

DATA ANALYSIS & FINDINGS

OPTIMIZING ANIMAL SHELTER ADOPTIONS

KATIE RITZ, 2020

APPROXIMATELY **6.5 MILLION** COMPANION ANIMALS
ENTER ANIMAL SHELTERS IN THE US EACH YEAR
OF THESE, APPROXIMATELY **HALF**
ARE ADOPTED

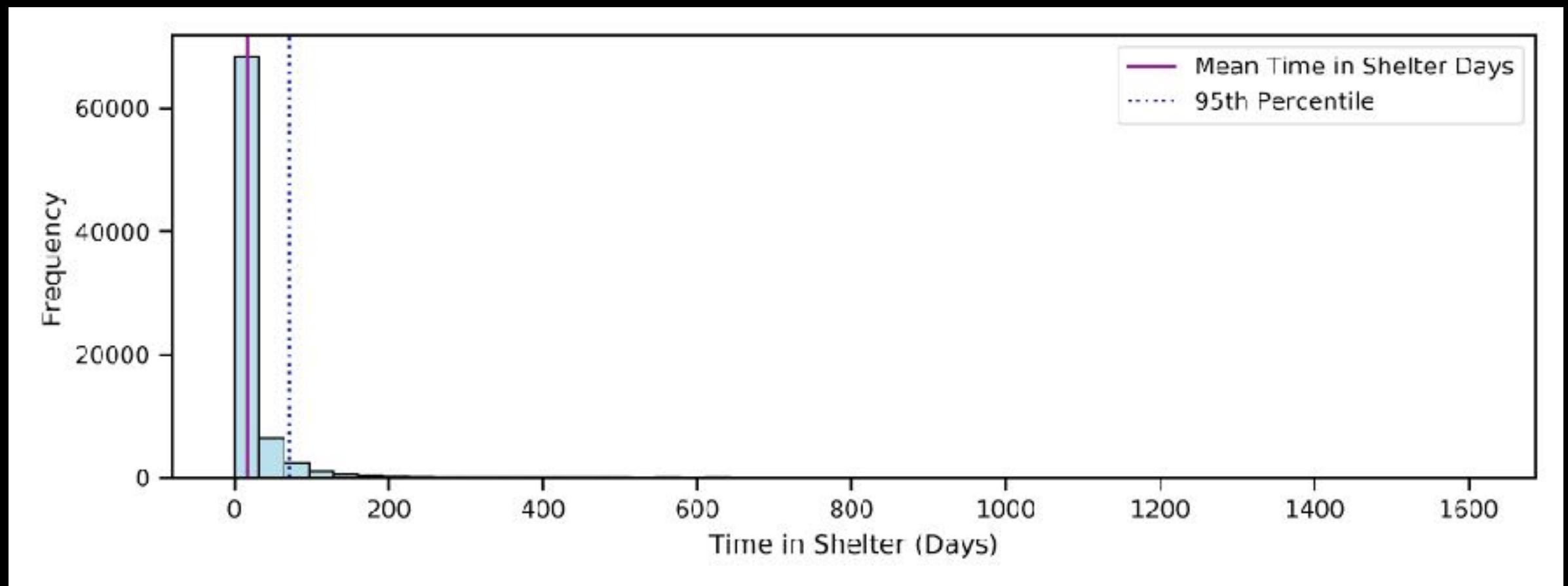


THE AUSTIN ANIMAL SHELTER IS THE LARGEST NO-KILL SHELTER IN THE U.S.



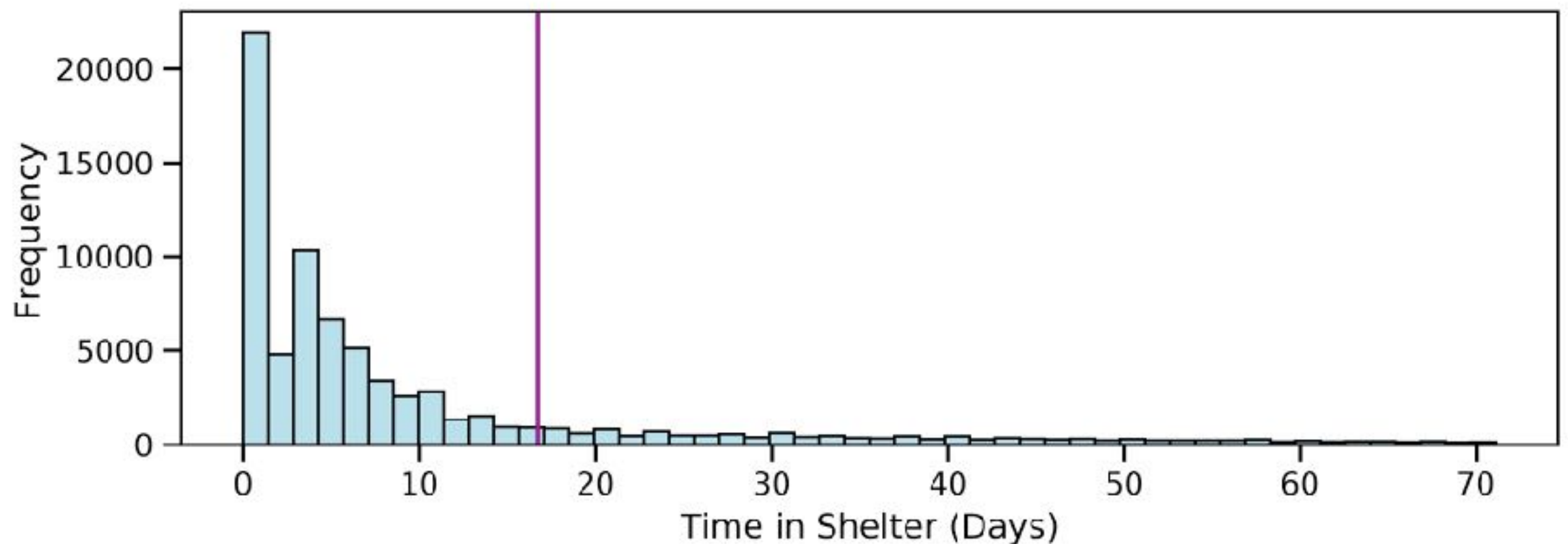
- Shelter data for 79,672 unique animals available through Kaggle from 2013 to 2018
- Python packages used: pandas, NumPy, matplotlib, seaborn, SciPy, statsmodels, scikit-learn

MOST ANIMALS ARE ADOPTED RELATIVELY QUICKLY, BUT A RARE FEW HAVE EXTRAORDINARILY LONG SHELTER TIMES



MEAN: 16.76 DAYS; MEDIAN: 4.99 DAYS

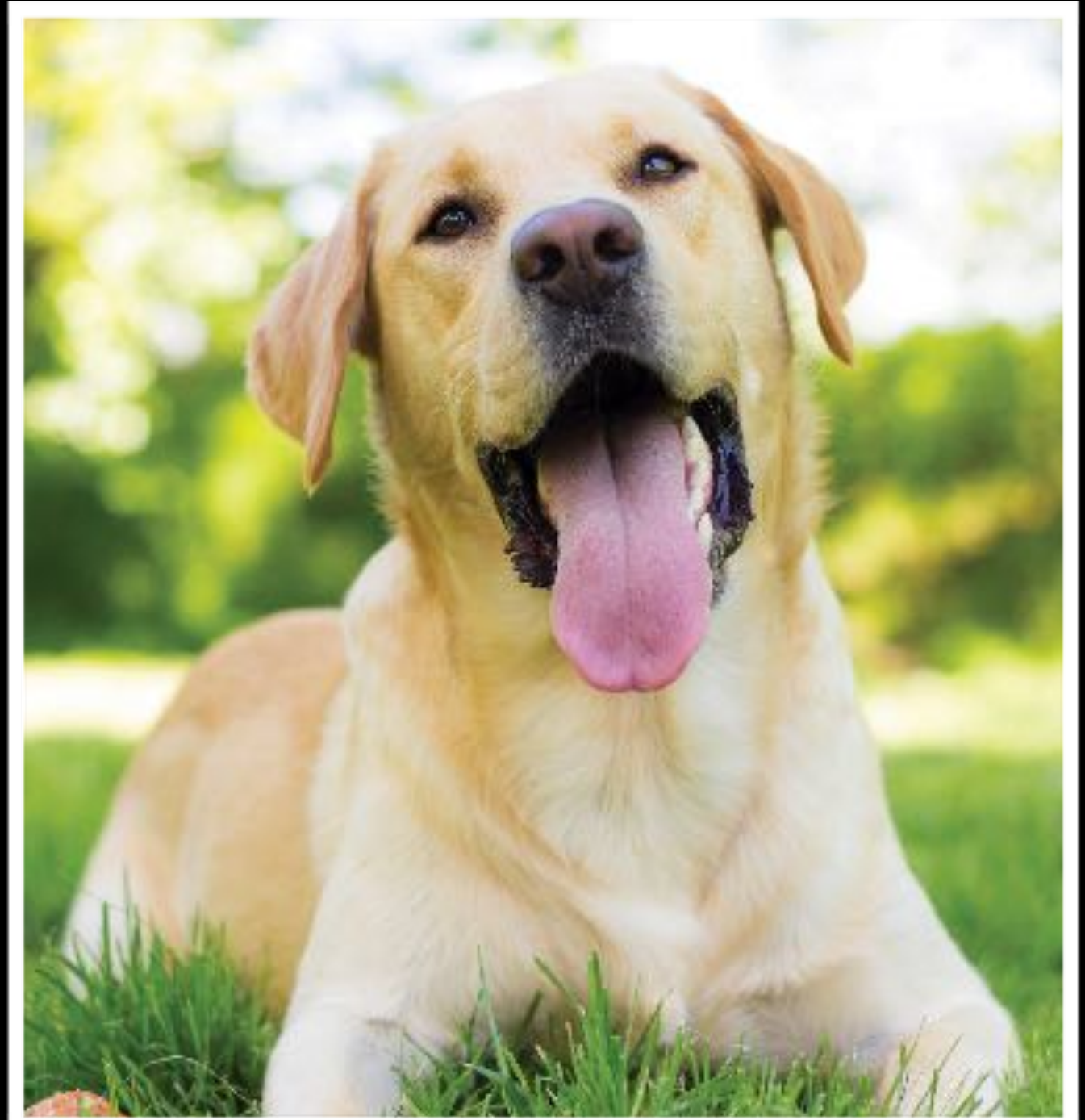
ZOOM IN TO THE LOWER 95TH PERCENTILE:
MOST ANIMALS ARE ADOPTED
WITHIN A WEEK



PLOT REPRESENTS ANIMALS WITH SHELTER TIMES <71 DAYS
(95% OF ANIMALS)

FOR MOST (95%) ANIMALS

TRENDS IN SHELTER TIMES



[HTTPS://WWW.DOGSTER.COM/DOG-BREEDS/LABRADOR-RETRIEVER](https://www.dogster.com/dog-breeds/labrador-retriever)

