

Rabies

Epidemiology Data Brief
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Issue 6

What We Know

The last reported case of human rabies in Ohio occurred in a 6 year old boy from Van Wert County in 1970.^[1] It is widely believed that he is one of the first people to have contracted rabies and survived without neurological damage.^[2] His survival is due to fast action from his medical team and intensive treatments.

From 2017-2021, Ohio reported 194 cases of confirmed rabies in animals, 165 of which were bats.

Hamilton County has reported 10 confirmed cases of rabies in the last five years, all of which were bats. Of those 10 rabies infected bats, 5 were within Cincinnati.

Between 2017 and 2021, about 2,231 animal bites were reported to the Cincinnati Health Department (CHD). These bite events included, dogs, cats, bats, rodents, and livestock, such as goats, cows and horses. Each animal bite reported to CHD is considered for its potential exposure to rabies.

Out of all of the exposures reported, 49 individuals received post-exposure prophylaxis (PEP) for rabies. PEP is recommended when the risk of developing rabies is high, such as when an animal was unvaccinated, or if the animal was unavailable to be quarantined or tested. PEP can also be advised after bat encounters, when the bat is not available for testing.

What is Rabies?

Rabies Lyssavirus is a fatal but preventable viral disease that causes inflammation of the brain and spinal cord. It is most commonly spread to people and their pets when they are bitten or scratched by another animal that is infected with rabies. Rabies can also be spread if an infected animal's saliva or mucus comes in contact with one's eyes, mouth, nose or open wound. In the U.S., [about 90% of all rabies cases](#) are found in wild animals such as bats, skunks, raccoons and foxes. Rabies can be prevented by vaccinating pets, staying away from wild animals, and seeking medical care immediately after a potential rabies exposure.^[3,4]

Rabies in Animals

Rabies only infects mammals and can only be confirmed with a laboratory test. However, animals infected with rabies can act strangely. This behavior includes, aggression, excessive drooling, trouble moving, or generally out of the ordinary behavior. For example, a raccoon out during the day, or a bat lying on the ground. Pets such as dogs, cats and livestock (cows, horses or goats) can also be infected with rabies, usually from a scratch or bite from an infected wild animal. Domesticated animals and pets can be protected by making sure they are up to date on all rabies vaccinations.^[4]

Rabies in Humans

Human rabies is extremely rare in the U.S, only about 1 to 3 cases are reported each year. However, once symptoms appear, the mortality rate is more than 99%. The majority of human rabies occur from an exposure to an infected bat.^[5] Rabies cases have also occurred from dog bites experienced while traveling internationally. For more information on how rabies affects the human body please reference [Appendix A](#).

Anytime you have contact with a wild or unfamiliar animal that ends in a bite or scratch, you should clean the wound with soap and water and speak with a healthcare provider as soon as possible to determine your risk of rabies. Bats have very small teeth, in any situation where you are unsure if a bite or scratch occurred, you should seek out professional medical advice.



HOW ARE PEOPLE EXPOSED TO RABIES?



How to Prevent Animal Bites and Exposure to Rabies:

- Never touch wild or stray animals.
- When you encounter a wild animal, such as a bat, call a professional for assistance.
- Never approach an animal or pet you do not know.
- Never leave small children alone with any animal—including trusted pets.
- Always keep dogs tethered, and when leashed maintain control at all times.
- Teach children about animal safety, such as not touching strange animals.
- Teach children characteristics of animals with rabies.
- Do not put your hands or fingers into animal's cages or kennels or behind fencing.
- Do not run from animals such as dogs, it is likely they will chase— instead avoid eye contact and stand still, until it is safe enough to slowly walk away.
- If you are knocked down by an animal and cannot stand, curl into a ball and protect your face.
- Respect both wild animals and pet's space—do not approach or touch while eating, sleeping, or interacting with other animals or pets.

To Report an Animal Bite , Contact CDH Technical Environmental Services: (513) 352-2922

Vaccinating Pets in Cincinnati

According to Cincinnati City Ordinance, [Section 606-3](#). All dogs over the age of 3 months are required to be vaccinated regularly by a veterinarian for rabies, and receive records and tags as proof of vaccination.^[7]

Quarantining Pets after a Bite Incident

The quarantine procedure for a dog, cat or ferret that bites someone is the same regardless of their rabies vaccination status. Outlined by [Ohio Administration Code 3701-3-29](#), quarantine should last no less than 10 days, any signs of illness during this time must be reported immediately. No dog, cat or ferret should be released from quarantine without a current rabies vaccine. CHD will monitor the animal at the owners home during the quarantine period, and gives the authority for its release after the rabies vaccination status is confirmed. CHD does not have the authority to remove an animal from its owner. However CHD can cite owners for failure to vaccinated their pets for rabies as outlined in [Cincinnati City Ordinance, Section 606-99](#).

Protect Your Pets!

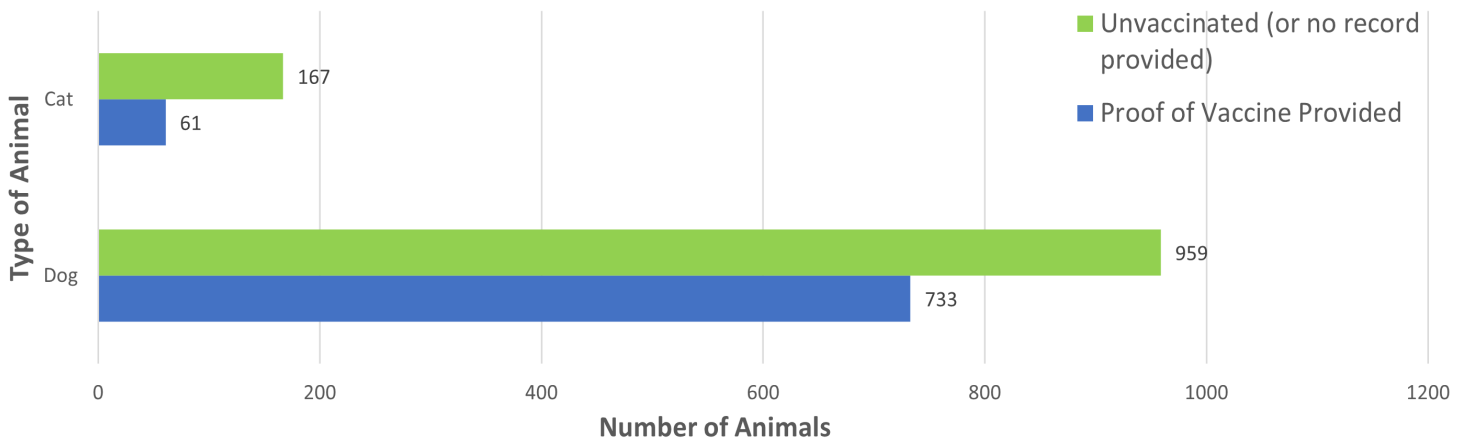
Who can get a Rabies Vaccine?

- Dogs
- Cats
- Horses
- Cattle
- Sheep
- Ferrets

On average it costs \$10-\$30 to vaccinate a dog for rabies. Talk to a vet for more information.

It is required by law that all dogs over 3 months are vaccinated for rabies, with a rabies tag attached to their collar. All dogs must also be licensed with the city. This license is about \$20.

