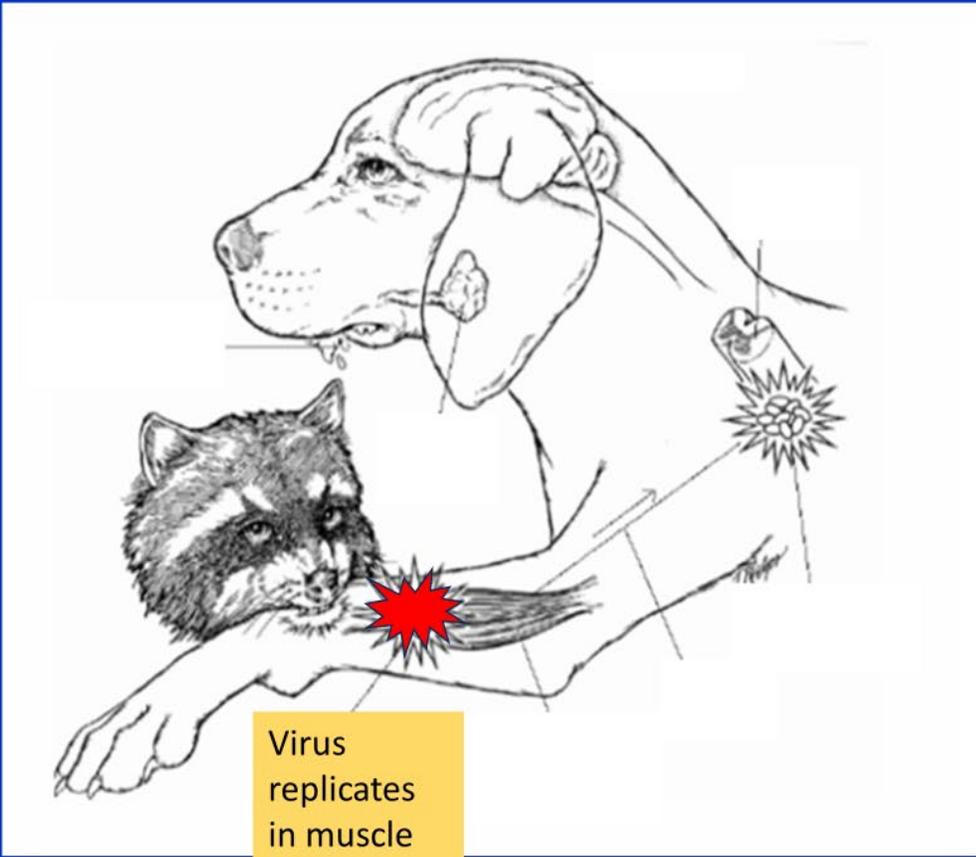
Credit Dr. Jennifer Brown, Indiana Department of Health

Animal exposed to a rabid animal



Rabies virus  
from  
infected  
saliva enters  
the wound





Virus  
replicates  
in muscle  
tissue



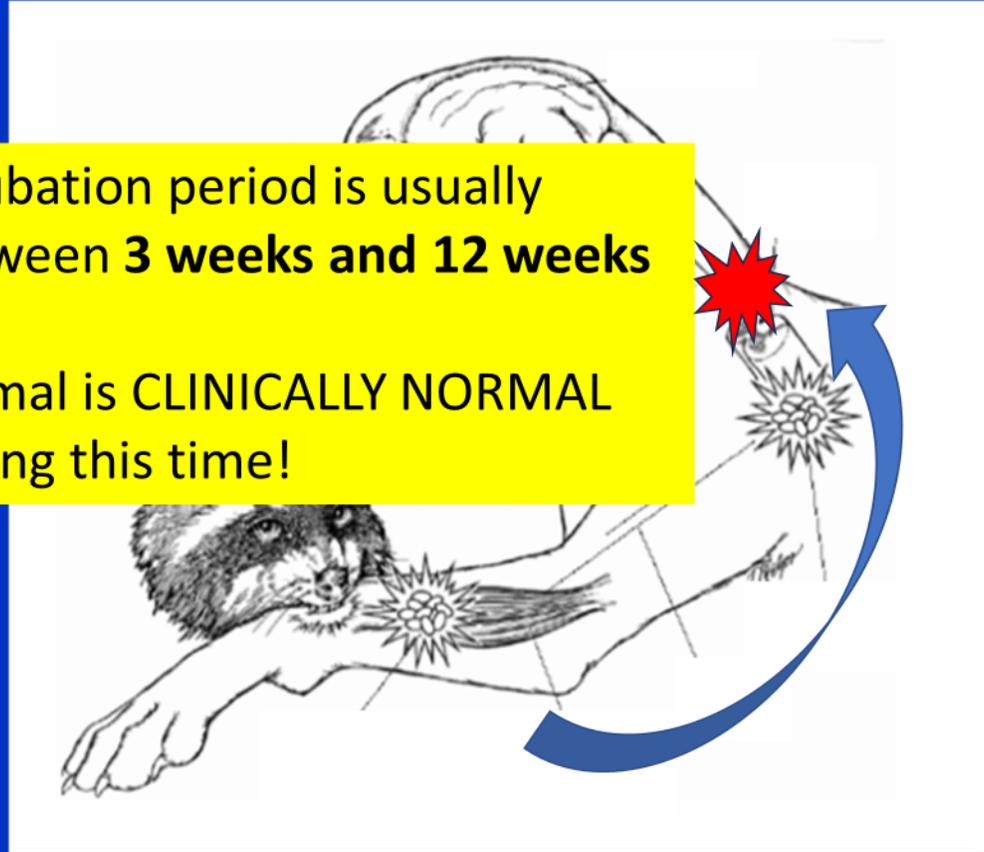
Virus travels  
up the  
peripheral  
nerves

