

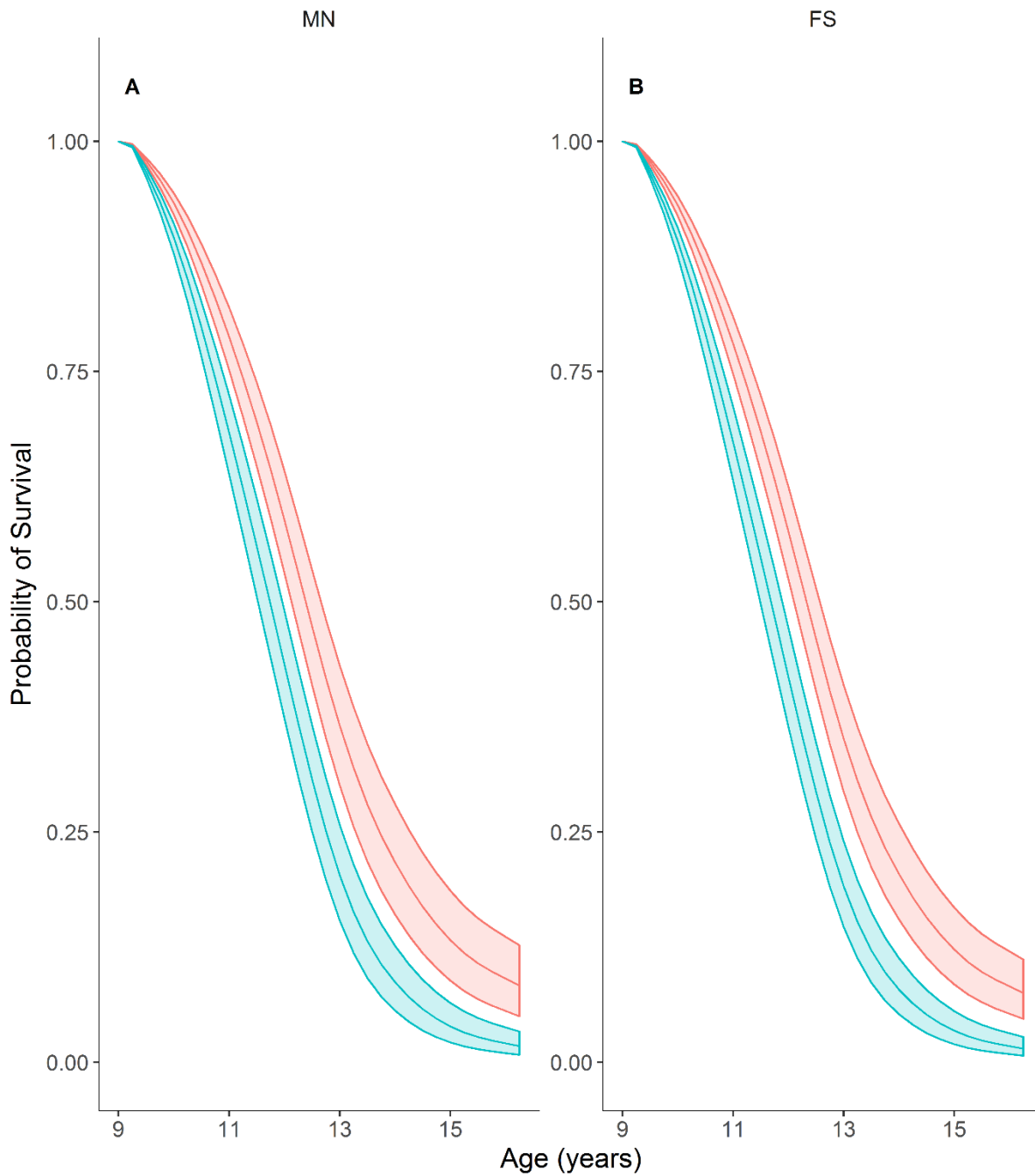
Supplementary Table S1. Changes in imbalance from Coarsened Exact Matching.

Breed	L1 Unmatched	L1 Matched	L1 Change
American cocker spaniel	0.913	0.325	0.589
Beagle	0.921	0.275	0.645
Boxer	0.88	0.381	0.499
Chihuahua	0.832	0.232	0.6
Dachshund	0.898	0.263	0.635
German shepherd	0.919	0.368	0.551
Golden retriever	0.919	0.365	0.554
Labrador retriever	0.902	0.342	0.56
Pit bull	0.894	0.34	0.554
Pomeranian	0.888	0.309	0.579
Shih tzu	0.849	0.218	0.631
Yorkshire terrier	0.821	0.238	0.583

The ‘L1 norm’ measures distance between multi-variate histograms, and is used to assess changes in imbalance from applying the CEM methodology.²¹ The treatment and control groups are first divided into k bins, and the difference between the proportion of treated observations in each bin and the proportion of control observations in each bin is then calculated. Completely imperfect balance is defined as $L1=1$ and perfect balance defined as $L1=0$.²¹ The L1 distance is shown for 12 breeds, before (unmatched) and after (matched) matching. The change in L1 distance (L1 change) due to matching is also shown.