Dog and Cat Bites in Cincinnati: Rabies Vaccination Status, 2017-2021

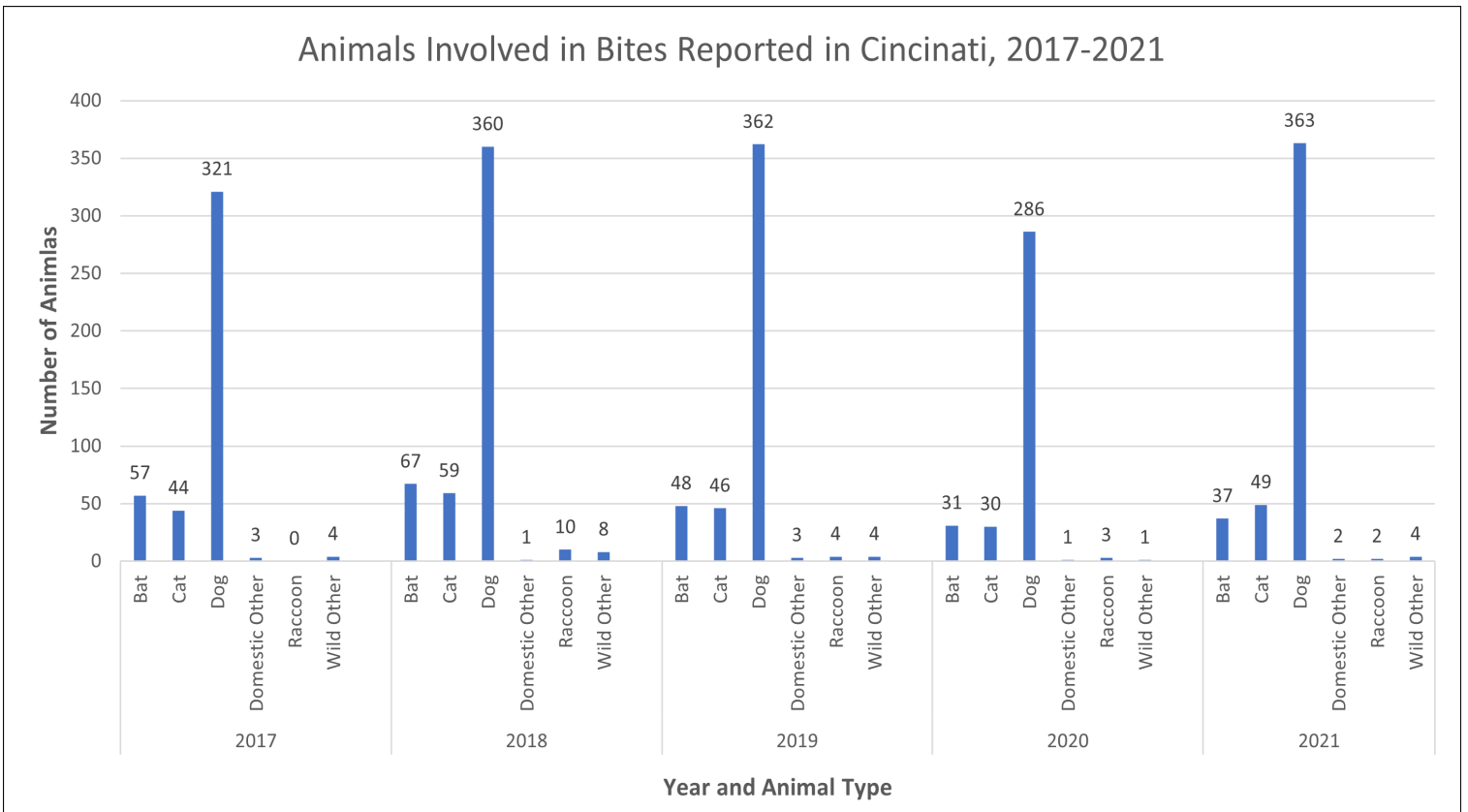
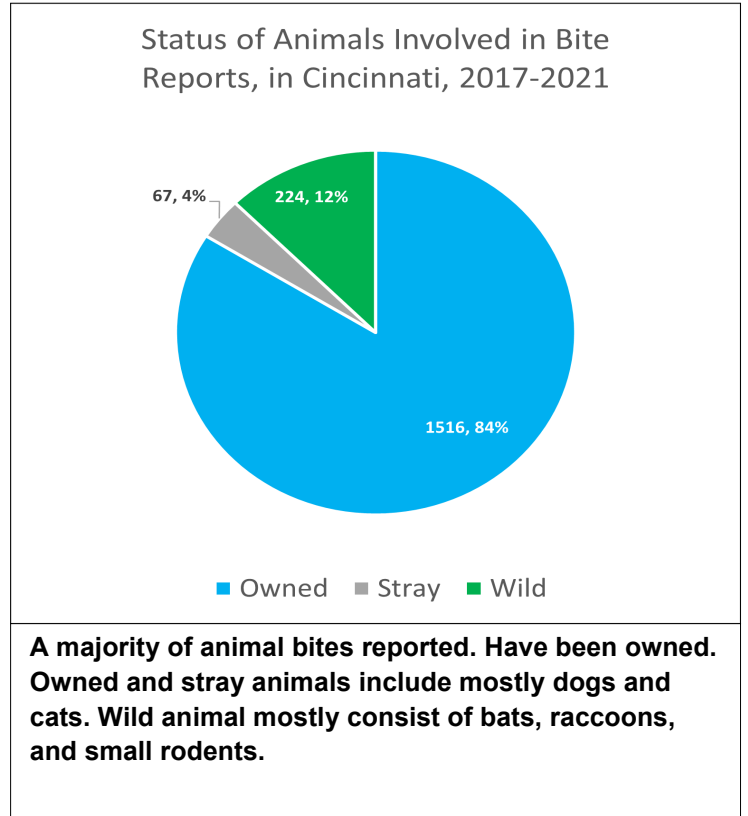
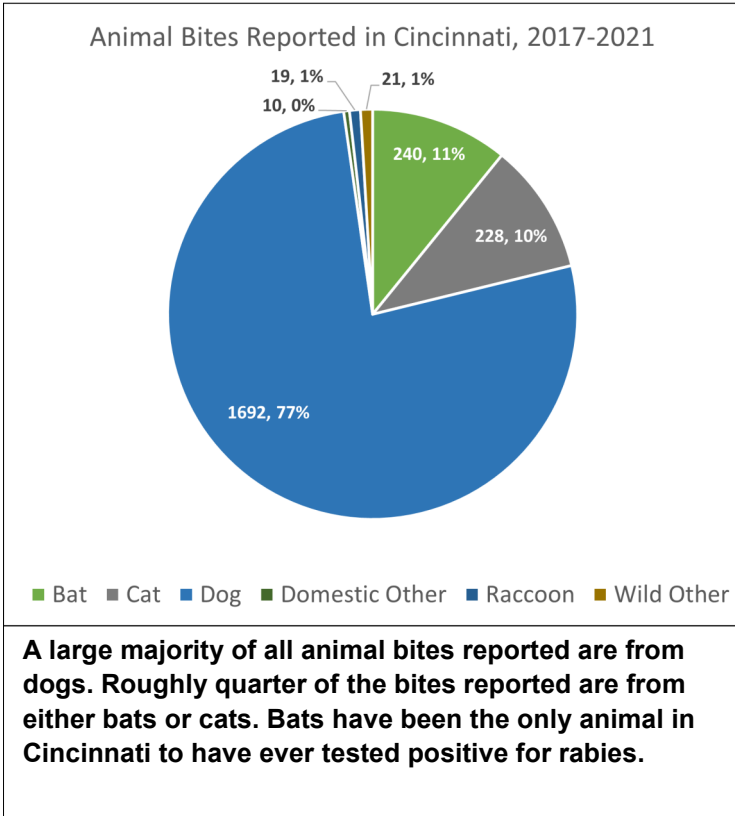


A large majority of the animals investigated after biting someone in the last 5 years in Cincinnati were either not vaccinated, did not have written documentation or valid rabies certificate, or the owner did not have a current license tag for their pet as proof a rabies vaccine had been administered by a veterinarian before the bite occurred.

