Evidence of longer life; a cohort of 39 labrador retrievers

Vicki J Adams,1 Kellie Ceccarelli,2 Penny Watson,3 Stuart Carmichael,4 Johanna Penell,5 David M Morgan6

A panel of veterinary and academic experts reviewed current available evidence on age at death for labradors and reached a consensus that their average/typical life span was 12 years of age.2 A prospective cohort study that described the longevity of 39 pedigree adult neutered labradors, showed that 89.7 per cent lived to meet/exceed this typical life span. The study showed that maintenance of lean body mass and reduced accumulation of body fat were associated with attaining a longer than average life span while sex and age at neutering were not associated with longevity.1

The present cohort was derived from 31 litters via 19 known (7 unknown) dams and 12 known (7 unknown) sires enrolled in a prospective longitudinal study at a median age of 6.5 years at the start of the study on July 16, 2004. The last dog died on September 09, 2015 at the age of 17.1 years and the oldest dog, a male, reached 17.9 years. The aim of this study was to compare the longevity of the present cohort fed to maintain a body condition score (BCS) between 2 and 4 on a 5-point scale to three historical comparison groups of pedigree labradors taken from previously published studies. The ‘oldest of the old’ labradors from the present cohort could hold important clues on how to achieve healthy ageing. Further analysis of the cohort’s clinical data is being undertaken with the objective to develop key strategies to increase the health span of dogs:

1. 2004 UK Kennel Club (KC) survey dogs owned/kept by owners and breeders that died in the previous 10 years (1994–2003).2
2. 1987 US ‘Restricted’ group (n=24) fed 25 per cent less than a sex-matched and bodyweight-matched sibling pair to maintain a mean BCS between 4 and 5 on a 9-point scale; 48 puppies from seven litters with seven dams and two sires randomly assigned to feeding group at six weeks of age, started on the study from eight weeks of age in 1987 and followed until death of all dogs in this pair-fed study.3–5
3. 1987 US ‘Control’ group (n=24) initially fed ad libitum and then fed a restricted amount of food to prevent excessive weight gain.

Descriptive statistics are reported for age at death using median, minimum and maximum values. Median age at death was compared using Kruskal-Wallis analysis of variance with post hoc Dunn’s pairwise comparisons. After excluding 32 KC survey dogs that died at <3.5 years of age, survival analysis was used to derive Kaplan-Meier product limit estimates of the survival functions with post hoc pairwise log rank tests and results are reported as median survival time (MST) with 95 per cent confidence intervals. The proportions of dogs surviving to 12 years and those alive at/beyond 15.6 years of age were compared using cross-tabulations with x² or Fisher’s exact tests. Level of significance for multiple comparisons was set at P<0.008 using a Bonferroni correction as a/k where a/is 0.05 and k is the number of comparisons (six). A one-sample sign test was used to compare the median age at death of the longevity cohort to the average/typical life span of 12 years for labradors.

The current cohort lived significantly longer than each of the historical comparison groups (P<0.0001). Survival analysis revealed significant differences in MSTs with the present cohort living longer than each of the other groups (P=0.004, Table 1, Fig 1). Almost 90 per cent of the present cohort reached the average expected age of 12 years for labrador retrievers while only 30 per cent of the US ‘Control’ group achieved this (P<0.0001, Table 2). Additionally, 28 per cent of the dogs in the present cohort reached/exceeded exceptional longevity, defined as being alive at/beyond 15.6 years of age and this was significantly greater than any of the historical comparison groups (P<0.0001, Table 2). Furthermore, the median...
The results of this study showed that the present cohort lived significantly longer than previously studied labs and had a greater than expected proportion living well beyond that of the expected breed life span, despite the limitations of using historical comparison groups and the fact that all of these groups of dogs are inherently biased. These 39 labs experienced a combination of a high quality plane of nutrition with appropriate husbandry and healthcare. Increased understanding and control of the ageing process provides an opportunity to estimate the impact of the longevity dividend. For human beings this is defined as the social, economic and health bonuses for both individuals and populations that accrue as a result of medical interventions to slow the rate of ageing. The importance of the ‘oldest of the old’ dogs as reported here is that they can provide a model system for exploring the longevity dividend in human beings as well as dogs.

Competing interests: VIA and JP received payment from Spectrum Brands (and formerly P&G) for provision of analytical services and interpretation of data. KC and DMMM are employees of Spectrum Brands (and formerly of P&G).

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References


TABLE 2 Numbers and proportions of dogs achieving a typical life span (average expected age of 12 years) and an exceptional life span (age of 15.6 years)

<table>
<thead>
<tr>
<th>Group</th>
<th>Total N</th>
<th>Dogs reaching typical life span</th>
<th>Dogs reaching exceptional life span</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>n% CI</td>
<td>n% CI</td>
</tr>
<tr>
<td>Longevity study</td>
<td>39</td>
<td>35 89.7* (74.8 to 96.7)</td>
<td>11 28.2* (15.6 to 45.1)</td>
</tr>
<tr>
<td>KC survey</td>
<td>574</td>
<td>302 52.61* (48.4 to 56.8)</td>
<td>24 4.18* (2.8 to 6.3)</td>
</tr>
<tr>
<td>Restricted*</td>
<td>24</td>
<td>17 70.83* (48.8 to 86.6)</td>
<td>0 0*</td>
</tr>
<tr>
<td>Control†</td>
<td>24</td>
<td>7 29.16* (13.4 to 51.3)</td>
<td>0 0*</td>
</tr>
</tbody>
</table>

*Proportions (%) with different superscripts are significantly different, P<0.0001.
†Proportions (%) with different superscripts are significantly different, P<0.0001.
CI, confidence interval; KC, Kennel Club.

TABLE 1 Descriptive statistics for age at death of the four groups of dogs and results of survival analysis

<table>
<thead>
<tr>
<th>Group</th>
<th>Descriptive statistics</th>
<th>Survival analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N Median age* (Min-Max)</td>
<td>N MST† (95% CI)</td>
</tr>
<tr>
<td>Longevity study</td>
<td>39 14.01* (9.68 to 17.90)</td>
<td>39 14.01* (13.18 to 14.77)</td>
</tr>
<tr>
<td>KC survey</td>
<td>574 12.25* (10.17 to 19.00)</td>
<td>542 12.58 (12.17 to 12.92)</td>
</tr>
<tr>
<td>Restricted*</td>
<td>24 12.95* (6.30 to 14.56)</td>
<td>24 12.90* (12.38 to 13.40)</td>
</tr>
<tr>
<td>Control†</td>
<td>24 11.16* (5.50 to 13.29)</td>
<td>24 11.16* (10.80 to 11.99)</td>
</tr>
</tbody>
</table>

*Kruskal-Wallis analysis of variance (P<0.0001) with post hoc Dunn’s pairwise comparisons: median ages with different superscripts are significantly different from one another. MST, Kaplan-Meier log rank; P<0.0001; MSTS with different superscripts are significantly different from one another (P<0.0001).
CI, confidence interval; KC, Kennel Club; MST, median survival time.
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Veterinary Record published online February 26, 2018

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