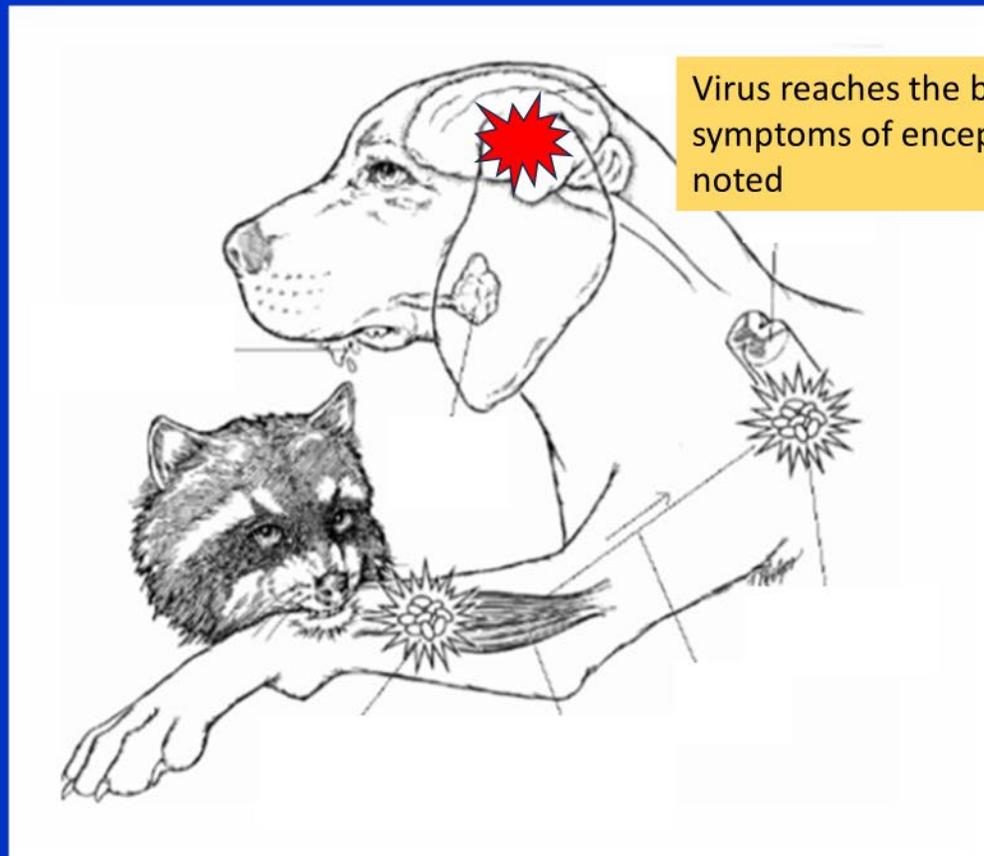


Virus moves into the spinal cord and travels up to the brain

Incubation period is usually  
between **3 weeks and 12 weeks**

Animal is **CLINICALLY NORMAL**  
during this time!

