RABIES!

Or the Fear of Water
What a Sanitarian Should Know

Connecticut Environmental Health Assoc.
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Jocelyn Mullins, DVM, MPH, PhD
Connecticut Department of Public Health
Epidemiology and Emerging Infections Program

860-509-7994
jocelyn.mullins@ct.gov
Rabies Virus

Positive sample
Cycle of the Rabies Virus

1. Exposure
2. Incubation
3. Virus Replication
4. C.N.S. Spread
5. Clinical Rabies
6. Virus Shedding
Terrestrial Animal Reservoirs
United States

https://www.cdc.gov/rabies/location/usa/surveillance/wild_animals.html
“spill-over”

https://www.cdc.gov/rabies/location/usa/surveillance/wild_animals.html
# Rabid Terrestrial Animals

**Connecticut, 1991-2018**

<table>
<thead>
<tr>
<th>Wild Animals</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Raccoon</strong></td>
<td>5349</td>
<td>(75%)</td>
</tr>
<tr>
<td><strong>Skunk</strong></td>
<td>1519</td>
<td>(21%)</td>
</tr>
<tr>
<td><strong>Fox</strong></td>
<td>121</td>
<td>(2%)</td>
</tr>
<tr>
<td>Woodchuck</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>Deer</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Coyote</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Coyote</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Bobcat</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Bobcat</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Otter</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Otter</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Opossum</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Opossum</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Beaver</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7092</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domestic Animals</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cat</strong></td>
<td>157</td>
<td>(73%)</td>
</tr>
<tr>
<td><strong>Cattle</strong></td>
<td>24</td>
<td>(11%)</td>
</tr>
<tr>
<td><strong>Dog</strong></td>
<td>11</td>
<td>(5%)</td>
</tr>
<tr>
<td>Horse</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Sheep</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Goat</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Rabbit</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Donkey</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Ferret</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>194</td>
<td></td>
</tr>
</tbody>
</table>

What if it can't be tested?

• Animal not available
• Sample can't be tested or called negative
• Again, consider: Species nature of exposure or incident
How about squirrels?

• Small mammals not considered a rabies threat

(Exception – rabbits/others kept outdoors in enclosures an animal can reach through)
Rabies in Animals

• Incubation: 3 - 12 weeks
• Early: look sick, abnormal behavior, staggering (can be non-specific)
• Within 3-5 days: clear signs of rabies (biting/aggression, very abnormal behavior, salivation, seizure, unable to eat/drink/swallow)
• Death within 7 days
Rabies in People

- Incubation: 3 - 8 weeks
- Prodrome: 2 - 10 days
- Acute neurologic phase: 2-7 days
- Coma
- Death – 100% fatal
Bats

First bats recorded in 1953 (CT 1959)

Bats = 3% of human case exposures

Bat variants = 42/45 (93%) human infections

Submitted bats in CT:

4 - 6% rabid

2015 – 2018: 71

Reported cases of rabies involving bats, by county, during 2015.
Rabies is a fatal viral zoonosis and serious public health problem. All mammals are believed to be susceptible to the disease, and for the purposes of this document, use of the term animal refers to mammals. The disease has no latency, appearance on the second or third post-exposure day, and is manifest by progressive neurologic signs, dysphagia, cranial nerve deficits, abnormal behavior, ataxia, paresis, altered vocalization, and seizures. Progression to death is rapid. There are currently no known effective rabies antiviral drugs.

Use of a Reduced (4-Dose) Vaccine Schedule for Postexposure Prophylaxis to Prevent Human Rabies

Recommendations of the Advisory Committee on Immunization Practices
Pre-exposure Immunization

For people at increased risk of exposure
  = animal control / conservation officers,
    veterinarians, vet staff, lab workers, travelers

Vaccine
  3 doses on days 0, 7, 21 or 28

Serologic testing
  frequency depends on risk of exposure
  vaccine booster
What is an Exposure?

Contact that can introduce the virus into the bloodstream of a person or animal

*Infectious material + “portal of entry”*

**Infectious material = CNS tissue, saliva**

**NOT infectious = blood, feces, urine, dried saliva**

**Portal of Entry = bite, saliva onto mucus membranes, saliva into broken skin**

**Bite vs. Non-bite exposure**

In saliva a few days before sick
Bat Exposures

Risk assessment difficult
limited injury, inaccurate recall

ACIP Guidelines
reasonable probability of contact
(or reasonable certainty of no contact)

- Bat in room with sleeping person
- Bat in room with unattended child, mentally disabled, intoxicated
What if it’s an exposure?

