What's Up With Dog Bites in New York City?



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01

Motivation

- Each year in the United States, there are between 4.5 to 4.7 million dog bites. Out of this number, around 800,000 (~20%) require medical attention.
- With dog bites affecting so many individuals and potentially being dangerous, it raises two main questions: How can one prevent dog bites? And in our case, are there certain factors that are associated with dog bites?
    - We decided to explore New York City because it is the largest city in the United States population-wise.

02

Our Research Question

Are factors like location, seasonality, breed, and spay/neuter status associated with the overall prevalence of dog bite case reports in New York City? To what extent?

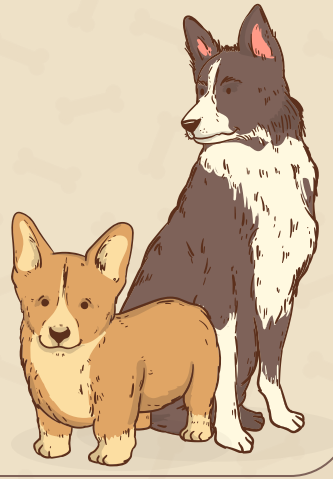


03

Data Dictionary

- New York City's Department of Health & Mental Hygiene Dog Bite Data Set, spanning from 2018 to 2025
- Each row represents a dog bite incident

Unique ID	Unique Bite Incident Case Number
Date of Bite	Date of Bite Incident
Season	Season of Bite Incident (Winter, Spring, Summer, Fall)
Species	Animal type (Dog mostly, some Alpaca, Goat, Cat)
Breed	Breed of Dog (2,203 unique breed names before data cleaning - trimmed to 203 after lots of work)
Age	Age of Dog (Mixed Entry Style)
Gender	Gender of dog (FEMALE, MALE, or UNKNOWN)
Spay/Neuter	Dog Spayed or Neutered Status (TRUE or FALSE)
Borough	Location of Bite Incident
Zip Code	Zip Code for Bite Incident



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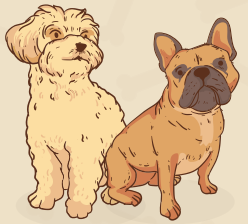
Exploratory Data Analysis
Visualization 1: Bites By Breed



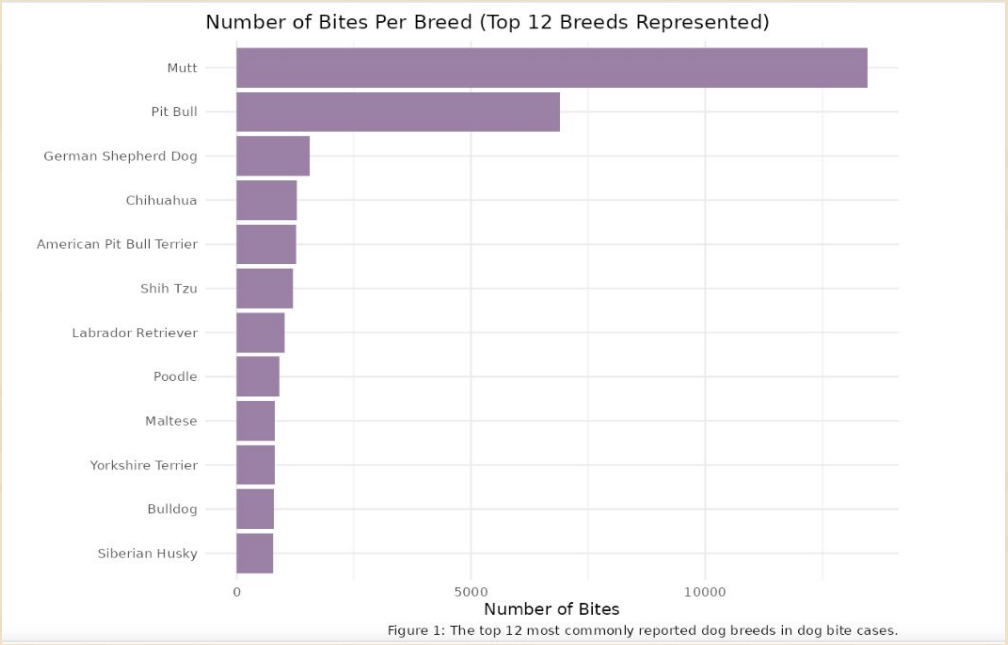


Figure 1: The top 12 most commonly reported dog breeds in dog bite cases.

