THE KENNEL CLUB

Breed Health and Conservation Plan

Wire Haired Dachshund

Evidence Base

CONTENTS

INTRODUCTION

The Kennel Club launched a new resource for breed clubs and individual breeders – the Breed Health and Conservation Plans (BHCP) project – in September 2016. The purpose of the project is to ensure that all health concerns for a breed are identified through evidence-based criteria, and that breeders are provided with useful information and resources to support them in making balanced breeding decisions that make health a priority.

The Breed Health and Conservation Plans take a complete view of breed health with consideration to the following issues: known inherited conditions, complex conditions (i.e. those involving many genes and environmental effects such as nutrition or exercise levels, for example hip dysplasia), conformational concerns and population genetics.

Sources of evidence and data have been collated into an evidence base which gives clear indications of the most significant health conditions in each breed, in terms of prevalence and impact. Once the evidence base document has been produced it is discussed with the relevant Breed Health Co-ordinator and breed health committee or representatives if applicable. Priorities are agreed based on this data and incorporated into a list of actions between the Kennel Club and the breed to tackle these health concerns. These actions and then monitored and reviewed on a regular basis.

DEMOGRAPHICS

The numbers of Wire Haired Dachshunds registered by year of birth between 1990 and 2023 are shown in Figure 1.

The trend of registrations over year of birth (1990-2023) was 22.4 per year (with a 95% confidence interval of 16.4 to 28.4) reflecting the significant increase in registrations during this time.

[Put simply, 95% confidence intervals (C.I.s) indicate that we are 95% confident that the true estimate of a parameter lies between the lower and upper number stated.]

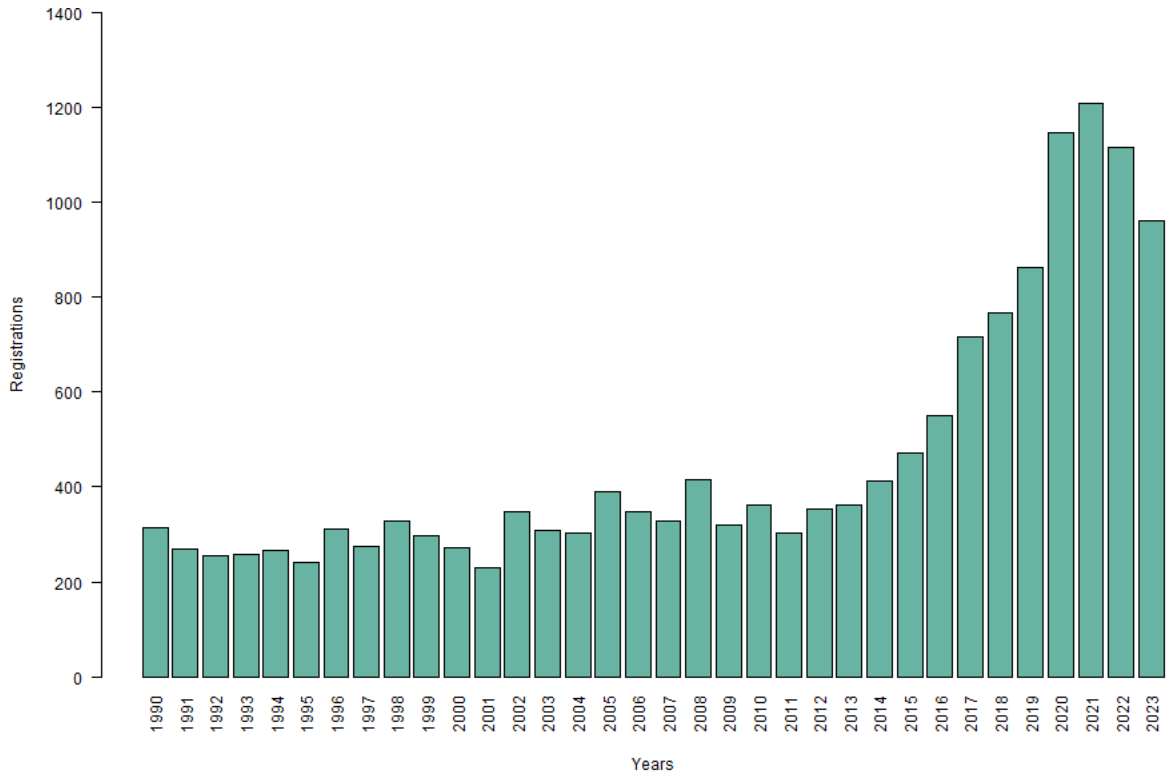


Figure 1: Number of registrations of Wire Haired Dachshunds per year of birth, 1990 – 2023.

The breeds have seen a marked increase in dilute dogs being bred and registered, with these shown in Figure 2 below.

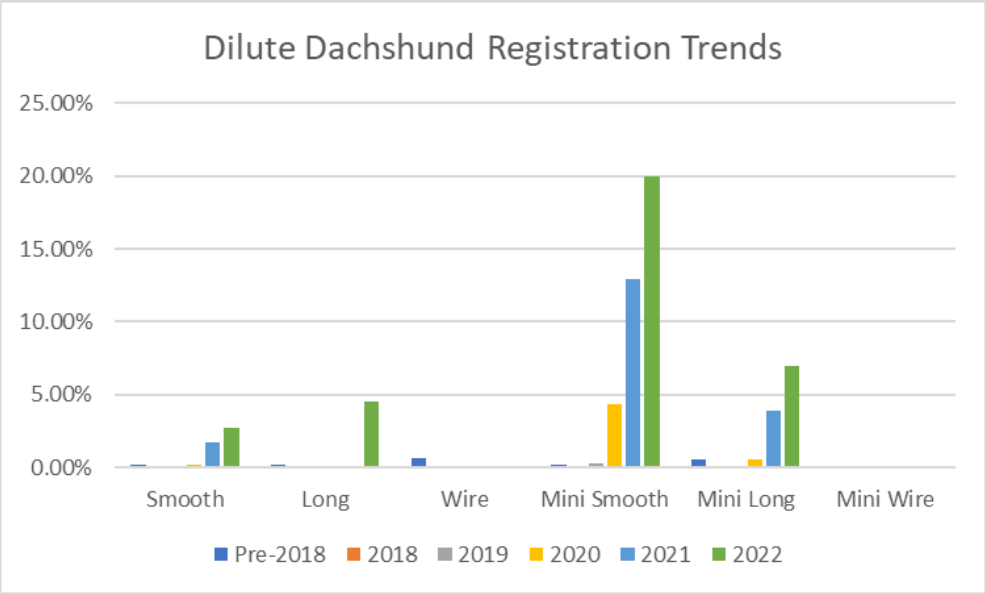


Figure 2: Proportion of dilutes registered per year in the Dachshund varieties.

