



Summary of Reported Animal Bites, 2019

Allegheny County, PA

Prepared by

S. Grace Hutko, BS

Graduate School of Public Health

University of Pittsburgh

Kristen Mertz, MD, MPH

Infectious Disease Epidemiology Program

Allegheny County Health Department

L. Renee Miller, BS, BSN, RN

Immunization Program

Allegheny County Health Department

February 2021

Introduction

Rabies, a viral zoonotic disease that is nearly always fatal, is a significant global public health concern.¹ Worldwide, rabies causes tens of thousands of deaths every year, with dog bites responsible for 99% of human cases.² In the United States, however, most rabies is found in wild animals, such as bats and raccoons, and there are only one or two human cases per year. In Pennsylvania, there have not been any cases of human rabies since 1984.¹ The low incidence of human rabies in the US is attributed to a robust public health surveillance and testing system, widespread availability of post-exposure prophylaxis (PEP), and rabies vaccination for pets.³

In Pennsylvania, all healthcare providers are required by law to report animal bites.⁴ In the event a domestic animal bites a human, the animal is placed on in-home quarantine, usually for a period of ten days, and monitored for signs of rabies. If the animal is already deceased, the owner is asked to submit the animal for testing. If the animal is unavailable for observation or testing, or tests positive for rabies, the victim is directed to seek medical care to receive PEP. PEP includes rabies immune globulin given on day 0 and rabies vaccine given on days 0, 3, 7, and 14 after being evaluated by a healthcare provider.

In Allegheny County, healthcare providers must report bites to the Allegheny County Health Department (ACHD). After notification, ACHD staff contact pet owners and bite victims to provide recommendations for quarantine of animals and treatment for bite victims. Deceased animals are submitted to the ACHD Public Health Laboratory for testing with direct fluorescent antibody. This report describes the characteristics of persons bitten and treatment received for animal bites reported to the ACHD in 2019.

Methods

The ACHD receives bite reports from healthcare providers via a web-based electronic form or a faxed report form. Bite reports are also received from police if they respond to animal bite incidents. The ACHD staff enters data from faxed reports into the database. Staff then contact the bite victim and if applicable, the pet owner, to provide guidance, and to collect any information missing from the original report form.

Bite data from 2019 were exported from the Oracle database to a Microsoft Excel file. These data were then imported to SAS version 9.4 for cleaning and analysis. Duplicate observations, identified by name and bite date, were deleted. All bite reports for an animal other than a mammal were deleted, as rabies is exclusive to mammals.

Descriptive statistics were generated in SAS. Tables and graphs were created in Microsoft Excel. Population age group estimates were obtained from the US Census Bureau to calculate rates per 100,000 population. Data from 2018 were used because estimates for 2019 were not available at the time of writing this report.

Data on dog breeds licensed in Allegheny County were obtained from the Allegheny County Treasurer's Office. Breeds involved in 2019 bite reports were compared to breeds licensed by the

county. Microsoft Excel was used to calculate z-scores and p-values for breeds involved in bite reports, and these values were then checked by hand calculations. A p-value of 0.05 was used to establish statistical significance.

Note that the terms “bite” and “exposure” are used interchangeably throughout this report and include both animal bites and scratches.

Results

In 2019, 2,051 animal bites were reported to ACHD. Almost all bite victims (99.7%) were Allegheny County residents. Almost all bite locations (97.5%) and animal owner addresses (99.4%) were within Allegheny County.