Reporting Animal Bites in Cincinnati:

All animal bites should be reported to **Cincinnati Health Department's (CHD) Technical Environmental Services** within 24 hours of the incident. This team will then conduct an investigation regarding the bite, CHD will consider if the animal was at risk for rabies. If the animal is available, it will be quarantined 10 days for observation, or humanely euthanized in order to be tested for rabies. Interactions bats should also be reported and risk for rabies exposure evaluated right away. There is no cost to have an animal tested for rabies.

To Report an Animal Bite, Contact CDH Technical Environmental Services: (513) 352-2922



Encounters with Bats

If you have contact with a bat, you may require medical treatment even if you cannot feel or see an injury on yourself. Infants, young children and individuals with impaired mental state (due to illness, medication or alcohol, for example) might also require medical treatment after a bat encounter. This treatment is necessary

because bat teeth and claws so incredibly small that they might not be felt or leave visible marks after a bite.^[8] If a bat seen out during the day, found on the ground, or is acting out of the ordinary, it should always be considered infected with rabies, and contact should be avoided.

If You Have Been Bitten or Scratched

If you know you have been bitten or scratched, or had exposure to infectious material such as bat saliva or mucus. Clean the wound or surface with soap and water and seek out professional medical advice immediately. When possible the bat should be trapped safely, preferably by a professional, in order to be tested for rabies.

Outdoor Exposure to Bats

Bats are common in the wild, and are normally seen at dusk or during the night. When spending time outside during these hours, be aware of possible bat interactions, and reduce your exposure. Setting up mosquito nets, screened doors and porches, or closed tents are good way to reduce interactions with bats.^[8] If you do have direct contact with a bat, or even suspect an encounter has occurred, please contact your doctor, emergency room staff, or CHD to discuss the need of rabies PEP treatments.

Indoors Exposure to Bats

If you wake up to a bat in your home, do not let it escape! Contact CHD Environmental Health for information and verbal assistance in catching and transporting the bat, so it can be tested for rabies. If the bat escapes or is unable to be tested, call CHD as soon as possible in order to evaluate your or your family's risk of developing rabies, and whether or not PEP treatment should be started right away.

To Report an Animal Bite, Contact CDH Technical Environmental Services: (513) 352-2922

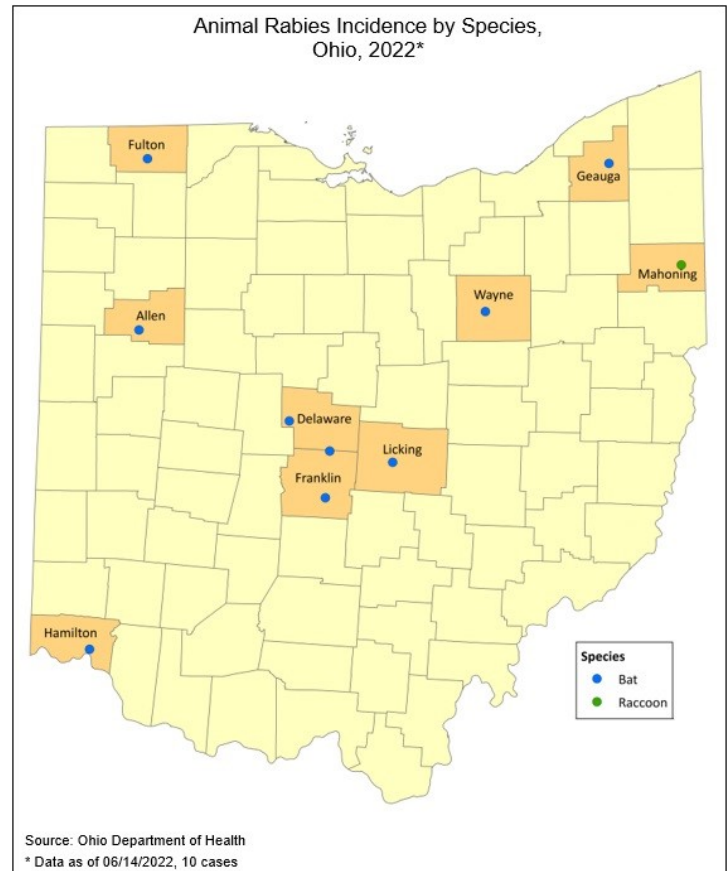
Bats are Important to the Ecosystem

According to the U.S Fish and Wildlife Service, 15 species of bats are currently endanger of becoming extinct.^[12] Bats are vital to the ecosystem. They work as pollinators for native plants, flowers, and several fruits. They also fly and eat insects like mosquitos and other pests that threaten crops. Bats save our agriculture industry about 3 billion dollars each year, just from eating pests!

For more information on what Ohio is doing to address the importance and conservation of Bat species please visit: <https://ohiodnr.gov/discover-and-learn/safety-conservation/wildlife-management/ohio-bat-conservation-plan>

Reported Bat Bites and Exposures in Cincinnati, 2017-2021

Year	Bat Bites Reported	Non-Bite Encounters	Total Bat Events	Total Persons Exposed to Bats	Individuals that Started PEP
2017	3	53	56	78	6
2018	5	55	63	75	21
2019	2	50	52	52	2
2020	2	39	41	49	2
2021	10	18	28	26	5



Capturing a Bat for Testing

It is **not recommended** to catch a bat on your own, only do so if professional assistance is not available.

1. Find a box or container, and a piece of card board or plastic that fits on the top on the container. Make sure to punch very small air holes in the box, or lid.
2. Make sure no extra people, pets or small children are in the area or room with the bat, ensure the doors and windows are closed.
3. Wear large leather work gloves, and thick clothing. When the bat lands, place container over it, and slide the lid below the container to trap the bat.
4. Make sure to secure the lid on the container, preferably with a sturdy tape. Once the bat is secured, call CHD for instruction on getting the bat sent out and tested for rabies.

Preventing Bats From Roosting in Your Home.

- Seal any cracks in your home's roof, windows, or siding. Bats can fit into very small spaces, as little as the size of a quarter.
- Close or seal all unused chimneys. Bats can use the chimney to roost, and can fly easily into your home.
- If you find bats in your attic or basement, set up some lights in the area. Bats prefer cool dark areas to roost. By heating and lighting the area, bats will most likely leave the area. However, be mindful of the lights you leave in the attic or basement—they can be a fire hazard if left completely unattended.
- Hang reflective materials such as old CDs. The reflection of light bothers the bat's vision and discourages this area for roosting.
- Leave items scented with mothballs, cinnamon or eucalyptus in the suspected indoor bat areas. Bats sensitive to these scents and will vacate the area.
- If you do notice bats flying around in the evening, look into a bat box. This will be a small box where bats can roost, that is **not** in your home. For more information on building a bat box habitat please visit the Cincinnati Zoo Website: <https://cincinnatizoo.org/create-a-shelter/>

Bats are an endangered species and in Ohio it illegal to harm or kill a bat unless a bite or potential rabies exposure has occurred.



