Analysis of Dog Breeds and Characteristics Affecting Longevity

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Introduction

Understanding the factors that influence canine longevity is important both for improving pet welfare and for gaining comparative insights into the biology of aging. Domestic dogs (Canis lupus familiaris) are especially valuable in aging research because they possess extensive genetic diversity, share environments with humans, and have lifespans short enough to study longitudinally.
Using breed-related characteristics such as size and weight, this study examines how breed, weight, sex, and reproductive status relate to canine lifespan, with a focus on size and weight.

Data Collection/Cleaning

The data for this study were obtained from the Dog Aging Project (DAP), comprising information on approximately 47,000 dogs. Two primary datasets collected in 2025 were used: the DAP 2023 Dog Overview v1.1 and the DAP 2023 End of Life (EOL) v1.0 datasets.

The Dog Overview dataset provides general demographic and health information, including dog ID, status (alive or deceased), breed, weight class, sex class, and estimated years at death. The EOL dataset contains owner-reported data for deceased dogs, including the primary cause of death. Dog ID was used to link the two datasets for analysis.

Data Analysis

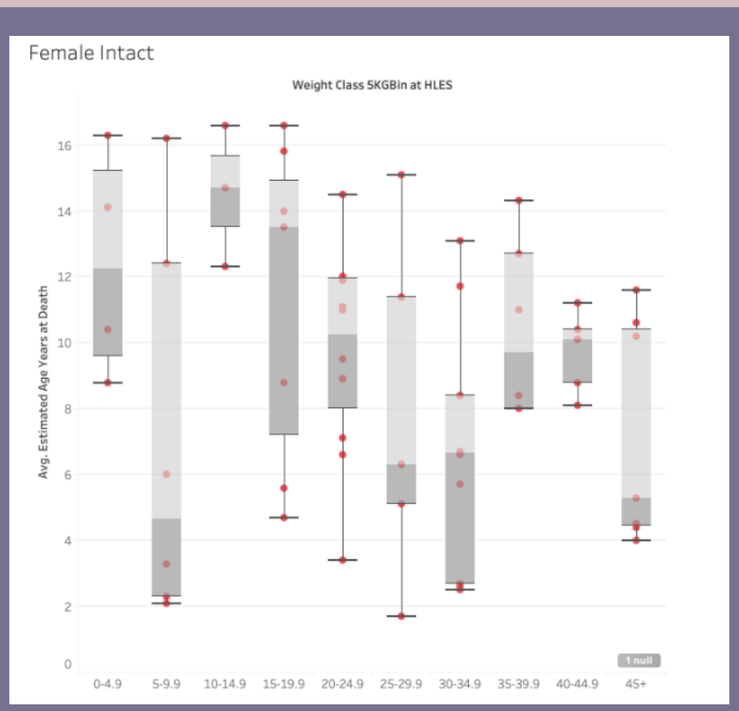
Understanding the factors that influence canine longevity is important both for improving pet welfare and for gaining comparative insights into the biology of aging. Domestic dogs (Canis lupus familiaris) are especially valuable in aging research because they possess extensive genetic diversity, share environments with humans, and have lifespans short enough to study longitudinally. Using breed-related characteristics such as size and weight, this study examines how breed, weight, sex, and reproductive status relate to canine lifespan, with a focus on size and weight.