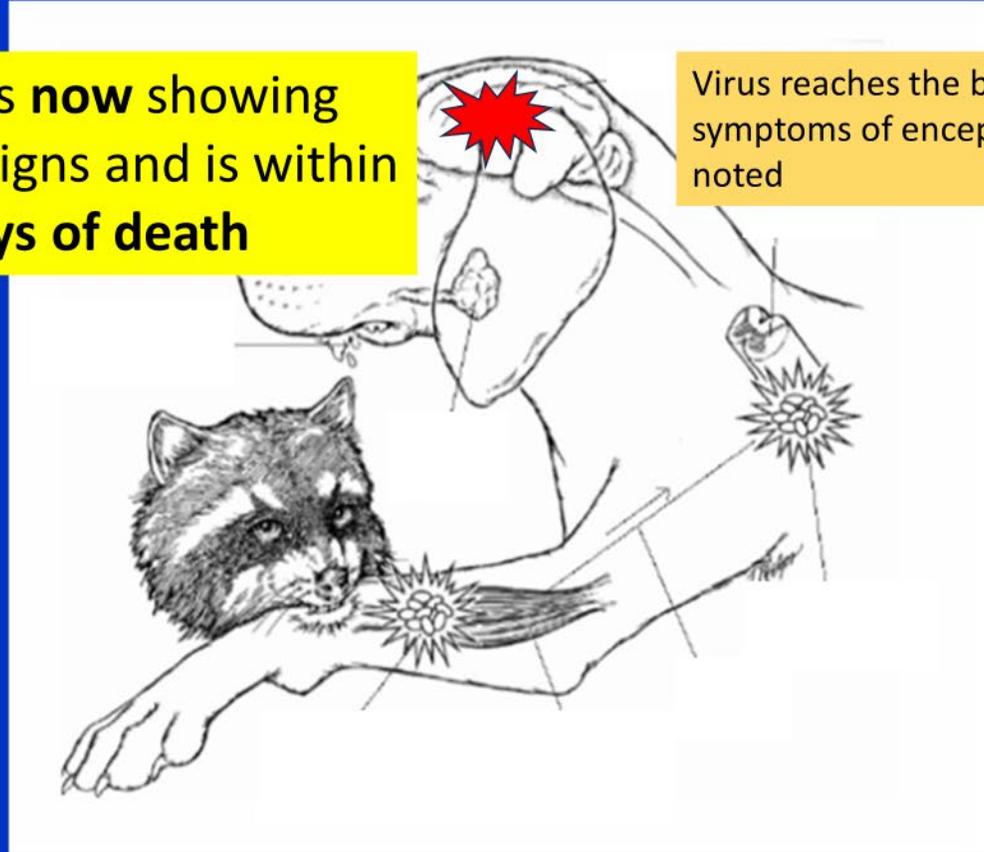




Virus reaches the brain and symptoms of encephalitis are noted

Animal is **now** showing clinical signs and is within **3 – 5 days of death**

Virus reaches the brain and symptoms of encephalitis are noted



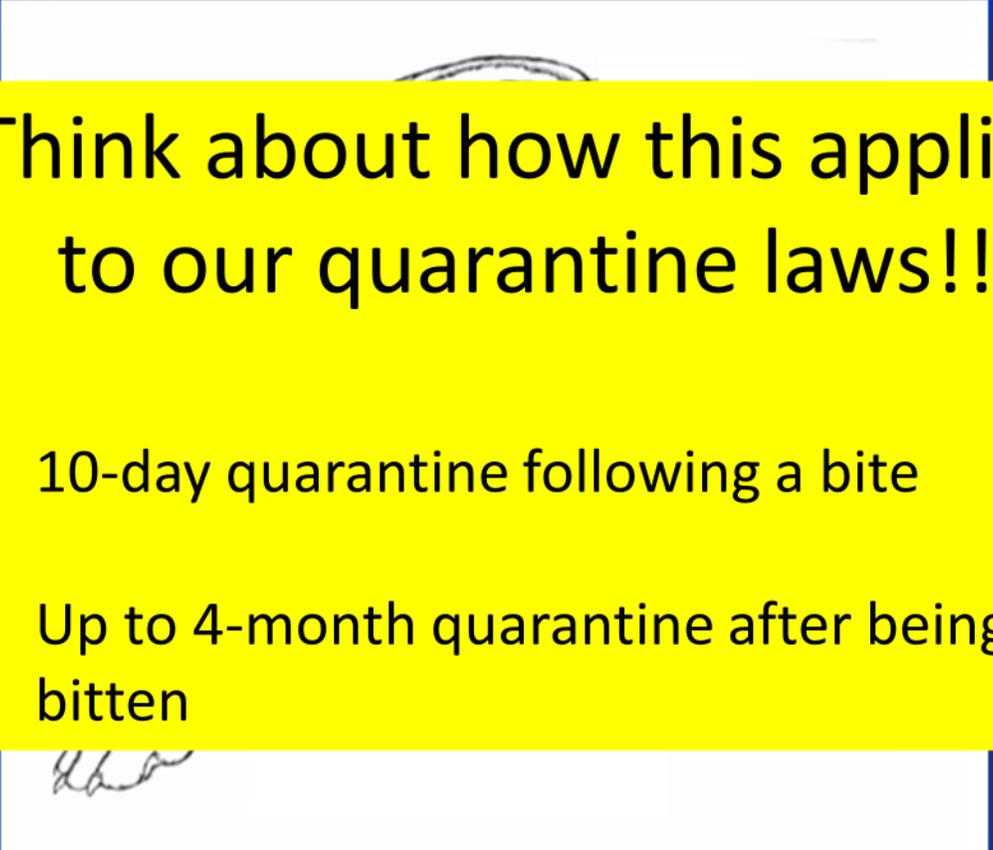
Virus replicates rapidly in the brain and then moves into the salivary glands.





Animal is **NOW INFECTIOUS** to humans and other animals

Animal is within 3 – 5 days of death as a result of infection

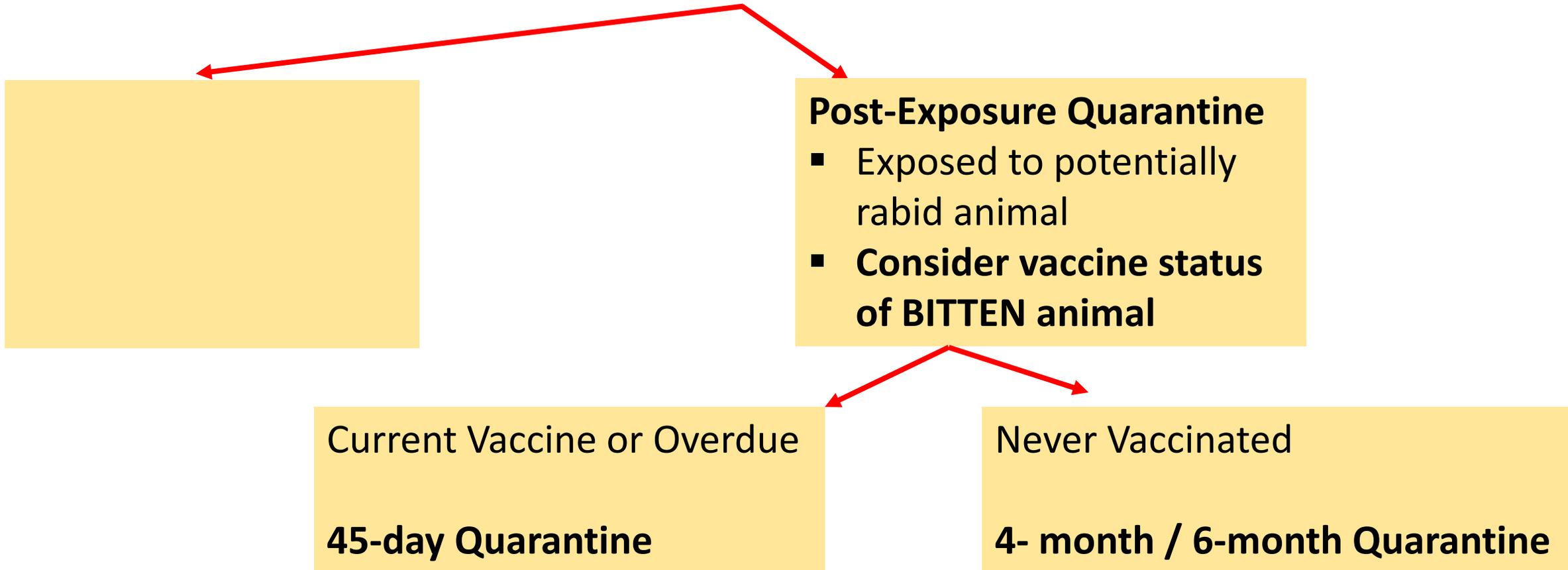


Think about how this applies  
to our quarantine laws!!

- 10-day quarantine following a bite
- Up to 4-month quarantine after being bitten

# Quarantine Length

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# Quarantine Length

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## Post-Bite Quarantine

- Bite to human or domestic animal
- **10-days**

## Post-Exposure Quarantine

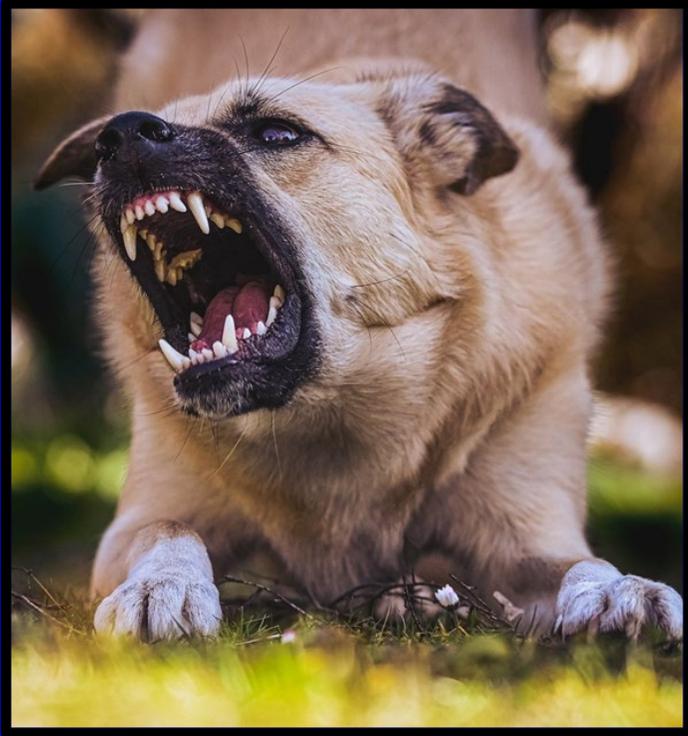
- Exposed to potentially rabid animal
- **Consider vaccine status of BITTEN animal**

