



24th Annual Chicago Infection Control Conference

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Dr. Layden has disclosed that there is no actual or potential conflict of interest in regards to this presentation

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Learning Objectives

At the conclusion of this course participants will be able to:

- Describe how Chicago Department of Public Health is exploring the root causes of health disparities among those living in Chicago.
- Identify public health resources to contact for reportable disease conditions, obtain specialized treatments, or engage for antibiotic stewardship assessments through the Chicago Department of Public Health.
- Describe surveillance and response efforts around emerging and re-emerging infections including Legionnaires' disease, measles, and preparedness regarding the Ebola situation in the DRC.
- Identify mechanisms of surveillance for acute responses (such as emerging lung diseases in those with vaping history) and how to report these suspected cases to public health.

To obtain credit you must:

- **Complete an electronic evaluation**
- **After completing the evaluation you can generate your certificate immediately.**

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Tips About Rabies Exposure and Rabies Post-exposure Prophylaxis (PEP)

OBJECTIVES

- Gain familiarity with risk assessments for post-exposure prophylaxis
- Learn the biologics used for rabies preventive treatment
- Scenarios – actual real life ones

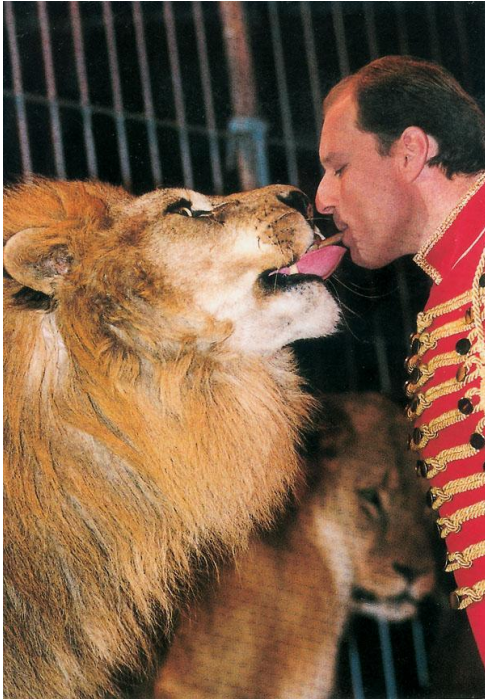
THE RABIES VIRUS *IS*:

- Transmitted via saliva into open wounds or mucous membrane
- Not able to invade intact skin
- Killed by UV light, drying, soap and water and any disinfectant

THE RABIES VIRUS IS *NOT*:

- transmitted by:
 - Blood
 - Urine
 - Feces
 - Skunk spray

A RABIES EXPOSURE IS NOT FROM:



- touching a rabid animal
- touching something a rabid animal touched
- being in the same room as a rabid animal
- A “dry scratch” where there was no saliva contamination



UNIQUE ASPECTS OF RABIES INFECTION



An immediate risk assessment must be made after the exposure.

The virus attaches to nerves, where it is hidden from the bitten person's immune system.