What is PEP for Rabies?

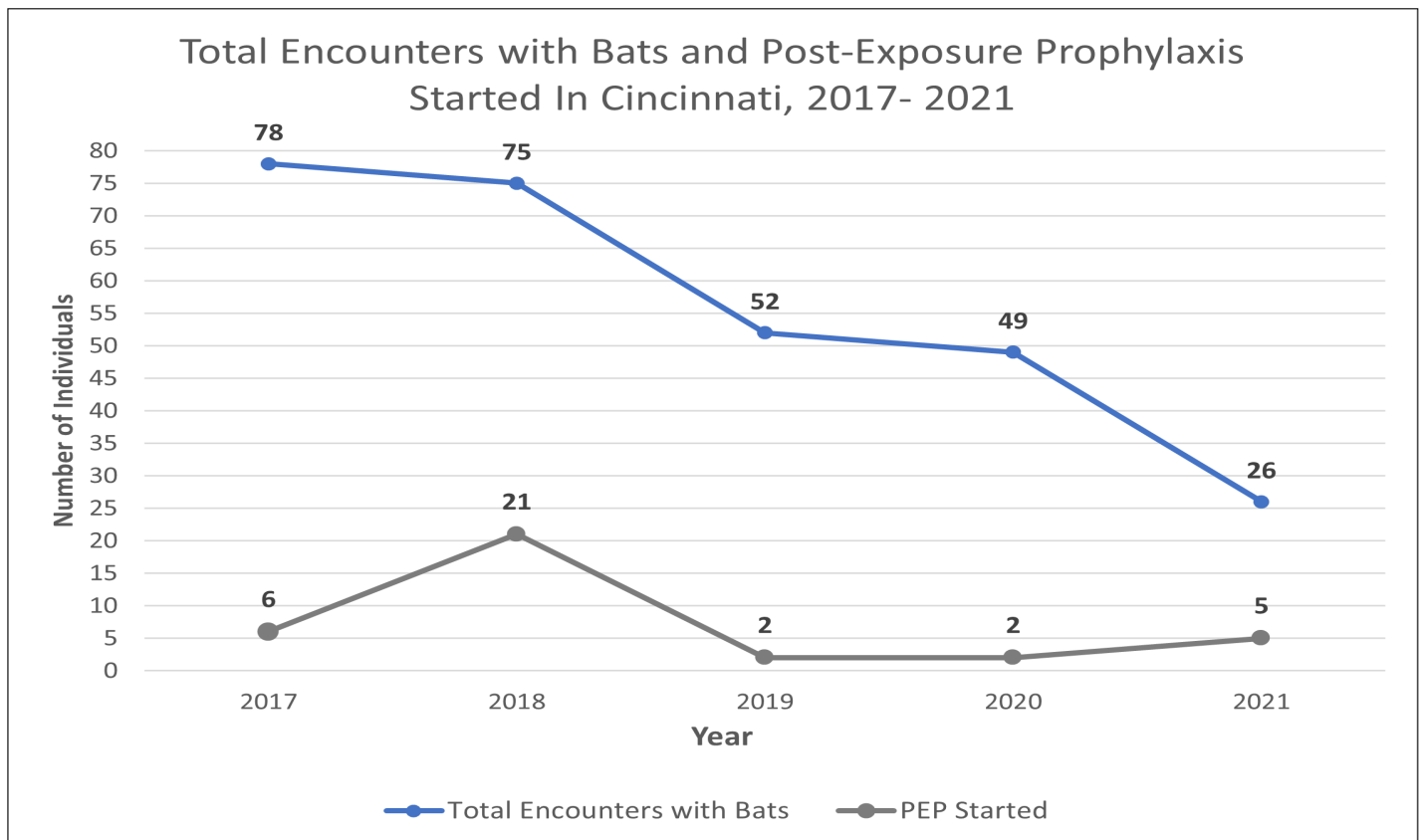
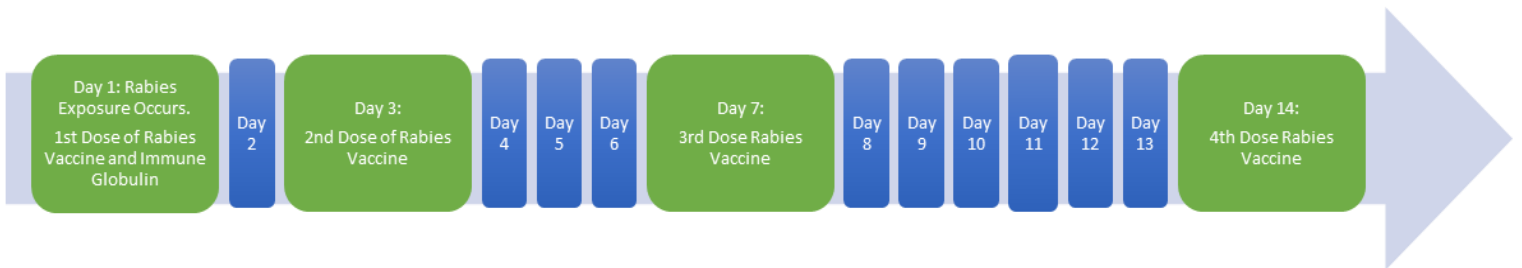
Postexposure Prophylaxis (PEP), is treatment for people who have already been exposed to a disease. PEP for rabies consists of one dose of [human rabies immune globulin \(HRIG\)](#), which provides antibodies to fight rabies infection, the treatment also includes four doses of [rabies vaccine](#), this combination is given on the day the exposure occurs. Subsequently a dose of rabies vaccine will be given on day 3, 7 and 14 after the exposure date.^[9] This treatment is only used to prevent a person who has been exposed to rabies, from developing rabies.

It is important to clean any wound with soap water and if advised, start PEP soon, if not immediately, after a bite or scratch occurs from an animal that is likely to have rabies. As soon as any type of animal bite or scratch occurs please seek out medical advice and file a report with the Cincinnati Health Department's Technical Environmental Services.



Cost of Rabies Treatment estimate as reported by the CDC. This estimate is without insurance. CDC Offers [lower cost assistance](#) to uninsured and underinsured coverage resources for patients.^[9]

For Cincinnati alone, the estimated cost for PEP for Rabies over the last 5 years was at least \$186,200



Assessing Your Risk of Rabies

<u>Animal Type</u>	<u>Evaluation of Animal</u>	<u>Postexposure Prophylaxis Recommendations</u>
Dogs, cats, and ferrets	Healthy and available for a 10-day observation	Individuals should not be given PEP unless the animal develops clinical signs of rabies
	Rabid or suspected rabid	Immediately administer PEP
	Unknown (Escaped)	Consult CHD or another trusted medical provider, these animals almost never require PEP
Raccoons, skunks, foxes, bats	Considered rabid unless proven negative by a lab test	Consider immediate PEP
Livestock, horses, rodents, rabbits, and other mammals	Consider individually	Consult CHD or another trusted medical provider. These animals almost never require PEP

International Travel

Before traveling internationally consult your doctor on possible rabies exposures, the availability of treatment in that country, and logistics of receiving treatments upon return to the U.S.^[10] Consult [the CDC Rabies Status Tool](#), where by country you are able to analyze your own risk, and the availability of rabies vaccine, and treatment in any country.