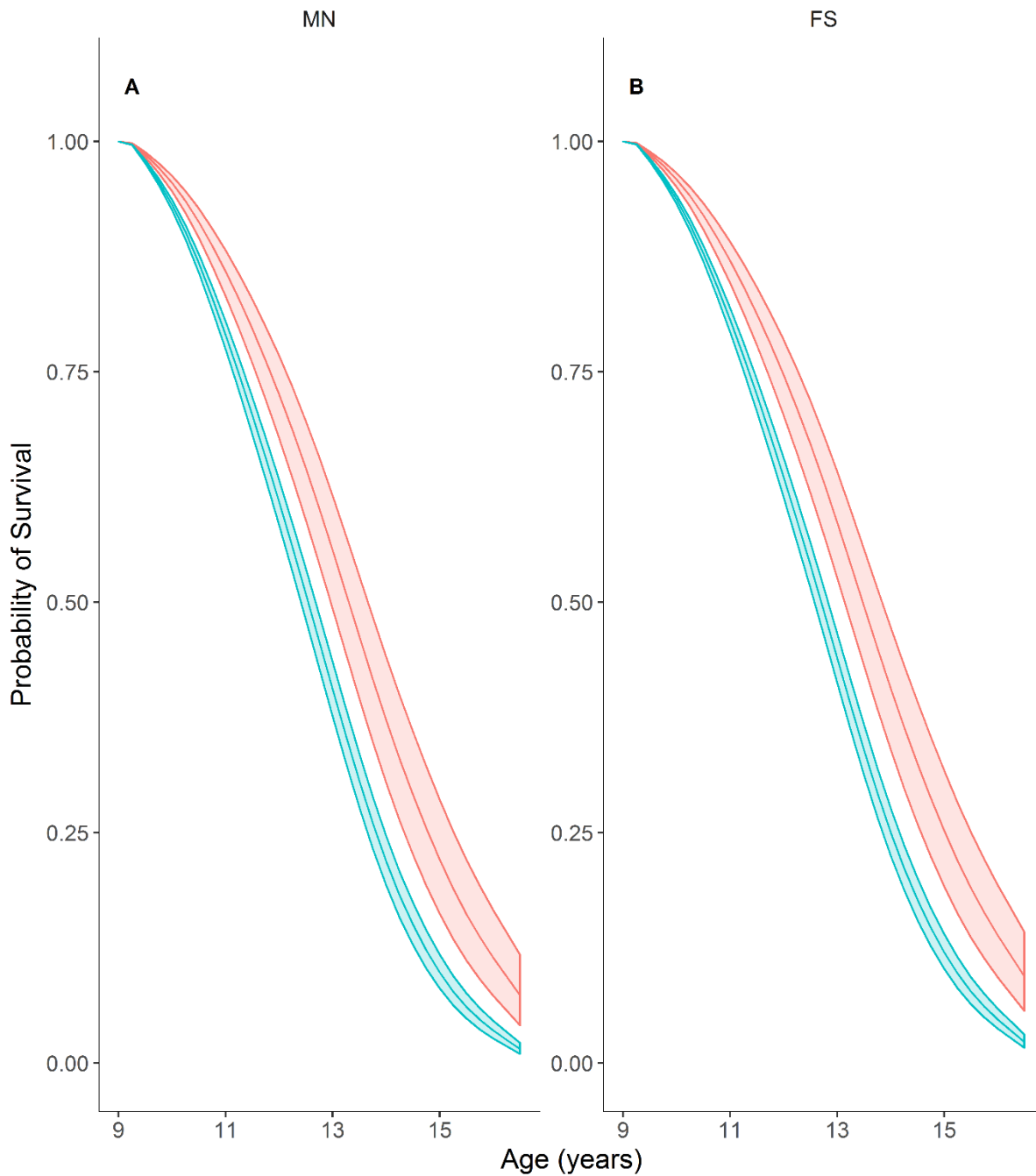
Supplementary Figure S1. Survival probability models for male neutered (a) and female spayed (b)

Boxer dogs. Middle lines depict the probability of survival for a dog at 7.5y age in 2003 (assuming survival to at least 9.5 years), with the upper and lower lines depicting 99.79 % confidence intervals. The survival of dogs in the normal body condition group is shown in blue, whilst that of the overweight group is shown in red.