ANALYSIS OVERVIEW

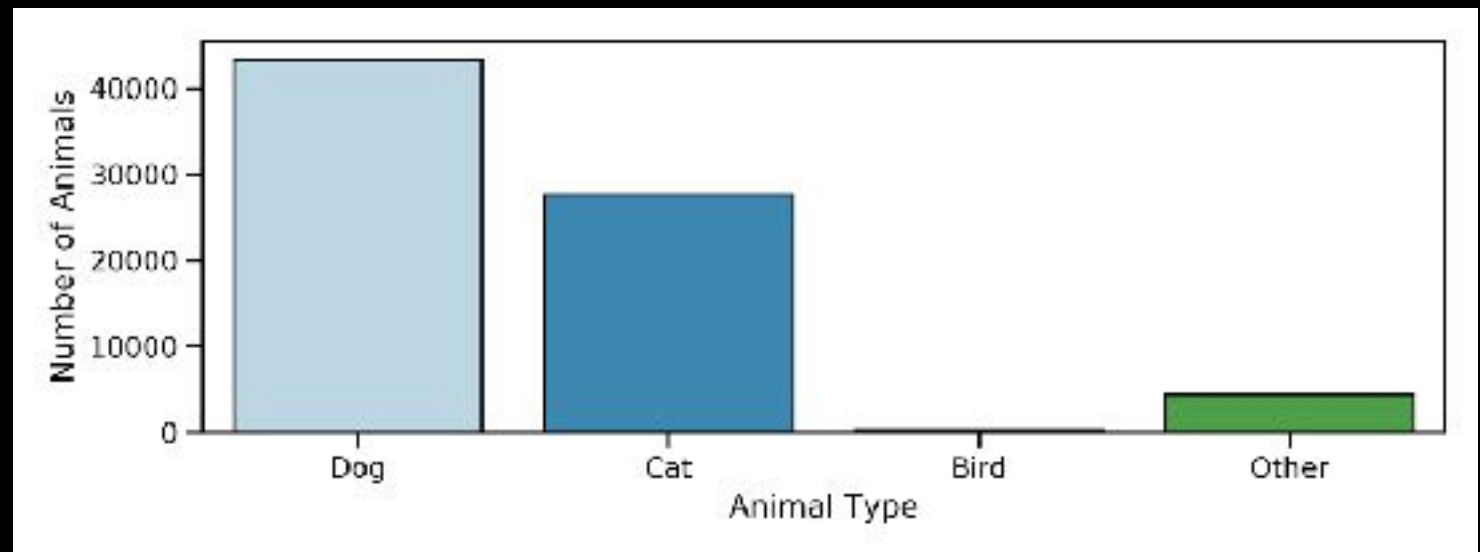
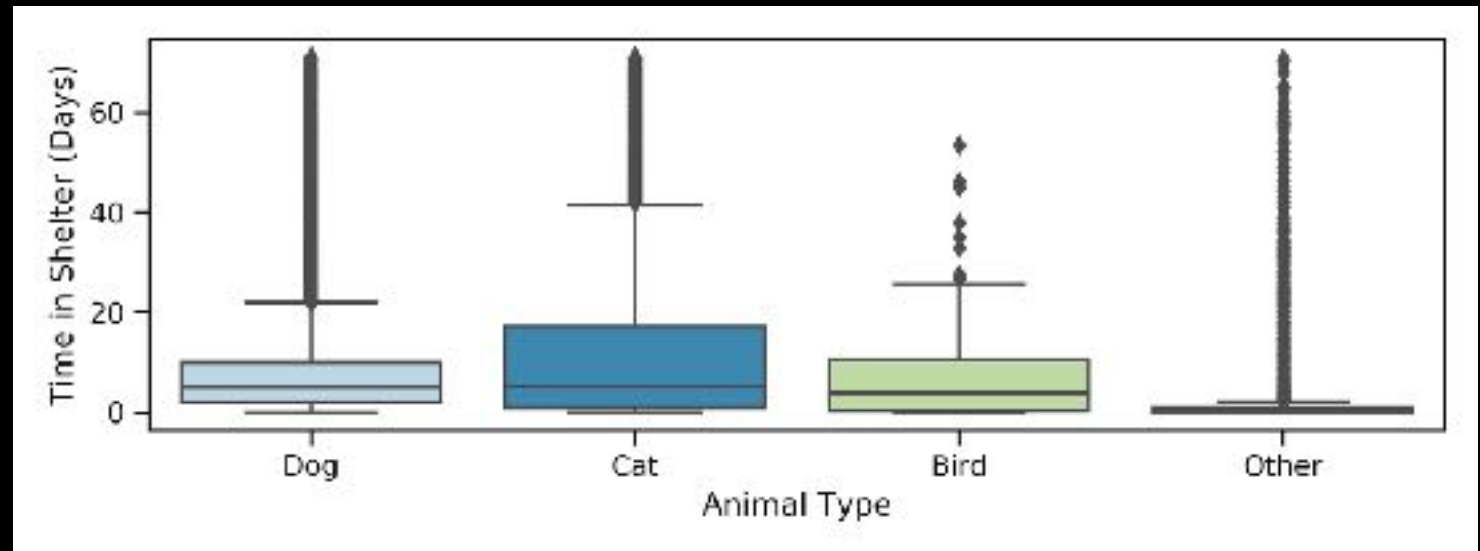
In this analysis, I examine dogs in the lower 95th percentile of shelter times. The goal is to identify common shelter trends that can be seen in **most** animals.



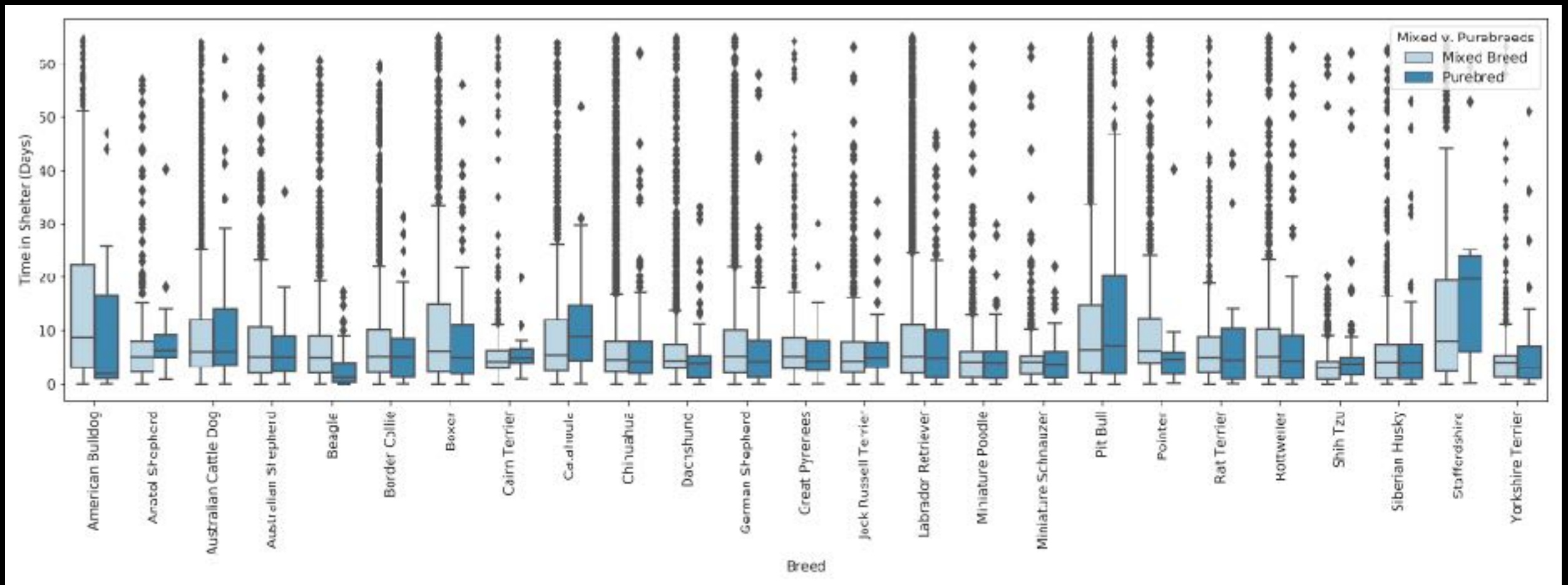
[HTTPS://WWW.AKC.ORG/PUPPIES/](https://www.akc.org/puppies/)

CATS SPEND MORE TIME IN SHELTERS THAN DOGS

- Cats have longer shelter times than dogs (mean time for cats = 12.8 days, dogs = 9.16 days)
- Dogs are more common in this shelter