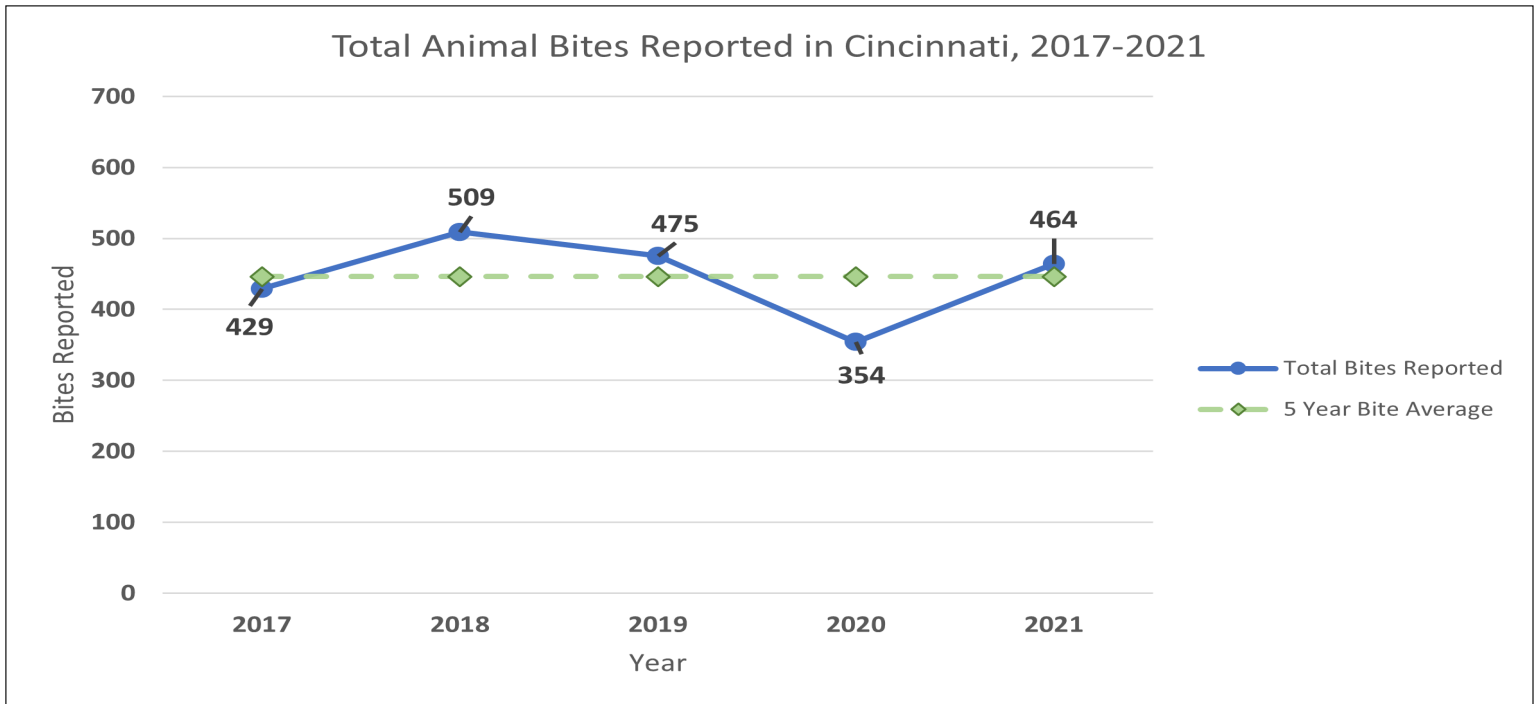
Who Should Get a Pre-Exposure Rabies Vaccine?

Pre-Exposure rabies vaccine is a treatment given to individuals who are likely to interact regularly with rabies virus, and need protection before an exposure occurs. Evaluate your need for a pre-exposure rabies vaccine on the table below. CHD does not offer pre-exposure rabies vaccines, however those in need of this vaccine can schedule an appoint with their local [Passport Health Clinic](#). Some local pharmacies may offer a pre-exposure rabies vaccine, please call ahead for scheduling and availability.

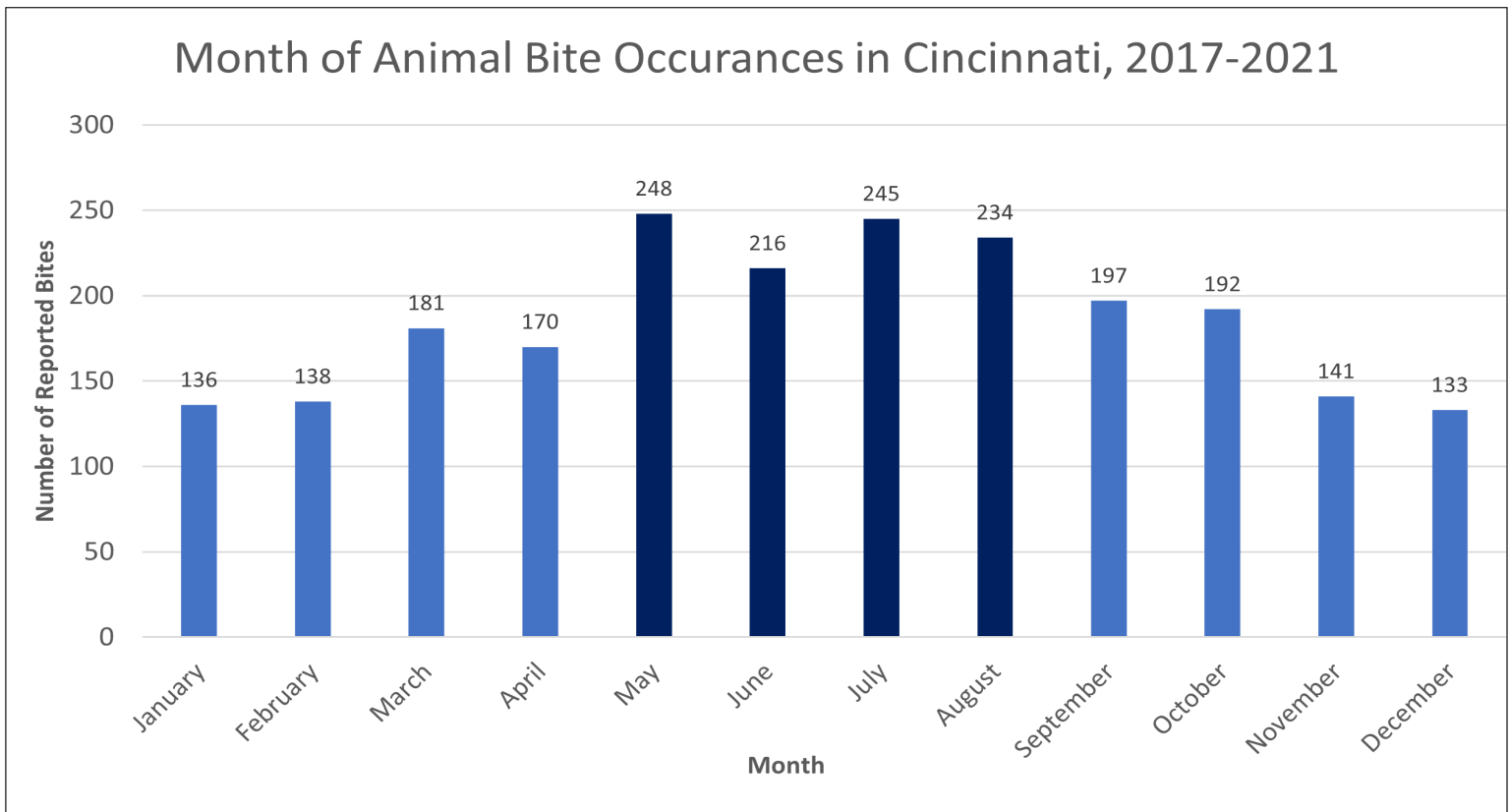
<u>Typical Population</u>	<u>Nature of Risk</u>	<u>Pre-Exposure Recommendations</u>	<u>Risk Category</u>
Rabies laboratory researchers; rabies biologics production workers.	Exposure to virus is continuous , often in a high concentration. Exposures are many times unrecognized. Bite, nonbite, or aerosol exposures.	Primary course of rabies vaccine. Serologic testing every 6 months; a booster vaccine if antibodies are below the acceptable level.	Continuous
Rabies diagnostic workers, spelunkers, veterinarians and staff, animal control workers and those who frequently handle bats.	Exposure is usually episodic, a source is recognized, but also could be unrecognized. Bite, nonbite, or aerosol exposures.	Primary course of rabies vaccine. Serologic testing every 2 years; booster vaccine if antibodies are below the acceptable level.	Frequent
Veterinarians and animal control workers, where rabies is uncommon or rare. Veterinary students, travelers visiting areas that have a high rabies exposure rate and medical access is limited.	Exposure nearly always episodic with a source recognized. Bite, or nonbite exposure.	Primary course of rabies vaccine. No serologic testing or booster vaccine.	Infrequent
U.S population at large, including areas with high rates of rabies.	Exposure is always episodic with a source recognized. Bite or nonbite exposure.	No vaccination necessary.	Rare (General Public)