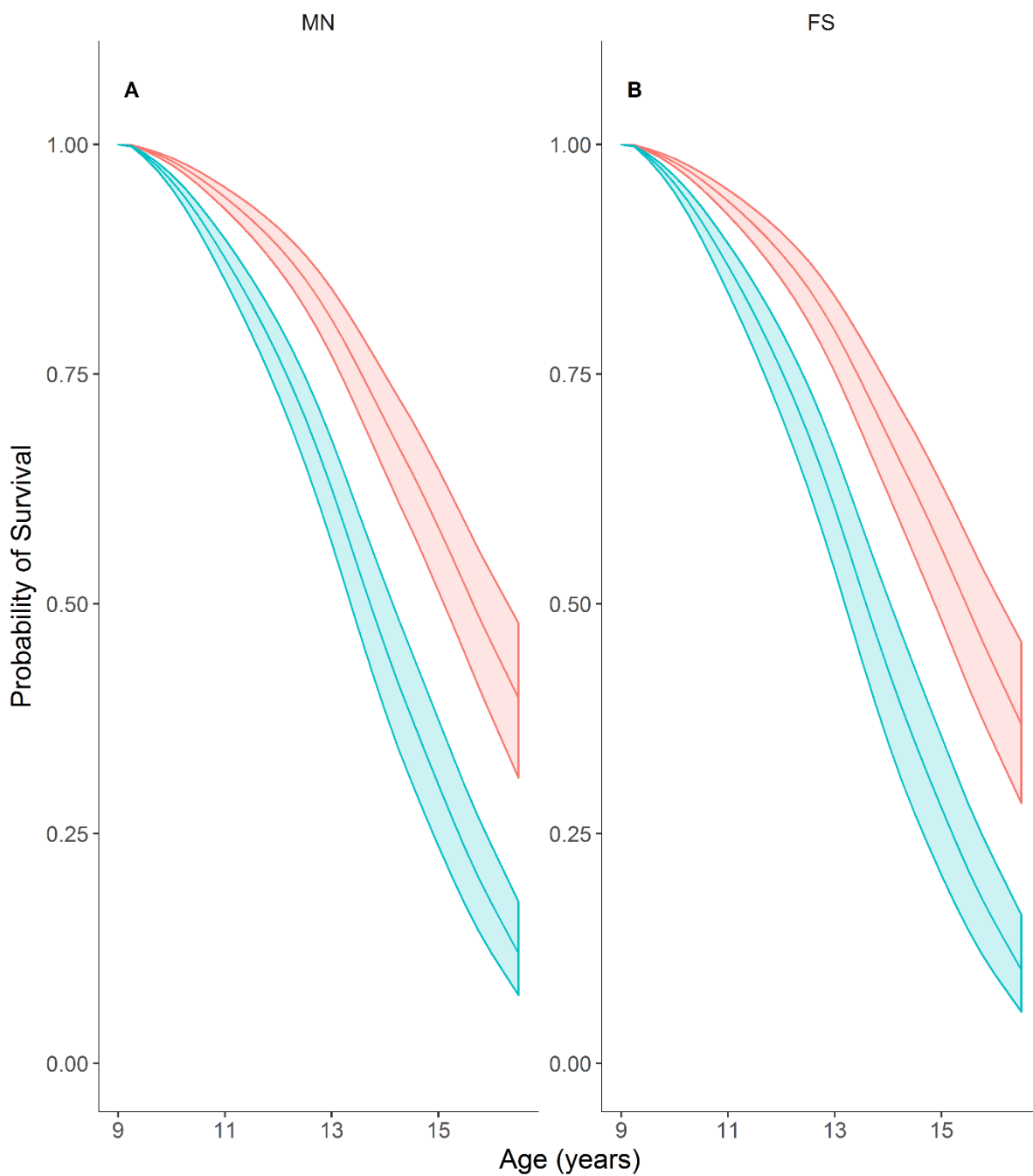


Supplementary Figure S2. Survival probability models for male neutered (a) and female spayed (b)

Golden retriever dogs. Middle lines depict the probability of survival for a dog at 7.5y age in 2003 (assuming survival to at least 9.5 years), with the upper and lower lines depicting 99.79 % confidence intervals. The survival of dogs in the normal body condition group is shown in blue, whilst that of the overweight group is shown in red.