Current Vaccine or Overdue

**45-day Quarantine**

Never Vaccinated

**4- month / 6-month Quarantine**



# Animal Bites to a Human

# Animal Bites to Human

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## Perform a Risk Assessment

1. Did sufficient contact occur to allow the transmission of rabies virus?
2. Was the animal rabid or potentially rabid?

# Did transmission occur?

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- Did sufficient contact occur to allow the transmission of rabies virus?
  - Bite Exposure
  - Non-Bite Exposure
  - Bat Exposure



Photo: Pixabay free images

# Transmission of the virus

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- Bite Exposure
  - Any penetration of the skin by an animal's teeth
- Non-Bite Exposure
  - Open wound
  - Mucous membrane



# Transmission of the virus

- Bat Exposure
  - Direct Contact where a bite or scratch cannot be ruled out
  - Bat found in the same room with:
    - Sleeping person
    - Person impaired by drugs or alcohol
    - Person with intellectual disability
    - Unattended child



Wound inflicted by canine teeth of big brown bat.  
Picture was taken on the same day as the bite.  
Photo: CDC.

# Was the animal rabid?

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- If the animal is available, then determination of rabies status is ALWAYS required.
  - Quarantine / observe
  - Euthanize and submit sample for testing

# Was the animal rabid?

	10-Day Quarantine	Euthanize and Submit for Testing
Dogs, Cats and Ferrets	✓	✓
Wild Animals		✓

# Was the animal rabid? – domestic animal

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- **Vaccination status** of the animal **DOES NOT** affect outcome when a domestic animal has **BITTEN A HUMAN**.



# Was the animal rabid? – domestic animal

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- Vaccination status of the animal **DOES NOT** affect outcome when a domestic animal has **BITTEN A HUMAN**.

- **THERE ARE ONLY 2 OPTIONS:**
  - 10-Day quarantine / observation of the animal
  - Euthanasia and submission of tissue for testing

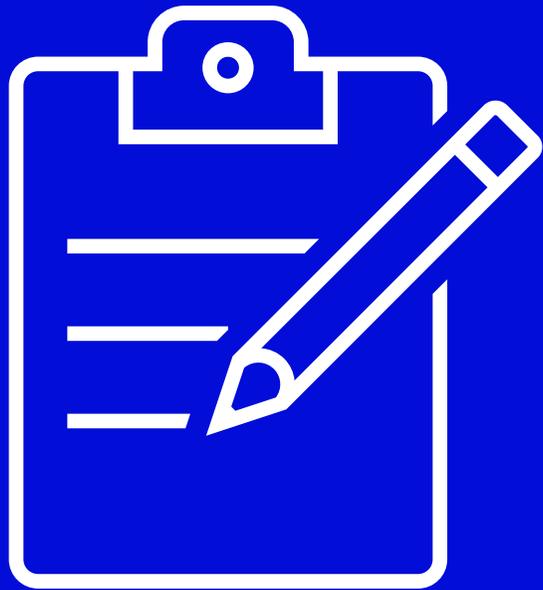


# 10-Day Post-Bite Quarantine

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- Determine if the animal was capable of transmitting the virus at the time of the bite
- Animal securely confined at owner's home, veterinary facility or shelter facility
- Do NOT update rabies vaccine until confinement is complete





# Bite Reports



## Keeping Pets and People Safe from Rabies

Presented by Indiana Department of Health and Indiana State Board of Animal Health

[Learn more](#)



Animal Rabies Sample Submission



Handling Animal Bites



Pet Vaccination Laws



Rabies Maps and Statistics

[www.in.gov/rabies](http://www.in.gov/rabies)



# Report an Animal Bite

Home Rabies Information > Report an Animal Bite

In Indiana, all animal bites to people must be reported to the local health department where the bite victim lives. Any adult may report an animal bite. Physicians are required by state law to report animal bites to people.

**Indiana Department of Health [Animal Bites Report Form](#)**

[Animal Bites Report Form \(Fillable PDF Version\)](#)

[Indiana State Local Health Department Directory](#)

[Human Bitten by an Animal](#)

[Pet Bitten by an Animal](#)

**Official Indiana Animal Bites Report**  
 Indiana State Department of Health  
 State Form 14072 (R3/4-04)

Incident Location Address _____	Reported by (name) _____	Reporting Agency Case Number _____	Reporting Agency _____
County _____	Reported by (phone) _____	Bite Classification _____ / _____ / _____ <small>(see reverse side of this page to classify)</small>	Incident On Off Property _____
Exposure Date _____ / _____ / _____	Received by (name) _____	Victim Type (circle Z) Human Animal / Juvenile Adult	
Reported Date _____	Reported Time _____	Release Date _____	