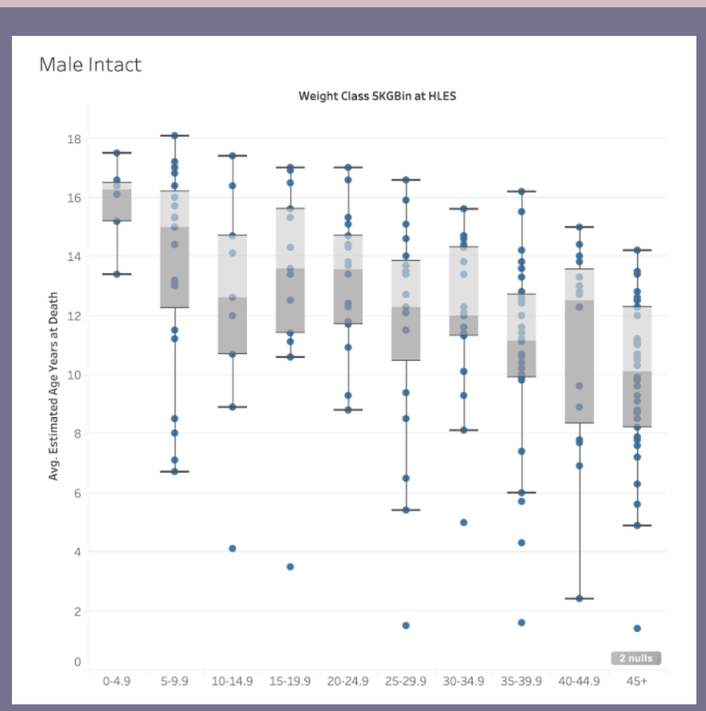
TABLE I. Top 5 Dog Breeds with the Longest Average Lifespan

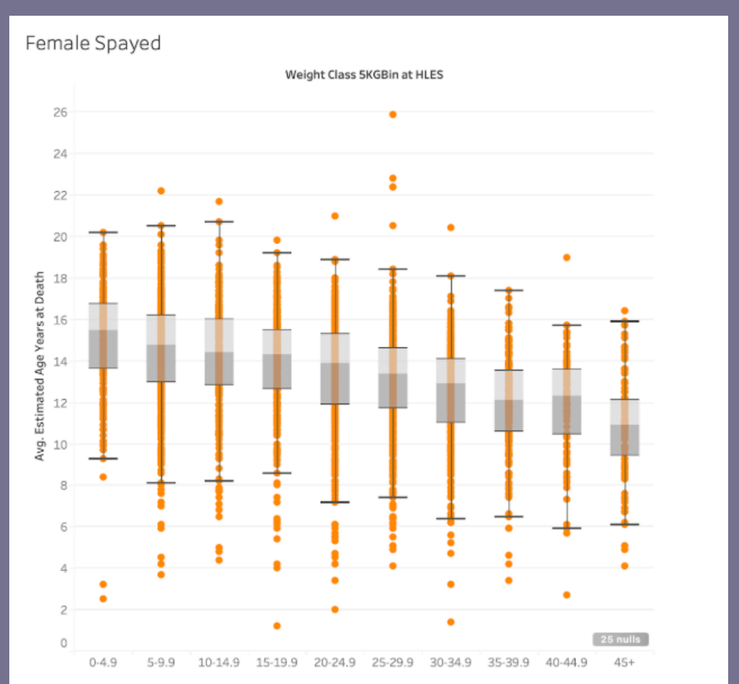
Dog Breed	Average Lifespan		
	Lifespan (Years)	*Count*	*Breed Status*
Miniature Pinscher	15.677	13	Purebred
Lhasa Apso	15.542	12	Purebred
Jack Russell Terrier	15.526	42	Purebred
Dachshund	15.526	101	Purebred
West Highland White Terrier	15.506	35	Purebred

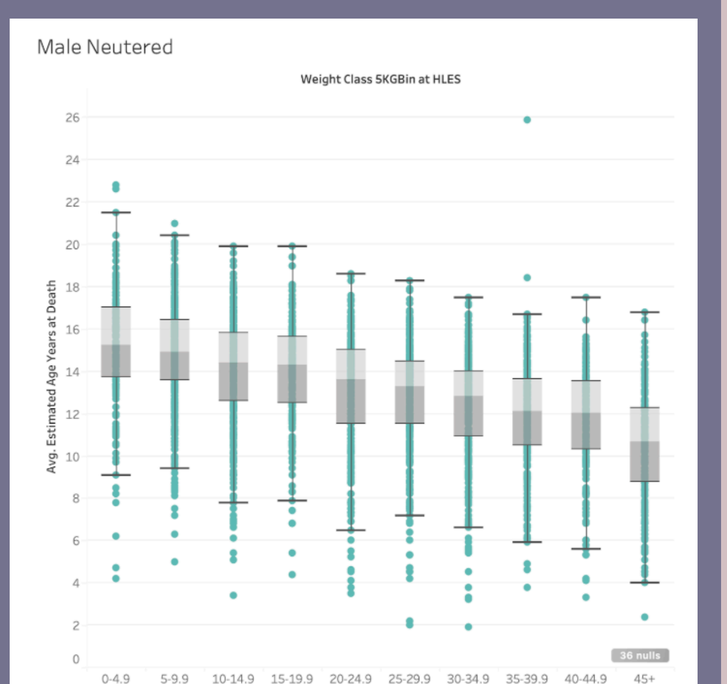
TABLE II. Top 5 Dog Breeds with the Shortest Average Lifespan

