



Acknowledgements

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Lifestyle risks for healthy aging in a dog population

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Background

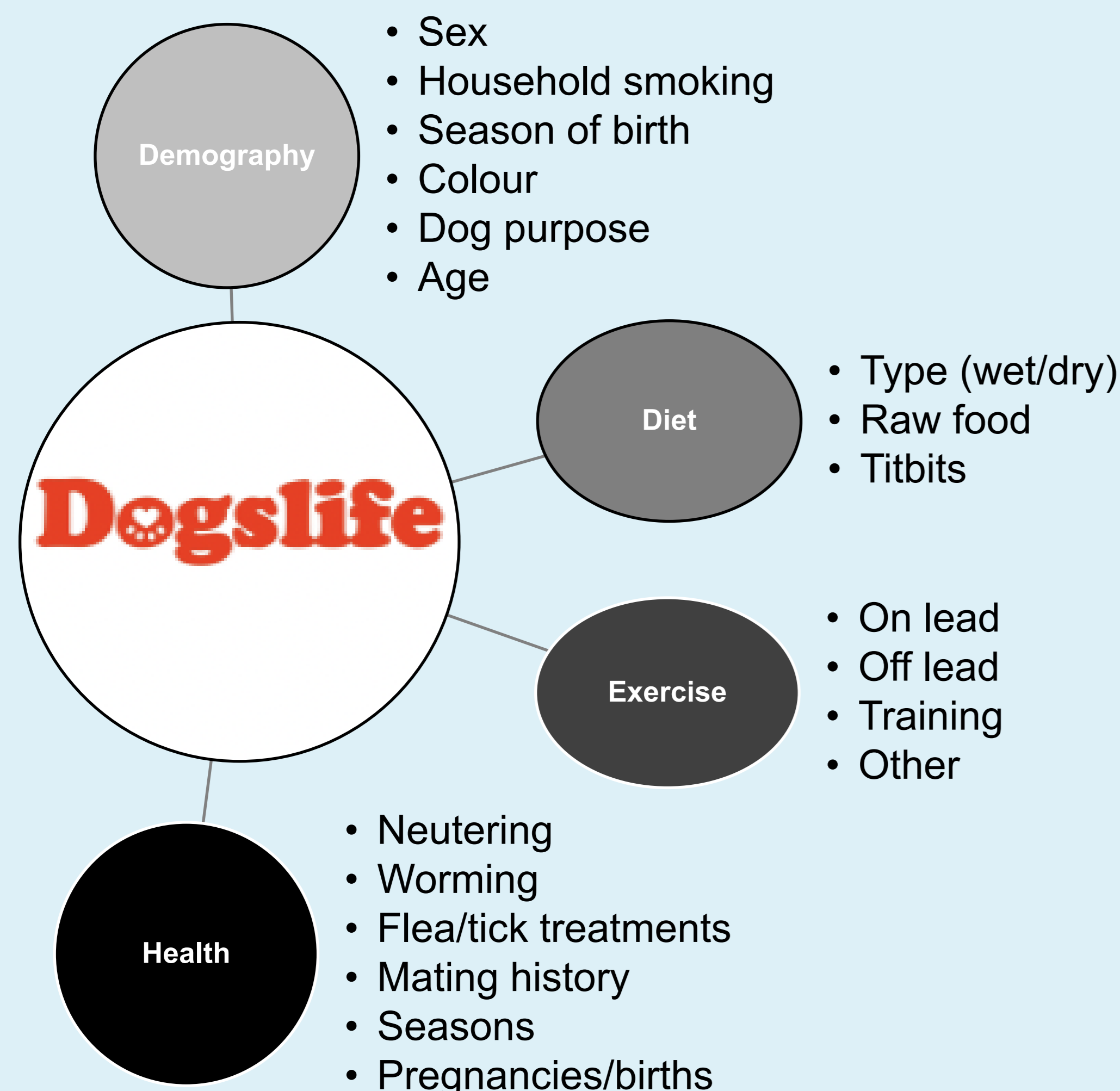
- Human studies have reported associations between lifestyle risks including demography, diet, exercise and health factors and all-cause mortality¹⁻⁵
- In dogs, lifestyle associations with healthy aging are poorly understood
- Reported association between sex and coat-colour and longevity in Labrador retrievers did not control for potential lifestyle and health confounders⁶
- Dogslife is the first, large-scale (national) longitudinal study of canine health
- Study launched in 2010 and collects information on the lifestyle, health and welfare of a cohort of Labrador retrievers who are registered with the UK Kennel Club via online questionnaires and ceased ownership reports (CORs), where death may be recorded⁷⁻⁸