	VICTIM INFORMATION	OWNER INFORMATION	
Victim	<b>Person bitten (if animal victim, use this space for animal victim's owner):</b> Last Name _____ First Name _____ Sex <input type="radio"/> M <input type="radio"/> F Date of Birth _____ / _____ / _____ Street Address _____ City _____ Zip _____ Telephone Home: _____ Work: _____	<b>Owner of Animal:</b> Last First Mid. Date of Birth _____ Street Address _____ City _____ Zip _____ Sex <input type="radio"/> M <input type="radio"/> F Home Telephone _____ Work Telephone _____ Biting Animal <input type="radio"/> Dog <input type="radio"/> Cat <input type="radio"/> Other _____ Color/Markings _____ Name _____ Sex <input type="radio"/> M <input type="radio"/> F Neutered <input type="radio"/> Y <input type="radio"/> N Breed _____ Animal's Veterinarian _____ Prior Incidents _____ Rabies Vaccine <input type="radio"/> Y <input type="radio"/> N Date _____ / _____ / _____ Rabies Tag Number _____ License Number _____ Microchip Number _____ Citation issued? <input type="radio"/> Y <input type="radio"/> N	Owner
Parent	<b>Parent if victim is a juvenile:</b> Last First Mid. _____ Street Address _____ City _____ Zip _____ Telephone Home: _____ Work: _____	Location of Quarantine _____ Date of Quarantine _____ Quarantined by (name) _____ Release Date _____	Animal
Animal	<b>If animal victim:</b> Breed/Species _____ Color/Markings _____ Name _____ Sex <input type="radio"/> M <input type="radio"/> F Vaccine Date (rabies) _____ (if animal victim) Quarantined? Yes No _____ Time of bite _____ Treating Physician (or veterinarian) Name: _____ Telephone: _____	Released from Quarantine by (name): _____ Owner release card (date received): _____ Released from shelter quarantine (date): _____ Lab #/Result: _____	Quarantine
Incident & Circumstances	<b>Location on Body and Extent of Injury:</b> _____ <b>Victim's statement of incident (animal owner if animal victim):</b> _____	<b>Animal owner's statement of incident:</b> _____	Incident
	<b>State Department of Health required information (must be completed):</b> Species (fill in the correct biting species): <input type="radio"/> Bat <input type="radio"/> Dog <input type="radio"/> Hamster <input type="radio"/> Raccoon <input type="radio"/> Cattle <input type="radio"/> Ferret <input type="radio"/> Horse <input type="radio"/> Rat <input type="radio"/> Cat <input type="radio"/> Fox <input type="radio"/> Mouse <input type="radio"/> Squirrel <input type="radio"/> Chipmunk <input type="radio"/> Gerbil <input type="radio"/> Rabbit <input type="radio"/> Other _____ _____ If Other, specify _____ <b>Did the animal exhibit any of the following:</b> <input type="radio"/> Convulsions <input type="radio"/> Aggression <input type="radio"/> Inability to eat/drink <input type="radio"/> Excessive salivation <input type="radio"/> Paralysis <input type="radio"/> Depression	<b>Circumstances:</b> <input type="radio"/> Animal confined (indoors, penned, leashed, or on leash) <input type="radio"/> Animal not confined (stray, roaming, etc.) <input type="radio"/> Wild Animal <input type="radio"/> Provoked <input type="radio"/> Unprovoked <input type="radio"/> Unknown <input type="radio"/> Other _____ <b>Action taken with animal:</b> <input type="radio"/> No Action <input type="radio"/> Body destroyed <input type="radio"/> Escaped/not found <input type="radio"/> Head sent to ISDH Lab <input type="radio"/> Pet quarantined (see dates above) <input type="radio"/> Other _____ (dog, cat, ferret only) <input type="radio"/> Unknown	
	I, the undersigned, have received a copy of the quarantine guidelines, have read them, and understand them. I agree to comply with all provisions of the quarantine guidelines and understand that noncompliance may result in seizure of my pet if it is in home quarantine or loss of my pet if it is not properly claimed at the end of the quarantine period from the quarantining agency.		
	Witness _____	Date _____	Signature _____

DISTRIBUTION: White - Enforcing Agency, Canary - Local Health Department, Pink - Owner

- Provide as much information as possible
- Submit to Local Health Department for further investigation
- If the human victim is seen by a physician, they will file the bite report



# *Animal bites to animals*

# Handling the BITER

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# Handling the BITER:

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## DOG, CAT, FERRET

- Vaccination Current:
  - Observe for 10 days
- Unvaccinated / No Proof:
  - Observe for 10 days
  - **VACCINATE AFTER QUARANTINE ENDS**