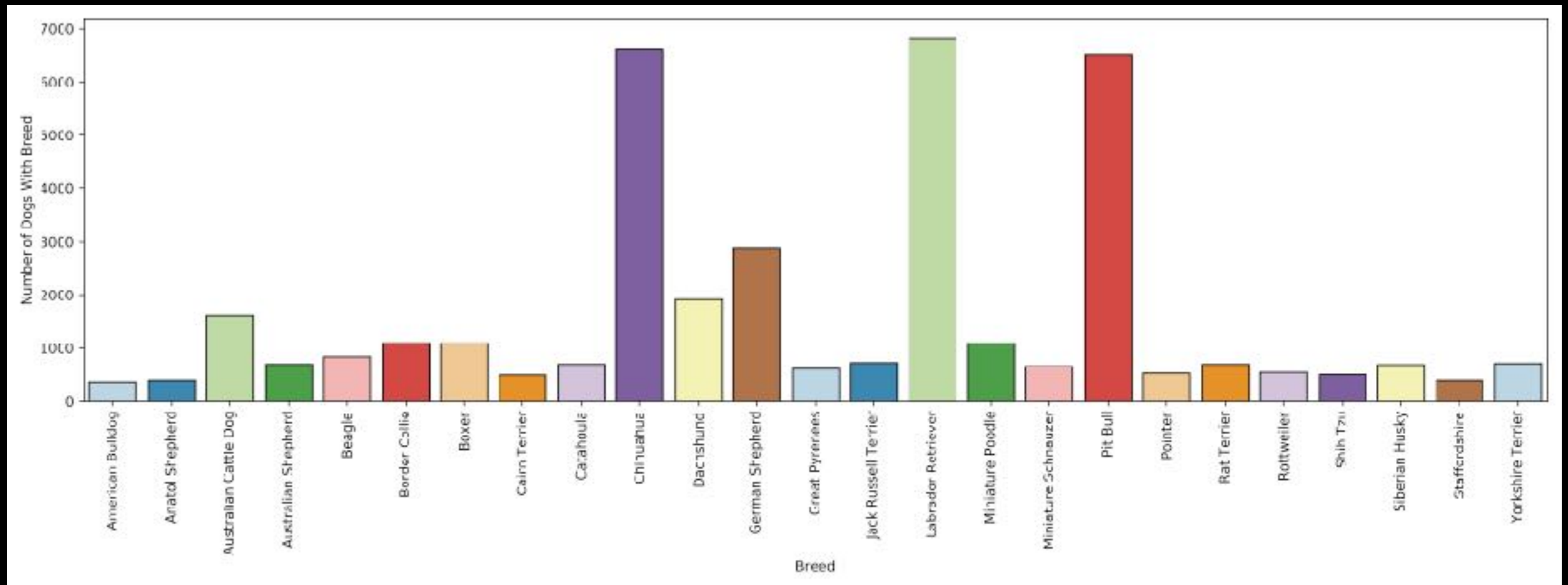


25 BREEDS WITH THE LONGEST SHELTER TIMES



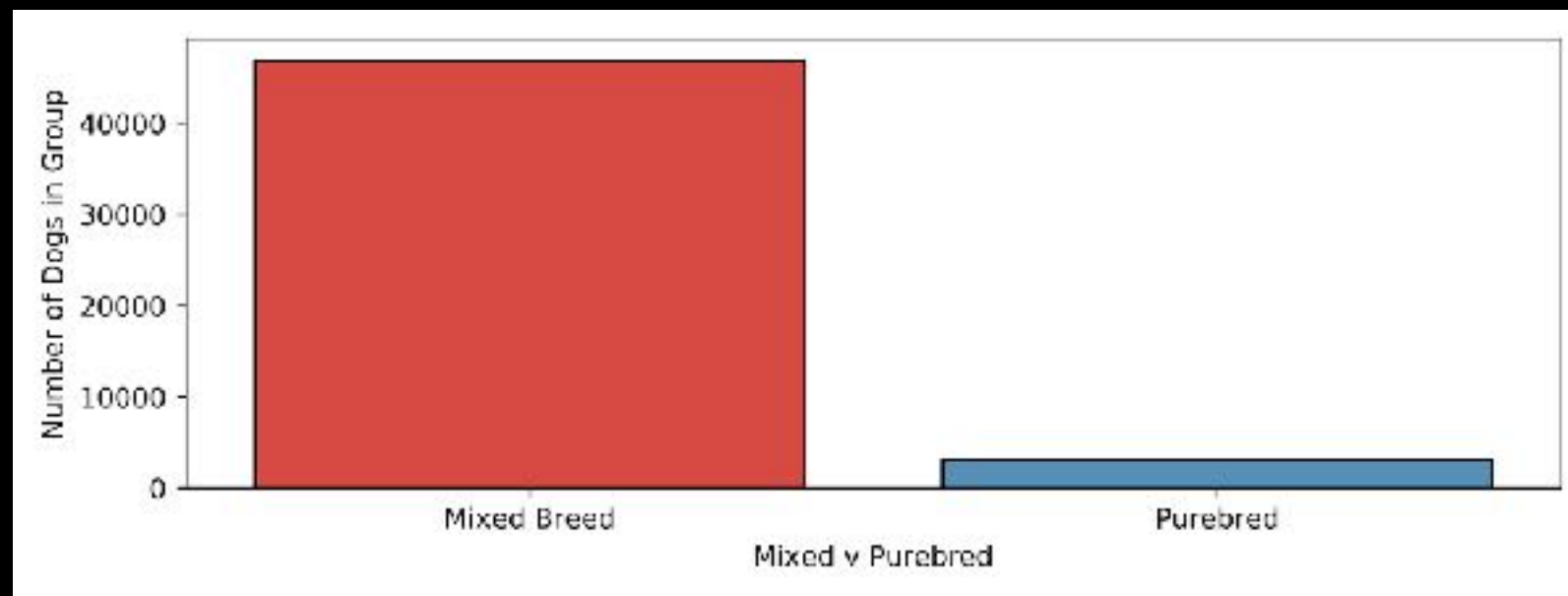
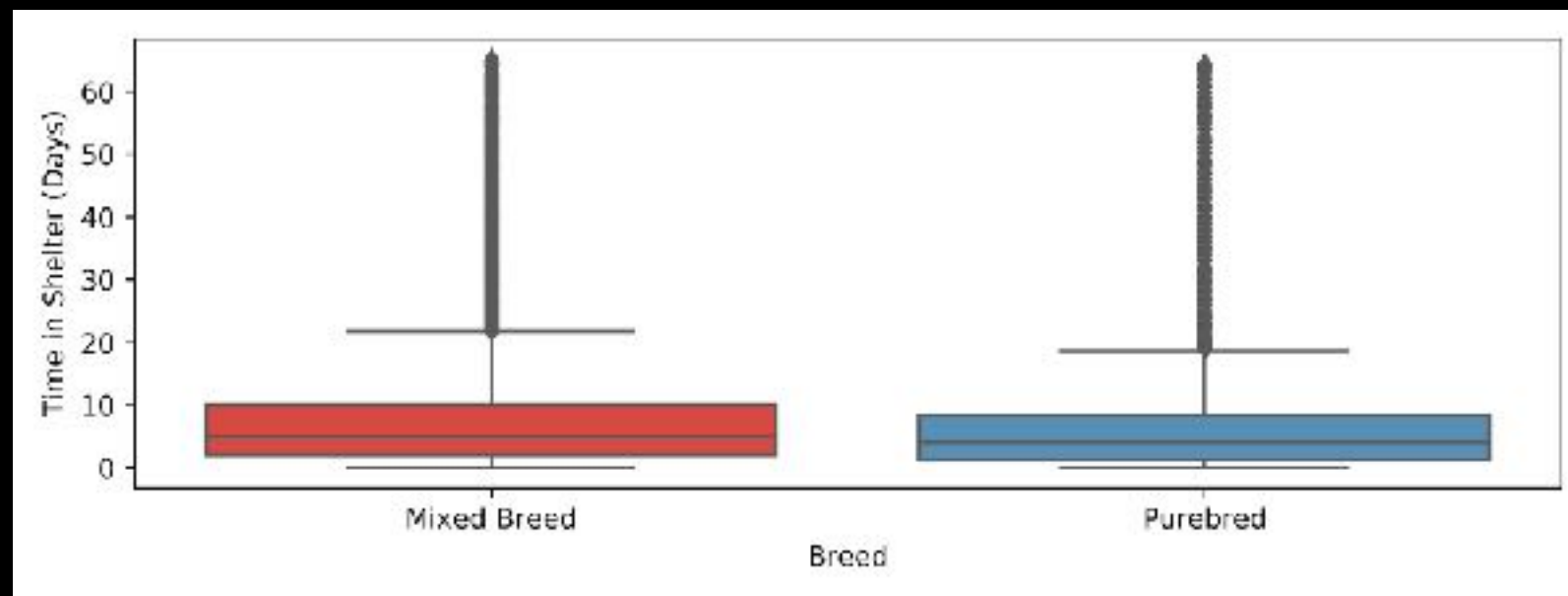
Labs and Pit Bulls have significantly longer shelter times, but Chihuahuas have shorter shelter times

LABS, CHIHUAHUAS, AND PIT BULLS ARE 200% MORE COMMON IN THIS SHELTER THAN ALL OTHER BREEDS

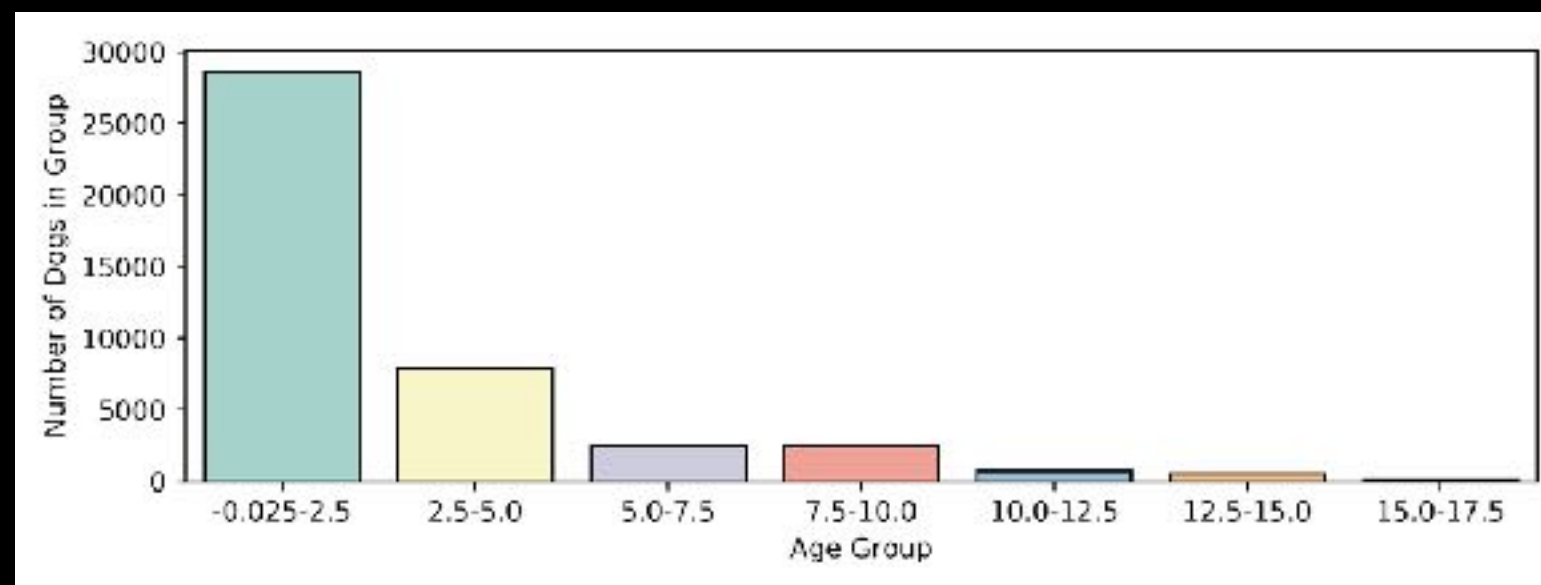
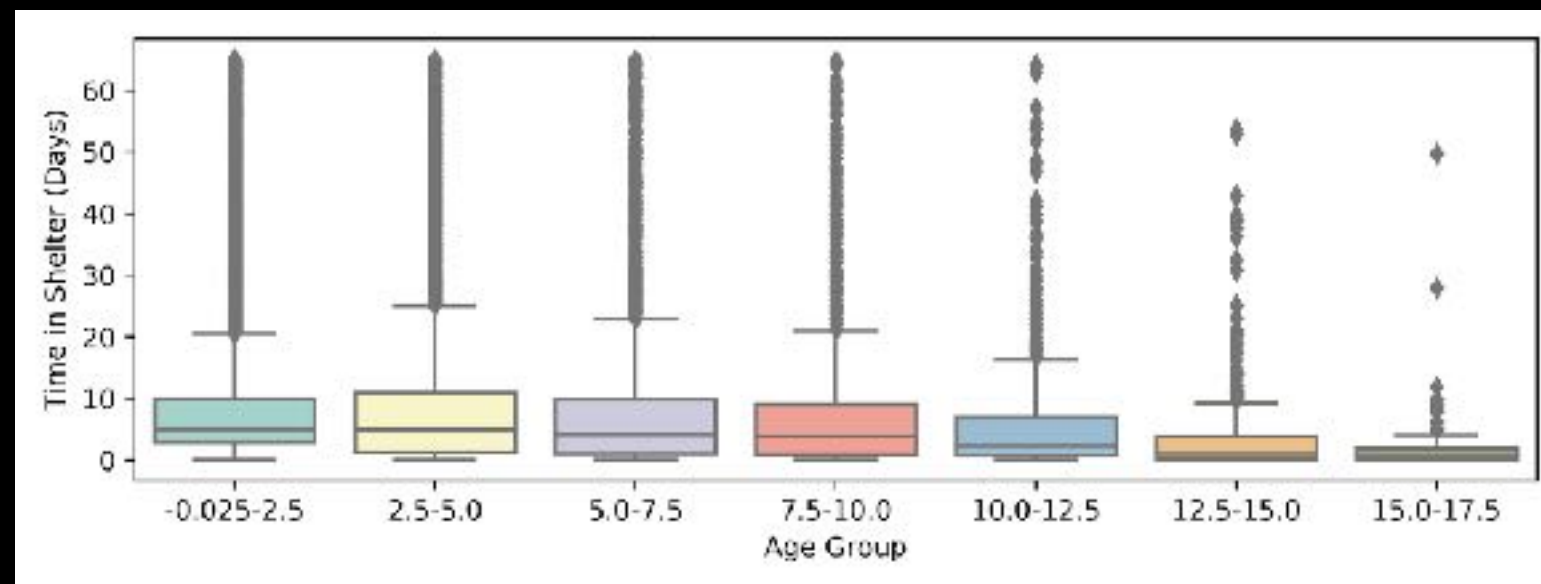