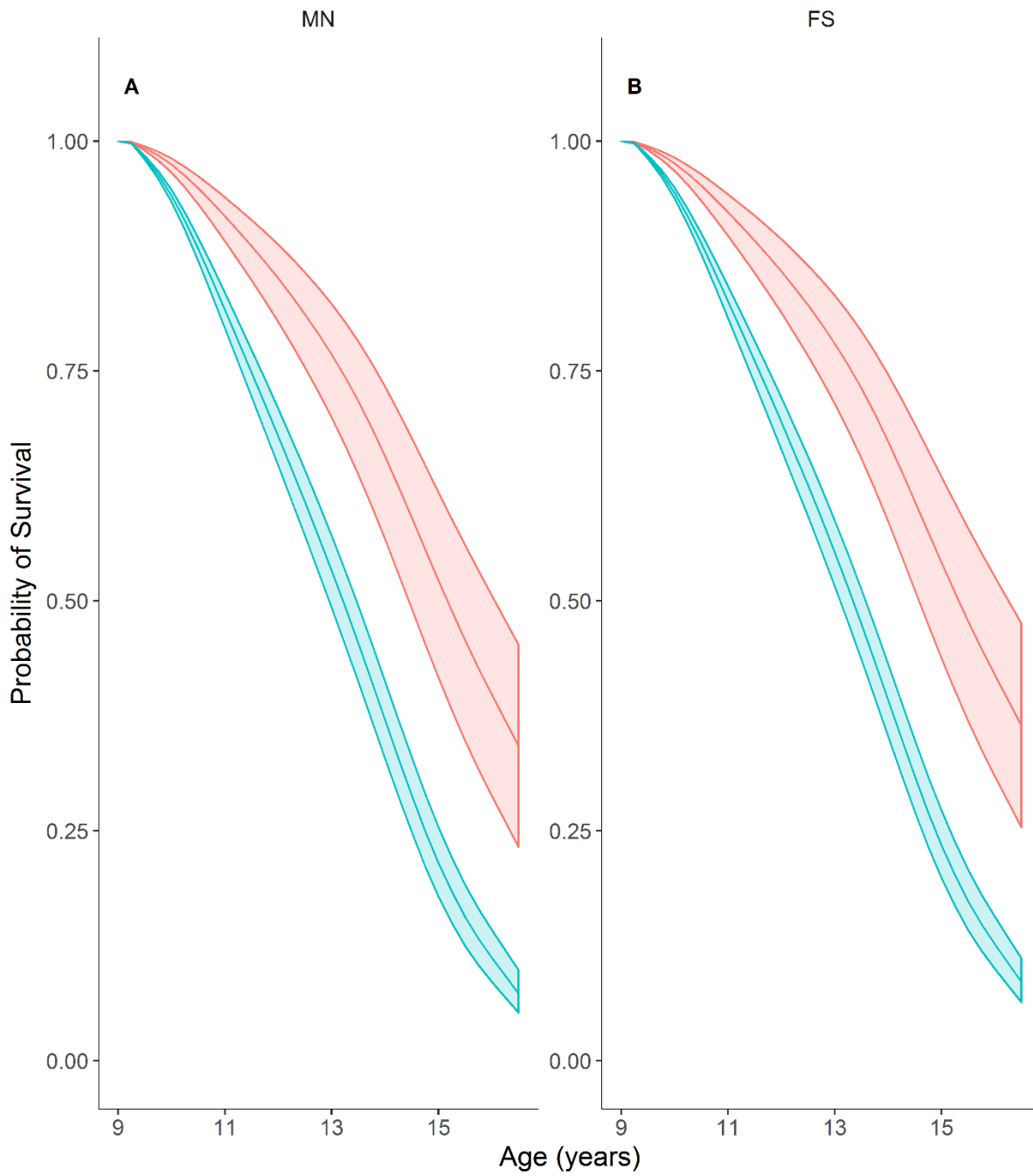


Supplementary Figure S3. Survival probability models for male neutered (a) and female spayed (b) Pomeranian dogs. Middle lines depict the probability of survival for a dog at 7.5y age in 2003 (assuming survival to at least 9.5 years), with the upper and lower lines depicting 99.79 % confidence intervals. The survival of dogs in the normal body condition group is shown in blue, whilst that of the overweight group is shown in red.



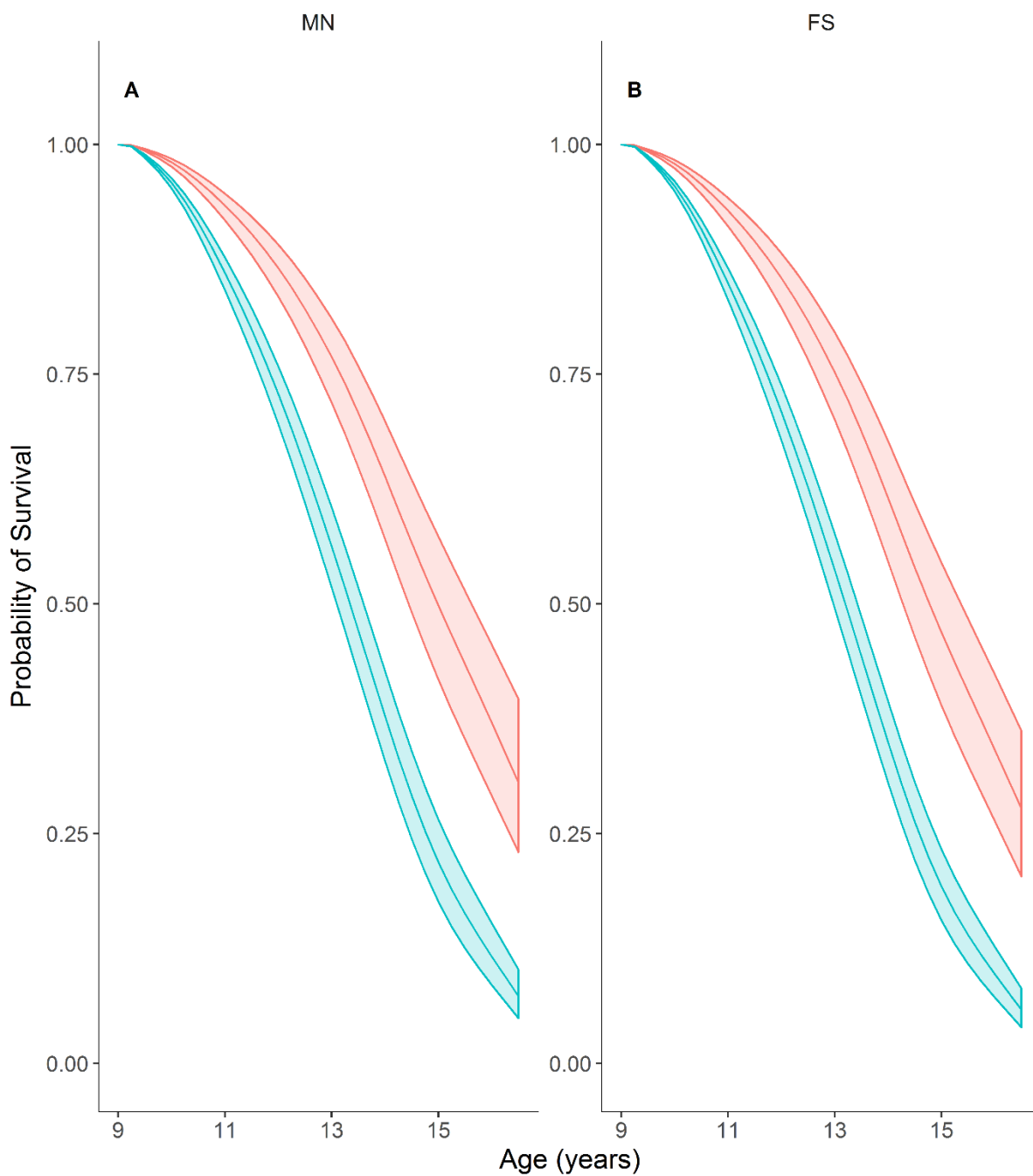
Supplementary Figure S4. Survival probability models for male neutered (a) and female spayed (b)