Snapshot of 5 Years of Animal Bite Reports from the Cincinnati Health Department

The data presented below was provided by the environmental health team within the Cincinnati Health Department, it consists of animal bites or suspected bites from bats that were reported and investigated by the Cincinnati Health Department.



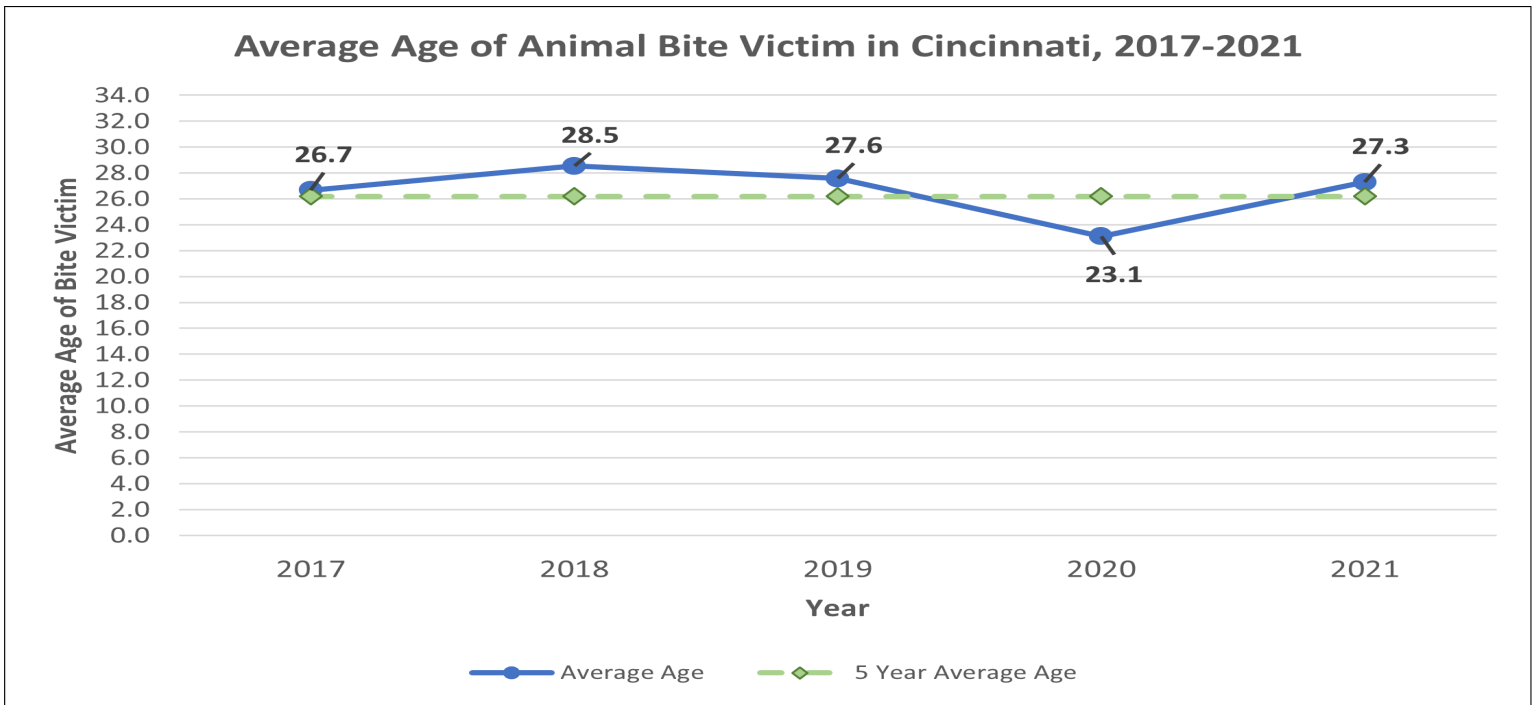
On average about 446.2 animal bites are reported annually to CHD. This represents a rate of about 148.04 animal bite incidents per 100,000 residents.