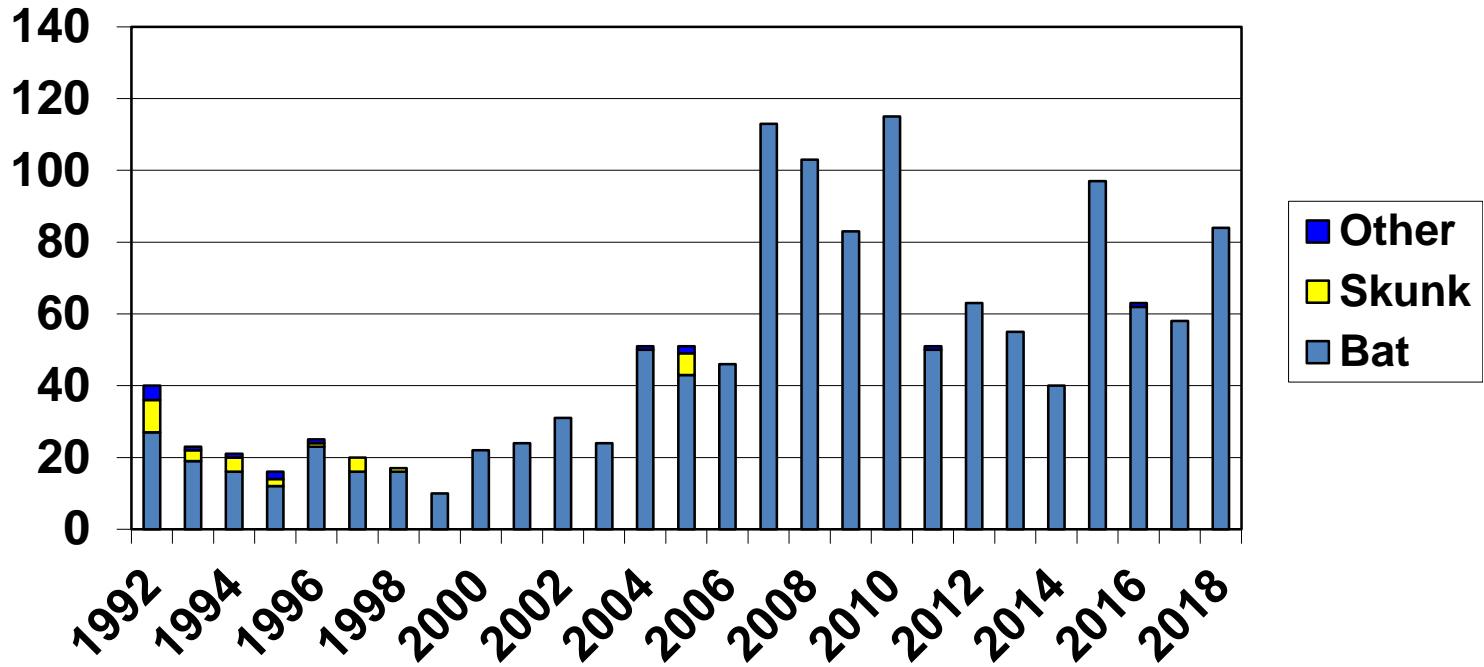
There is no early diagnostic test that can tell if a person has been infected.

Can't wait for symptoms to initiate treatment.



ANIMAL RABIES

ANIMAL RABIES IN ILLINOIS, 1992-2018





RISK OF RABIES BY SPECIES IN ILLINOIS



■ Low-healthy

- Rodents
- Rabbits
- Pocket Pets (hamsters, gerbils, guinea pigs etc)
- Dogs, cats, ferrets
- Livestock



■ High

- Wild animals, e.g. raccoon, skunk, fox
- Bats

HEALTH CARE PROVIDER ROLE IN RABIES PREVENTION

- Recognizing a potential rabies exposure
- Reporting to the local health department
 - LHD assists with
 - Risk assessment
 - Quarantine-dogs/cats
 - Testing of the exposing animal
 - Do not send patients to LHD for treatment
- Administering rabies post-exposure prophylaxis **WHEN NEEDED**

SCENARIO

- A person arrives at an ED and says they were bitten by a squirrel. The person is started on rabies treatment.
- Does the ED have to report this to their LHD?



ASSESSING EXPOSURE

2016 EXPOSURES IN ILLINOIS

	Bat	Raccoon	Domestic Animal
PEP recommended and correct per ACIP guidelines	65%	81%	32%
PEP recommended and incorrect per ACIP guidelines	31%	20%	66%
PEP not recommended, correct per ACIP guidelines	5%	-	2%

Unnecessary Rabies PEP

- 66% of the time rabies PEP is given but not needed for domestic pet exposures. (Healthy expected type of bite)
- Almost 1/3 of the time not needed for a bat exposure
- \$\$
- Given when needed but not for every animal exposure

MILLIONS OF BITES, THOUSANDS OF ED VISITS WHAT DO THESE PATIENTS REALLY NEED?