Following recommendations made by the non-breed standard colours working party, the Kennel Club Board has approved several measures. These include the separation of breed standard and non-breed standard (NBS) colours in the Breed

Record Supplement; the implementation of a Colour Watch system, similar to Breed Watch, to provide clear guidance on breed standard and NBS colours in every breed; and the introduction of a process whereby the UK owners of imported dogs are asked to record their dog's true colour from The Kennel Club's current full list of both breed standard and NBS colours.

BREED HEALTH CO-ORDINATOR ANNUAL HEALTH REPORT

Breed Health Co-ordinators (BHCs) are volunteers nominated by their breed to act as a vital conduit between the Kennel Club and the breed clubs with all matters relating to health.

The BHC's Annual Health Report 2022, completed for all six Dachshund varieties together, determined the following as priorities to work towards in the coming year:

- Reduce the risk of IVDD by promoting the use of screening and by educating owners about lifestyle risk factors.
- Increase buyer and breeder awareness of the breed to influence responsible buying/breeding decisions, particularly in relation to the dilute colours that have increased risks of health issues.

The full report of actions and activities can be found in full on the Dachshund Health UK website here: https://www.dachshundhealth.org.uk/welcome/annual-breed-health-report-for-2022

BREED CLUB HEALTH ACTIVITES

The Dachshund has a health council, an active Breed Health Coordinator (BHC) and a dedicated health website: https://www.dachshundhealth.org.uk/ .

BREED SPECIFIC HEALTH SURVEYS

Kennel Club Pedigree/Purebred Dog Health Surveys

All six Dachshund varieties were grouped together in the 2004 Purebred Dog Health Survey.

2004 Morbidity results: Health information was collected for 509 live Dachshunds of which 322 (63%) were healthy and 187 (37%) had at least one reported health condition. The top categories of diagnosis were reproductive (19.7%, 58 of 294 reported conditions), neurologic (11.9%, 35 of 294 reported conditions), dermatologic (10.5%, 31 of 294 reported conditions), cardiac (8.8%, 26 of 294 reported conditions) and dental (8.8%, 26 of 294 reported conditions). The most frequently reported specific conditions were IVDD (4.5% prevalence, 23 cases), heart murmur (4.3%, 22

cases), false pregnancy (3.2% prevalence, 11 cases in the 346 female Dachshunds in the survey), alopecia (3.1% prevalence, 16 cases) and dental disease (2.8% prevalence, 14 cases).

2004 Mortality results: A total of 245 deaths were reported for all Dachshund varieties combined. The median age at death was 12 years and 8 months (min = 4 months, max = 19 years). The most frequently reported causes of death by organ system or category were old age (21.6%, 53 of 245 deaths), cancer (16.7%, 41 deaths), cardiac (14.3%, 35 deaths) and neurologic (11.0%, 27 deaths). The most frequently reported specific causes of death apart from old age and cancer were heart failure (4.9%, 12 deaths) and IVDD (4.1%, 10 deaths).

The Dachshund varieties were separated for the 2014 Pedigree Dog Health Survey.

2014 Morbidity results: Health information was collected for 296 live Miniature Smooth Haired Dachshunds of which 198 (66.9%) had no reported conditions and 59 (33.1%) were reported to be affected by at least one condition. The most frequently reported conditions were IVDD (10.1% prevalence, 30 cases), hypersensitivity (allergic) skin disorder (3.7% prevalence, 11 cases), anal gland/sac impaction/blockage (2.7% prevalence, 8 cases), dermatitis (2.7% prevalence, 8 cases) and unspecified skin, ear or coat. (2.7% prevalence, 8 cases).

2014 Mortality results: A total of 19 deaths were reported for the breed. The range of age at death for Miniature Smooth Haired Dachshunds was two years to 17 years. The most frequently reported causes of death were spinal disorder (5 cases), old age (3 cases), herniated vertebrae (2 cases) and IVDD (2 cases).

DachsLife 2012

DachsLife 2012 was a survey of UK Dachshunds that was conducted between1st January 2012 and 31st March 2012. The survey was widely advertised among the Breed Club community, and also many owners of pet Dachshunds, via online discussion groups and Facebook. Responses were received for 1,464 Dachshunds. The survey results can be found here: https://sites.google.com/site/ukdachshundhealthreport/view-reported-health-statistics/dachs-life-2012

DachsLife 2015

A web-based survey 'Dachs-Life 2015: The UK Dachshund Breed Council's Back Disease (IVDD) and lifestyle survey' was carried out for ten weeks in 2015. The survey was hosted by the UK Dachshund Breed Council and owners of Dachshunds with or without a history of IVDD were recruited online via social media and the Council's newsletter. Responses were received for 2031 individual Dachshunds. The overall prevalence of IVDD was 15.7% (95% C.I. 14.1 – 17.3; 310 cases, 1665 non-cases and 56 exclusions). Variety-specific IVDD prevalences are shown in Table 1 below.

Table 1: Prevalence of IVDD for the six varieties of Dachshunds, from the DachsLife 2015 survey

Breed	Cases	Total	IVDD prevalence (%)	95% C.I. (%)
Standard Wire Haired	18	252	7.1	5.97-8.23
Standard Smooth Haired	49	201	24.4	22.51-26.29
Standard Long Haired	16	127	12.6	11.14-14.06
Miniature Wire Haired	54	305	17.7	16.02-19.38
Miniature Smooth Haired	127	744	17.1	15.44-18.76
Miniature Long Haired	46	346	13.3	11.80-14.80

Full analysis of the results of the survey have been published (Packer et al, 2016) and are available here: https://cgejournal.biomedcentral.com/track/pdf/10.1186/s40575-016-0039-8

DachsLife 2018

This year's survey accumulated responses for 2,564 dogs, with the survey focusing on cancers affecting the breed. Of the 228 dogs that were deceased, 37.7% were due to cancer, with the highest prevalence by variety seen in the Miniature Longhaired (~13%), followed by Long Haired (~12%). Overall the prevalence of cancers was 7%. The body location of cancer/tumour by variety and age of cancer diagnosis by variety is shown in Figure 2 and 3, respectively.