- **Mutts** are most represented in the data and are involved in the largest amount of bites (13,500 bites and roughly double the next most represented)
- **Pit Bulls (~6800 bites), German Shepherds (~1500 bites), Chihuahuas (~1200 bites), and American Pit Bull Terriers (~1200 bites)** have the next most frequent amount of bite incidents
- Popularity is an external factor that we cannot adjust for (the Shih Tzu, Labrador Retriever, Yorkshire Terrier case studies)

05 Visualization 2: Location

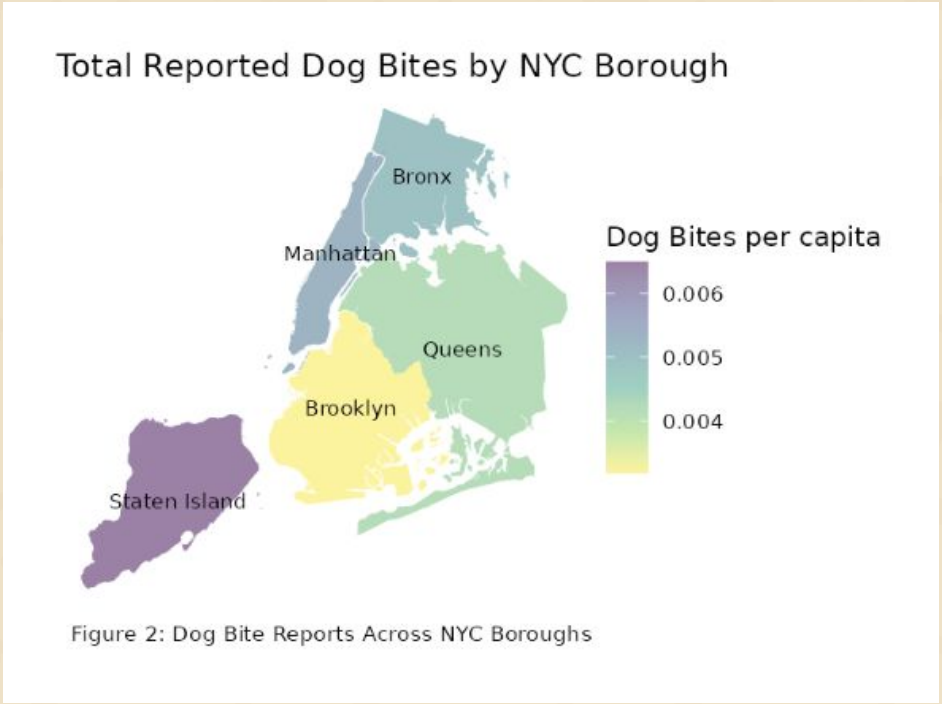


Figure 2: Dog Bite Reports Across NYC Boroughs

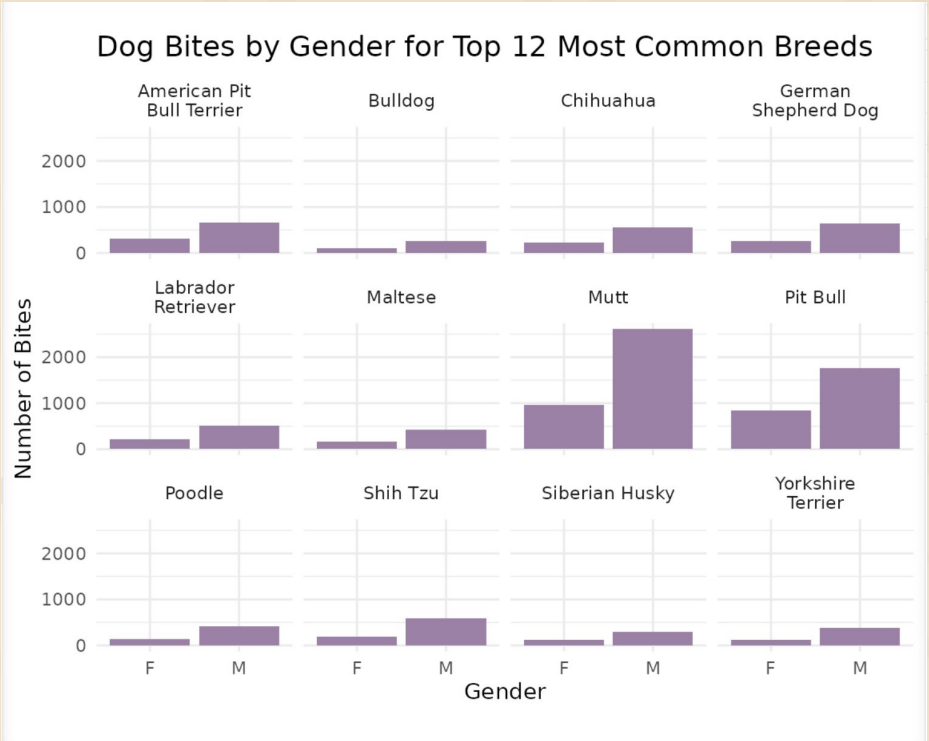


- **Queens:** most bites (~9,800)
- **Brooklyn & Manhattan:** close behind (~8,500)
