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Rabies Prevention

**When You Have to be Right
100% of the Time**

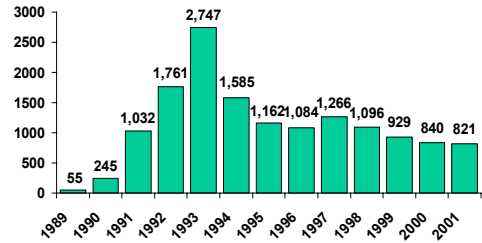
Bryan Cherry, PhD

**VMD, Deputy State Public Health
Veterinarian, NYSDOH, Bureau of
Communicable Disease Control –
Zoonoses Program**

Rabies

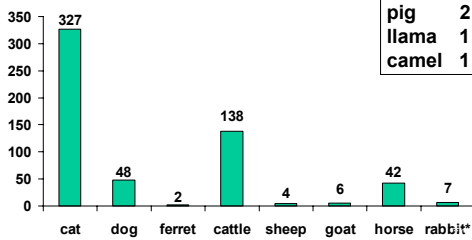
- Infectious disease
- Fatal
- Preventable

CONFIRMED RABID ANIMALS NEW YORK STATE



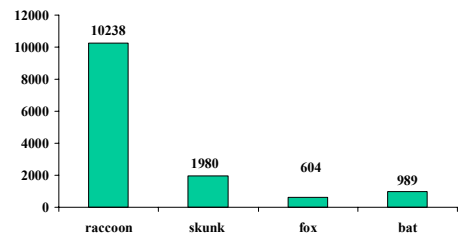
RABIES LABORATORY
NYS DOH
WADSWORTH CENTER

Rabies in Domestic Animals, NYS 1990-2001



RABIES LABORATORY
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Rabies in Wildlife, 1990-2001 terrestrial rabies-vector species in NYS:



RABIES LABORATORY
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Methods of transmission

- Bite of an infectious animal
- Inhalation or other direct exposure of mucous membranes (rare)
- Non-bite exposure: contamination of open wounds, scratches or abrasions by saliva from a rabid animal

Rabies Pathogenesis

- Virus at wound site
- Migrates toward CNS, via peripheral nerves
- Rapid replication in CNS
- Only then to salivary glands from CNS
 - No transmission or diagnosis during incubation
 - Transmission during or just prior to clinical signs

Clinical Signs of Rabies-Animals

- Change in behavior
- Change in voice
- Paralysis, paresis
- Dysphagia, salivation (drooling)
- Aggression
- Lethargy, convulsions
- Death



Human Rabies in the U.S. 1990 - 2004

- 45 Cases total
- 37 Acquired in U.S.
 - 2 Due to dog rabies
 - 1 Due to raccoon variant
 - 34 DUE TO BAT VARIANTS
- 4 due to transplants
- 5 with reported bite
- 9 with some contact
- 16 with unknown exposure history
 - 6 reported bats in home
 - 7 with no bat history
 - 2 report bats outside
 - 1 may have caught bats



DOH

Rabies Prevention

- Prevent Exposure
 - Children and animal bites
- Vaccinate Pets
 - Pets are the barrier between people and raccoons
- Avoid Bats
 - Release w/o handling
 - Capture safely!



Rabies Prophylaxis: Pre-exposure

MMWR, 1999, vol. 48, no. RR-1

- Three IM vaccine doses day 0, 7, 21 or 28
- Vets, vet techs, animal control, animal husbandry staff, etc.
- Rabies titer every two years
 - Single dose booster if titer <0.5 IU
- Goal: protect against unrecognized exposures

Rabies Prophylaxis: Post-exposure

MMWR, 1999, vol. 48, no. RR-1

- Anyone with a known exposure
- Previously unvaccinated patient:
 - HRIG (20 IU/kg) infiltrated at site of exposure
 - 5 vaccine doses: days 0, 3, 7, 14, 28
- Previously vaccinated patient:
 - 2 vaccine doses, days 0 and 3

Rabies Postexposure Prophylaxis

MMWR, 1999, vol. 48, no. RR-1

- | Vaccinated | Not vaccinated |
|-----------------------------|---------------------------------------|
| • WASH wound | • WASH wound |
| • No rabies immune globulin | • Rabies immune globulin administered |
| • Revaccinate | • Vaccinate |