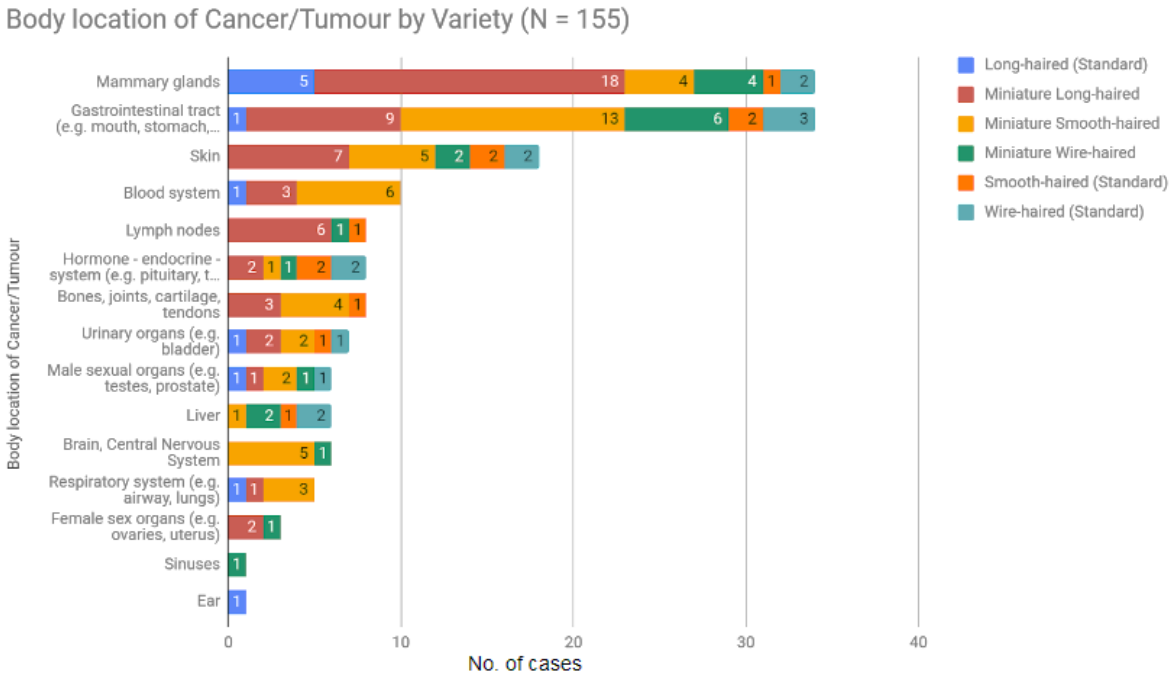


Figure 2: A breakdown of body location for cancer/tumours by variety in the Dachslife 2018 survey.

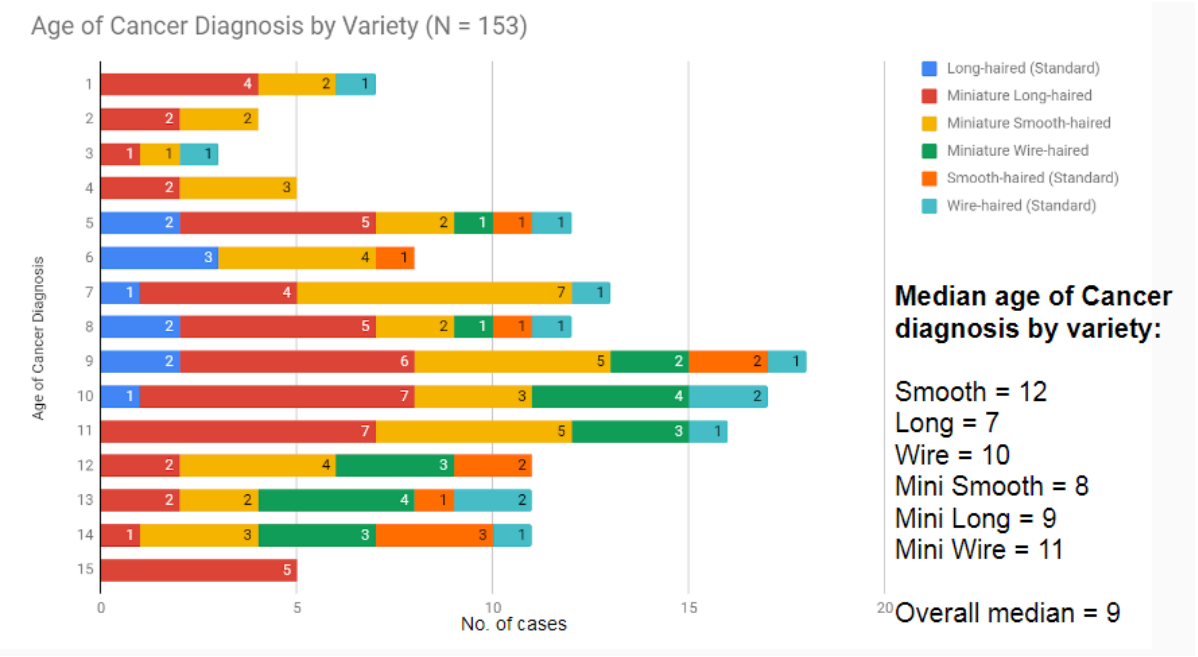


Figure 3: Age of cancer diagnosis by variety and median age of cancer diagnosis for dogs reported in the Dachslife 2018 survey.

The prevalence of reported health conditions in comparison to the results of the 2015 and 2012 surveys are also shown in Figure 4 below. By far the most commonly reported health concern was IVDD, followed by skin allergies/atopy, cancers/tumours, cryptorchidism and dystocia.