- Exposure to Wild animals
  - test if available

- Exposure to Domestic animals (animal control)
  - Owned animal consider quarantine
  - Test if euthanized (stray, elective)

- Recommend PEP?
  - Discuss with health director or DPH if ‘gray area’
  - Recommend discuss PEP with their physician or ED
Who is Involved?

• Local Animal Control
  – Investigation of bites/incidents, quarantine, seizure, euthanasia

• Department of Agriculture
  – Assessment of animals – final authority for quarantine, euthanasia

• Local health
  – Human risk assessment, coordination, communication

• State Department of Public Health
  – Testing, human risk assessment, assistance

• DEEP
  – Wildlife issues
Where to test?

At State Lab:

*When there is a possible human exposure* (infectious material + portal of entry)

- Must be submitted by ACO, local health, veterinarian, NWCO
- Domestic animals – consider quarantine

At UConn: No human exposure
Rabies Testing

DPH Lab, 10 Clinton St., Hartford

After Hours
What if the test is positive?

- Lab notifies submitter, local health, DPH
  - Animal control, vet, local health, DPH
  - One (or more) of above notifies owner or exposed person
- Humans assessed for risk, need for PEP
  - ACO, vet staff, owners, community members
  - PEP recommended to those potentially exposed
- Domestic animals assessed
  - Quarantine, booster vaccination, euthanasia
Post-exposure Prophylaxis
(NO previous vaccination)

1. Really good wound cleansing

2. Immune globulin (HRIG)
   Infiltrate wound
   IM in gluteal or distant area

3. Post-exposure vaccine (revised 2010)
   4 doses IM in deltoid (shoulder muscle)
   Days 0, 3, 7, 14
Post-exposure Prophylaxis
(WITH previous vaccination)

1. Really good wound cleansing
2. NO Immune globulin (HRIG)
3. Post-Exposure Vaccine
   - 2 doses, days 0 and 3
Post-exposure Prophylaxis

Urgency vs Emergency?
Factors to consider:
  - Species
  - Nature of exposure or incident
  - Severity or location of wound
  - Animal available for quarantine or testing

quarantine in CT 14 days for dog or cat

Highly successful
Rabies

Rabies is a viral disease primarily of animals caused by infection of the brain and spinal cord. People get rabies from the bite of an infected animal. In many areas of the developed world including Asia, Africa, and South America, it is transmitted most often to bats, and in the United States, where rabies in dogs has been largely eliminated, rabies is still widespread in wildlife. Bats, raccoons, skunks, and foxes are the major reservoirs and serve as a source of potential infection for other animals and people.

In 1991, a resurgence of rabies in Connecticut followed the spread of rabies in raccoons from southern states and resulted in the first rabid domestic animals in the state since the 1940s. The raccoon rabies outbreak reached Connecticut in March of that year, spreading Fairfield County through New York state. Over the following 4 years it spread to the entire state of Connecticut.

Rabies testing done at the Connecticut Department of Public Health (CT-DPH) Laboratory allows the DPH to monitor the occurrence of rabies among wild and domestic animals. Rabies is also important to guide the medical management of patients exposed to potentially rabid animals.

After an incubation period that is usually 3-8 weeks, symptoms in people progress over the course of several days from a flu-like illness to encephalitis that may be characterized by confusion, agitation, hallucinations, and muscle paralysis. Once clinical signs of rabies appear, the disease is fatal. However, disease can be prevented by thorough wound cleaning and timely medical treatment that includes administration of one dose of immune globulin (antibodies) and 5 doses of vaccine over 2 weeks.

Vaccination of domestic animals is an important component of rabies prevention programs. Connecticut state law requires vaccination of cats and dogs. In addition, dogs must also be licensed.

When making decisions related to rabies post-exposure prophylaxis, health care providers are encouraged to refer to "Use of a Reduced (6-dose) Vaccine Schedule for Postexposure Prophylaxis to Prevent Human Rabies: Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2010."  

Important Contact Information:
- The Department of Public Health, Epidemiology, and Infectious Disease Program for questions regarding human exposures at 860-509-7974.
- The Department of Agriculture, Animal Control Division for questions regarding domestic animals at 860-713-2086.
- The Department of Energy and Environmental Protection, Wildlife Division for questions regarding wildlife at 860-424-3013.
- The local police department when prompt assistance is needed.