In addition to long shelter times, a handful of breeds are extraordinarily more common, possibly biasing the results.

MIXED BREED DOGS ARE MORE COMMON **AND** HAVE LONGER SHELTER TIMES

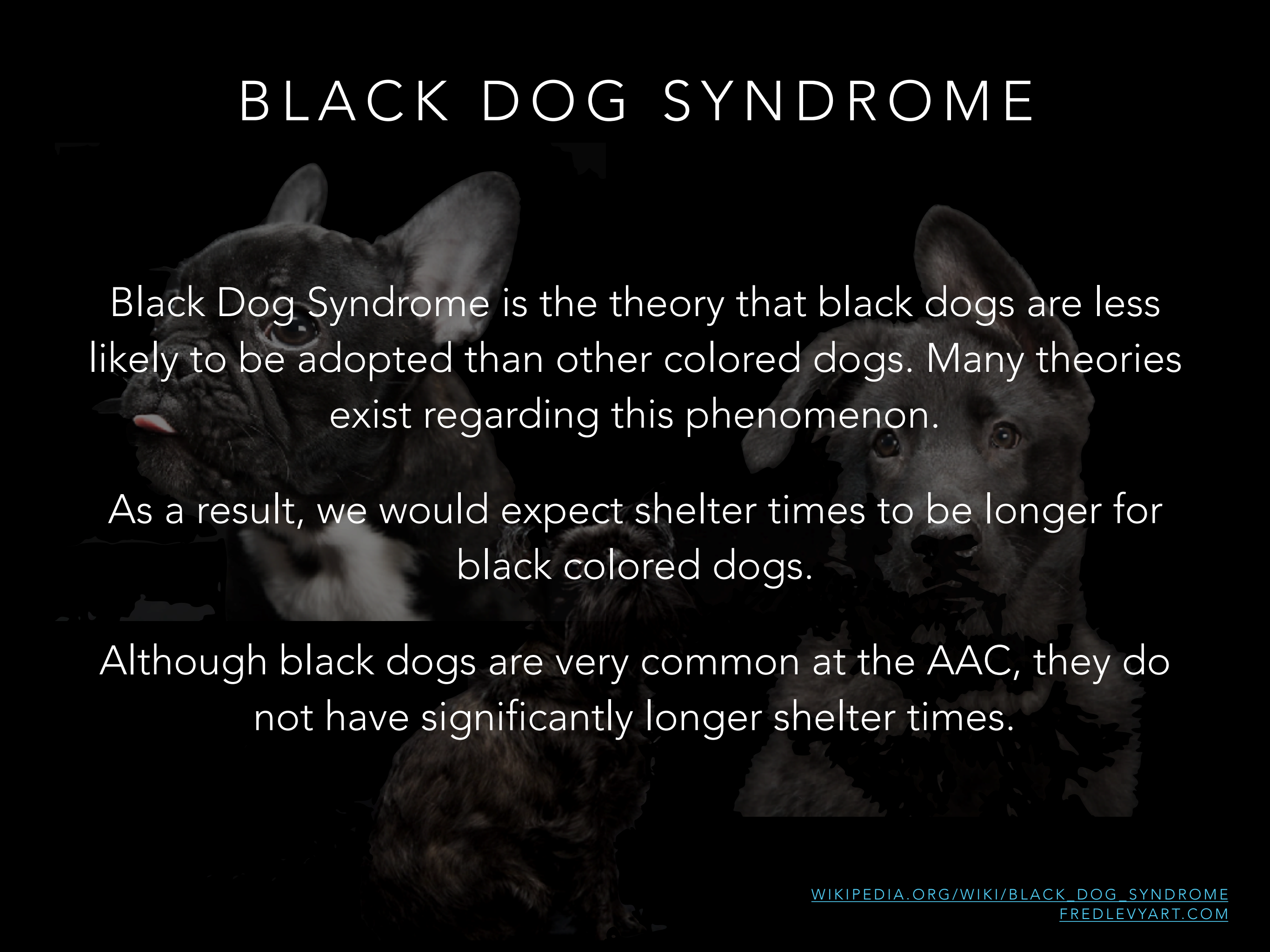


YOU MIGHT NOT BE ABLE TO TEACH AN OLD DOG
NEW TRICKS,
BUT THEY'RE LESS COMMON IN SHELTERS AND
DON'T HAVE LONGER SHELTER TIMES



YOUNGER DOGS LIKELY HAVE HIGHER MEAN SHELTER TIMES
BECAUSE THERE'S MORE OF THEM

BLACK DOG SYNDROME

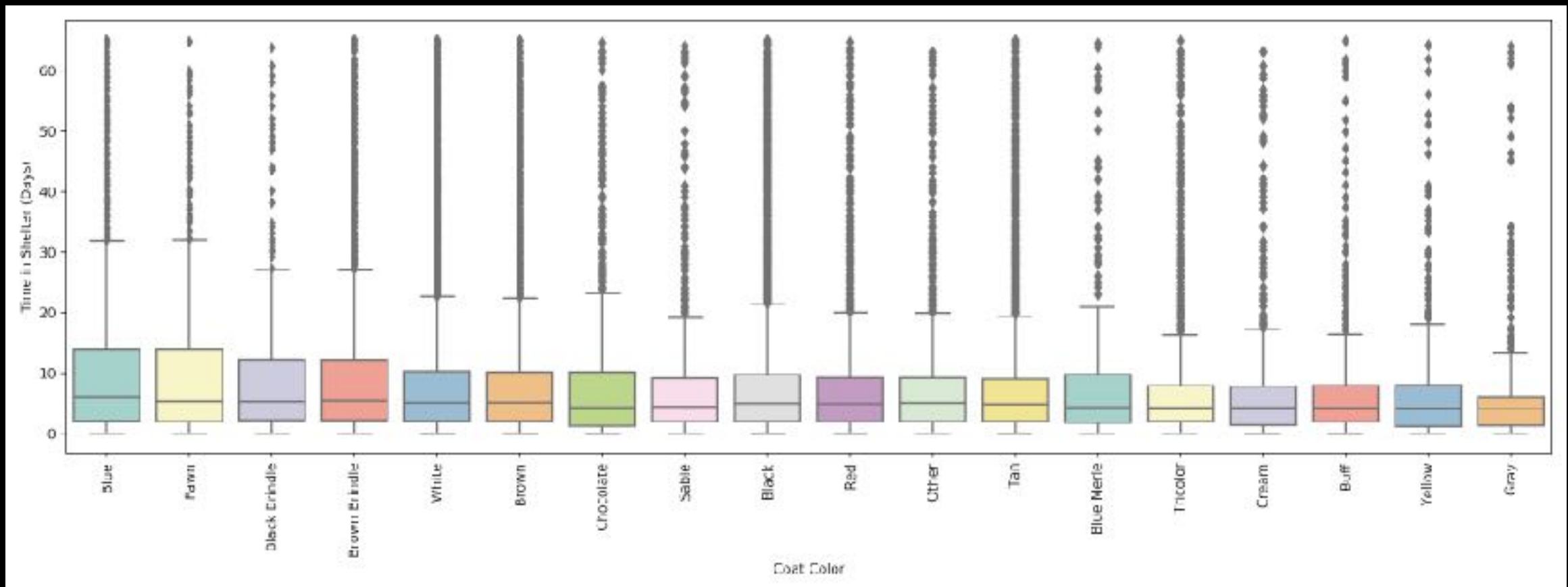


Black Dog Syndrome is the theory that black dogs are less likely to be adopted than other colored dogs. Many theories exist regarding this phenomenon.

As a result, we would expect shelter times to be longer for black colored dogs.