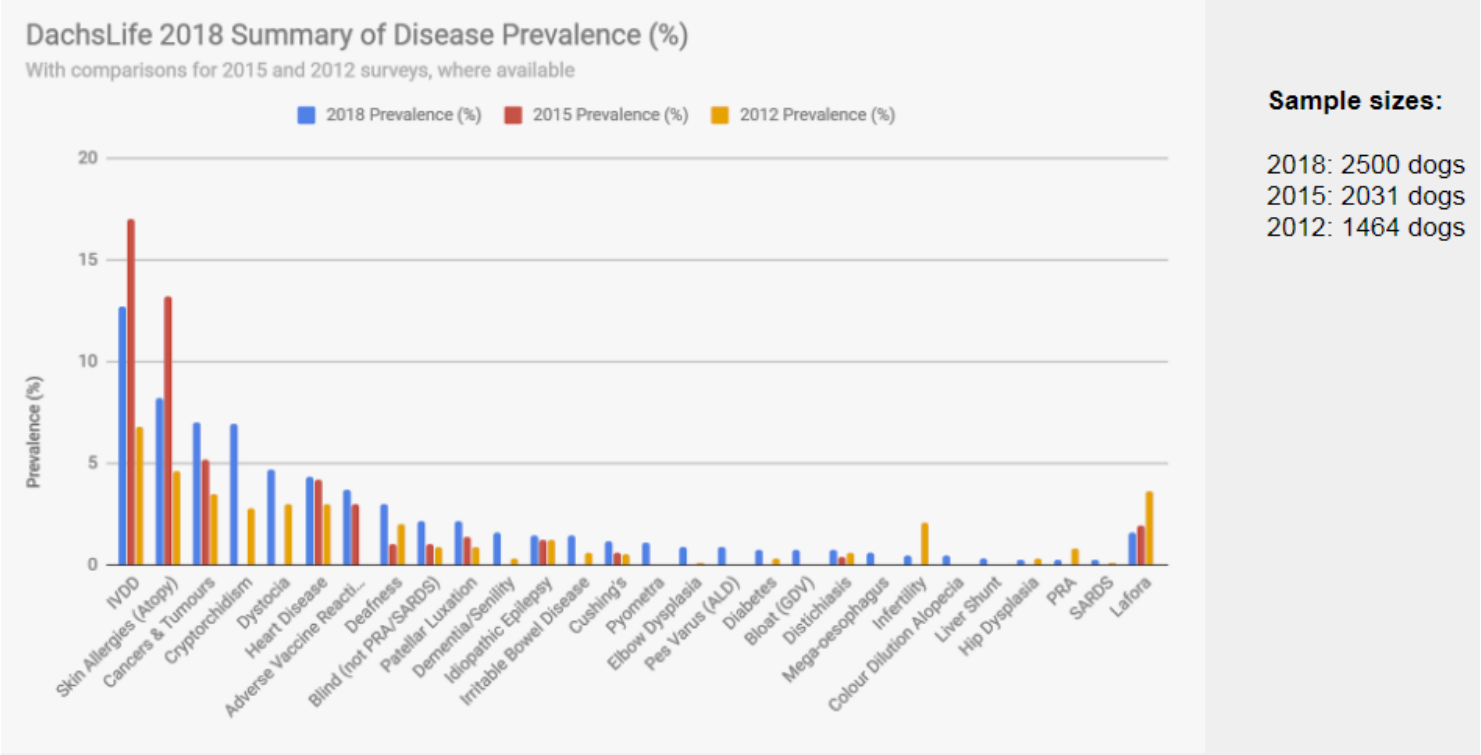


Figure 4: A summary of disease prevalence for dogs reported in the Dachslife 2018 survey, in comparison in prevalence to 2015 and 2012 surveys.

Miniature Smooth Haired had the highest prevalence for IVDD, at 29.9% of dogs reportedly affected. The prevalence by age in this variety is shown in Figure 5 below,

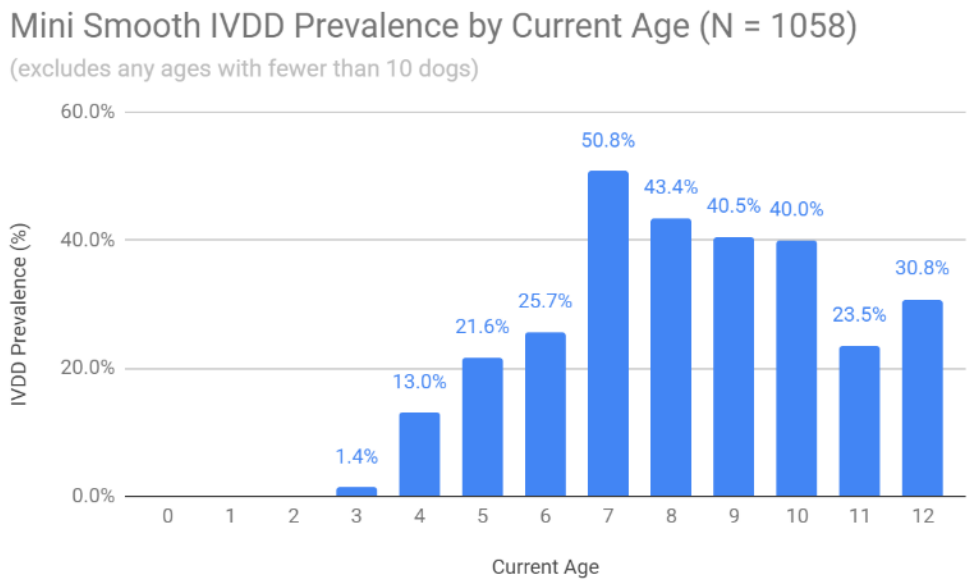


Figure 5: The prevalence of IVDD for Miniature Smooth Dachshunds by year of age.

This variety was also the most commonly affected for colour dilution alopecia, with a prevalence of 0.6% of dogs affected, and similarly with megaoesphagus, in which just over 1% of dogs of the variety were affected.

A full breakdown of the survey can be found through the link provided below: https://www.dachshundhealth.org.uk/dachslife-2018

DachsLife 2021

A total of 9,908 individual responses were recorded in this survey. Of the 9,908 dogs this represented, 7,853 (79.3%) were KC registered and 1,810 (18.3%) were not KC registered. The median age of the dogs included in the survey was 4 years.

Of 9,908 dogs, 5,292 (53.4%) were male and 4,616 (46.6%) were female. Across sexes, 5,055 (51.2%) were entire and 4,819 (48.8%) were neutered. The majority of dogs were neutered between 6 months and 1 year for both males (37.1%, 901 of 2,431) and females (30.8%, 735 of 2,388).

The majority of the Dachshunds included in the survey were Miniature Smooth Haired (52.3%, 5,125 of 9,807).