- Wound care
- Antibiotic therapy
- Tetanus Booster or TIG administration¹
- Rabies specific risk assessment

¹ Talan DA, Abrahamian FM, Moran GJ, et al. Tetanus immunity and physician compliance with tetanus prophylaxis practices among emergency department patients presenting with wounds. *Ann Emerg Med.* 2004;43:305-314.

DON'T ALWAYS RUSH TO ADMINISTER PEP

*Administration of PEP is medically
urgent, but not an emergency*

Start within a few days if needed

Consult with LHD if needed

STEPS IN ASSESSING EXPOSURES

- Confirm exposure
- Species of exposing animal
- Geographic location
- Availability of the animal for testing/observation
- Vaccination status of domestic animal
- For dogs,cats,ferrets: Circumstances of the bite



Dogs, Cats, and Ferrets



- A high number of bites are caused by dogs & cats
- Remaining healthy during a 10 day quarantine is evidence that the pet was not shedding rabies virus at the time of the bite
- Treatment can be withheld, pending results of testing or quarantine unless the animal is symptomatic including unprovoked bites
- Pet vaccination is very effective

PROVOKED OR NON-PROVOKED?

- Provoked exposures:
 - Attempting to feed the animal
 - Entering the animal's territory
 - Breaking up a fight between 2 or more animals
 - Handling an injured animal
 - Running, or riding a bike past an animal
 - Unprovoked exposures:
 - Bite when sitting and reading at a park bench
- GET DETAILS TO ASSESS SITUATION!



Have a break, have a Kit-Kat



SCENARIO

- A child is walking home from school with other children
- A large breed dog comes up
- The children scatter except for one child
- The dog charges her and bites her
- Another child has to beat off the dog
- PEP needed?

WILD ANIMAL (BAT, SKUNK, COYOTE, RACCOON, FOX) BITE

- Rabies PEP recommended unless can test the animal negative



SCENARIO

- Several children caught a fox and put a collar on the fox and were walking it around.
- Does the fox need to be tested for rabies?

BAT BITE ON FINGER





BAT EXPOSURES



- Small bites; may go unrecognized
- Always ideal to test bat if available
- Bat testing and/or PEP indicated in response to:
 1. Known bite
 2. Direct contact and bite cannot be ruled out
 3. Situations where exposure may have gone unrecognized like bat found in the same room as a sleeping or mentally impaired or very young person

Testing the bat is VERY IMPORTANT!

CAVEATS TO BAT EXPOSURE RECOMMENDATIONS

- The risk is very, very low when there is no known physical contact with a bat
 - Wait for test results
 - No bat, no PEP (Tiny skin wounds can be anything)
 - We draw a line at the bedroom door for sleeping people
 - When people are awake, we need physical contact with a bat to warrant giving PEP

SCENARIO

- 2 yr old child was outside. Mother heard child shriek, went outside and child had hand closed around a bat. “The bat seemed very angry”.
They arrive at ED
- What is the most important piece of information you need before starting child on PEP

SCENARIO

- A person awakes to find a bat in the room.
- The bat tests neg
- She sees puncture marks on her hand
- The next day she finds another bat in her bedroom closet but it escapes without testing
- PEP?

SCENARIO

- A bat is found flying in a house at night. No one woke up to the bat in their room. All bedroom doors were open. The bat is not available for testing.
- Would PEP be recommended for all family members?
- Any change in the recommendation if the bat tests positive for rabies?