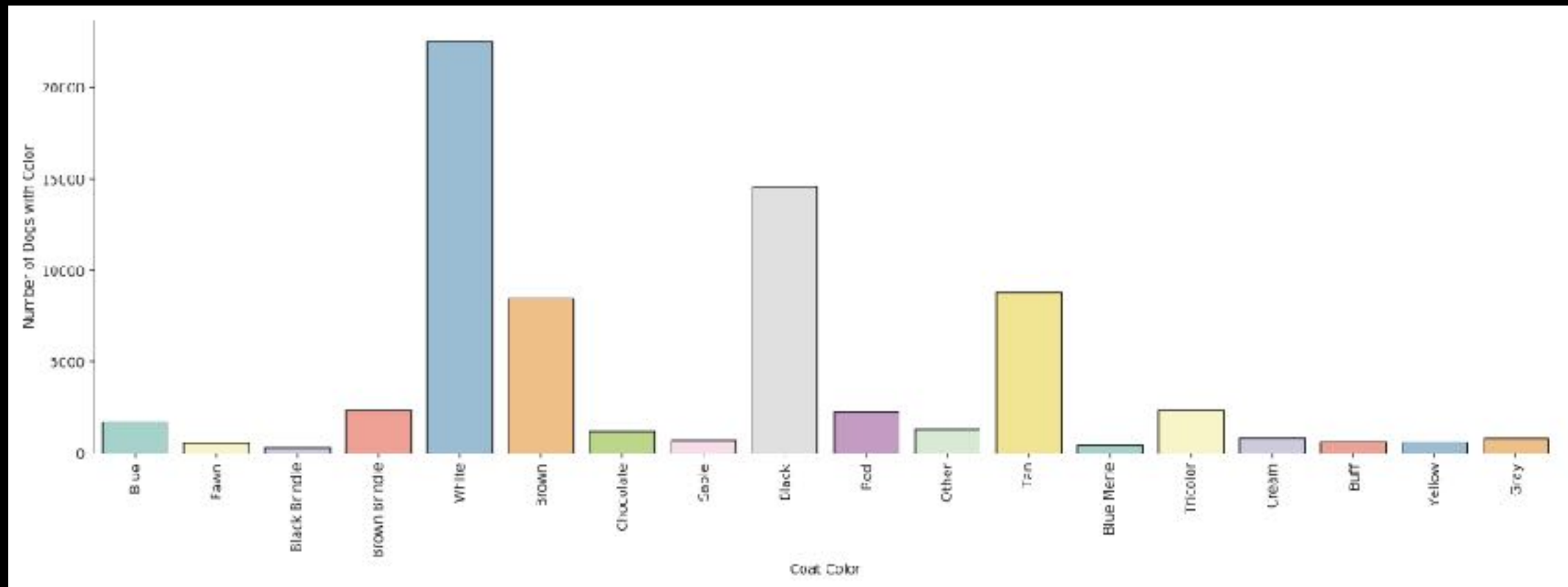
Although black dogs are very common at the AAC, they do not have significantly longer shelter times.

COLOR AFFECTS SHELTER TIME



- Blue, brown brindle, fawn, and white colored dogs have significantly longer shelter times
- Buff, cream, gray, tan, tricolor, and yellow dogs have significantly shorter shelter times

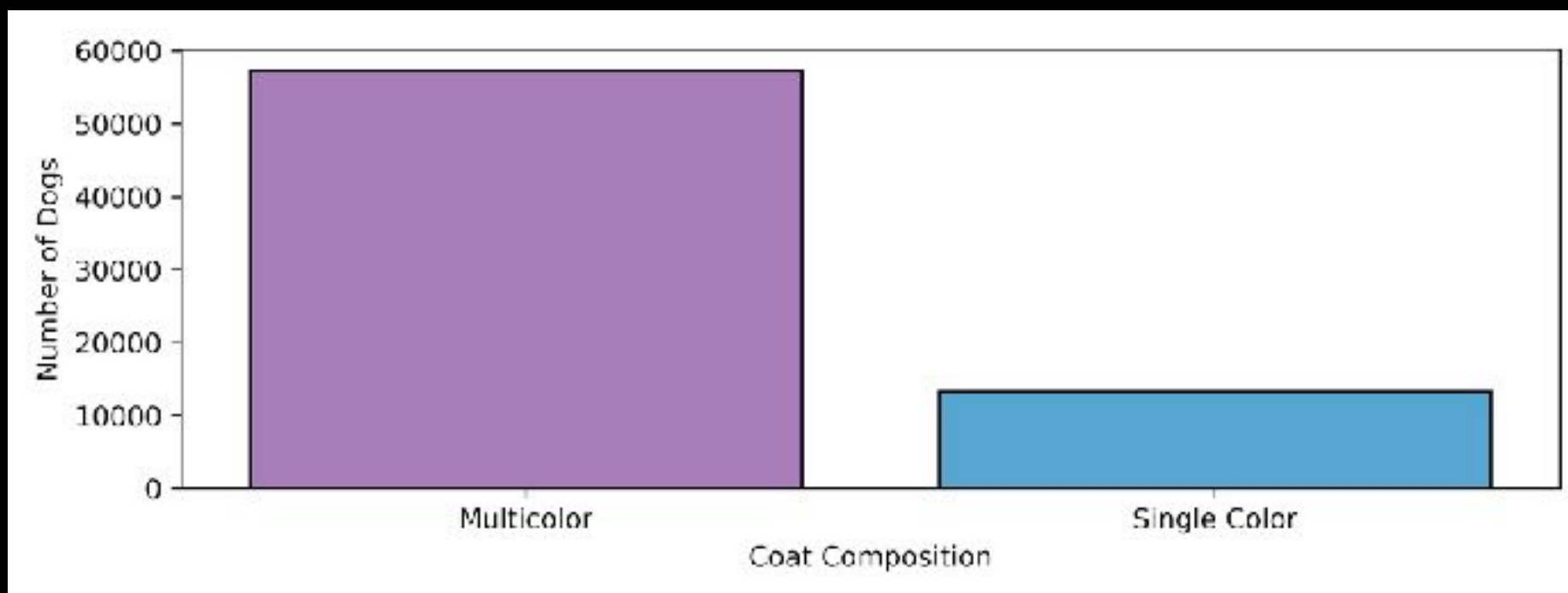
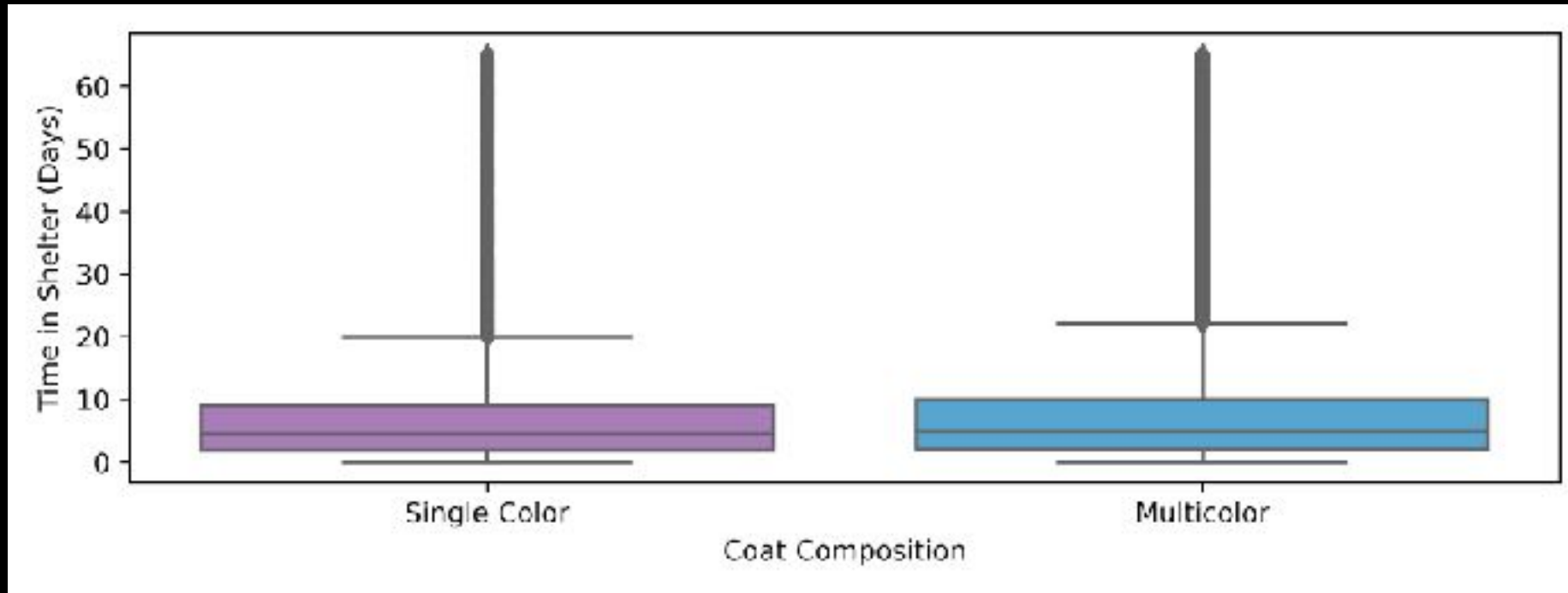
COLOR AFFECTS SHELTER TIME



- White, black, brown, and tan dogs are most common at this shelter.

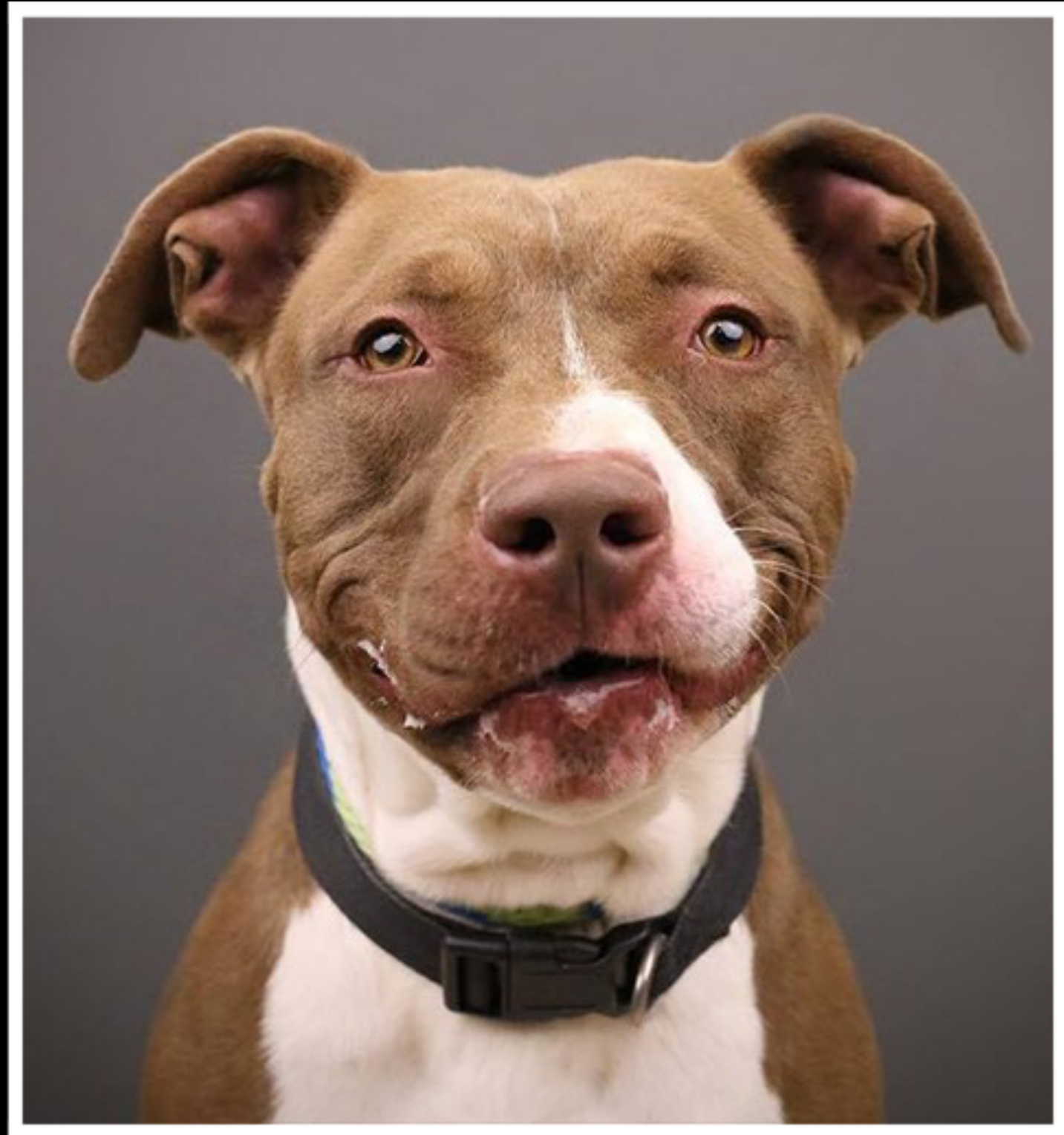
MULTICOLOR DOGS HAVE LONGER SHELTER TIMES

POTENTIAL FOLLOW-UP: DO PEOPLE THINK SINGLE COLOR = PUREBRED?