- **Bronx:** middle (~6,900)
- **Staten Island:** fewest (~3,200)
- This visualization shows per capita

06

Visualization 3: Bites by Gender and Breed





- **Male dogs** are involved in more bites than female dogs **in every one of the top 12 breeds**, usually about 2 to 3 times as many.
- The gap is largest for **Mutts (~2,600 male vs. ~1,000 female)** and **Pit Bulls (~1,750 male vs. ~850 female).**
- The pattern holds for small breeds too (Chihuahua, Shih Tzu, Yorkshire Terrier), so it isn't just about size.

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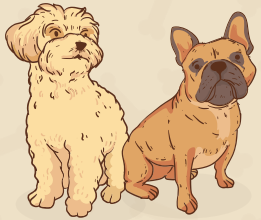
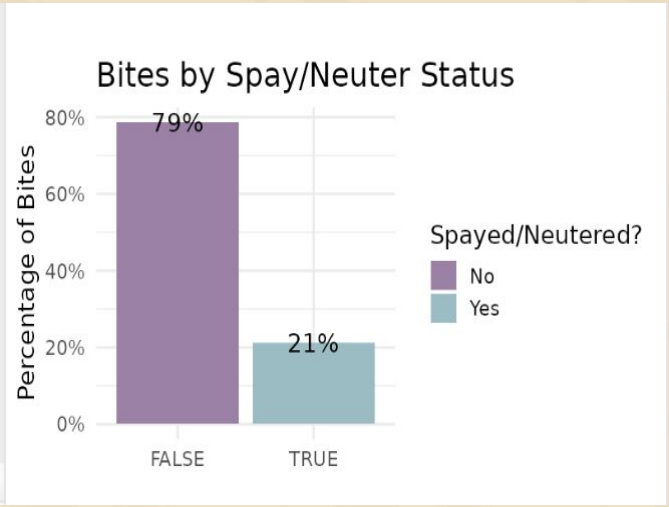
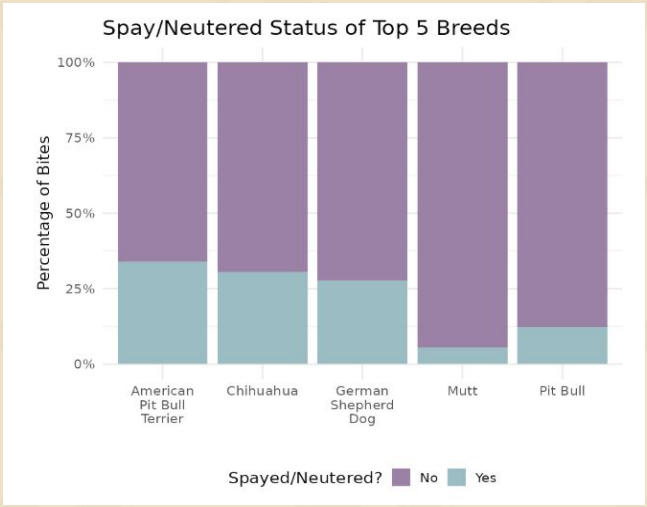
Visualizations 4/5: Spay/Neuter Status