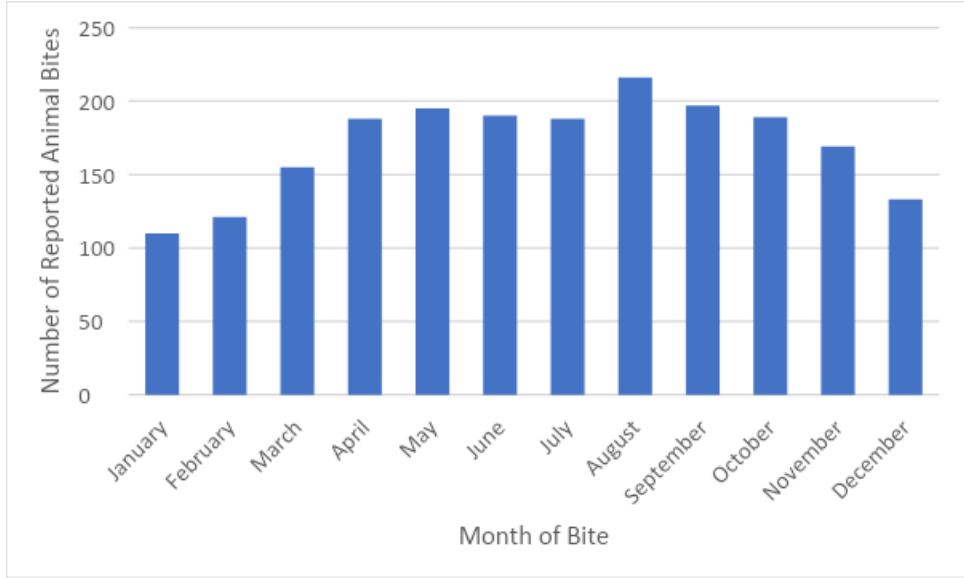
Most reported bites involved dogs (72.2%) or cats (24.1%). Bats (0.9%) and raccoons (0.6%) were the most common wild animals listed in bite reports. For thirteen bites (0.6%), the type of animal involved was not reported (**Table 1**).

Table 1. Bites reported by animal type, Allegheny County, 2019

| Species | N=2,051 | |
|-------------------|-------------|------------------|
| | n | (%) |
| Dog | 1480 | (72.2) |
| Pet | 1285 | (62.7) |
| Stray/Feral | 33 | (1.6) |
| Unknown | 162 | (7.9) |
| Cat | 495 | (24.1) |
| Pet | 394 | (19.2) |
| Stray/Feral | 78 | (3.8) |
| Unknown | 23 | (1.1) |
| Bat | 18 | (0.9) |
| Raccoon | 12 | (0.6) |
| Mouse | 9 | (0.4) |
| Chipmunk | 5 | (0.2) |
| Primate | 5 | (0.2) |
| Guinea Pig | 2 | (<0.1) |
| Hamster | 2 | (<0.1) |
| Rabbit | 2 | (<0.1) |
| Rat | 2 | (<0.1) |
| Squirrel | 1 | (<0.1) |
| Groundhog | 1 | (<0.1) |
| Beaver | 1 | (<0.1) |
| Fox | 1 | (<0.1) |
| Opossum | 1 | (<0.1) |
| Zebra | 1 | (<0.1) |
| Unknown | 13 | (0.6) |
| Total | 2051 | (100) |

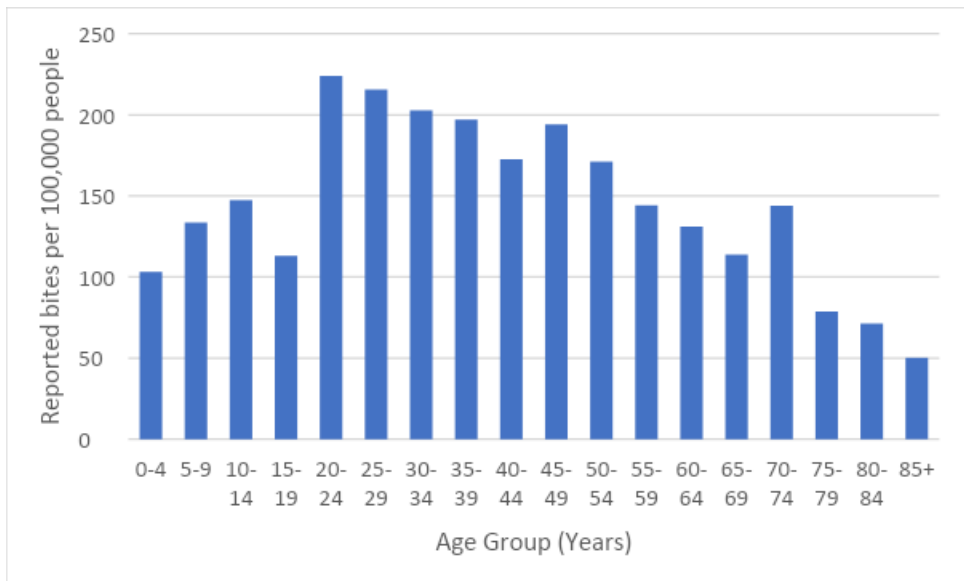
The number of reported bites was lower in the winter than in other seasons (**Figure 1**).