Beagle dogs. Middle lines depict the probability of survival for a dog at 7.5y age in 2003 (assuming survival to at least 9.5 years), with the upper and lower lines depicting 99.79 % confidence intervals. The survival of dogs in the normal body condition group is shown in blue, whilst that of the overweight group is shown in red.

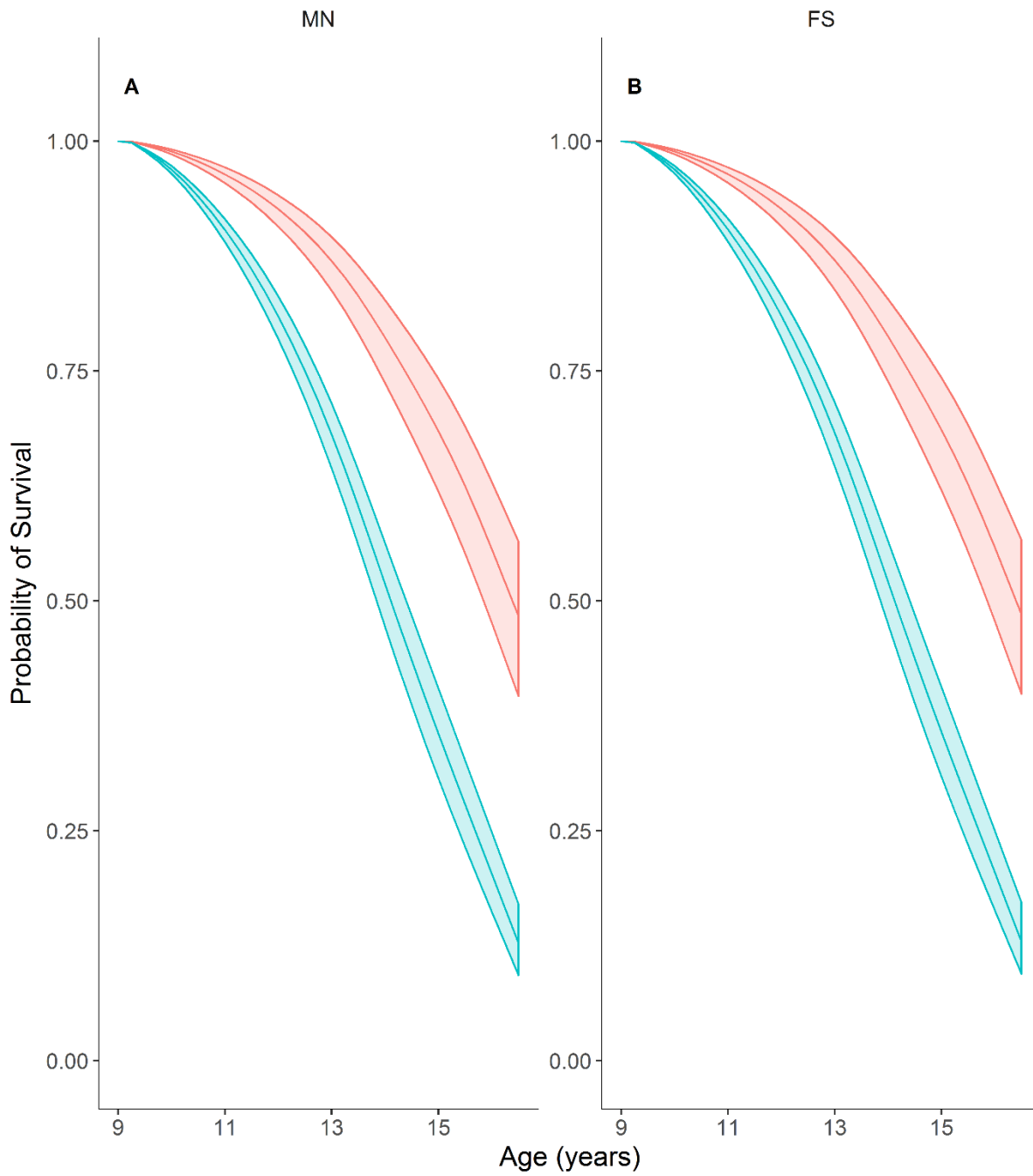


Supplementary Figure S5. Survival probability models for male neutered (a) and female spayed (b)

American cocker spaniel dogs. Middle lines depict the probability of survival for a dog at 7.5y age in 2003 (assuming survival to at least 9.5 years), with the upper and lower