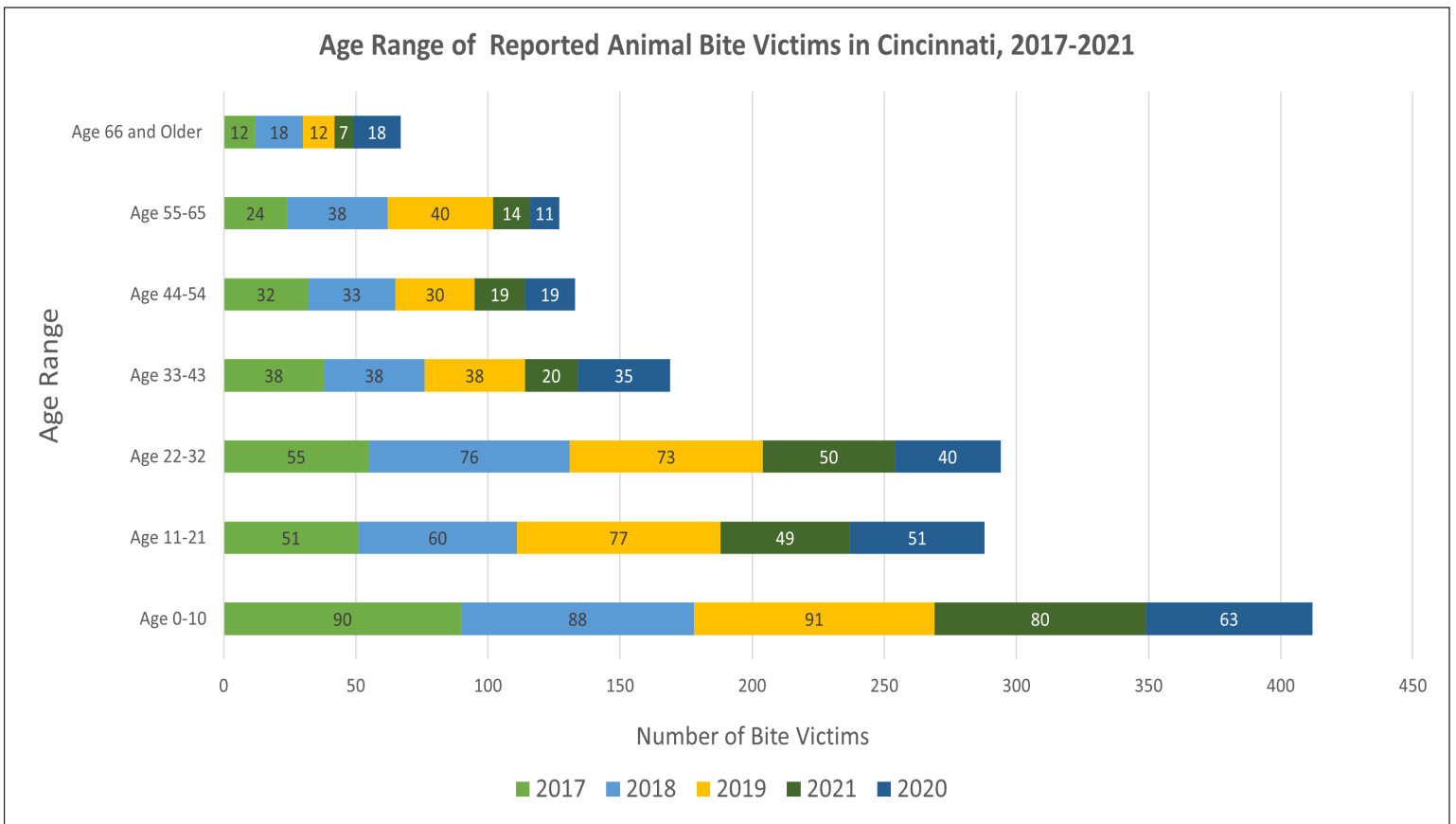
The summer months (May- August) have the highest number of animal bites reported. During the summer months, people are spending more time outside; therefore interaction with animals are increased during these months.

Snapshot of 5 Years of Animal Bite Reports from the Cincinnati Health Department

The data presented below was provided by the environmental health team within the Cincinnati Health Department, it consists of demographic data collected from victims of an animal bite or suspected bites from bats that was reported and investigated by the Cincinnati Health Department.



The average age of the victim reporting animal bites to the CHD is 26.2 years old.

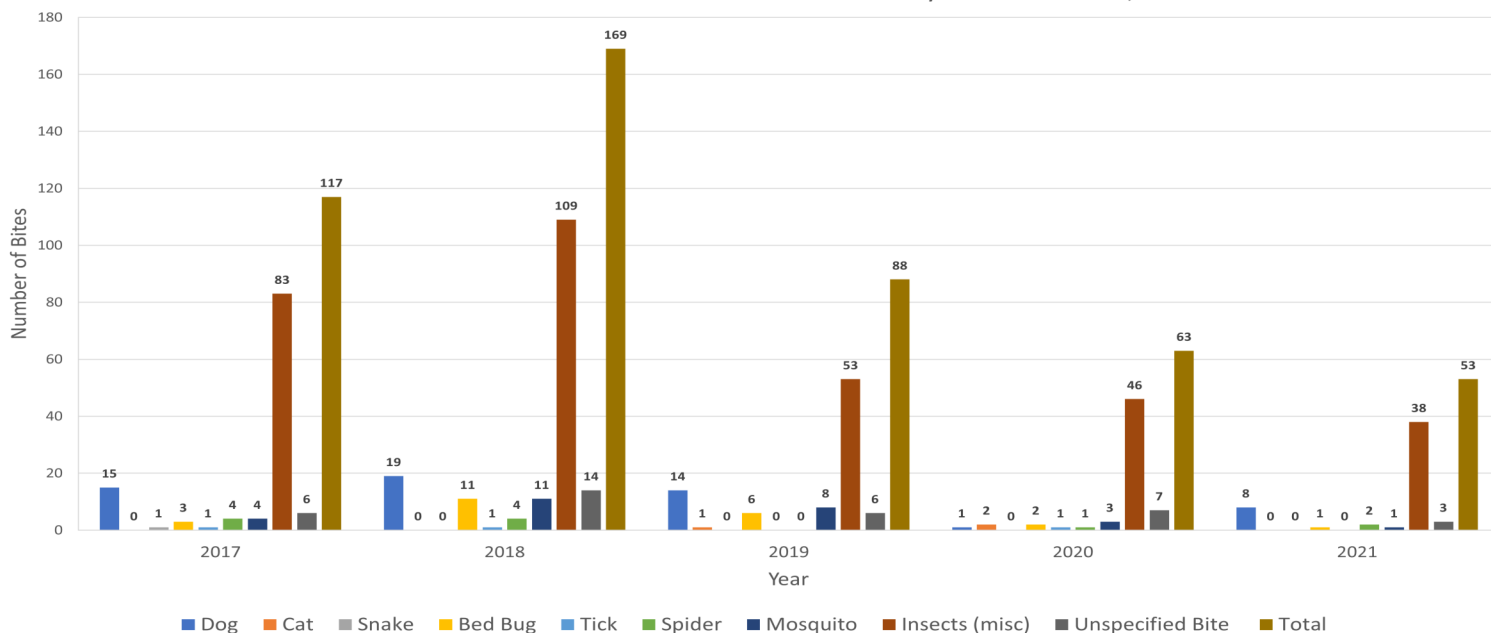


A majority of animal bite victims are under the age of 10 years old. The youngest victim of an animal bite was only a few days old, and the oldest victim was 83 at the time the bite was reported.