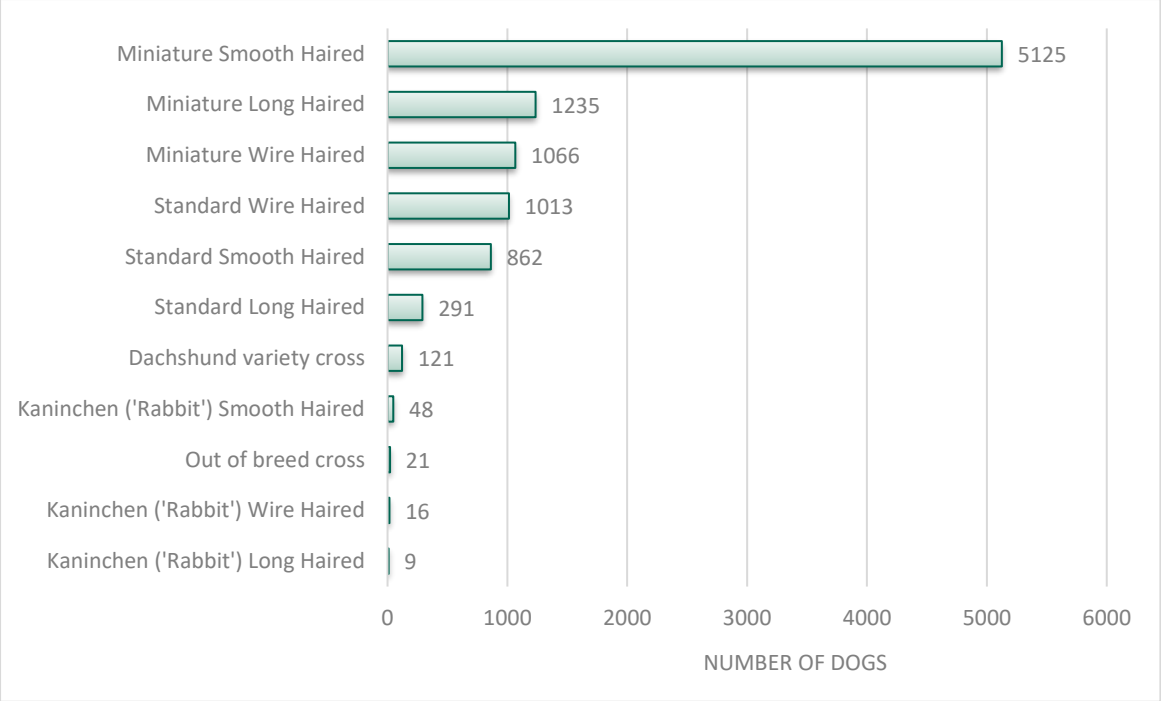


Figure 6: Variety of Dachshunds included in the survey, as reported by their owners.

The majority of Dachshunds included in the survey were black & tan (33.8%, 3,313 of 9,807). A full breakdown of responses by colour are shown in Figure 6.

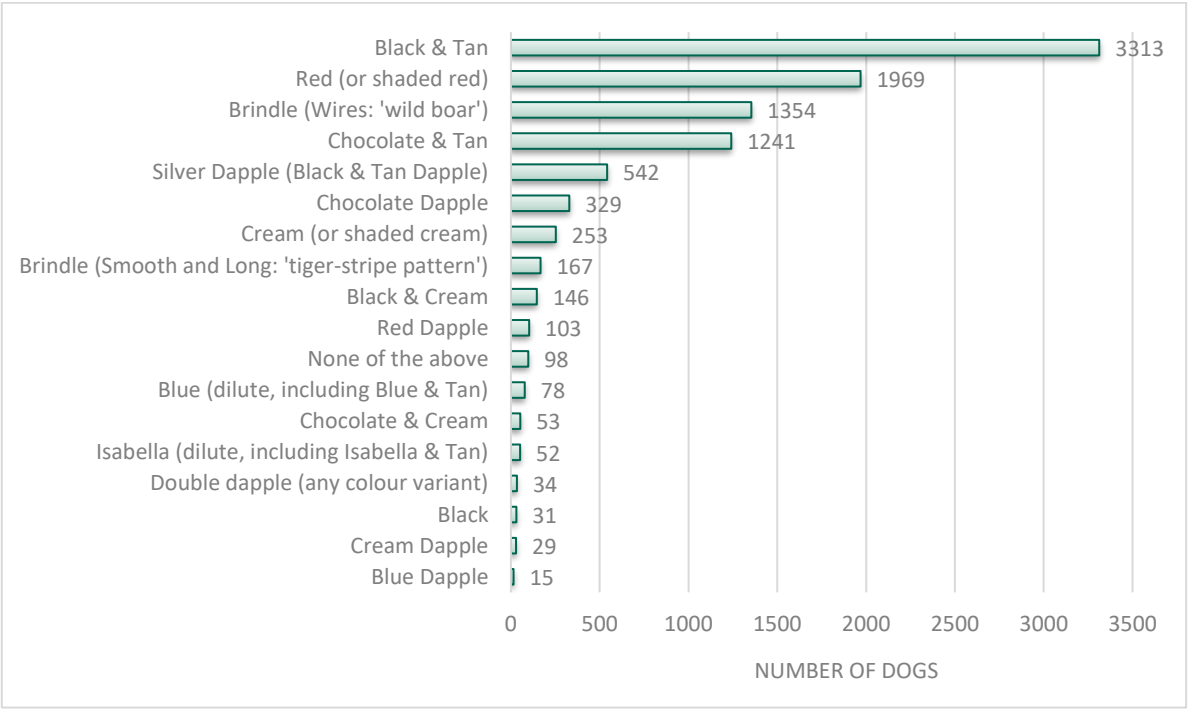


Figure 7: Colour of Dachshunds included in the survey, as reported by their owners.

Lifestyle

When asked if their dog had any known dietary allergies, out of 9,573 dogs, 820 (8.6%) did have known dietary allergies. Figure 10 shows the dietary allergies reported in the survey, the most frequently reported being ‘other’ (23.3%, 341 of 1,466), followed by ‘chicken’ (16.4%) and then ‘wheat’ (14.7%).

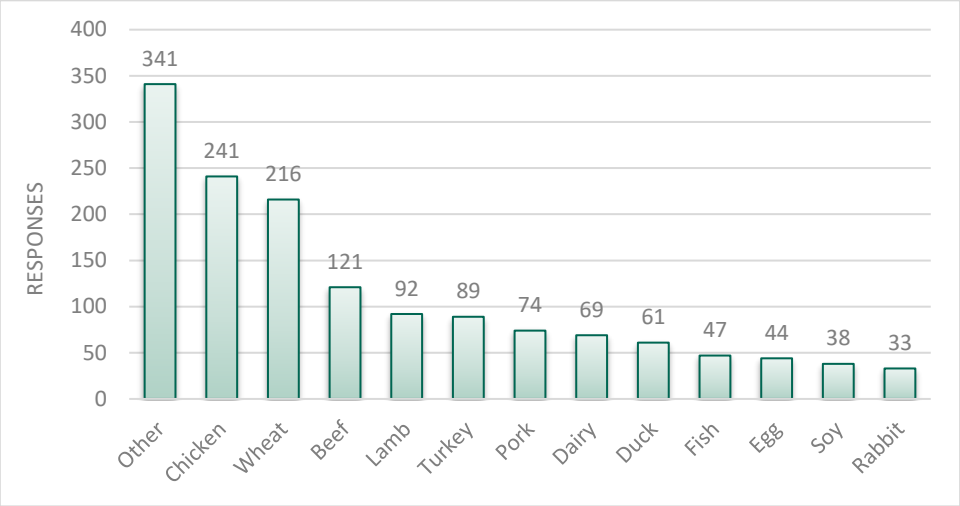


Figure 8: Known dietary allergies, as reported in the survey.