lines depicting 99.79 % confidence intervals. The survival of dogs in the normal body condition group is shown in blue, whilst that of the overweight group is shown in red.

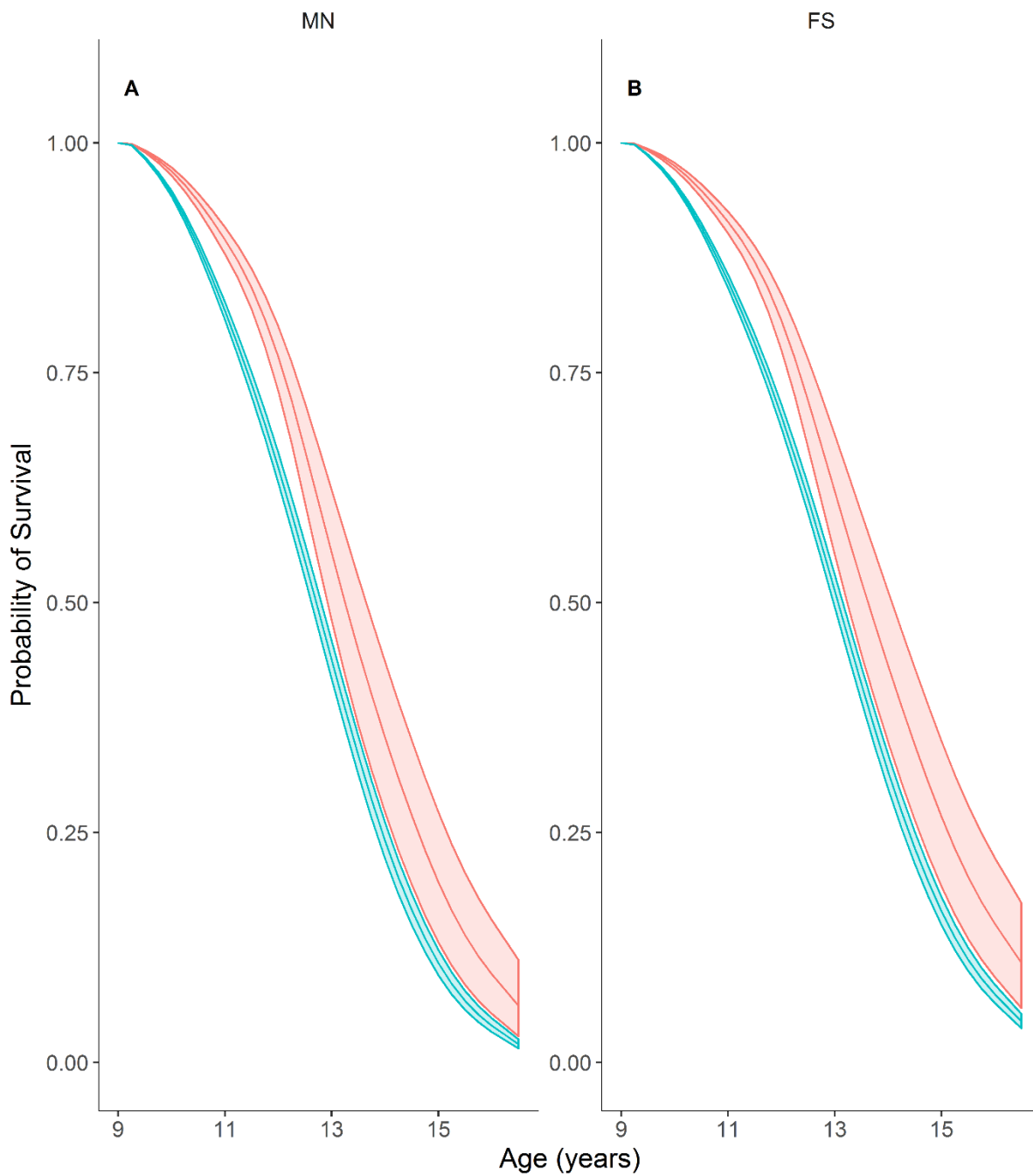


Supplementary Figure S6. Survival probability models for male neutered (a) and female spayed (b) Dachshund dogs. Middle lines depict the probability of survival for a dog at 7.5y age in 2003 (assuming survival to at least 9.5 years), with the upper and lower lines depicting 99.79 % confidence intervals. The survival of dogs in the normal body condition group is shown in blue, whilst that of the overweight group is shown in red.