Rabies Biologics

- **Vaccines: can be used interchangeably, all IM**
 - Imovax (Aventis), RabAvert (Chiron)
 - Deltoid, lateral thigh, avoid gluteal
- **Rabies Immunoglobulin (HRIG): 20 IU/kg**
 - Imogam (Aventis), BayRab (Bayer) – 150 IU/ml
 - Instill in wound AS MUCH AS POSSIBLE
 - Remainder in muscle distant from vaccine site

Immediate PEP

- Bites near the head
- Animals behaving abnormally at time of injury
- Animals not available

Delayed PEP

- Bite distant from head (foot, leg, hand)
- Scratches
- Incidental saliva contact
- Animal not immediately available but may be traceable
- Animal can be observed

PEP Decision Tree

Did an Exposure Occur?

- Exposures generally break skin
 - Bite, scratch
- Skin may already be broken
 - Previous wound, salivary exposure
- The special case of bats
 - Bat bites may go unnoticed
 - Special concern for children, those asleep in room where bat is found
- Need to assess level of risk
- When in doubt, call the Zoonoses Program

Raccoons, Skunks, Bats, Foxes

- Raccoon and skunk bites or scratches should receive PEP unless animal is available for testing
- Bat exposure: best for bat to be tested
 - Many seemingly insignificant exposures related to human infection
 - When in doubt, err on the side of caution

Domestic Pets, Livestock

- Observe for 10 days, evaluate immediately upon signs of illness
- How soon does PEP have to be started?
 - Usually OK to try to find animal for 2-3 days
 - Depends on nature of wound, circumstances of injury
 - If animal unlikely to be found/identified...treat

Other Species

- Wild rodent exposures
 - generally never need PEP
- Pet rabbits and rodents:
 - Case-by-case evaluation
 - Housed only indoors → no treatment
 - Housed outside → need to evaluate further

PEP Case Scenarios

“We’ll Just Get Vaccinated”

- Family finds a cat in upstate NY in January
- Late April, cat develops progressive neurologic disease
- Family wants to treat (!) cat and will get prophylaxis “just in case”
- 3 weeks later, cat is dead, family did not get prophylaxis, vet is calling on Saturday afternoon.

Vaccinated Review

- Biggest concern is that this cat was treated at all (should have been euthanized)
- Testing is needed, but PEP can wait
- Rabies unlikely based on course of illness, discussion with vet

A Squirrely Situation

- 6 y.o. boy observed handling a live squirrel
- Mother releases squirrel, inspects child, no injuries
- Squirrel climbs up neighbor’s leg, police called to retrieve squirrel
- Child’s father is a veterinarian, insists that the squirrel be tested for rabies

Squirrely Review

- Family concerned because of bizarre behavior of squirrel
- Any number of causes for behavior, rabies not a concern
- In any case, available for testing, so can delay PEP, but if untestable, still would not treat

Of Bats and Babies...

- Couple awakened during the night because two bats are flying around in their bedroom
- One bat gets caught between window and screen--released
- Couple lose sight of the other bat, forget incident, go to wedding in Puerto Rico
- Return to find a dead bat in the bedroom
- Woman is 12 weeks pregnant

Bats and Babies Review

- Regardless of status of dead bat, still one bat unavailable, so PEP indicated
- Pregnancy is NOT a contraindication
- Testing dead bat may help emphasize need for PEP (if positive), also may cause false confidence (if negative)

Bat Exposure?

- Family A visits friend's summer home in MA
- One week later, friends report they "heard bats" in summer home (after Family A left)
- Friend checks with pediatrician, starts whole family on PEP
- Family A wants to know if they should begin PEP
- No one ever saw a bat, no one had any contact with a bat.