Figure 1. Distribution of reported animal bites by month, Allegheny County, 2019



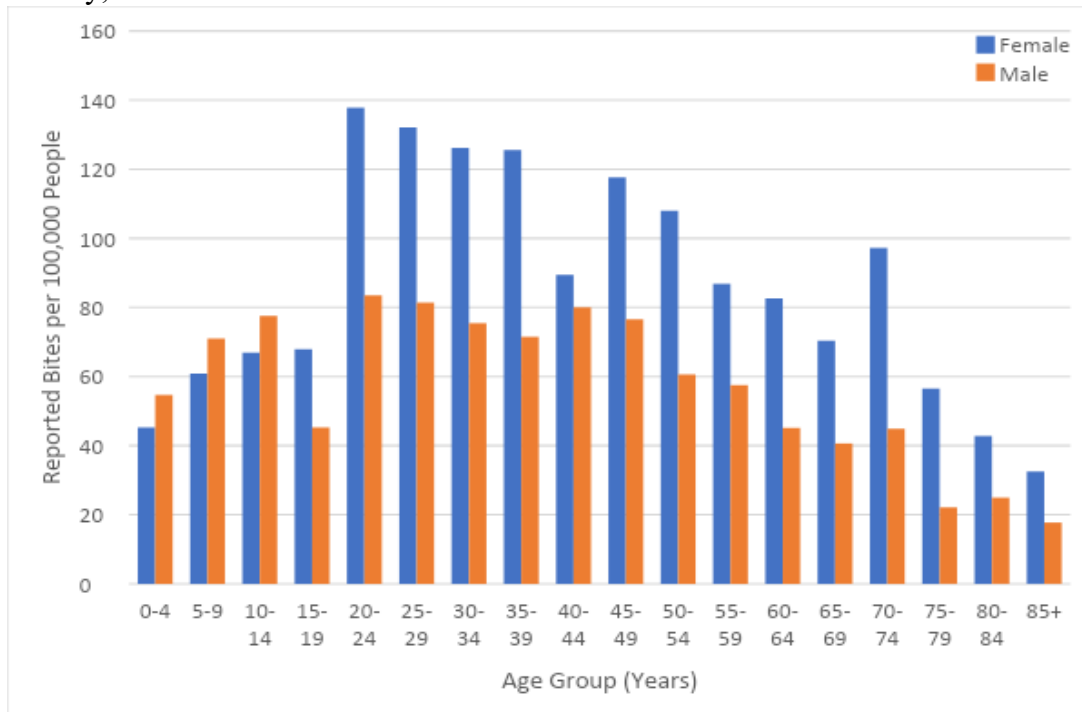
Bite victims ranged in age from less than one year to 99 years of age with a median of 36 years. Bite rates per 100,000 population were highest among individuals 20 through 29 years of age (**Figure 2**).

Figure 2. Reported bite rate per 100,000 population by age group of victim, Allegheny County, 2019



Of the 2,021 bite victims with known gender, 61% were female and 39% were male. Male children had a higher bite rate than female children through ages 10-14 years (**Figure 3**). Females had a higher bite rate than males in all other age groups (15-19 through 85+ years).

Figure 3. Reported bite rate per 100,000 population by age group and sex of victim, Allegheny County, 2019



Although ACHD receives many reports of animal bites, few animals are tested for rabies and very few test positive (Table 2).

Table 2. Number of animals tested for rabies and number positive among animals listed on bite reports, Allegheny County, 2019

| Species | No. Known to be Tested for Rabies | No. Positive |
|-----------------|-----------------------------------|----------------|
| | N | n (%) |
| Dog | 106 | 0 (0) |
| Pet | 85 | 0 |
| Stray | 1 | 0 |
| Unknown/Missing | 20 | 0 |
| Cat | 51 | 5 (9.8) |
| Pet | 28 | 0 |
| Stray/Feral | 15 | 5 |
| Unknown/Missing | 8 | 0 |
| Bat | 1 | 0 |
| Raccoon | 3 | 2 (66.7) |
| Total | 161 | 7 (4.3) |

The circumstances under which the bites occurred are described in Table 3, but for two thirds (66.2%) of bites, circumstances were not reported. Among those with reported incident type, the most common were breaking up a fight, playing with the animal, and the animal got spooked. Situations in which the bite was not provoked (“at a community area and animal came up and bit the victim” and “walking on the road”) accounted for 57 (2.8%) bites.