Snapshot of 5 Years of Animal Bites Treated by CCPC's and School Based Health Centers

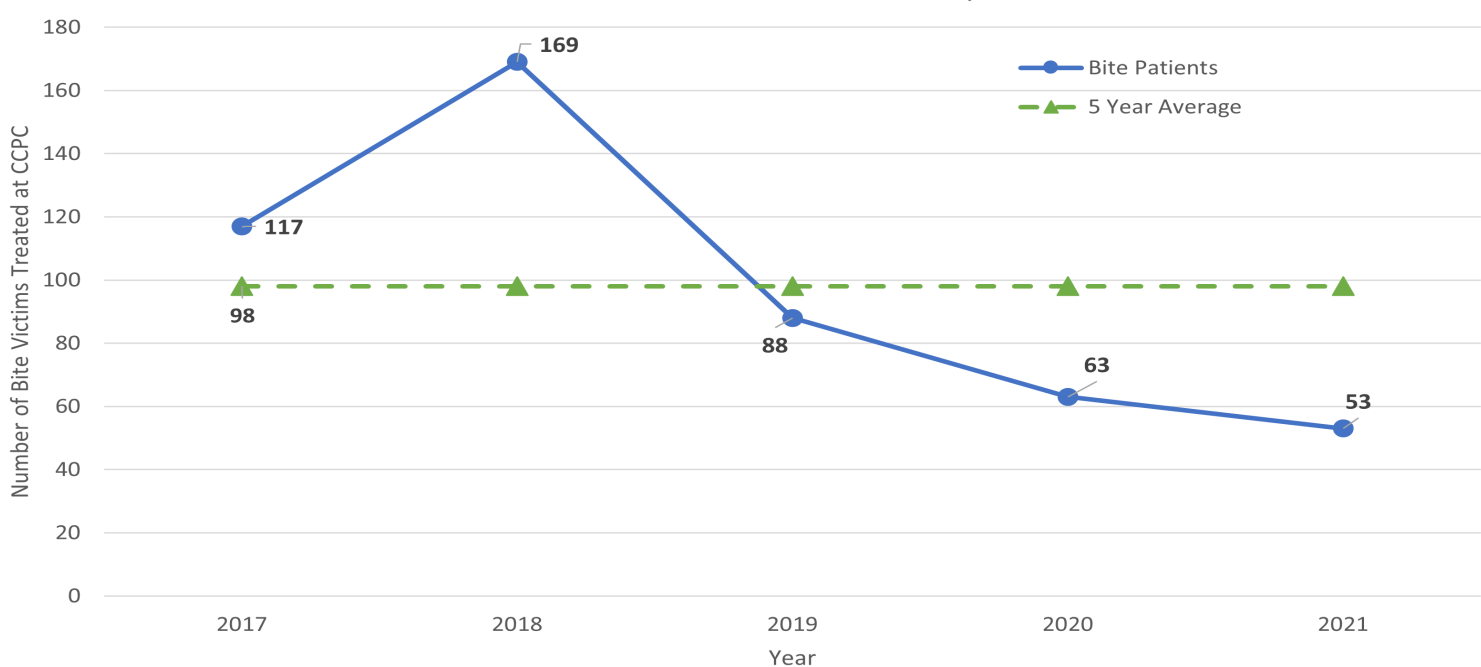
The data presented below was provided by the Cincinnati City Primary Care Centers (CCPC), it consists of data collected from patients under 18 years old with an animal bite that were seen at CCPC's and School Based Health Centers (SBHC) in Cincinnati.

Animal Bites in Children Under 18 Years Old Treated By CCPC's & SBHC, 2017-2021



Majority of patients treated at CCPC's and SBHC were due to insect bites. Insects can be carriers for many infectious diseases such as Lyme disease, Spotted Fever Rickettsiosis and West Nile Virus, for examples. Some children are also allergic to different types of insect bites and stings. *Insects do not carry or spread Rabies.*

Total Animal Bites in Children Under 18 Years Old Treated By CCPC's & SBHC, 2017-2021



Similar to the Animal Bites Reported and investigated by CHD, CCPC's also experienced an increase in patients seen in 2018. The average number of patients seen is 98 each year.

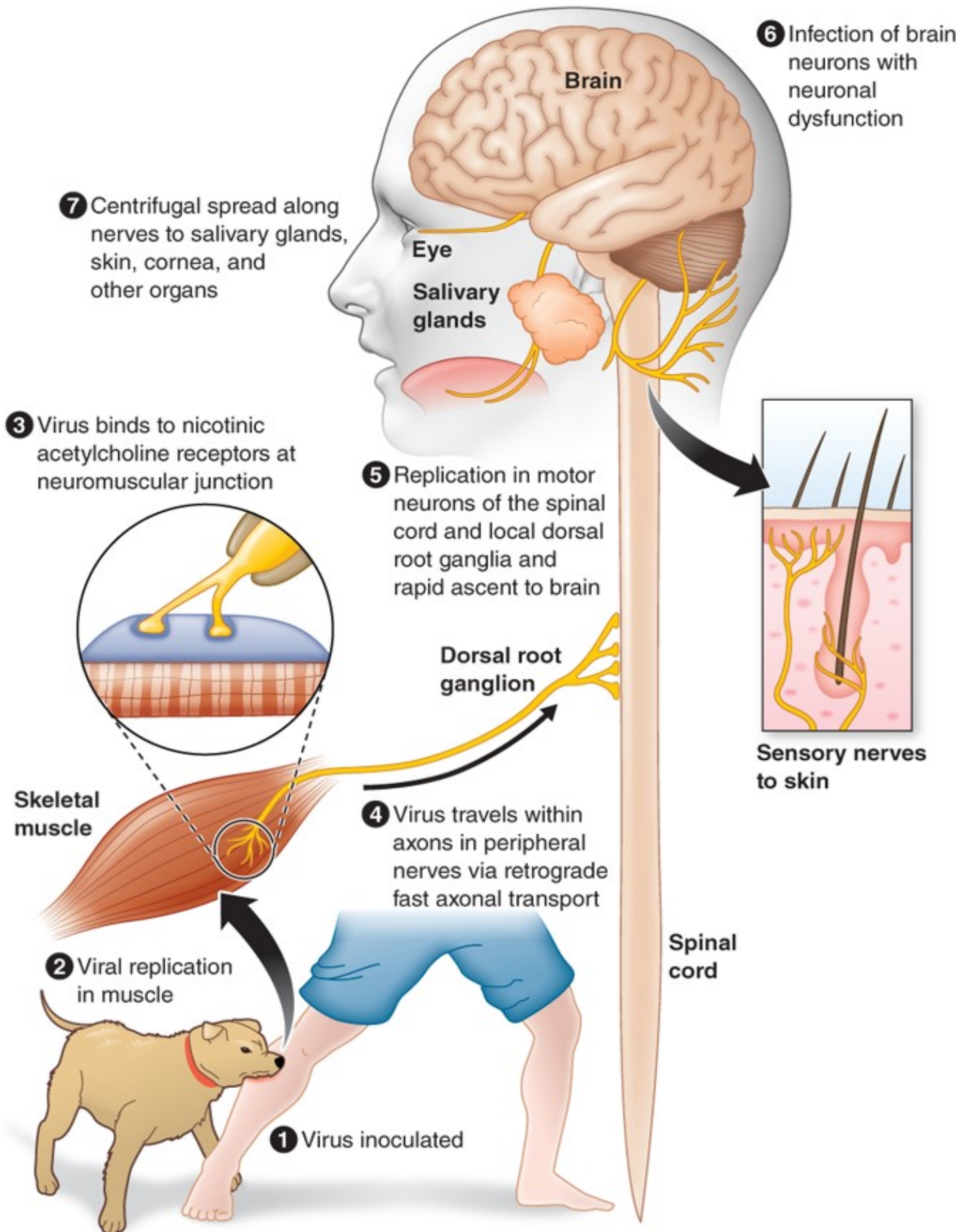
Authors: Christina Becker

**Acknowledgements: Cincinnati Environmental Health
Contact Regarding This Report: christina.becker@cincinnati-oh.gov
Contact Regarding Animal Bites & Rabies: (513)-352-2922**

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Appendix A:



Source: J.L. Jameson, A.S. Fauci, D.L. Kasper, S.L. Hauser, D.L. Longo, J. Loscalzo: Harrison's Principles of Internal Medicine, 20th Edition Copyright © McGraw-Hill Education. All rights reserved.