Aims

- To identify survival modelling methods suitable for complex Dogslife data
- To use these methods to detect lifestyle risks for all-cause mortality in the cohort
- To provide dog owners and veterinarians with advice regarding healthy aging in dogs

Methods

- Cleaned Dogslife data from 62218 questionnaires and 697 CORs from 6046 dogs
- Collected between July 2010 and November 2022
- Directed acyclic graphs used to identify covariates to be included (see below)



- For 358 (51.36%) of CORs, the date of dog status (dead/alive) was not exact, so dates were predicted from a linear regression model fit to known dates
- Kaplan-Meier survival curves plotted to visualise data
- Royston and Parmar flexible parametric models fitted
- All analysis performed in R version 4.2.2

Conclusions

- Associations found between various groups and mortality:
 - Household smoking and increased risk
 - Neutering, breeding, parasite treatments, raw feeding, titbit feeding, walking on the lead/off the lead and decreased risk
- Implications for canine health likely to affect dog owners, breeders and veterinarians
- Future work could investigate specific causes of mortality

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Results

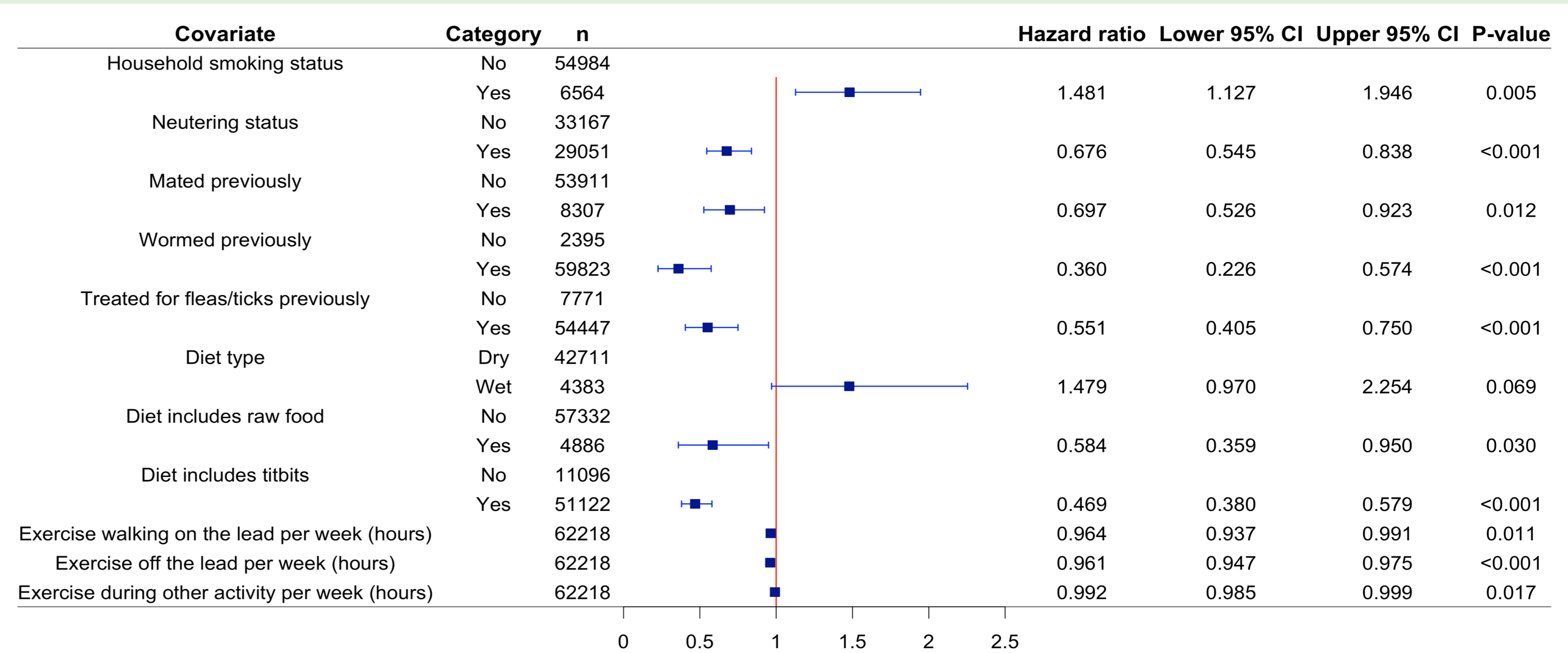


Figure 1: Royston and Parmar flexible parametric survival model of Dogslife dogs (N = 6046)

Covariates shown here had a P-value < 0.1. Model was also adjusted for dog age at start, dog colour, sex, BMI percentile, season of birth, purpose (working/assistance/showing), mixed diet and other types of exercise.

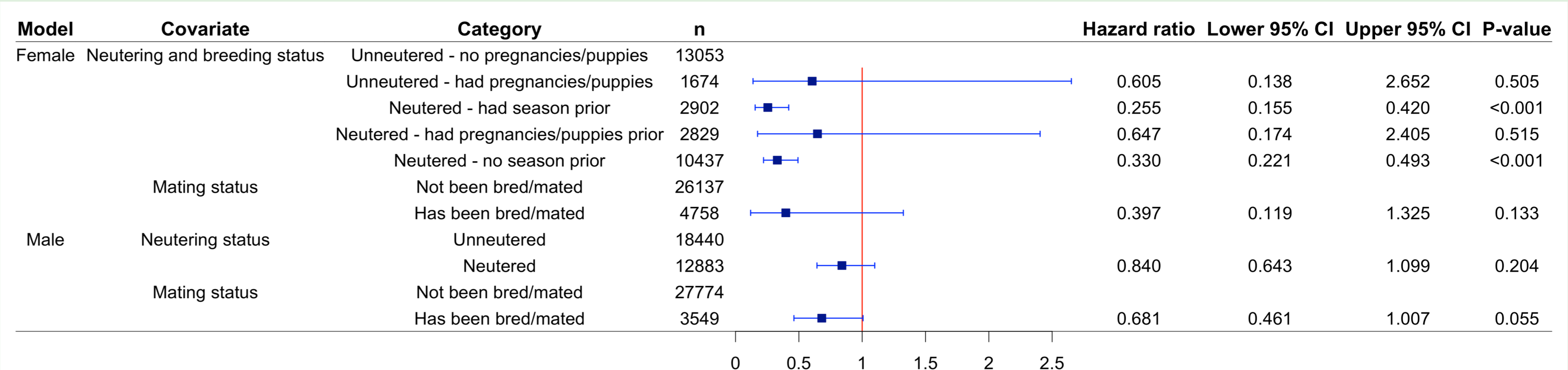


Figure 2: Royston and Parmar flexible parametric survival models of female (N = 2857) and male (N = 3190) Dogslife dogs

Covariates shown relate to breeding and neutering status. Model was also adjusted for dog age at start, dog colour, BMI percentile, season of birth, household smoking status, purpose (working/assistance/showing), worming, flea/tick treatments, diet and exercise.