Rabies & Risky Behavior (YouTube)
Rabies Brochure
Rabies Fact Sheet
Request for Rabies Examination Form


Statistics

Rabies Statistics, Connecticut
Annual Cases of Reportable Diseases

Other helpful sites:

Connecticut Department of Agriculture
Connecticut Department of Energy and Environmental Protection
- Nuisance Wildlife Control and Rabies
Centers for Disease Control and Prevention (CDC) Rabies

https://portal.ct.gov/DPH/Infectious-Diseases/EEI/Rabies
Rabies Statistics

In the United States (US), rabies was controlled after World War II mainly by injection of vaccine and stray dog control programs.

Although rabies in dogs has been controlled in the US, it is still the animal species most responsible for rabies transmission to people in much of the world. Rabies is also widespread in wild mammals. In the US, bats, raccoons, skunks, and foxes are the major reservoirs and serve as the primary source of infection to other animals and people.

In 1991, a resurgence of rabies in wild animals followed the spread of rabies in raccoons from southern states to Connecticut. By the end of 1995, each county in the state was affected. Skunks and raccoons were the cause of the first rabid domestic animals in the state since the 1940s.

In 1992, the highest number of rabid animals in Connecticut was identified (635). Since then the number of reported rabies animals has declined but infected animals continue to be found. In areas of the state, the decline reflects an actual reduction of the raccoon population due to rabies and a change in animal testing criteria.

In Connecticut, testing of wild animals for the rabies virus is limited to animals involved in exposure incidents with people or domestic animals. Therefore, the statistics presented on this page do not represent the total number of rabid animals in the wild. Rabies testing of animals is primarily performed to aid healthcare providers in the medical evaluation and treatment of people who may have been exposed. Testing is also done to guide animal control officers in the management of domestic animals that have been exposed to the rabies virus, through the bite of a wild animal. These statistics are useful to identify the species that most frequently test positive for rabies and the statewide distribution of rabid animals; they should not be used to evaluate risk of exposure. Connecticut residents may consult with their local health department or the DPH to evaluate their risk of exposure to the rabies virus.

Animals suspected of having rabies infection that have been involved in incidents with humans or domestic animals are tested at the Department of Public Health Virology Laboratory. Animals not involved in incidents with humans or domestic animals can be tested at the Connecticut Veterinary Medical Diagnostic Laboratory at the University of Connecticut.

All documents are PDF unless otherwise stated.

Current Connecticut statistics %

Line Listings
- Rabies Positive Animals by Town and County, 2017%
- Rabies Positive Animals by Town and County, 2016%
- Rabies Positive Animals by Town and County, 2015%
- Rabies Positive Animals by Town and County, 2014%
- Rabies Positive Animals by Town and County, 2013%
- Rabies Positive Animals by Town and County, 2012%
- Rabies Positive Animals by Town and County, 2011%
- Rabies Positive Animals by Town and County, 2010%
- More
Manual for Rabies Management and Protocols

In December 1991 with assistance from state and private agencies, the Connecticut Veterinary Medical Association published the “State of Connecticut Manual for Rabies Management and Protocols”. It served as an essential reference for veterinarians and other professionals who were expected to provide assistance and advice regarding rabies. In large part this web site is based on the manual and includes updated information with links that will provide further information about rabies and who to contact in the event of a rabies incident.

All documents below are in .pdf format unless noted otherwise.

- Introduction
- Rabies Contact Information
- Rabies Information Brochure
- (NEW) Rabies Management of Domestic Animals Exposed to Wildlife
- Rabies Advisory Notice
- Rabies Management of Domestic Animals Bitten by other Domestic Animals
- Rabies Management of Livestock
- Regulations for the Control of Rabies in Public Settings
- Quarantine and Euthanasia of Biting Animals (C.G.S. 22-358)
- Rabies Wildlife Situations and Information
- Instructions for Submitting Specimens to CT Department of Public Health (DPH) Lab
- DPH Lab Rabies Testing Submission Form
- UCONN - CT Veterinary Medical Diagnostic Lab (CVMDL) Rabies Testing Submission Form
- Acknowledgement of Receipt of Rabies Testing Information
- Human Rabies Prevention
- Rabies Statistics (link to CT Dept of Public Health page)
Nuisance Wildlife Control