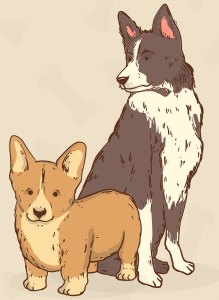


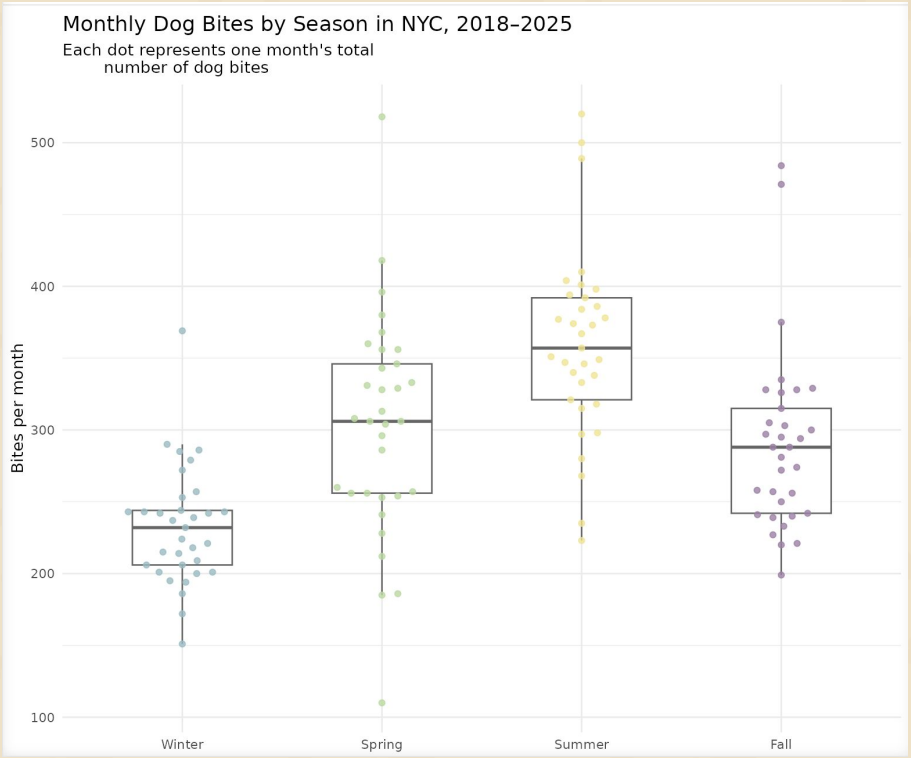


- **79% of bites** involved dogs that were **not spayed or neutered.**
- This holds across the top 5 breeds, but varies a lot: about **one-third** of American Pit Bull Terriers, Chihuahuas, and German Shepherds were fixed, versus only **~12% of Pit Bulls** and **~5% of Mutts**

08

Visualization 6: Seasonal Variation





- Summer has the most bites (median ~355 per month)
- Winter has the fewest (median ~230 per month)
- Spring and Fall fall in between
- Summer and winter barely overlap, so the pattern holds year after year

09 Conclusion / Discussion / Critique

Conclusions:

- Queens had the most bite incidents; Staten Island had the fewest
- Mutts made up the majority of the bite incident reports
- Most biting dogs in the top 5 breeds were not spayed/neutered
- Bites peak in summer and are lowest in winter

Discussion:

- Location pattern likely reflects population size
- Mutt incidents could reflect stray dogs
- Seasonal pattern may reflect more time outdoors in warm weather
- Spay/Neuter might reflects hormonal differences



Limitations:

- Only *reported* bites, many go unreported
- Borough totals not adjusted for population
  - No dog population census & cannot adjust for popularity of breed
- No data on all dogs, only dogs that had bite incidents (no baseline)
- Breed is often reported by victims and may be inaccurate