FOR HIGH-RISK, LONG SHELTER
TIMES [OUTLIERS (5%)]

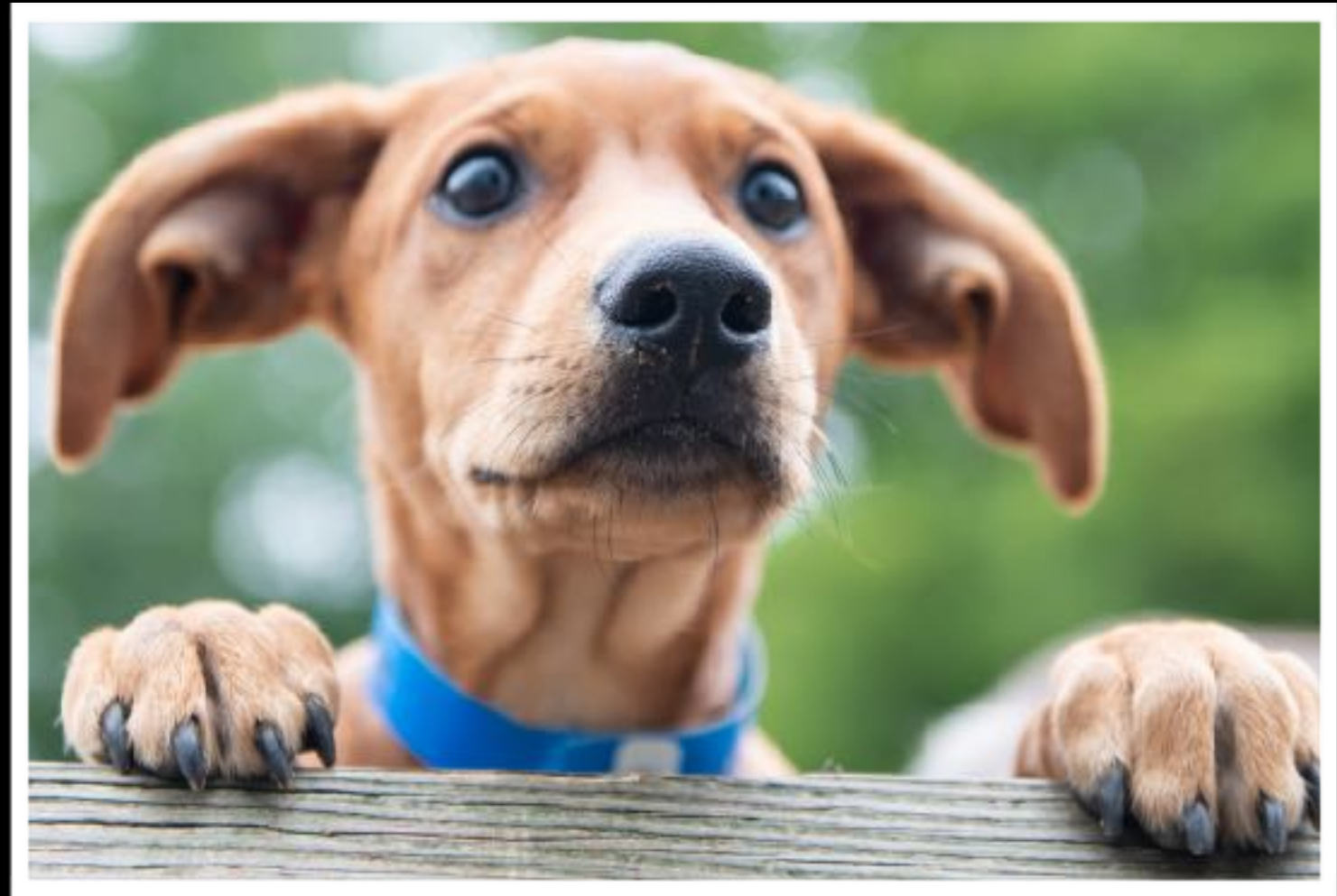
TRENDS IN SHELTER TIMES



[HTTPS://WWW.TODAY.COM/PETS/WHAT-PIT-BULL-IT-S-NOT-ACTUALLY-
DOG-BREED-T118066](https://www.today.com/pets/what-pit-bull-it-s-not-actually-dog-breed-t118066)

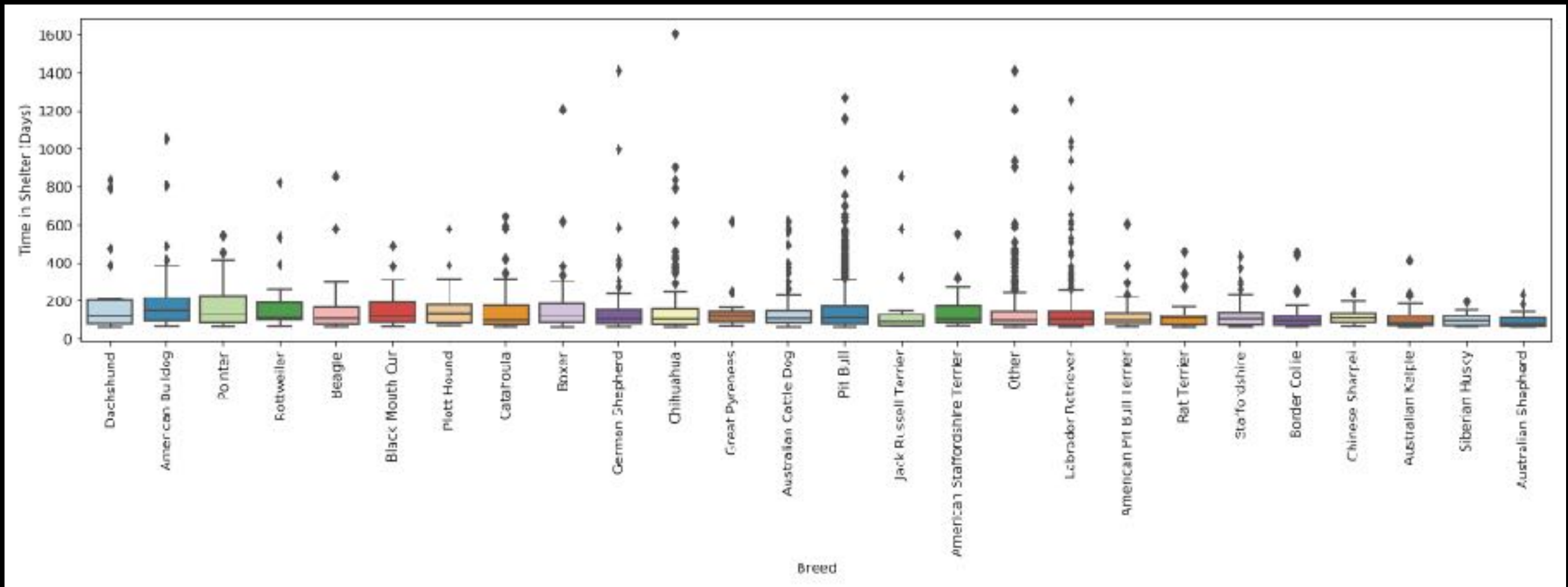
THE OUTLIER GROUP, EXPLAINED

In this analysis, I examine dogs in the top 5th percentile of shelter times. The goal is to identify dogs at a high risk fo having excessively long shelter times.



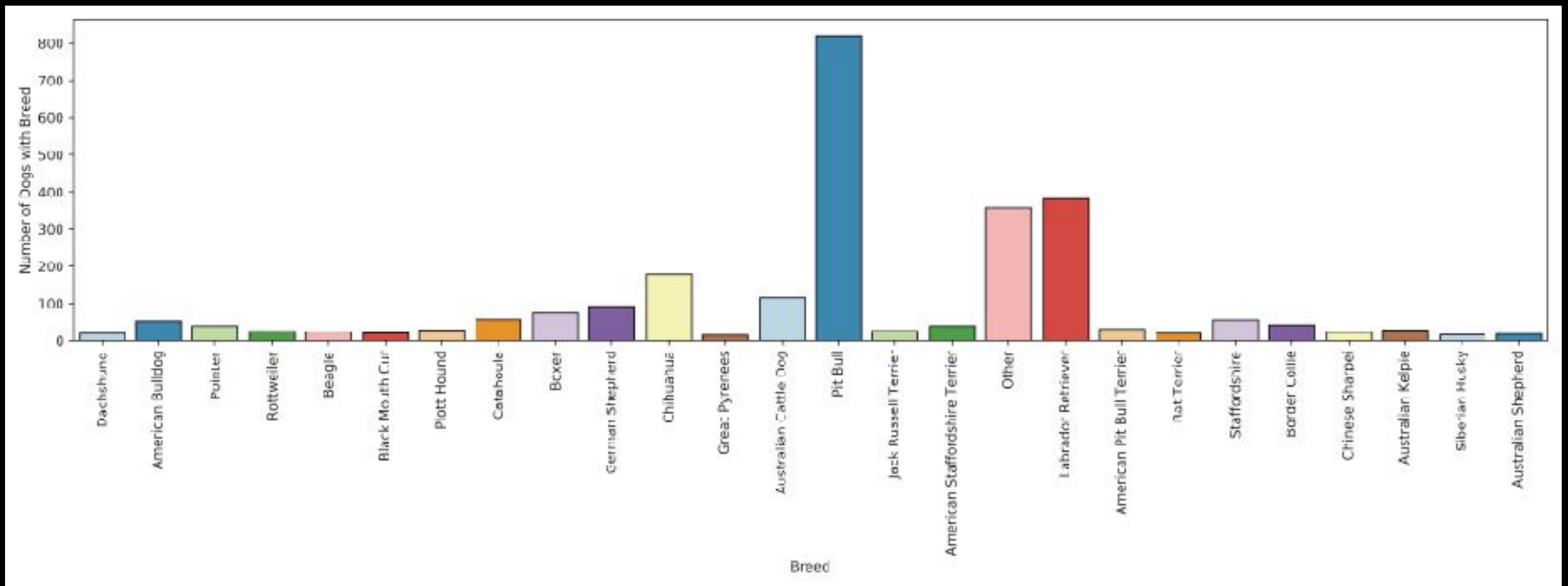
[HTTPS://WWW.MARYSDOGS.ORG](https://www.marysdogs.org)

25 BREEDS AT A HIGH RISK OF HAVING LONG SHELTER TIMES



American Bulldogs have a significantly longer shelter time within this outlier group

PIT BULLS REPRESENT 1/3 OF DOGS WITH LONG SHELTER TIMES



RECOMMENDATIONS: HIGH-RISK BREEDS

Targeted efforts to help certain dog breeds be adopted more quickly could help optimize shelter resources.