and

Rabies

Information for Connecticut's Home & Business Owners

Connecticut's Nuisance Wildlife Control Operator Program

Each year, the Wildlife Division receives several thousand calls concerning conflicts with wildlife. A majority of these problems involve small mammals, such as squirrels, raccoons, skunks, woodchucks, opossums, and bats, as well as some birds, such as house sparrows, starlings, pigeons, and woodpeckers. Problems caused by these species vary, but they often involve animals establishing dens and nests in or under homes, decks and sheds; damages from holes, burrows, nesting material, and faces; and associated safety and disease concerns. Other species commonly reported as causing conflicts include beavers, coyotes, foxes, and Canada geese. Some of the conflicts include threats and damages from flooding; attacks on pets, poultry and livestock; fecal damages to lawns and recreation areas; and associated disease and safety threats to people and pets.

Compounding these conflicts are the loss of wildlife habitats caused by residential and commercial development and an increasing human population that often lacks a basic understanding of common wildlife and the prevention and control of damages.

The Wildlife Division provides wildlife damage control information over the telephone through information provided on our website to assist Connecticut residents in resolving wildlife conflicts, but some residents require more assistance.

In 1985, the Connecticut State Legislature established a license for Nuisance Wildlife Control Operators (NWCOs). Licensed NWCOs must complete a comprehensive training course and pass a state exam which assesses their knowledge of NWCO regulations, policies and procedures; animal identification, habits, and life histories; recommended wildlife control practices, and humane handling and euthanasia. NWCOs can advertise services and charge fees for the purpose of controlling nuisance wildlife. They must keep accurate, up-to-date records of their activities and report their activities annually. Though not DEEP employees, their activities are governed by DEEP regulations, policies, and procedures. By instituting these requirements, DEEP is certifying that NWCOs have reviewed the procedures, guidelines, and expectations of the NWCO Program. ([How to Become a NWCO](#))

If you are experiencing wildlife-caused problems and are unable or unwilling to resolve the situation yourself, you will most likely be referred to a NWCO. The DEEP, through regulation and policy, determines which animals the NWCOs can handle and which methods they can employ ([Brochure: Nuisance Wildlife Control Program, Rabies, & Client Notification - PDF](#)). However, some decisions must be negotiated between you and the NWCO. After contacting a NWCO, you should discuss the following issues before action is taken:

- **Determine the nature of the problem.**
  - With the NWCO's assistance, identify the offending species, the number of animals involved (if possible), and describe the extent and types of damage.
- **Determine which methods will be used to resolve the problem.**
RABIES CONTACT INFORMATION

Who to Call for Assistance

Department of Agriculture
For questions concerning domestic animals (e.g. biting incidents, quarantine, vaccination)
* Animal Control Division 860-713-2506 (M-F, 8:00-4:30)
* State Veterinarian 860-713-2505 (M-F, 8:00-4:30)

Department of Environmental Protection
For questions concerning wildlife (e.g. biting incidents, wildlife management, rehabilitation)
* Wildlife Division 860-424-3011 (M-F, 8:00-4:30)
* Environmental Conservation Police 860-424-3833 (after-hours)

Department of Public Health
For questions concerning rabies in people (e.g. risk assessment, treatment)
* Epidemiology Program 860-509-7904 (M-F, 8:30-4:30)
* For questions concerning submission of animals for testing (e.g. packaging, forms)
* Virology Section, State Laboratory 860-509-8553 (M-F, 8:00-4:00)

Connecticut Veterinary Medical Association 860-635-7770
For questions regarding rabies clinics
  * http://www.ctvet.org/

University of Connecticut
For questions regarding submission of livestock for testing (e.g. cost, requirements)
* Veterinary Medical Diagnostic Laboratory 860-486-3738 (M-F, 8:30-4:30)
  * http://cvmdl.uconn.edu/

Local Animal Control Officer – found in the blue pages of the telephone directory
For reporting incidents of animals biting people or domestic animals

Local Health Department – listing available at
https://www.han.ct.gov/local_health/local.asp?bar=1
For questions concerning rabies in people (e.g. risk assessment, treatment)

Centers for Disease Control and Prevention
For information about rabies in the United States
  * http://www.cdc.gov/rabies/

⇒ When prompt assistance is needed call your local police department!
QUESTIONS?

Jocelyn Mullins, DVM, MPH, PhD
Connecticut Department of Public Health
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