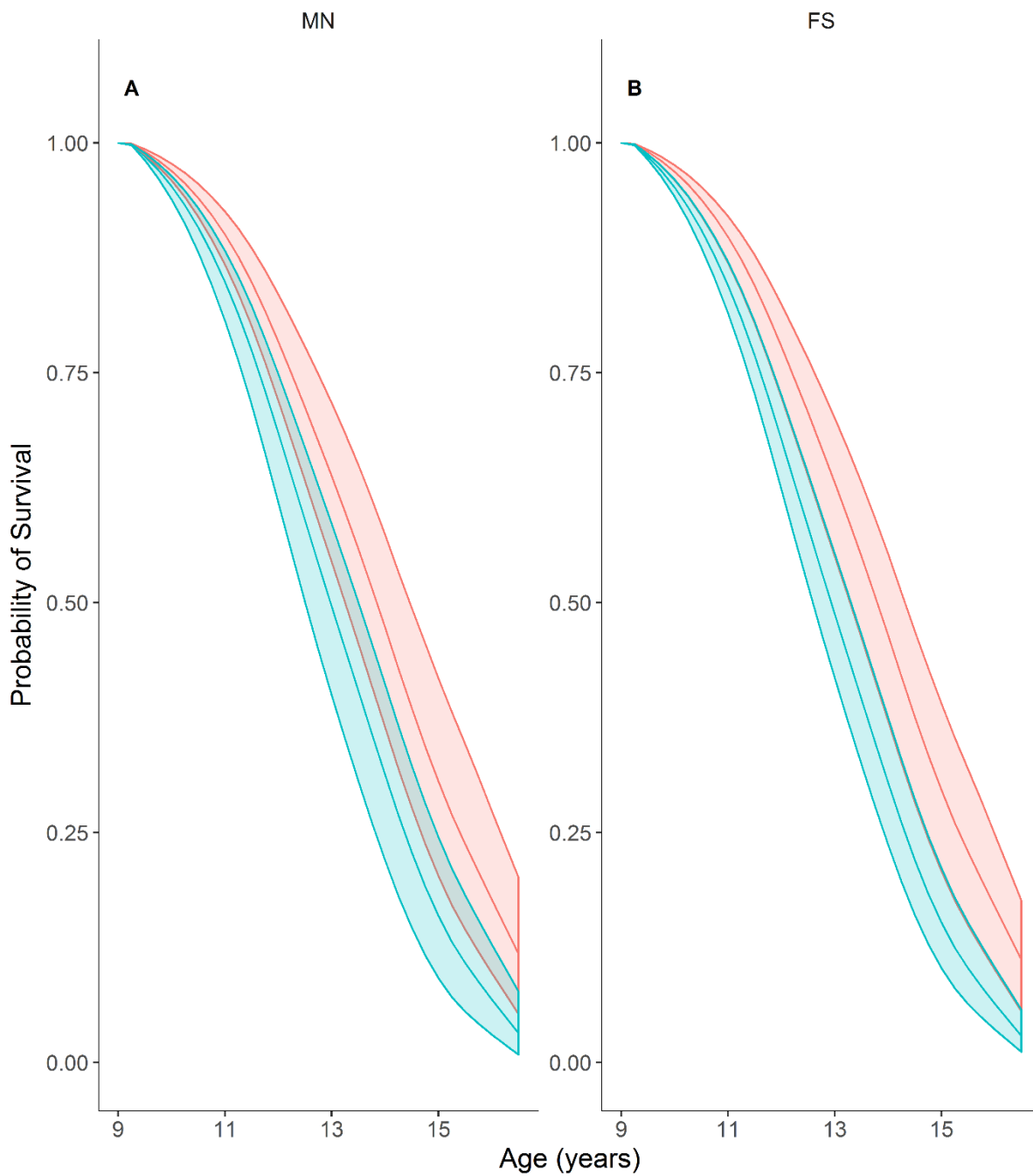
Supplementary Figure S7. Survival probability models for male neutered (a) and female spayed (b)

Labrador retriever dogs. Middle lines depict the probability of survival for a dog at 7.5y age in 2003 (assuming survival to at least 9.5 years), with the upper and lower lines depicting 99.79 % confidence intervals. The survival of dogs in the normal body condition group is shown in blue, whilst that of the overweight group is shown in red.