The most common answers to “other” for known dietary allergies not already listed in the survey were: rice (n=22), grain (n=22), corn (n=13), potato (n=12), and peas (n=10).

When asked if their dog had any known environmental allergies, out of 9,398 dogs, 1,601 (17.0%) did have known environmental allergies. The most frequently reported were ‘grass’ (37.0%, 593 of 1,601), followed by ‘other’ (21.6%) and then ‘pollen’ (20.8%).

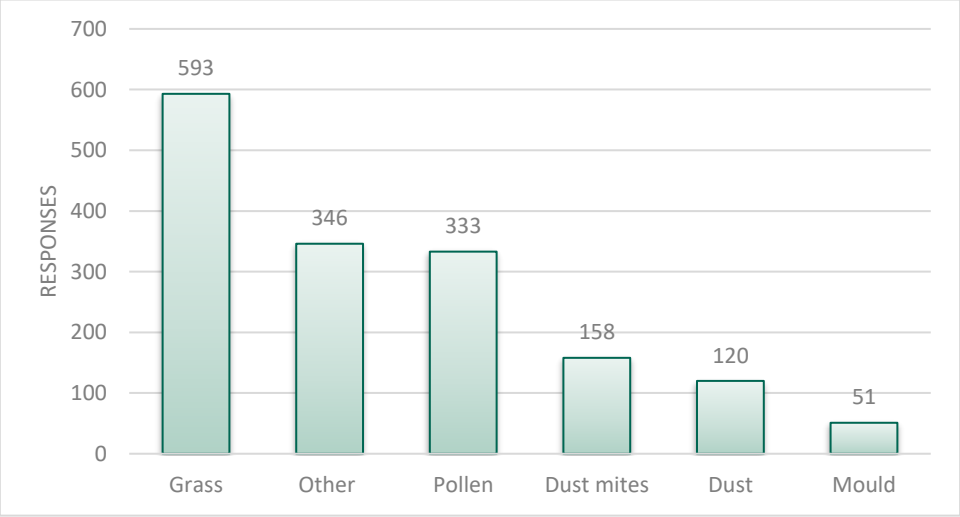


Figure 9: Known environmental allergies for the Dachshunds included in the survey, as reported by their owners.

The most common answers to “other” for known environmental allergies not already listed in the survey were: mites (n=21), trees (n=13), nettles (n=9), and fleas (n=8).

Health

The survey investigated the number of dogs affected by a number of skin conditions. The overall summary is given in the figure below.

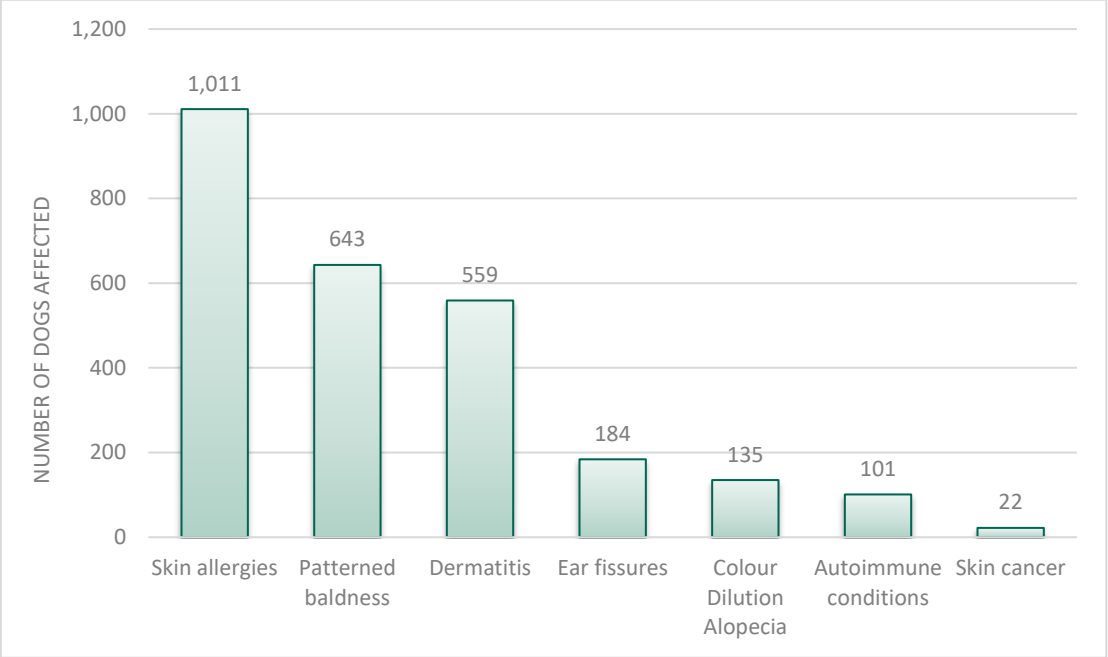


Figure 10: Overall summary of skin and/or coat conditions reported in the survey.

The total number of skin and/or coat conditions reported in the survey was 2,655. Out of these, 38.1% were for skin allergies, 24.2% were for patterned baldness, and 21.1% were for dermatitis. Of 8,763 Dachshunds, 2,438 (27.8%) had been affected by at least one skin and/or coat condition at some point in his/her lifetime.

Figure 11 shows that 18.8% (834 of 4,442) of the entire dogs had been affected by a skin and/or coat condition(s), and 37.1% (1,594 of 4,294) of the neutered dogs had been affected by a skin and/or coat condition(s). Statistical analysis confirmed that neutered dogs are significantly more likely to be affected by skin and/or coat conditions ($p < 0.001$, OR 2.55 (95% CI 2.32 – 2.82)).

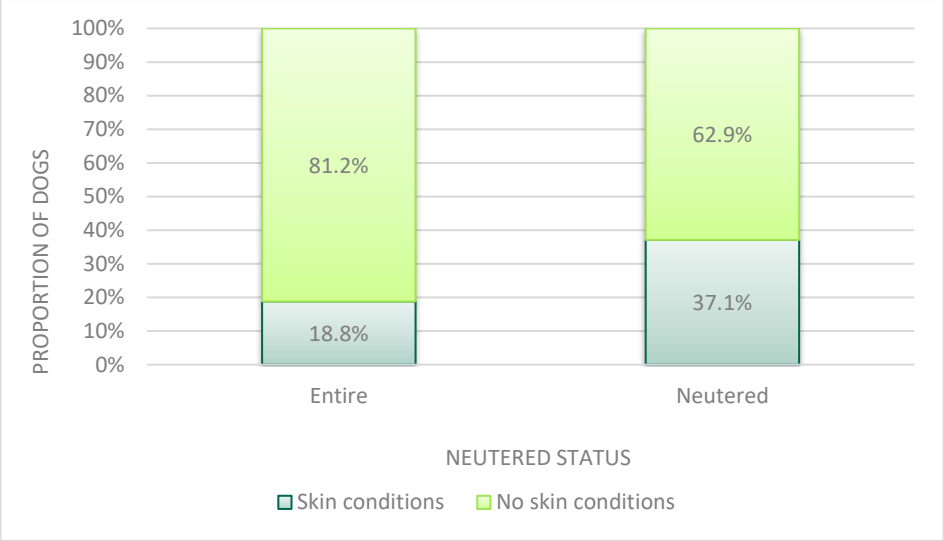


Figure 11: Proportion of neutered and entire dogs affected by a skin condition, as reported in the survey.