Bat Review

- Despite concerns, no one ever saw a bat
- Noises in walls could be caused by anything
- No one in either family required PEP

Vampire Signs

- Woman presents to ER with two puncture wounds on her arm
- Concerned a bat hit her
- Never saw a bat, no evidence in the home, but had a bat in the house last year (tested negative)

Vampire Signs Review

- People often expect to see two bites from a bat
- Two small punctures likely to be insect (spider) bites, from thorns, etc.
- Bat bites may not look like two bites
- Main issue: no bat → no PEP

Attack of the Killer Raccoons

- 18 y.o. girl walking her puppy in the Jamaica area of Queens
- Sees a raccoon crossing the street, heading straight for her dog
- Starts to head away from the raccoon, but the raccoon pursues and girl sustains several wounds to her ankle before she is able to escape
- At the ER, the girl's ankle is examined and several scratches appear on the ankle, and skin was broken superficially

Killer Raccoon Review

- ER staff questioned risk associated with a “scratch”
- Impossible to know whether bite or scratch
- Failure to recognize this raccoon demonstrated highly typical behavior for rabies

The “Too Friendly” Dog

- A woman scratched on the leg by a neighbor's friendly dog
 - The scratch was incidental but did break skin
- One week later, leg is swollen and painful
- She is treated for wound infection with oral antibiotics, surgical drainage
- The question is raised whether she also requires rabies PEP
- She continues to see the dog regularly

Friendly Dog Review

- PEP was considered because wound was infected
- Infection at wound site is not a consideration in rabies treatment
- Main considerations: known dog, acting normally, patient sees dog regularly

Guinea Pig

- Woman bitten by pet guinea pig
- Recalls incident outdoors that may have involved a raccoon...guinea pig possibly injured (1 month prior)
- Guinea pig acting normal, but tested anyway
- Positive for rabies

Guinea Pig Review

- Normally rodent exposures are not treated
 - Especially caged pets
- History in this case was concerning
- Always be sure to get a complete history on the rodent or rabbit: if housed outdoors, may need to initiate PEP
- Consult Zoonoses Program

Rabies PEP Do's

- Thoroughly review exposures
- Make every effort to find the animal (dogs/cats...2-3 days if able to identify)
- Thoroughly clean wounds immediately
- Communicate with medical providers to avoid conflicting recommendations
- Follow up on treatment
- When in doubt, contact Zoonoses Program

Rabies PEP Don't's

- Don't lose the bat! ...or other suspicious animals
- Don't start PEP when animal may be found or is under observation
- Don't treat rodent/rabbit exposures unless known rabid or unusual circumstance
- Don't forget to communicate with medical provider, review administration of HRIG if necessary!

Rabies Contact Info

<http://www.health.state.ny.us/nysdoh/rabies/rabies.htm>

NYSDOH After-hours Duty Officer:

866-881-2809

NYSDOH Zoonoses Dept:

518-474-3186

Evaluations

Please visit

www.t2b2.org

to fill out your evaluation and post test...

And you will receive a

Free *T2B2* Paper Holder!

Recent articles regarding rabies and rabies treatment:

- Robbins A, Eidson M, et al. 2005. Bat incidents at children's camps, New York State, 1998–2002. *Emerg Infect Dis.* 11(2): 302 – 305.
- Rupprecht, CE, Gibbons, RV. 2004. Prophylaxis against rabies. *N Engl J Med.* 351(25): 2626 – 2635.
- Gibbons, RV. 2002. Cryptogenic rabies, bats, and the question of aerosol transmission. *Ann Emer Med.* 39(5): 528 – 536.
- Chang HGH, Eidson M, et al. 2002. Public health impact of reemergence of rabies, New York. *Emerg Infect Dis.* 8(9): 909 – 913.
- Chutivongse S, Wilde H, et al. 1995. Postexposure rabies vaccination during pregnancy: effect on 202 women and their infants. *Clin Infect Dis.* 20: 818 – 820.
- Varner MW, McGuinness GA, Galask RP. 1982. Rabies vaccination in pregnancy. *Am J Obstet Gynecol.* 143:717 – 718.

General reference on rabies:

Baer, GM, ed. 1991. *The natural history of rabies*, 2nd edition. Boca Raton: CRC Press. 620 pg.

Internet resources:

NYSDOH Rabies website: <http://www.health.state.ny.us/nysdoh/zoonoses/zoonoses.htm>

NYSDOH HIN Secure Discussion Forum (Access limited, contact the Zoonoses Program)

CDC Rabies information: <http://www.cdc.gov/ncidod/dvrd/rabies/>