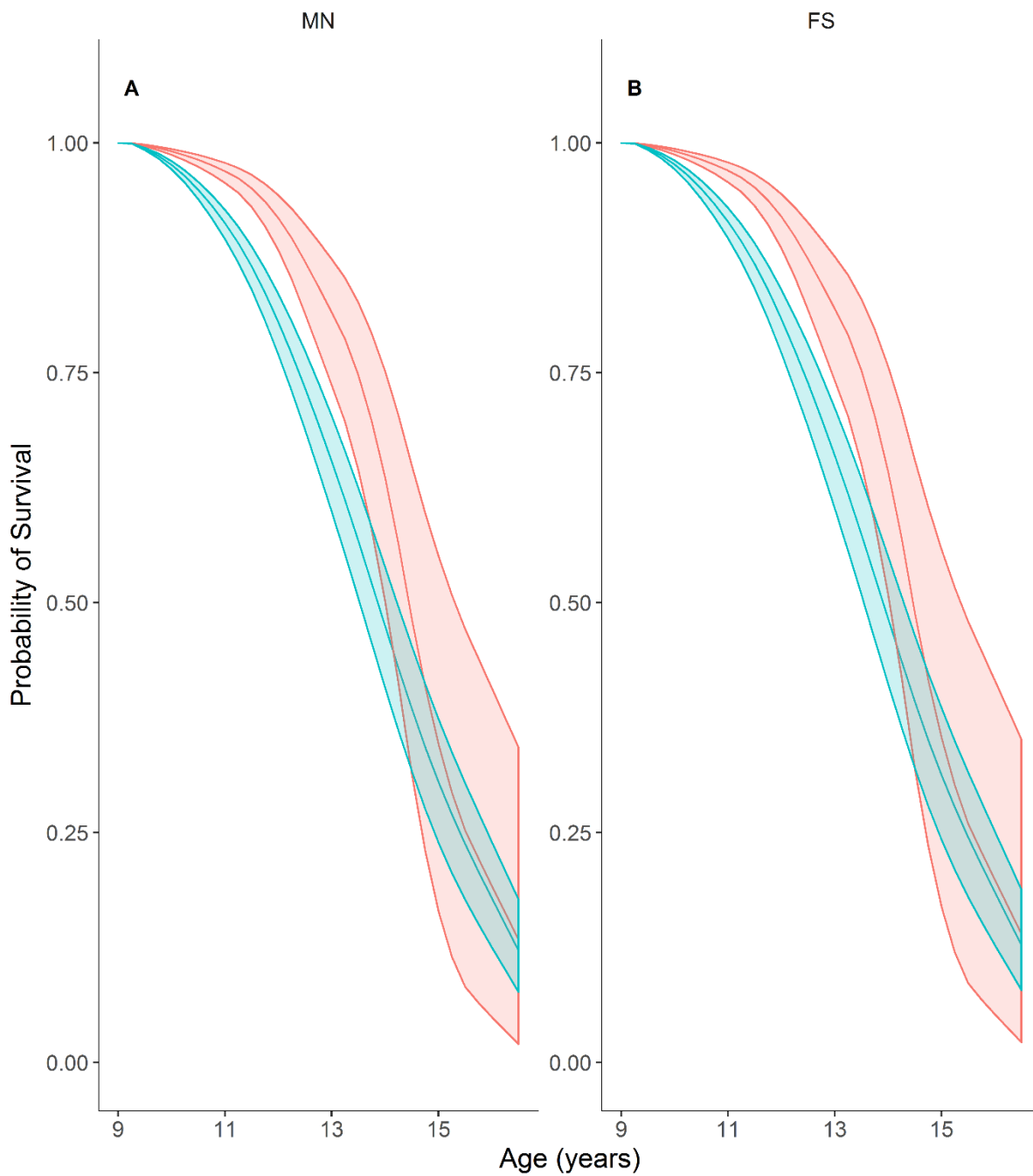
Supplementary Figure S8. Survival probability models for male neutered (a) and female spayed (b)

Pit bull dogs. Middle lines depict the probability of survival for a dog at 7.5y age in 2003 (assuming survival to at least 9.5 years), with the upper and lower lines depicting 99.79 % confidence intervals. The survival of dogs in the normal body condition group is shown in blue, whilst that of the overweight group is shown in red.



Supplementary Figure S9. Survival probability models for male neutered (a) and female spayed (b)

Shih tzu dogs. Middle lines depict the probability of survival for a dog at 7.5y age in 2003 (assuming survival to at least 9.5 years), with the upper and lower lines depicting 99.79 % confidence intervals. The survival of dogs in the normal body condition group is shown in blue, whilst that of the overweight group is shown in red.



Supplementary Figure S10. Survival probability models for male neutered (a) and female spayed (b)

Yorkshire terrier dogs. Middle lines depict the probability of survival for a dog at 7.5y age in 2003 (assuming survival to at least 9.5 years), with the upper and lower lines depicting 99.79 % confidence intervals. The survival of dogs in the normal body condition group is shown in blue, whilst that of the overweight group is shown in red.