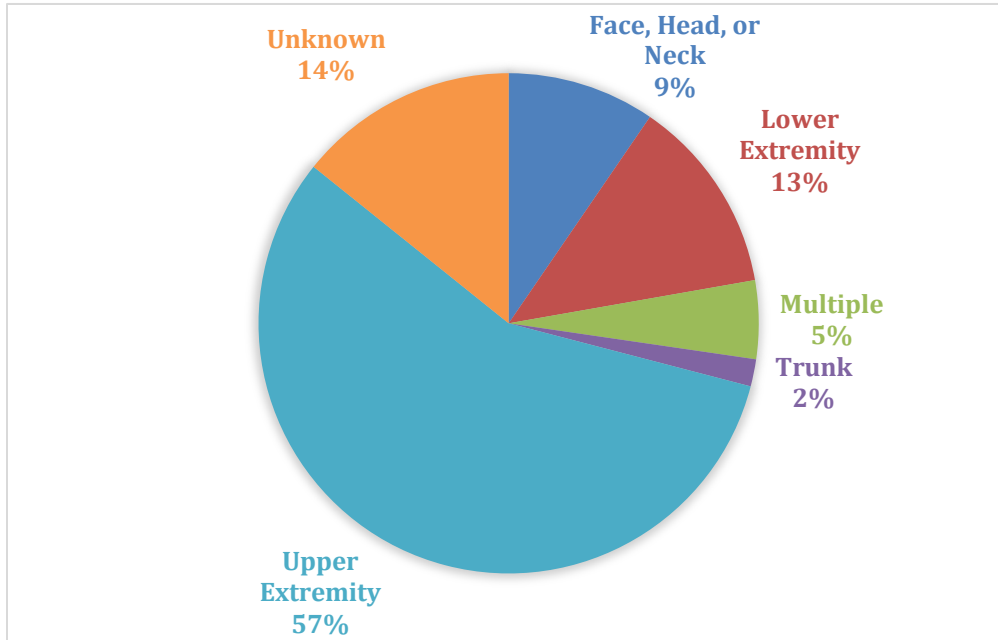
The data on circumstances are shown separately for dogs and cats (Table 3). Situations noted more frequently for cat bites than dog bites include trying to capture the animal, performing a medical procedure, bathing or grooming the animal, and trying to put the animal in a crate.

Table 3. Type of incident for reported bites, Allegheny County, 2019

| Incident Type | All (N=2051) | | Dog (N=1480) | | Cat (N=495) | |
|---|--------------|------------|--------------|------------|-------------|------------|
| | n | (%) | n | (%) | n | (%) |
| Breaking up a fight | 112 | (5.5) | 100 | (6.8) | 10 | (2.0) |
| Playing with the animal | 109 | (5.3) | 94 | (6.4) | 15 | (3.0) |
| The animal got spooked | 103 | (5.0) | 72 | (4.9) | 30 | (6.1) |
| Trying to pet the animal | 48 | (2.3) | 37 | (2.5) | 11 | (2.2) |
| At a community area and animal came up and bit the victim | 41 | (2.0) | 35 | (2.4) | 5 | (1.0) |
| Trying to capture the animal | 26 | (1.3) | 8 | (0.5) | 17 | (3.4) |
| Performing a medical procedure | 23 | (1.1) | 9 | (0.6) | 13 | (2.6) |
| Taking something from the animal | 22 | (1.1) | 21 | (1.4) | 0 | (0) |
| Trying to feed the animal | 20 | (1.0) | 11 | (0.7) | 7 | (1.4) |
| Bathing/ Grooming the animal | 18 | (0.9) | 7 | (0.5) | 11 | (2.2) |
| Entering the owner's house | 17 | (0.8) | 17 | (1.1) | 0 | (0) |
| Walking on the road | 16 | (0.8) | 16 | (1.1) | 0 | (0) |
| Trying to put the animal in a crate | 15 | (0.7) | 6 | (0.4) | 9 | (1.8) |
| Greeting a new animal | 11 | (0.5) | 10 | (0.7) | 1 | (0.2) |
| Delivering the mail | 9 | (0.4) | 9 | (0.6) | 0 | (0) |
| Giving medication to or cleaning a wound on the animal | 9 | (0.4) | 5 | (0.3) | 4 | 0.8 |
| Walking into the owner's yard | 9 | (0.4) | 9 | (0.6) | 0 | (0) |
| Touching a wound or painful spot on the animal | 5 | (0.2) | 3 | (0.2) | 1 | 0.2 |
| Bitten by a bat | 3 | (0.1) | N/A | N/A | N/A | N/A |
| Waking up in a room with a bat | 3 | (0.1) | N/A | N/A | N/A | N/A |
| Bitten by a wild animal | 2 | (0.1) | 0 | (0) | 0 | (0) |
| Checking the animal for a collar and tags | 2 | (0.1) | 2 | (0.1) | 0 | (0) |
| Repairing/ Installing an item on the owner's property | 1 | (0.0) | 1 | (0.1) | 0 | (0) |
| Other | 69 | (3.4) | 51 | (3.4) | 13 | (2.6) |
| Missing | 1358 | (66.2) | 957 | (64.7) | 348 | (70.3) |
| Total | 2051 | 100 | 1480 | 100 | 495 | 100 |