# Handling the BITER:

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## HIGH-RISK SPECIES

- Euthanize and submit tissues for testing

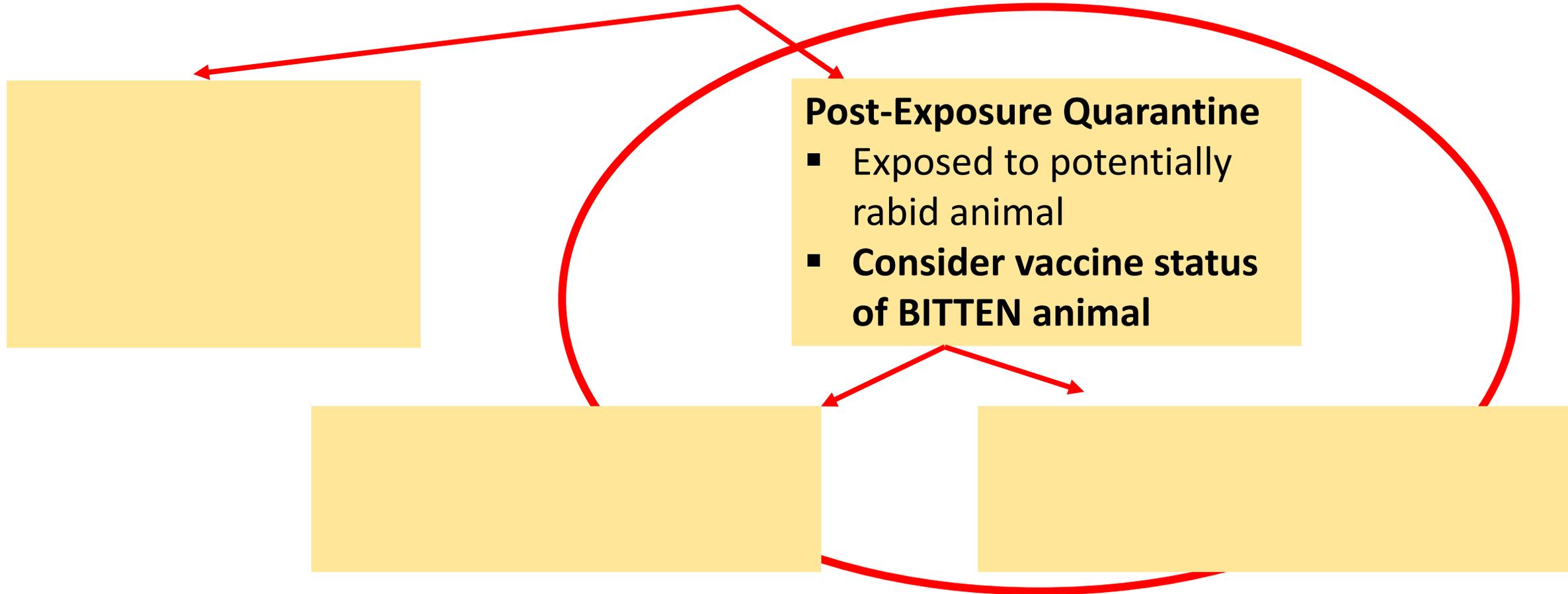


# Handling the BITTEN ANIMAL

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# Quarantine length

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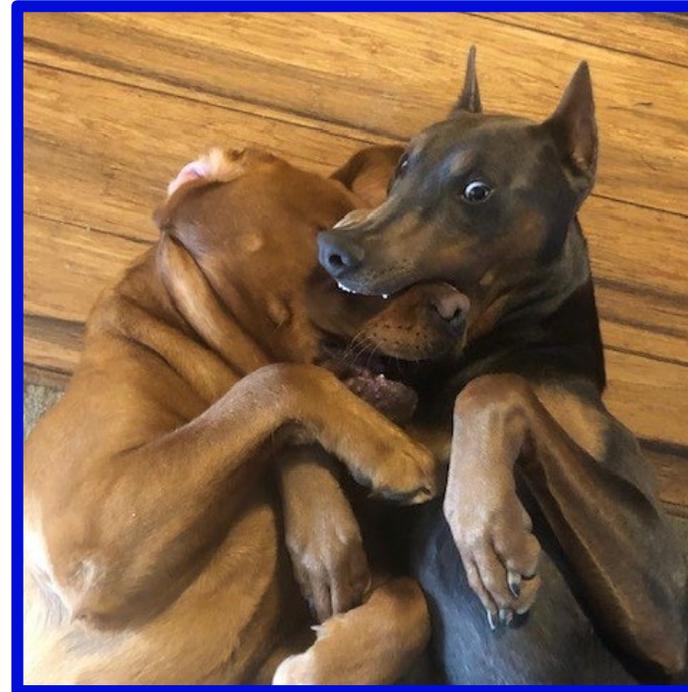


# Handling the BITTEN ANIMAL:

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## WHEN BITER IS: DOG, CAT, FERRET OR LIVESTOCK

- Vaccination Current:
  - Treat all wounds
  - No observation necessary
- Unvaccinated or Overdue:
  - Vaccinate at the time of the bite
  - Treat all wounds
  - Observe the animal (if possible)



# Handling the BITTEN ANIMAL:

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## WHEN BITER IS: UNKNOWN OR RABIES-POSITIVE ANIMAL

- Vaccination Current or Overdue:
  - Vaccinate within 96 hours of exposure
  - Observe bitten animal for 45 days
- Unvaccinated:
  - Vaccinate within 96 hours of exposure
  - Quarantine and observe
    - Dogs and Cats – 4 months
    - Ferrets – 6 months



# Post-Exposure Quarantine

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Vaccinate animal prior to the onset of the quarantine period

# Post-Exposure Quarantine

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- Animal should be securely confined with two levels of protection from the public.
- Prevent elective contact with the general public or other animals
- Illness should be reported to a veterinarian
- Animals that die or are euthanized must be tested

# Post-Exposure Quarantine

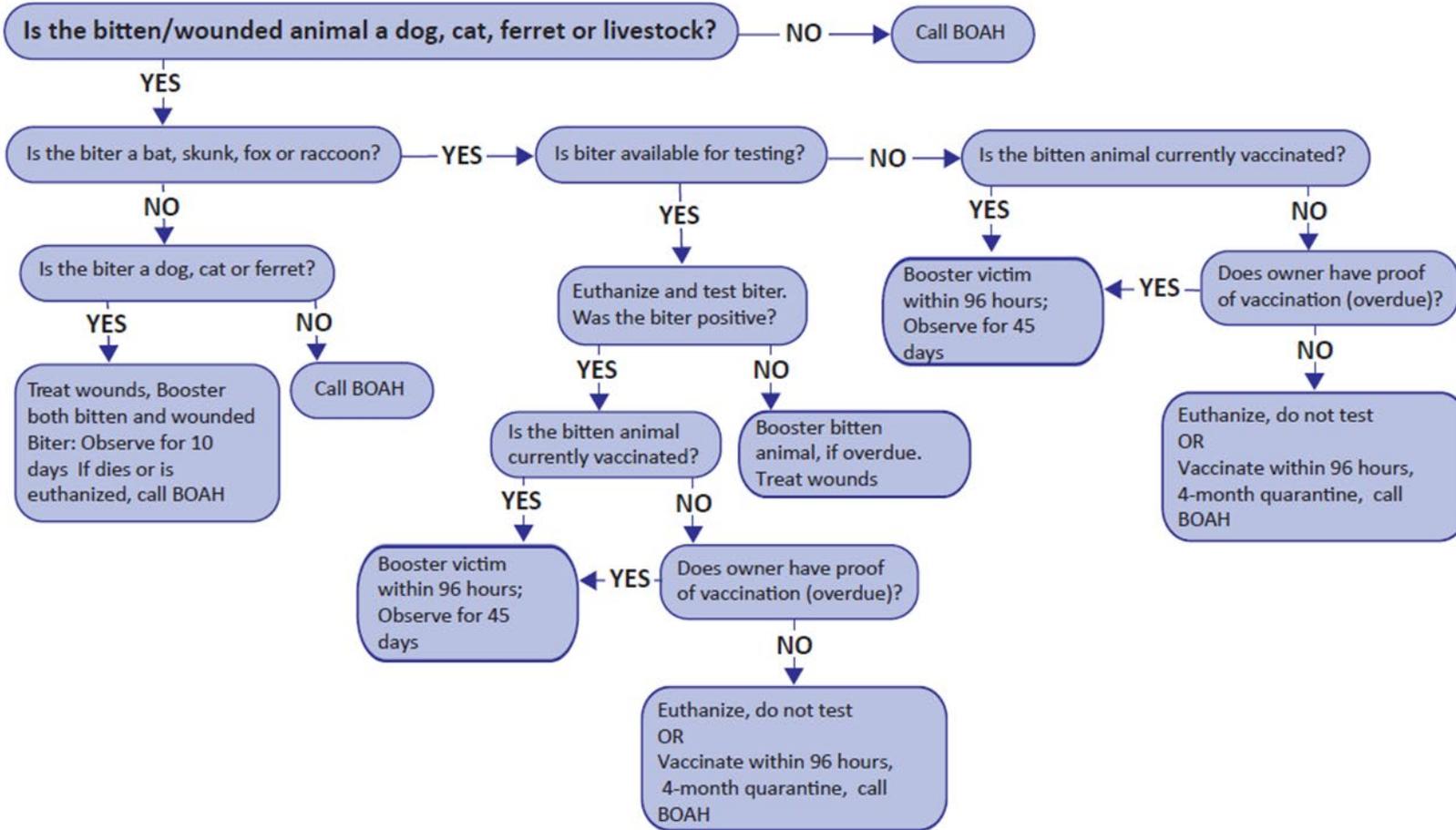
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- Animal should be securely confined with two levels of protection from the public.
- Prevent elective contact with the general public or other animals
- Illness should be reported to a veterinarian
- Animals that die or are euthanized must be tested

