Animal Bites and Rabies Control for Indiana

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Epidemiology Resource Center
Rabies Virus
Rabies

Transmission
- Bite wounds that break skin
- Virus infected saliva contaminating scratches or mucous membranes
  - 0.1% develop rabies
- Medical procedures
  - Transplants from infected donors
1. Virus enters tissue from saliva of biting animal
2. Virus replicates in muscle near bite
3. Virus moves up peripheral nervous system to CNS in spinal cord
4. Virus ascends spinal cord
5. Virus reaches brain and causes fatal encephalitis
6. Virus enters salivary glands and other organs of victim
Incubation Period

- Normal is 3-12 weeks (humans)
- Range may be 9 days to 7 years

- Long incubation period allows time to wait for treatment in certain situations
Rabies In Dogs

Dogs shed rabies virus during this time

Exposure

No more than 4-7 days prior to symptoms

Death

Incubation Period
- 7 - 125 days

Prodromal period
- 1-3 days

excited phase
- 1-7 days

Paralytic phase
- 2-5 days

More affectionate?
Shy and seek seclusion?
Snappy and irritable? (behavior change)

Very agitated
Roam
Bite anything
Drooling

Paralysis of masseter muscles
Drooling (foaming)
Rabies in Humans

Exposure

Incubation Period
20 - 60 days

First Symptom

Prodrome
2 - 10 days

Neurological signs

Acute Neurological phase
2 - 10 days

Onset Coma

Coma
0 - 14 days

Death

Recovery

fever, anorexia, nausea, headache, malaise, lethargy, pain or tingling at bite site

hyperventilation, CNS signs, paresis, hydrophobia, confusion, delirium, hallucinations, hyperactivity

Hypoventilation, apnea, hypotension, cardiac arrhythmia or arrest, coma
Rabies Virus Variants - 2009
Source: Centers for Disease Control and Prevention, November 2010
Source: Centers for Disease Control and Prevention, November 2010
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Summary Of Human Rabies Since 1990, US

- BATS!
- In-apparent bites?
- Not recognizing bite or not reporting
- Rabies is not always suspected by medical personnel when clinical signs develop
Recent Human Cases in the US

- 45 Cases in United States (1995-2010)
  - 34 bat variant
    - 4 organ/tissue transplantations
  - 8 canine variant (foreign origin)
  - 3 other variants
    - Raccoon
    - Mongoose
    - Fox
Incidence in Animals (IN)

- Bat variant is endemic
  - 24 positive bats in 2010
- Skunk variant occasionally (2004)
- Other variants are not currently present, but may be introduced at anytime
  - How?
## Rabies, Indiana 2000 - 2010

<table>
<thead>
<tr>
<th>Year</th>
<th>Bat</th>
<th>Horse</th>
<th>Skunk</th>
<th>Human</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
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<td>2010</td>
<td>24</td>
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</tbody>
</table>
Indiana Positive Bats

The bar chart shows the number of positive bat detections by month and year. The categories are Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, and Dec. The colors represent the years 2009 (brown), 2010 (orange), and 2011 (pink).

- In January 2009, there were 0 detections.
- In February 2009, there were 0 detections.
- In March 2009, there were 0 detections.
- In April 2009, there were 0 detections.
- In May 2009, there were 1 detection.
- In June 2009, there were 3 detections.
- In July 2009, there were 3 detections.
- In August 2009, there were 14 detections.
- In September 2009, there were 8 detections.
- In October 2009, there were 3 detections.
- In November 2009, there were 0 detections.
- In December 2009, there were 1 detection.

- In January 2010, there were 0 detections.
- In February 2010, there were 0 detections.
- In March 2010, there were 0 detections.
- In April 2010, there were 0 detections.
- In May 2010, there were 3 detections.
- In June 2010, there were 3 detections.
- In July 2010, there were 3 detections.
- In August 2010, there were 14 detections.
- In September 2010, there were 8 detections.
- In October 2010, there were 3 detections.
- In November 2010, there were 0 detections.
- In December 2010, there were 1 detection.