Of the majority of bites were to upper extremities (57%), followed by lower extremities (13%) and face/head/neck (9%). Five percent of individuals were bitten in multiple locations. Only two percent of bites were solely on the trunk area. For 292 (14%) reports, the bite location was not listed (**Figure 4**).

Figure 4. Location of exposure for bites reported, Allegheny County, 2019



Note: upper extremity was defined as shoulder, arm, wrist, finger, and hand. Lower extremity was defined as leg, foot, hip, ankle, and toe. Face/head/neck was defined as face, head, neck, and ear. Trunk was defined as abdomen, chest, buttocks, and back. “Multiple” locations was defined as any incident that included more than one location on the body.

Treatment for bites

Most (62%) bite victims were prescribed antibiotics, almost one third (32%) received a tetanus vaccine, and 4% received the full course of PEP. Just under one quarter (24%) received none of the above.

Among victims bitten by dogs, 62% were prescribed antibiotics, 33% received a tetanus vaccine, and 2% received the full course of PEP; 25% received none of the above. Among victims bitten by cats, 66% were prescribed antibiotics, 28% received a tetanus vaccine, and 5% received the full course of PEP; 22% received none of the above (**Table 4**).

Table 4. Type of treatment received for animal bites, Allegheny County, 2019

| Treatment Type | All (N=2051) | | Dog (N=1480) | | Cat (N=495) | |
|-----------------|--------------|--------|--------------|--------|-------------|--------|
| | n | (%) | n | (%) | n | (%) |
| Antibiotic | 1274 | (62.1) | 920 | (62.2) | 326 | (65.9) |
| Wound Cleansed | 1176 | (57.3) | 907 | (61.3) | 242 | (48.9) |
| Tetanus Vaccine | 653 | (31.8) | 492 | (33.2) | 138 | (27.9) |
| Rabies PEP | 86 | (4.2) | 36 | (2.4) | 26 | (5.3) |
| Other Treatment | 155 | (7.6) | 126 | (8.5) | 24 | (4.9) |
| No Treatment | 498 | (24.3) | 366 | (24.7) | 111 | (22.4) |

The most common antibiotic prescribed was amoxicillin/clavulanate (Augmentin), reported for 59.9% of all bite victims. The antibiotic data for dog and cat bites are shown separately but no major differences were noted (**Table 5**).

Table 5. Type of antibiotic prescribed among bite victims receiving antibiotics, Allegheny County, 2019

| Antibiotic | All (N=1274) | | Dog (N=920) | | Cat (N=326) | |
|-------------------------|--------------|--------|-------------|--------|-------------|--------|
| | n | (%) | n | (%) | n | (%) |
| Amoxicillin/Clavulanate | 763 | (59.9) | 570 | (62.0) | 189 | (58.0) |
| Doxycycline | 51 | (4.0) | 25 | (2.7) | 23 | (7.1) |
| Ampicillin/Sulbactam | 38 | (3.0) | 30 | (3.3) | 8 | (2.5) |
| Amoxicillin | 30 | (2.4) | 16 | (1.7) | 3 | (0.9) |
| Clindamycin | 16 | (1.3) | 12 | (1.3) | 4 | (1.2) |
| Multiple | 45 | (3.5) | 30 | (3.3) | 15 | (4.6) |
| Other | 26 | (2.0) | 14 | (1.5) | 9 | (2.8) |
| Not Specified | 305 | (23.9) | 223 | (24.2) | 75 | (23.0) |

Among the 86 victims who received the full course of rabies PEP, most (81%) were exposed to an animal that could not be observed, and 14% were exposed to a rabid animal. Four victims received PEP for an invalid reason; either they chose to get PEP despite it not being recommended or an improper recommendation was made (**Table 6**).