The results from this survey suggest that blue Dachshunds have a higher risk of developing a skin condition compared with any other colour, with 55.4% of blue Dachshunds in this survey being affected by one or more skin condition (36 of 65 blue Dachshunds included in this question). The results from this survey show that dilutes are significantly more likely to be affected by skin and/or coat conditions in general ($p < 0.01$, OR 1.78 (95% CI 1.24-2.57)).

Table 2: Percentage of Dachshunds affected by a skin and/or coat condition per colour, as reported in the survey.

Colour	General skin and/or coat conditions		
	N affected	Total	%
Blue (dilute, including Blue & Tan)	36	65	55.4%
Black	10	21	47.6%
Chocolate & Tan	370	1081	34.2%
Chocolate & Cream	14	43	32.6%
Black & Tan	928	2973	31.2%
Red (or shaded red)	462	1773	26.1%
Isabella (dilute, including Isabella & Tan)	11	43	25.6%
None of the above	20	83	24.1%
Brindle (Smooth and Long)	32	137	23.4%
Silver Dapple (Black & Tan Dapple)	112	485	23.1%
Cream (or shaded cream)	52	229	22.7%
Brindle (Wires)	278	1244	22.3%
Chocolate Dapple	64	303	21.1%
Black & Cream	24	121	19.8%
Red Dapple	16	92	17.4%
Double dapple (any colour variant)	5	30	16.7%
Blue Dapple	2	13	15.4%
Cream Dapple	2	27	7.4%

Table 5 shows the percentage of dogs per colour affected by specific skin and/or coat conditions. The survey found that dilutes are significantly more likely to be affected by autoimmune conditions, colour dilution alopecia and patterned baldness but not more likely to be affected by dermatitis, ear fissures, skin allergies or skin cancer.

Table 5: Percentage of Dachshunds affected by specific skin conditions per colour, as reported in the survey.

Colour	Autoimmune			CDA			Dermatitis			Ear fissures		
	N affected	Total	%	N affected	Total	%	N affected	Total	%	N affected	Total	%
Black	0	6	0.0%	1	9	11.1%	5	8	62.5%	0	10	0.0%
Black & Cream	0	19	0.0%	2	21	9.5%	4	20	20.0%	2	23	8.7%
Black & Tan	33	686	4.8%	42	776	5.4%	218	732	29.8%	70	838	8.4%
Blue (dilute, including Blue & Tan)	3	21	14.3%	23	28	82.1%	5	23	21.7%	4	30	13.3%
Blue Dapple	0	1	0.0%	1	2	50.0%	1	2	50.0%	1	2	50.0%
Brindle (Smooth and Long)	1	25	4.0%	1	28	3.6%	4	21	19.0%	4	30	13.3%
Brindle (Wires)	18	204	8.8%	12	243	4.9%	65	224	29.0%	11	258	4.3%
Chocolate & Cream	0	10	0.0%	2	12	16.7%	2	9	22.2%	1	14	7.1%
Chocolate & Tan	15	294	5.1%	26	300	8.7%	60	290	20.7%	44	345	12.8%
Chocolate Dapple	4	50	8.0%	2	56	3.6%	9	50	18.0%	8	56	14.3%
Cream (or shaded cream)	4	36	11.1%	3	46	6.5%	15	39	38.5%	2	48	4.2%
Cream Dapple	2	2	100.0%	0	2	0.0%	1	2	50.0%	0	2	0.0%
Double dapple (any colour variant)	0	3	0.0%	0	5	0.0%	3	5	60.0%	1	5	20.0%
Isabella (dilute, including Isabella & Tan)	2	6	33.3%	6	7	85.7%	1	5	20.0%	1	8	12.5%
None of the above	0	11	0.0%	0	15	0.0%	6	13	46.2%	2	18	11.1%
Red (or shaded red)	14	321	4.4%	11	382	2.9%	122	365	33.4%	25	424	5.9%
Red Dapple	0	11	0.0%	0	14	0.0%	6	16	37.5%	2	13	15.4%
Silver Dapple (Black & Tan Dapple)	5	92	5.4%	3	89	3.4%	32	82	39.0%	6	98	6.1%

Colour	Patterned baldness			Skin allergies			Skin cancer			Other		
	N affected	Total	%	N affected	Total	%	N affected	Total	%	N affected	Total	%
Black	2	8	25.0%	3	5	60.0%	0	9	0.0%	0	0	0.0%
Black & Cream	5	22	22.7%	16	20	80.0%	1	24	4.2%	0	1	0.0%
Black & Tan	273	826	33.1%	370	728	50.8%	11	835	1.3%	3	11	27.3%
Blue (dilute, including Blue & Tan)	16	28	57.1%	7	23	30.4%	0	29	0.0%	0	0	0.0%
Blue Dapple	1	2	50.0%	1	2	50.0%	0	2	0.0%	0	0	0.0%
Brindle (Smooth and Long)	8	29	27.6%	11	26	42.3%	0	29	0.0%	0	0	0.0%
Brindle (Wires)	48	253	19.0%	119	234	50.9%	2	253	0.8%	0	2	0.0%
Chocolate & Cream	4	14	28.6%	4	10	40.0%	0	12	0.0%	0	0	0.0%
Chocolate & Tan	127	331	38.4%	133	294	45.2%	1	343	0.3%	0	1	0.0%
Chocolate Dapple	16	57	28.1%	22	46	47.8%	0	57	0.0%	0	0	0.0%
Cream (or shaded cream)	6	48	12.5%	31	41	75.6%	1	48	2.1%	0	1	0.0%
Cream Dapple	0	2	0.0%	1	2	50.0%	0	2	0.0%	0	0	0.0%
Double dapple (any colour variant)	1	5	20.0%	3	5	60.0%	0	5	0.0%	0	0	0.0%
Isabella (dilute, including Isabella & Tan)	6	8	75.0%	3	5	60.0%	0	7	0.0%	0	0	0.0%
None of the above	5	17	29.4%	8	14	57.1%	0	16	0.0%	0	0	0.0%
Red (or shaded red)	99	418	23.7%	231	360	64.2%	5	401	1.2%	0	5	0.0%
Red Dapple	4	16	25.0%	6	12	50.0%	0	15	0.0%	0	0	0.0%
Silver Dapple (Black & Tan Dapple)	22	97	22.7%	42	86	48.8%	1	95	1.1%	0	0	0.0%

Figure 12 shows the descriptions that most closely describe the affected dogs' coats, as reported by their owners. The most frequently reported coat description was 'normal' (49.6%, 1,448 of 2,921), followed by 'dry' (18.8%) and then 'thin' (18.6%).