- In January 2011, there were 0 detections.
- In February 2011, there were 0 detections.
- In March 2011, there were 0 detections.
- In April 2011, there were 0 detections.
- In May 2011, there were 1 detection.
- In June 2011, there were 3 detections.
- In July 2011, there were 3 detections.
- In August 2011, there were 14 detections.
- In September 2011, there were 8 detections.
- In October 2011, there were 3 detections.
- In November 2011, there were 0 detections.
- In December 2011, there were 1 detection.
Skunks Rabies, 1990 - 2010

- 1996 – 1
- 1997 – 4
- 1998 – 1
- 2002 – 1
- 2004 – 1
## Last Rabies Positive Submission

<table>
<thead>
<tr>
<th>Species</th>
<th>Year</th>
<th>Species</th>
<th>Year</th>
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<tbody>
<tr>
<td>Dog</td>
<td>1989</td>
<td>Cat</td>
<td>1984</td>
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<tr>
<td>Horse</td>
<td>2002</td>
<td>Skunk</td>
<td>2004</td>
</tr>
<tr>
<td>Fox</td>
<td>1990</td>
<td>Cow</td>
<td>1986</td>
</tr>
<tr>
<td>Pig</td>
<td>1967</td>
<td>Ground Hog</td>
<td>1983</td>
</tr>
<tr>
<td>Raccoon</td>
<td>1979</td>
<td>Bat</td>
<td>2011</td>
</tr>
<tr>
<td>Goat</td>
<td>1967</td>
<td>Mouse</td>
<td>1970</td>
</tr>
<tr>
<td>Opossum</td>
<td>1968</td>
<td>Human</td>
<td>2006, 2009</td>
</tr>
</tbody>
</table>
Human Rabies Cases (IN)

• Between 1900 and 1949 – 120 cases
• Between 1950 and 1959 – 10 cases
• After 1959 – 2 cases
  – 2006
  – 2009
Public Health Issues

• Animal bites that potentially expose individuals to rabies

• Issues are:
  – Does the animal have rabies
  – Is post exposure prophylaxis needed
Laws and Regulations

- Management of Animal Bites to Humans
  - 410 IAC 1-2.3
- Animal bites; specific control measures
  - Section 52
- Authority: IC 16-41-2-1
- Affected: IC 15-17-6-11; IC 16-41-2; IC 16-41-9
Quarantine Regulations

- 10 day bite Quarantine
- 6 month exposure Quarantine

- What is the difference?
- Why is there a difference?
Risk of rabies transmission

- Degree of exposure
- Circumstances of bite
- Behavior of biting animal
- Vaccination status
- Prevalence of rabies - geographic area
- SPECIES of animal involved
Summary, Rabies in Indiana

- Indiana’s primary reservoir = ?
- Indiana’s secondary reservoir = ?

- Rabies vaccination can prevent transmission from reservoirs
- Human exposures to bites/saliva from wildlife and domestic animals must continue to be evaluated
Bats and Rabies

• ~ 1% of bats carry rabies virus
• May or may NOT show symptoms
• Bites don’t always leave visible marks
• Most exposure occur when bats enter human living quarters

• Photo: Green River Health District, KY
courtesy of Nebraska Department of Health and Human Services
More about Bat Exposure!

- Bat bites may not be noticed because bat teeth are very tiny and razor sharp.

- Examining a person for a bat bite is unreliable, because bat bites can be no bigger than a needle prick.

- **ANY direct contact with a bat should be considered a possible rabies exposure.**
Proximity Exposures

- Photo by Kevin Lilly
Bat Exclusion

http://wildlifehotline.info/

Hoosiers trying to cope with nuisance wildlife may find useful information at the Indiana Department of Natural Resources (DNR) website. To access the latest news and information, visit http://wildlifehotline.info/.

The Nuisance Wildlife page provides specific information on the general characteristics, food habits, distribution, reproduction, prevention and control techniques, and disease threats of many species of mammals and birds, as well as general information about snakes.

Because of the large number of raccoons and other species that cause a nuisance for landowners throughout the state, the DNR is unable to provide assistance to actually help remove the animals. The DNR does offer some solutions and advice on how to try to prevent future problems and remove wild animals that have created a problem.

Acknowledgments

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When should you submit a bat for Rabies testing?

- Bite human or domestic pet
- Direct contact with human or pet
- Proximity exposures

Photo: Green River Health District, KY
Low risk animals

- Not usually considered rabies exposures
- Treatment or testing is not normally necessary
- Evaluate for unusual circumstances that may indicate possible rabies