Known positive exposures in UNVACCINATED animals will be quarantined and monitored by a veterinarian from the Board of Animal Health

# Pet/Animal Post-Exposure Rabies Treatment Guide

Instructions: Read the flow chart below. Follow the Yes or No answers to their conclusion. Follow the proper COURSE OF ACTION. Questions should be directed to the Indiana State Board of Animal Health (BOAH) at: 877-747-3038 or animalhealth@boah.in.gov



## GUIDELINES FOR RABIES RISK ASSESSMENT



Revised May 2019

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# Sample Submission

# Sample Submission

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- Which animals should be tested?
  - Dogs, cats and ferrets which cannot complete a 10-day post-bite confinement.
  - ANY mammal that is exhibiting neurologic symptoms
  - Rabies reservoir species



# Sample Submission

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- The Department of Health Lab is the only provider of Rabies testing services in Indiana
- ship samples **OVERNIGHT DELIVERY DURING NORMAL BUSINESS HOURS**





## Keeping Pets and People Safe from Rabies

Presented by Indiana Department of Health and Indiana State Board of Animal Health

[Learn more](#)

  
**Reporting Animal Bites**

  
**Animal Rabies Sample Submission**

  
**Handling Animal Bites**

  
**Pet Vaccination Laws**

  
**Rabies Maps and Statistics**



# Rabies Sample Submission

[Rabies Information](#) > Rabies Sample Submission

## Rabies Sample Submission

Indiana Department of Health  
State Laboratories  
550 West 16th Street, Suite B  
Indianapolis, IN 46202  
(317) 921-5500  
Hours: M-F 8:15 a.m. to 4:45 p.m.

[Rabies Sample Submission Criteria](#)

*NOTE: Only the Rabies Laboratory at the Indiana Department of Health can run the test for rabies in an animal in Indiana.*

## Indiana Department of Health Laboratory Submission System

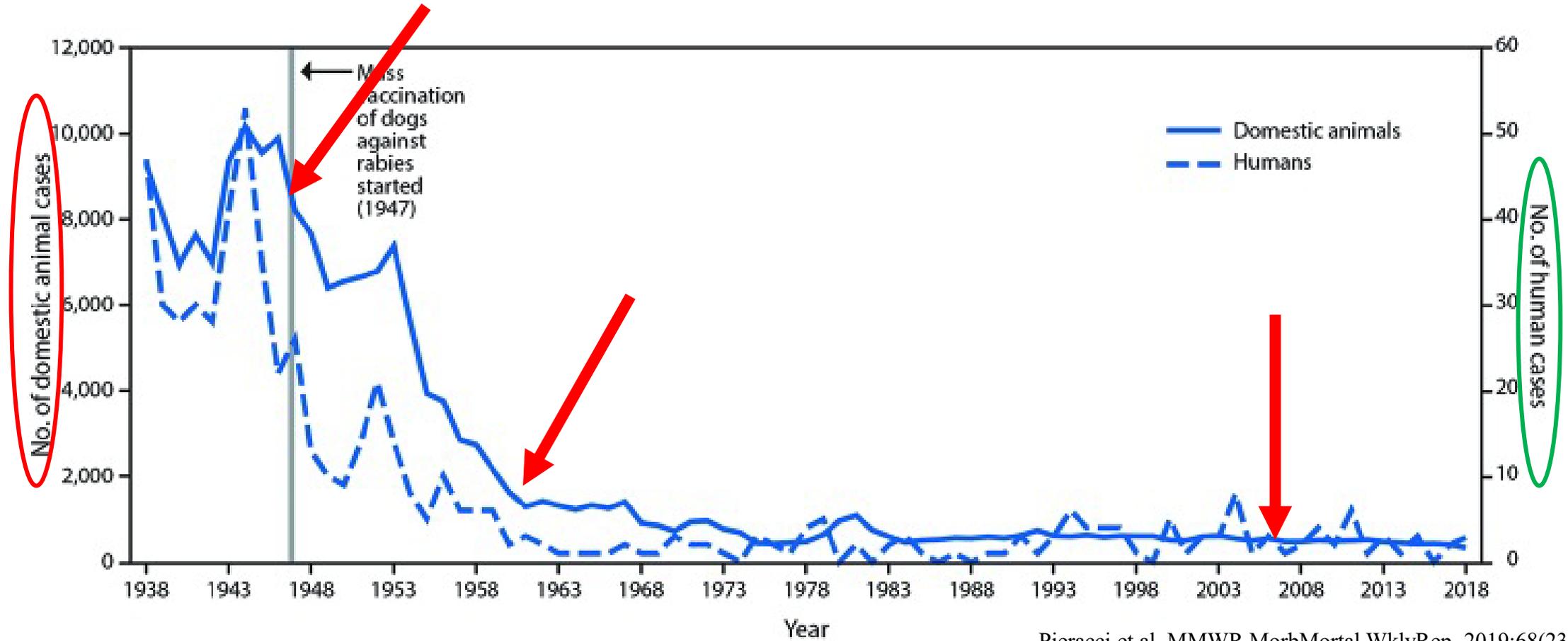
[Log-in to IDOH LIMSNet](#)  
(for registered users)  
LIMSNet Help Desk:  
(317) 921-5506  
Email: [LimsAppSupport@health.in.gov](mailto:LimsAppSupport@health.in.gov)



Photo Source: CDC Public Health Image Library #8326

# The Role of Vaccination

# Rabies cases in humans and domestic animals – US 1938-2018



# Vaccine Administration

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Must be administered by a licensed, accredited veterinarian in the state of Indiana

# Vaccine Administration

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- ALWAYS follow the label directions
  - Administer full 1.0 ml dose
  - First exposure to vaccine requires a booster within 1 year
    - Age at first vaccine does NOT matter
    - Product used for first vaccine does NOT matter