- Pit Bulls and American Bulldogs are more likely to have extraordinarily long adoption times.
- Labs, Pit Bulls, and Chihuahuas are the most common shelter breeds.
- Labs, Pit Bulls, Australian Cattle Dogs, Boxers, Catahoulas, Rottweilers, Pointers, Staffordshires, and American Bulldogs are statistically more likely to have longer shelter times.

RECOMMENDATIONS: HIGH-RISK BREEDS

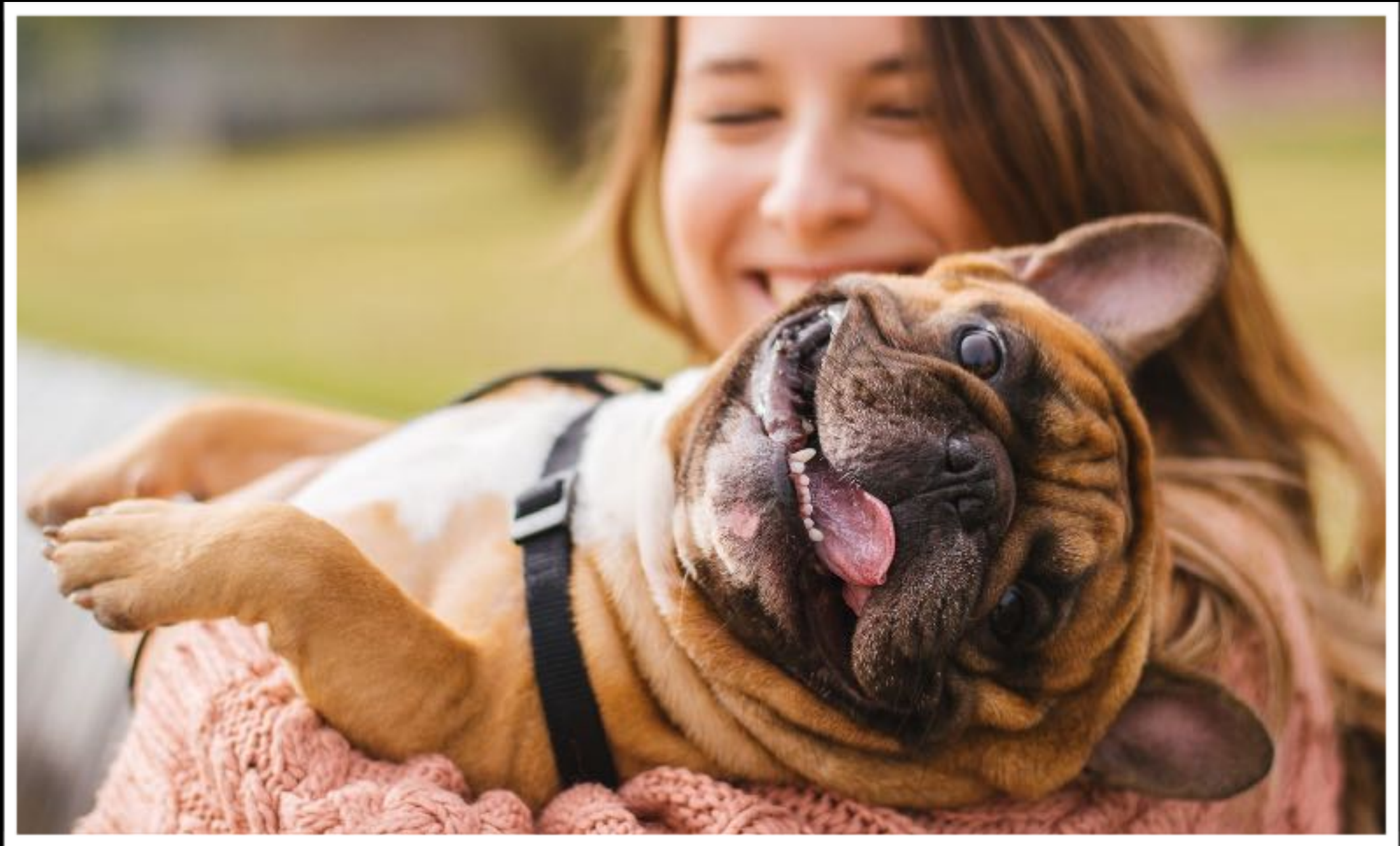
- High-energy dogs have longer adoption times, such as those in the Working, Herding, Sporting, and Miscellaneous groups. Support for adopting a high-energy dog, such as recommendations for exercise and stimulation, might be helpful here.



RECOMMENDATIONS: HIGH-RISK BREEDS

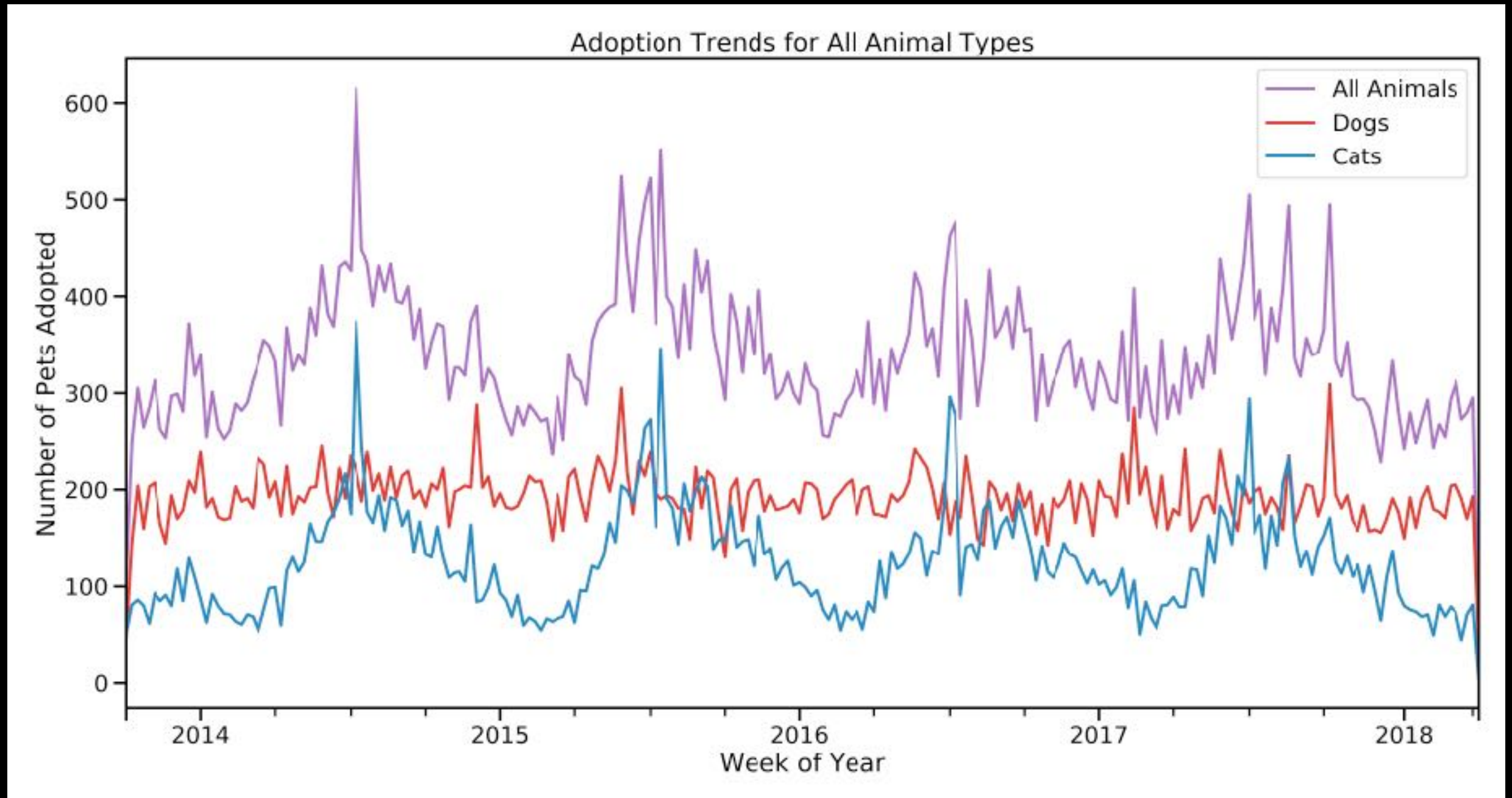
- Mixed breeds are more likely to have long shelter times; however, purebred dogs often have more health issues due to poor breeding practices. Perhaps some targeted messaging here could benefit this group.
- Multicolor dogs have longer shelter times than single colored dogs.