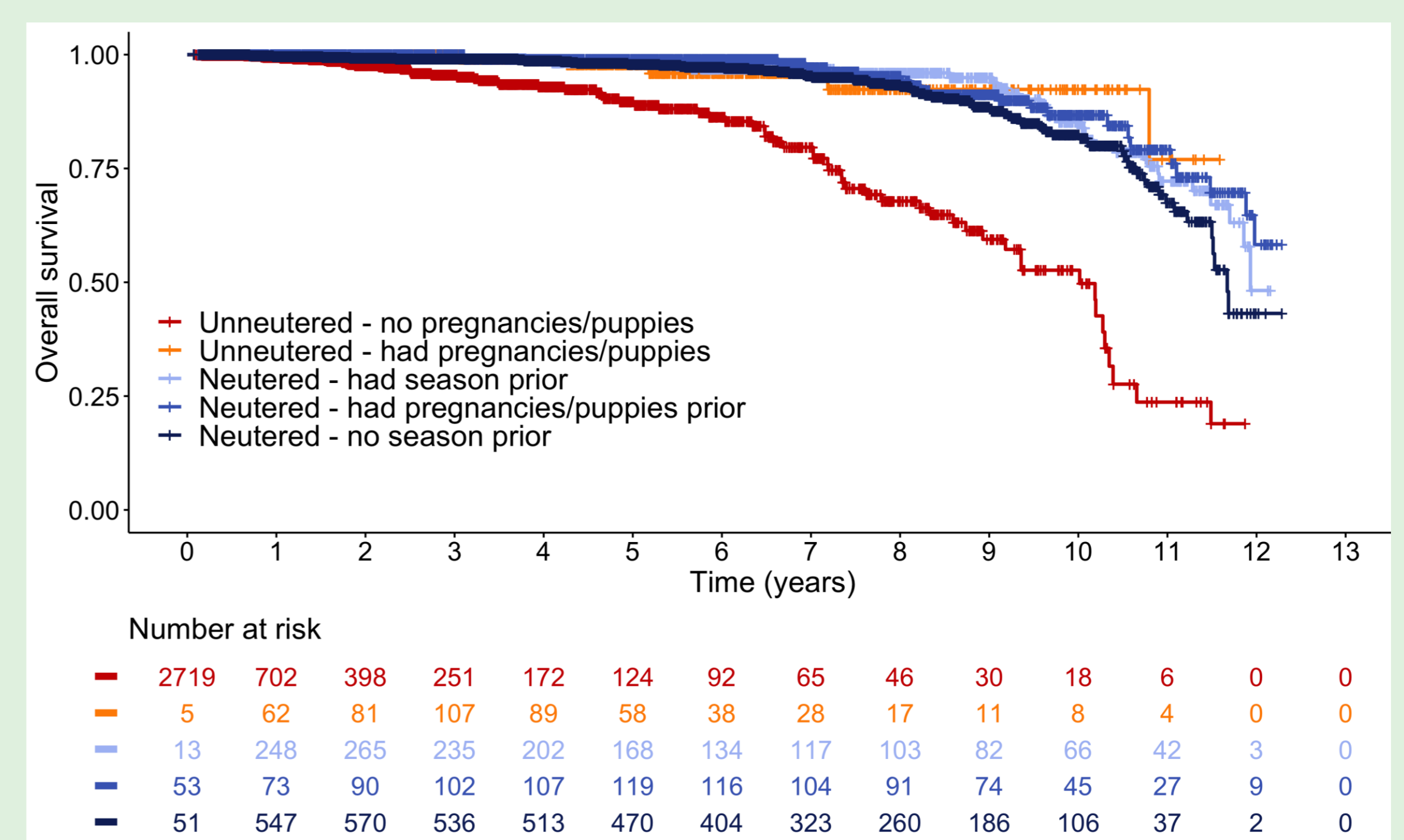


Figure 3: Kaplan-Meier survival curves of female Dogslife dogs (N = 2857) by neutering and breeding status

Time (years)	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Unneutered - no pregnancies/puppies	2719	702	398	251	172	124	92	65	46	30	18	6	0	0
Unneutered - had pregnancies/puppies	5	62	81	107	89	58	38	28	17	11	8	4	0	0
Neutered - had season prior	13	248	265	235	202	168	134	117	103	82	66	42	3	0
Neutered - had pregnancies/puppies prior	53	73	90	102	107	119	116	104	91	74	45	27	9	0
Neutered - no season prior	51	547	570	536	513	470	404	323	260	186	106	37	2	0