Dog Breed	Average Lifespan		
	Lifespan (Years)	*Count*	*Breed Status*
Irish Wolfhound	7.292	14	Purebred
Flat-coated Retriever	8.630	10	Purebred
St. Benard	9.060	15	Purebred
Bernese Mountain Dog	9.100	33	Purebred
Great Dane	9.223	56	Purebred





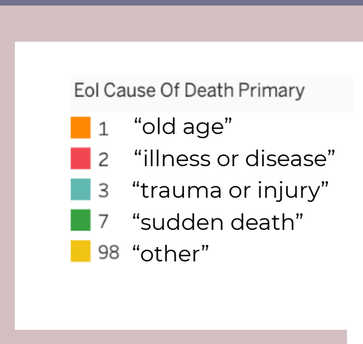


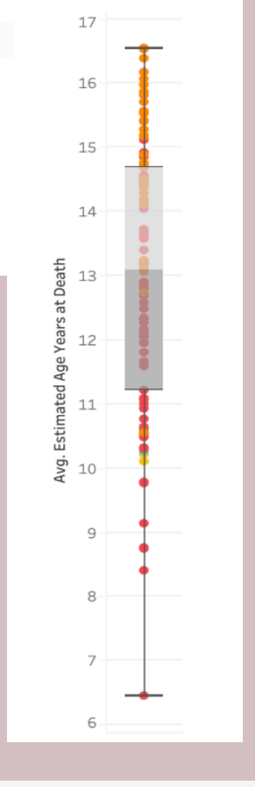


The box plots show weight class versus estimated age at death across reproductive groups (female spayed, female intact, male neutered, male intact). The results show a clear inverse relationship between body weight and longevity, with lighter dogs consistently living longer than heavier dogs across all groups.

There is also variation between reproductive groups, suggesting that sterilization may interact with weight to influence lifespan, although these patterns should be interpreted cautiously due to smaller subgroup sizes. Illness-related mortality appears to be the predominant outcome, indicating that differences in longevity may partly reflect variation in disease susceptibility associated with body size and hormonal exposure.

The box-and-whisker plot shows that most dogs have estimated lifespans between about 11.5 and 14.5 years, with a median of around 13 years. Very few dogs die before 10 years, while some live up to around 16.5–17 years.
Cause-of-death patterns vary by age: deaths attributed to old age are concentrated among longer-lived dogs, trauma is more common at younger ages, and illness occurs across a wide range of ages. Overall, this indicates that mortality risks differ across the lifespan, with different causes becoming more prominent at different stages of life.





Conclusion

The goal of this project was to explore patterns in canine longevity using a combined dataset, with a particular focus on how lifespan varies across breeds, sex classes, and weight categories.
Canine longevity is strongly influenced by body size, with smaller dogs consistently living longer, while reproductive status shows more subtle effects, where sterilized dogs tend to have slightly longer lifespans and may interact with weight in shaping outcomes. Mortality patterns vary across the lifespan, with illness affecting dogs broadly, trauma more common earlier, and age-related causes dominating in longer-lived dogs.
Together, body size, reproductive status, and age-dependent mortality risks work in combination to influence overall lifespan in dogs.

Future Work & QR

For future work, this project could be expanded by incorporating additional variables available in the Dog Aging Project (DAP) dataset. In subsequent analysis (Big Data 2), focus will be placed on examining how water and food sources may influence canine health.
This allows for a more comprehensive understanding of the complex interactions that contribute to canine health and longevity.

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