THE BEST TIMES TO BE AVAILABLE FOR ADOPTIONS SHELTER HOURS OF OPERATION

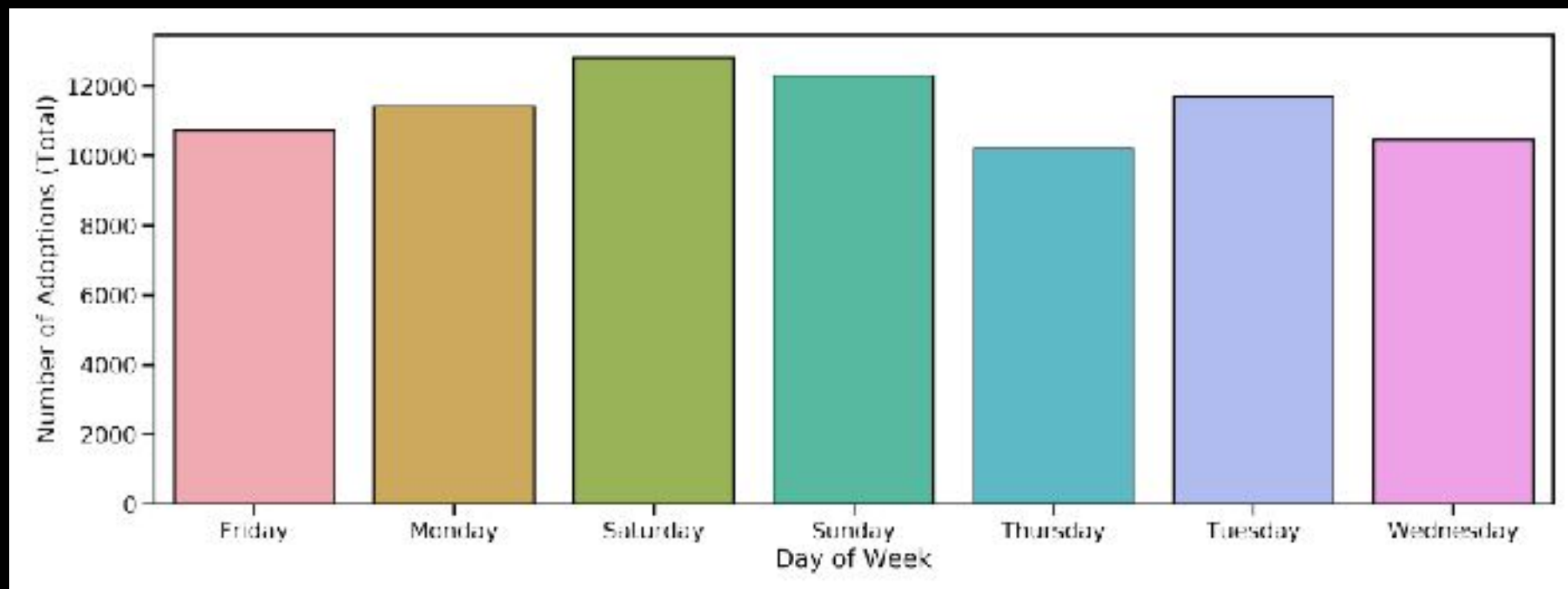
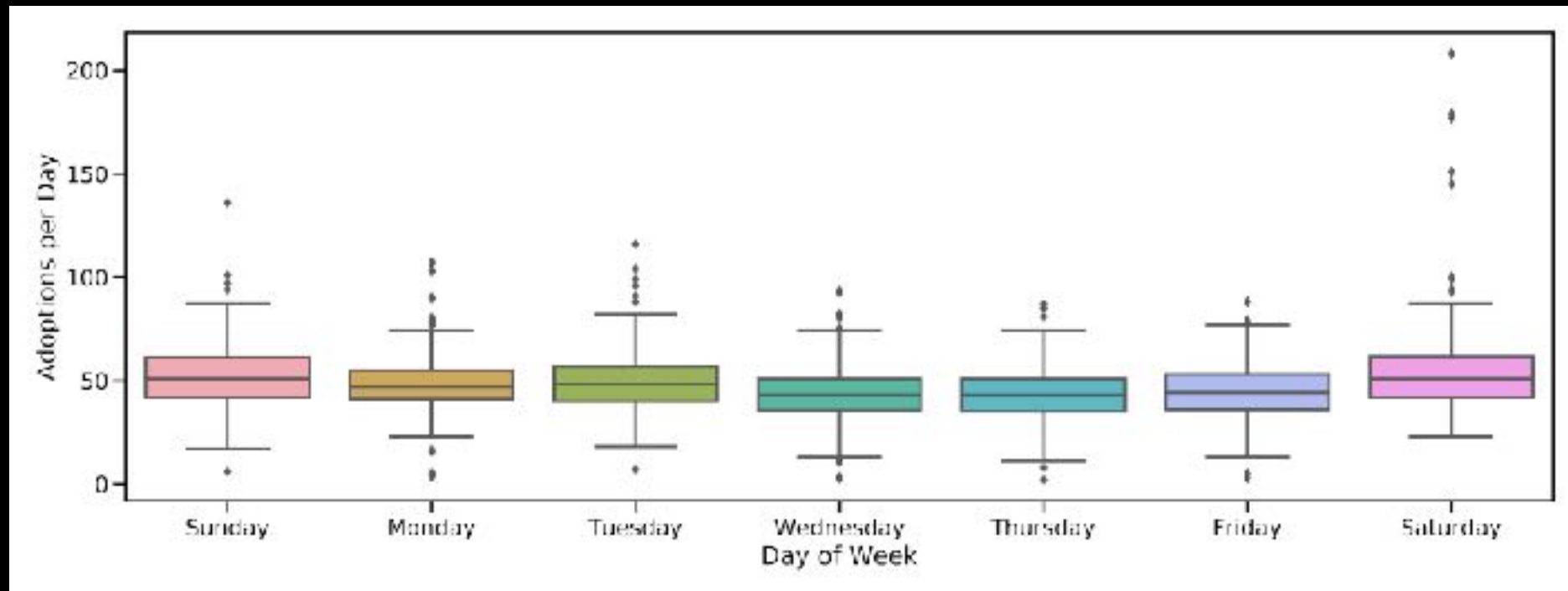


[HTTPS://WWW.HELPGUIDE.ORG/ARTICLES/MENTAL-HEALTH/MOOD-BOOSTING-POWER-OF-DOGS.HTM](https://www.helpguide.org/articles/mental-health/mood-boosting-power-of-dogs.htm)

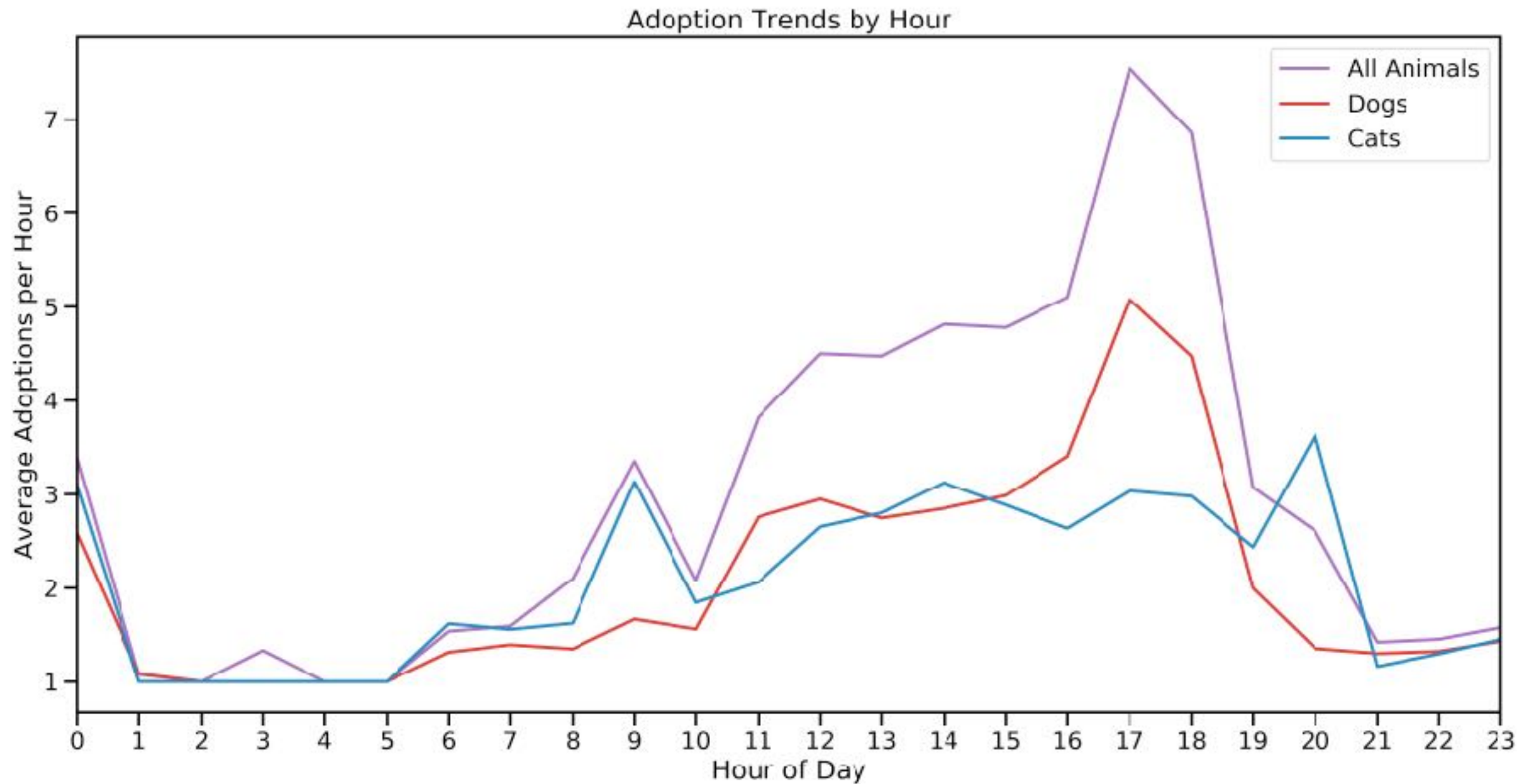
THERE ARE SEASONAL ADOPTION TRENDS FOR CATS, BUT NOT DOGS



WEDNESDAY, THURSDAY, AND FRIDAY HAVE LOWER ADOPTION RATES



ADOPTIONS OFTEN FLANK THE 9-5 WORK DAY



RECOMMENDATIONS: HOURS OF OPERATIONS

Trends in adoption times vary by hour, day of week, and week of year. Scheduling hours of operation and special events around these times could optimize shelter funds.

- Adoption events are likely to be more productive during the summer for cats, but not dogs. In general, cats have longer shelter times than dogs, too, so some cat-specific events might be rewarding for adoption rates.

RECOMMENDATIONS: HOURS OF OPERATIONS

- If needed, reduced hours Wednesday/Thursday are least likely to disrupt current adoption patterns.
- A split business hours schedule of morning and evening operations to facilitate adoptions flanking the standard 9-5 business day could optimize employee time.

SHELTER TIME PREDICTOR

Using Linear Regression, Ridge Regression, Support Vector Regression, and Gradient Boosting, I've developed 4 models that predict shelter times given an animal's intake information.

[SEE MODEL HERE](#)



[HTTPS://WWW.DISCOVERMAGAZINE.COM/TECHNOLOGY/TECHNOLOGY-IS-GIVING-DOGS-THEIR-DAY](https://www.discovermagazine.com/technology/technology-is-giving-dogs-their-day)

DATA ANALYSIS & PRESENTATION BY KATIE RITZ

FULL ANALYSIS

[GITHUB.COM/KRRITZ/ANIMAL-
SHELTER-EXPLORATORY-ANALYSIS](https://github.com/krritz/animal-shelter-exploratory-analysis)

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