Table 6. Reason for getting rabies post-exposure prophylaxis, Allegheny County, 2019

| Reason | N=86 | |
|--------------------------------|------|--------|
| | n | (%) |
| Exposed to Rabid Animal | 12 | (14.0) |
| Exposed to Unobservable Animal | 70 | (81.4) |
| Invalid Reason | 4 | (4.7) |

Note: individuals who started PEP but stopped for any reason were not included in this analysis.

Among pets involved in bite incidents, more dogs than cats were reported to be up to date with rabies vaccine (48.1% of dogs and 40.0% of cats) but the vaccination status of the animal was missing for many cases (48.7% for dogs and 51.7% for cats).

Table 7 summarizes the dog breeds involved in bite reports. Only breeds involved in 10 or more bites are listed. The most common breeds involved in dog bites, other than mixed breeds (14.0%), are pit bulls (20.9%), German Shepherds (9.8%), and Labrador Retrievers (7.1%). For 31.1% of dog bites, no breed was listed in reports. Some breeds were overrepresented in the data compared with county licensing statistics. Breeds that accounted for significantly higher percentages of bite involvement compared with county license percentages are shown in bold font, and include pit bulls, German Shepherds, and rottweilers.

Table 7. Dog breeds involved in bites and dog breeds licensed, Allegheny County, 2019

| Breed | Bites Involving Dogs* (N=1020) | | Dogs Licensed in Allegheny County (N=85,086) | | p-value |
|--------------------------|-----------------------------------|---------------|---|--------------|-----------------|
| | n | (%) | n | (%) | |
| Pit Bull | 213 | (20.9) | 3348 | (4.0) | <0.01 |
| Mixed Breed | 143 | (14.0) | 10470 | (12.5) | 0.15 |
| German Shepherd | 100 | (9.8) | 4316 | (5.2) | <0.01 |
| Labrador Retriever | 72 | (7.1) | 10424 | (12.5) | <0.01 |
| Bulldog | 30 | (2.9) | 1033 | (1.2) | <0.01 |
| Rottweiler | 30 | (2.9) | 869 | (1.0) | <0.01 |
| Boxer | 28 | (2.7) | 2393 | (2.9) | 0.82 |
| Chihuahua | 22 | (2.2) | 3288 | (3.9) | <0.01 |
| Golden Retriever | 22 | (2.2) | 4024 | (4.8) | <0.01 |
| Beagle | 20 | (2.0) | 3967 | (4.8) | <0.01 |
| Husky | 20 | (2.0) | 1035 | (1.2) | 0.04 |
| Shih-Tzu | 19 | (1.9) | 3000 | (3.6) | <0.01 |
| Mastiff | 16 | (1.6) | 499 | (0.6) | <0.01 |
| Boston Terrier | 12 | (1.2) | 796 | (1.0) | 0.46 |
| Doberman Pinscher | 12 | (1.2) | 458 | (0.5) | <0.01 |
| Jack Russell | 12 | (1.2) | 281 | (0.3) | <0.01 |
| Poodle | 12 | (1.2) | 1830 | (2.2) | 0.03 |
| Terrier | 11 | (1.1) | 1603 | (1.9) | 0.05 |
| Yorkshire Terrier | 11 | (1.1) | 2808 | (3.4) | <0.01 |
| Labradoodle | 10 | (1.0) | 581 | (0.7) | 0.27 |
| Breed with <10 bites | 205 | (20.1) | | | |

*Missing on 460 bite reports. Percentages are based on denominator of 1020 instead of 1480.

Breeds shown in bold fonts are **significantly** overrepresented in animal bite reports compared to county license data from 2019.

Note: if two or more breeds were listed as a dog breed (e.g. pit bull + mastiff), breed was categorized as the first breed listed (pit bull). If a breed was listed as a single breed mix (e.g. pit bull mix), the breed was categorized as a single breed (pit bull).

Discussion

In summary, among the 2,051 animal bites reported to the ACHD in 2019, most involved dogs, which were implicated on 72.2% of all bite reports and responsible for 1,000 more reported bites than cats, the second most commonly reported animal. The most common wild animals involved in bites were bats, raccoons, and chipmunks.