# Vaccine Administration

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- Animal is considered “vaccinated” 28 days after the initial vaccine
- Animal is considered “vaccinated” immediately after any booster
  - Overdue animals may be given either a 1-year or 3-year product
  - No need to “start over”

# Off-label use of vaccine

- Other species for which there is no approved vaccine
  - Wolves, coyotes and hybrids
  - Raccoon, fox, skunk
- Not Prohibited
  - May be used at the discretion of the veterinarian
- Vaccination will NOT be recognized in a bite or exposure situation



# Off-label use of vaccine

- Veterinarians should:
  - Counsel the owner that vaccination could provide protection to the animal BUT is not recognized as “legally vaccinated”
- DO NOT PROVIDE OWNER WITH A VACCINE CERTIFICATE OR RABIES TAG

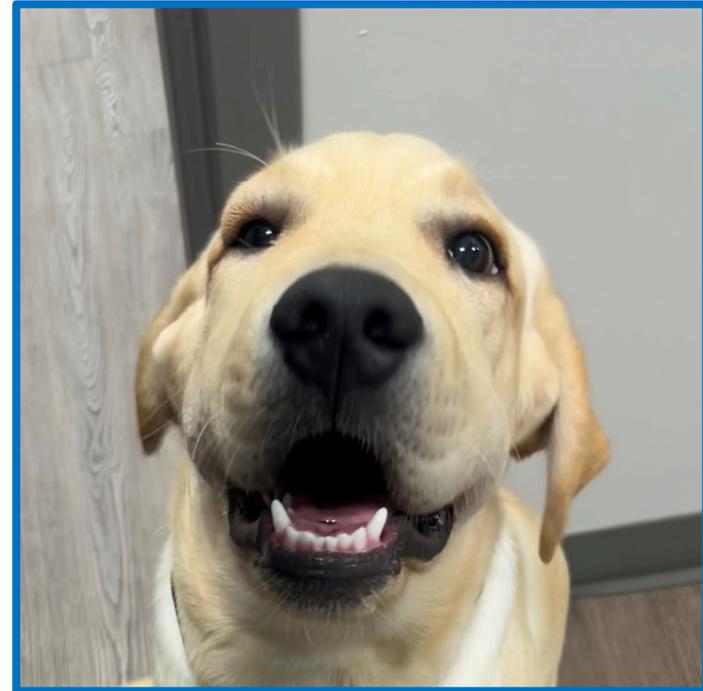


Rabies Vaccination Certificate						Rabies Tag Number	
Owner's name & address NASPHV Form #50						657 - B554	
Print-Last	First	M.I.		Telephone			
Doe	Jack	M.		555-111-1111			
No.	Street	City	State	Zip			
	123 Washington Ave,	Centersville,	Ohio	77777			
Animal's Name	Species:	Sex	Age	Breed:	Colors:		
Bella	<input checked="" type="checkbox"/> Dog <input type="checkbox"/> Cat	<input type="checkbox"/> Male <input checked="" type="checkbox"/> Female	<input type="checkbox"/> 3-12 months <input checked="" type="checkbox"/> 12 month or older	Golden Retriever	Light Golden		
Producer	<input type="checkbox"/> 1 Year Lic./Vacc <input type="checkbox"/> 3 Year Lic./Vacc			Vaccination Serial Number			
First Three Letter	Other			987-654-321			
For Licensing Agency Use		Date Vaccinated		Veterinarian No. 123987			
License No.	Year	06/01/2013		Signature <i>Buddy Savor</i>			
		Month Day Year		Address 789 Main Street			
		Vaccination Expires:		Centersville, Ohio 77777			
		07/05/2014					
		Month Day Year					
<input type="checkbox"/> Change <input type="checkbox"/> Add Control #							

# Exemptions

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- Indiana Code does not provide exemptions for medical reasons
  - Life-threatening allergic reaction
  - Immune-mediated disease
  - Old age
  - Cancer



# Exemptions

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- Pets considered unvaccinated or overdue in exposure / bite situation
- Will be required to be vaccinated according to the situation

# Exemptions

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- Titters DO NOT replace a current rabies vaccination
  - Titters do not imply immunity or protection
- Titters indicate an animal has received a vaccination
  - Can be used as proof of vaccination for international travel
  - Can be used in an animal exposure situation
    - Animal believed to have been vaccinated but owner has no proof

# Questions??

**Melissa Justice, DVM**

Director Small Animal Health Programs  
Indiana Board of Animal Health

Phone: 317-439-4888

Email: [mjustice@boah.in.gov](mailto:mjustice@boah.in.gov)

Indiana Rabies website:

[www.in.gov/rabies](http://www.in.gov/rabies)



# CDC Recommendations for Rabies Pre-Exposure Prophylaxis (PrEP)

Risk Category	Who this typically affects	Recommendations
<b>Risk Category 1 – Highest Risk</b>	People who work with live or concentrated rabies virus in laboratories	2 doses, days 0 and 7 <ul style="list-style-type: none"> <li>• Check titer every 6 months</li> </ul>
<b>Risk Category 2</b>	People who frequently do at least one of the following: handle bats, have contact with bats, enter high-density bat environments like caves or perform animal necropsies	2 doses, days 0 and 7 <ul style="list-style-type: none"> <li>• Check titer every 2 years</li> </ul>
<b>Risk Category 3</b>	People who interact with, or are at higher risk to interact with mammals other than bats that could be rabid, for a period longer than three years after they receive PrEP. This group includes: <ul style="list-style-type: none"> <li>• Most veterinarians, veterinary technicians, animal control officers, wildlife biologists, rehabilitators, trappers, and spelunkers (cave explorers)</li> <li>• Certain travelers to regions outside of the United States where rabies in dogs is commonly found</li> </ul>	2 doses, days 0 and 7 PLUS: <ul style="list-style-type: none"> <li>• Either a one-time titer check after 1 year <u>and</u> up to 3 years following the first 2-dose vaccination</li> </ul> OR <ul style="list-style-type: none"> <li>• 1-dose booster between 3 weeks and 3 years following the first vaccine in the 2-dose vaccination</li> </ul>
<b>Risk Category 4</b>	Same population as risk category 3, but at a higher risk for ≤ three years after they receive PrEP	2 doses, days 0 and 7
<b>Risk Category 5 – Lowest Risk</b>	General U.S. Population	NONE