RABIES POST-EXPOSURE PROPHYLAXIS (PEP)

ERRORS IN PEP ADMINISTRATION, ILLINOIS EXPOSURES, 2016

- For 457 patients in 2016 with information available, 52% had some incorrect administration of rabies PEP

ERRORS IN PEP ADMINISTRATION, ILLINOIS EXPOSURES 2016

Incorrect Administration Type	%
Incorrect timing of vaccination	56
Incorrect body location of vaccine administration	22
Incorrect location of RIG administration	18
No RIG given when it was indicated	8
Incorrect timing of RIG (not on day 0)	6
Other	6

RATIONALE FOR RABIES VACCINATION

- Following inoculation of rabies virus into a human by a rabid animal, the virus replicates locally before invading the nervous system
- This delay provides an opportunity to neutralize the virus
- Once virus has gained access to the nervous system, it is beyond immune attack

WHERE SHOULD VACCINE BE INJECTED?



Adults-deltoid muscle

In children, the outer thigh can be used

Rabies vaccine should not be injected in gluteus.
Studies have shown this site yields lower
antibody titers.

RIG?

- RIG is only indicated in patients who have not previously received full course of rabies PEP or pre-exposure immunization
- RIG is *always* indicated if there is need for post-exposure prophylaxis

WHAT IS RIG? (CONT.)

- RIG serves two purposes:
- 1. Passive immunity during the lag period before active immunity from vaccination
- 2. It neutralizes rabies virus directly at exposure site, before virus has time to penetrate peripheral nerves and migrate to central nervous system



IMPORTANT DON'TS FOR RIG



- Because RIG partially counteracts effectiveness of vaccine and can suppress active immunity, heed the following:
 - Don't give RIG to patient who has previously been vaccinated against rabies
 - Don't give more than recommended dose
 - Don't administer at same site as vaccine
 - Don't give in gluteus due to sciatic nerve
 - Don't give later than 7 days after the vaccination series has been initiated

SCENARIO

- A person was bitten by a bat 5 days ago and just looked on line and found out that bats can carry rabies.
- They would like to know if it is too late to receive rabies treatment?

RABIES POST-EXPOSURE PROPHYLAXIS (PEP) (EXPOSED INDIVIDUALS NOT PREVIOUSLY VACCINATED)

- Rabies Vaccine
 - Given on days 0, 3, 7, and 14 (5th dose on day 28 if immunocompromised)
- Administer Rabies Immune Globulin (RIG)
 - 20 IU/kg
 - Infiltrate as much as feasible around wound
 - Remainder IM at a site distant from vaccine administration
 - Gives passive immunity up to 21 days

Rabies PEP is typically given at a hospital ED



SCENARIO

- An Illinois resident is in China and their family member in Illinois calls to ask what should they do. The person in China was bitten by a family member's dog in China. The dog is typically aggressive with people. They were started on rabies treatment in China. The packaging for the vaccine was in Chinese.
- What do you need to know?

HUMAN RABIES PEP IF PREVIOUSLY VACCINATED; 2 DOSES, 2 VISITS*



1 ml (IM) into deltoid
(adults) or into
anterolateral area of
thigh (children)



D 0 D 3
x 1 x 1

D 0
Wound
Cleansing

IF THE ANIMAL TESTS NEGATIVE

- No need to initiate PEP
- PEP can be discontinued if already started

DECISION MAKING ON RABIES PEP, ILLINOIS, 2016

Who decided on PEP?	PEP correct per ACIP	PEP incorrect per ACIP
Both health department and health care provider	81%	19%
Health care provider only	41%	59%

DIFFICULT CONSULTATIONS – **PLEASE CALL!**

- Patients who have initiated PEP in other countries
- Deviations from schedule occur
- Exotic or unusual species bites
- Dog or cat exposure PEP administration
- Grey areas

KEY POINTS - SUMMARY



- *Risk Assessment is Critical*
- *There is no test available to detect rabies infection early after exposure*
- *Prophylaxis must be started soon after exposure (within a few days)*
- *Report Exposures Quickly. Local and State Health Departments are an important resource in evaluating rabies exposures.*
- *PLEASE CALL before administration if the need for PEP is unclear*