Of animals listed on bite reports, 161 were known to be tested for rabies, with 7 testing positive, including 5 cats and 2 raccoons. All the rabid cats were feral. Wild animals remain the main threat of rabies in Allegheny County.

By law, rabies vaccines are required for dogs and cats in Pennsylvania once the animal is three months of age, and must be maintained.⁴ However, this vaccination requirement is rarely enforced. Data on rabies vaccination for pets was not available for many of the bites reported to ACHD so we were unable to assess the vaccine coverage for pets involved in bites.

Certain dog breeds were overrepresented in bite reports compared to county licensing statistics in 2019, namely pit bulls, German Shepherds, bulldogs, and rottweilers. These dogs may be more aggressive, or their bites cause more severe injuries because of their size.

Animal bites can be a source for infection and should be properly cleansed.³ Our data indicate that 57% of reported bites were cleansed but this is most likely an underestimate as this information may not be recorded on the bite form. Antibiotics were prescribed for nearly two-thirds of bites in Allegheny County in 2019. According to the American Academy of Family Practice guidelines, antibiotic prophylaxis should be considered for all bites requiring closure and for high-risk bites. Cat bites are considered high risk for infection,⁵ but according to ACHD bite data, only 66% of cat bite victims received antibiotics in 2019. Amoxicillin/clavulanate (Augmentin) was the antibiotic of choice, prescribed in over half of bite reports, consistent with current guidelines.⁵

In Allegheny County in 2019, 31.8% of victims received a tetanus vaccine. This is recommended if the victim had not received the tetanus vaccine in the last ten years or vaccination status is unknown.³ If a victim is unsure when they last received a tetanus shot, healthcare providers should consult the Pennsylvania Statewide Immunization Information System (PA-SIIS) to see when the last tetanus vaccine was administered; however, PA-SIIS does not include vaccines given out of state or by providers who do not submit data. We are not able to assess the appropriateness of tetanus vaccination from bite report data.

The PEP regimen should only be administered if someone is exposed to 1) a rabid animal, 2) an animal that cannot be quarantined for observation, or 3) an animal that cannot not be tested for rabies. Of bite victims reported to ACHD, four reportedly completed the PEP regimen unnecessarily. More persons began the regimen but stopped, most likely because the biting animal tested negative or was located and quarantined.

Recommendations

1. **Avoid contact with wild animals.** Do not attempt to feed, touch, or take in wild animals as pets. Avoid contact with dead wild animals to prevent rabies exposure.
2. **Pet owners should comply with Pennsylvania’s rabies vaccine regulations for pets.** All pet owners should have their pets vaccinated by three months of age and then when recommended by their vet, depending on the vaccine used. This will protect pets and their owners from rabies virus. Pets should be supervised in situations where they could encounter wildlife.
3. **Health care providers should be familiar with the protocol for animal bites and rabies PEP.** Health care providers should only recommend/provide the PEP vaccine series for rabies if the victim was exposed to an animal that had rabies, an animal that could not be observed during a quarantine period, or an animal that could not be tested for rabies. Health care providers should check PA-SIIS for information on tetanus vaccinations, although the database may not be complete. Additionally, providers should continue to report bites to the health department.
4. **Animals should be submitted for rabies testing if possible.** If pets involved in bites are euthanized during the quarantine period, the animal should be submitted for rabies testing. If bats are found in the home in rooms where people were sleeping, they should be captured and submitted for testing at the ACHD laboratory. To safely capture a bat, wear gloves and place a container over the bat when it lands, and then slip a piece of cardboard underneath and tape it to the container. Be careful to avoid contact with the bat. If there is no reason to suspect contact between the bat and humans or pets, release the bat outdoors.

References

1. PA Department of Health. *Rabies Fact Sheet*. <https://www.health.pa.gov/topics/Documents/Programs/Rabies/Rabies%20Fact%20Sheet.pdf> Accessed September 2020.
2. WHO. *Rabies*. (2020, April 21). <https://www.who.int/news-room/fact-sheets/detail/rabies> Accessed September 2020.
3. Centers for Disease Control. *Rabies*. <https://www.cdc.gov/rabies/index.html> Accessed September 2020.
4. PA Department of Agriculture. *Rabies*. <https://www.agriculture.pa.gov/Animals/AHDServices/diseases/Pages/Rabies.aspx> Accessed September 2020.
5. Ellis R, Ellis C. (2014). Dog and Cat Bites. *Am Fam Physician*. 2014 Aug 15;90(4):239-243.