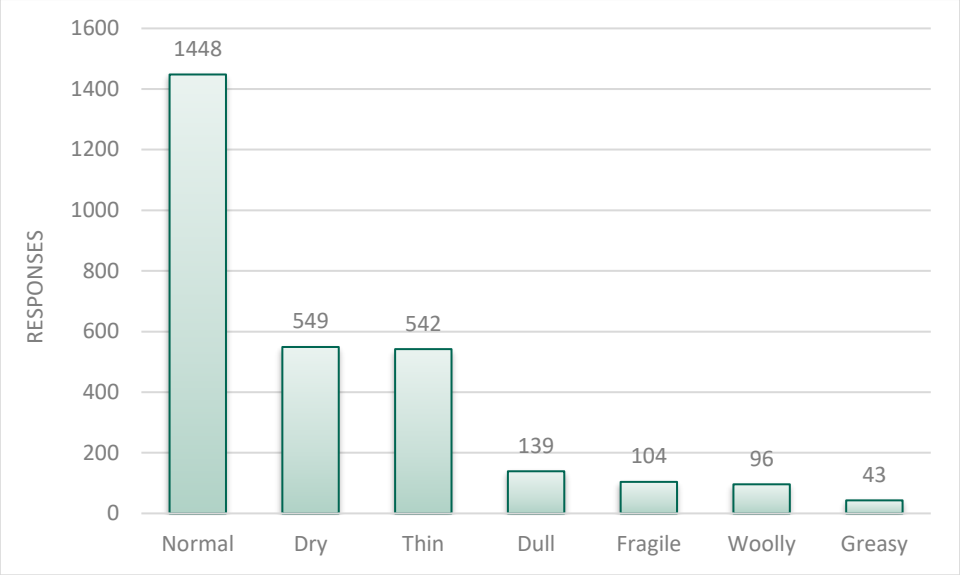


Figure 12: Coat descriptions, as reported by their owners.

Figure 13 shows the clinical signs seen in the affected dogs, as reported by their owners. The most frequently reported clinical sign was ‘itching’ (17.6%, 978 of 5,543), followed by ‘hair loss’ (16.9%) and then ‘dry skin’ (11.7%).

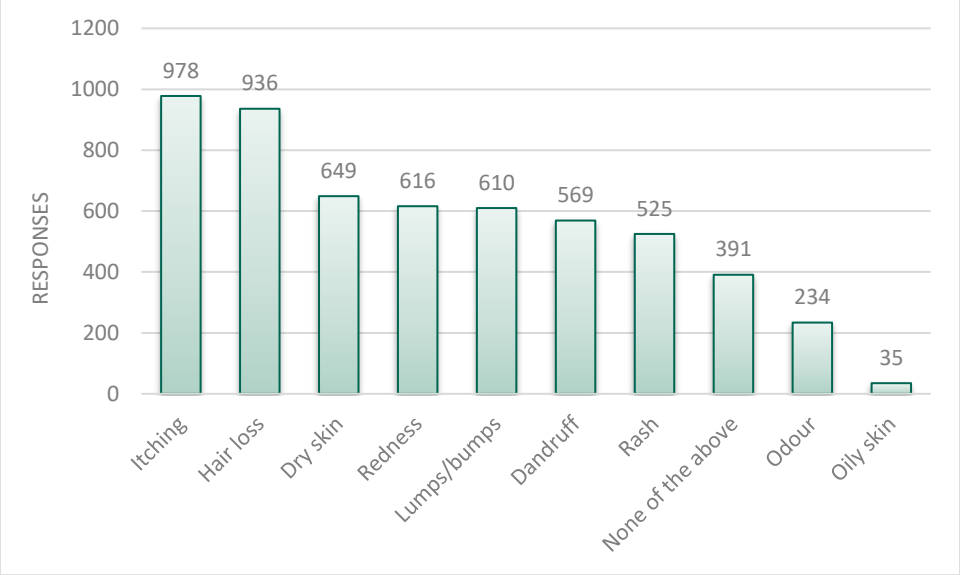


Figure 13: Clinical signs, as reported by their owners.

When asked if their Dachshund scratches, rubs, chews, licks or bites himself/herself, out of 2,433 responses, 1,407 (57.8%) answered ‘Yes – Intermittent’, 189 (7.8%) answered ‘Yes – Continuous’, and 837 (34.4%) answer ‘No’.

The majority of owners selected ‘chest’ for where on the body the problem started (21.5%, 822 of 3,820) and selected ‘none of the above’ for where on the body did the problem spread (38.3%, 1,334 of 3,479), suggesting that the problem often did not spread beyond the initial site.

Skin Allergies

When asked if their Dachshund has ever suffered from skin allergies, out of 2,279 responses, 1,011 (44.4%) answered “Yes”. The overall prevalence for skin allergies (10.2%, 1,011 of 9,908) reported in this survey is greater than the overall prevalence reported in the DachsLife 2018 health survey (8.2%).

Neutered dogs were significantly more likely to be affected by a skin allergy ($p < 0.001$, OR 1.55 (95% CI 1.28 – 1.88)). The median age of the affected dogs when they first experienced clinical signs associated with skin allergies was 2 years old (min: less than 1 year old, max: 12 years old).

When asked if the problems are worse at a particular time of year, out of 997 responses, 644 (64.6%) answered “Yes”, 233 (23.4%). Of these, the majority reported that their Dachshund’s skin allergies were worse in the summer (45.5%, 507 of 1,115).

The median age of the affected dogs when the suspected condition was confirmed by veterinary diagnosis was 2 years old (min: less than 1 year old, max: 14 years old). The most frequently reported diagnosis method was visual diagnosis by veterinary surgeon (52.6%, 637 of 1,210). When asked what treatment(s) improved the severity of the condition, the most frequently reported treatment was prescriptive medication – temporary (33.9%, 411 of 1,213). A full breakdown of results are shown in Figure 26.

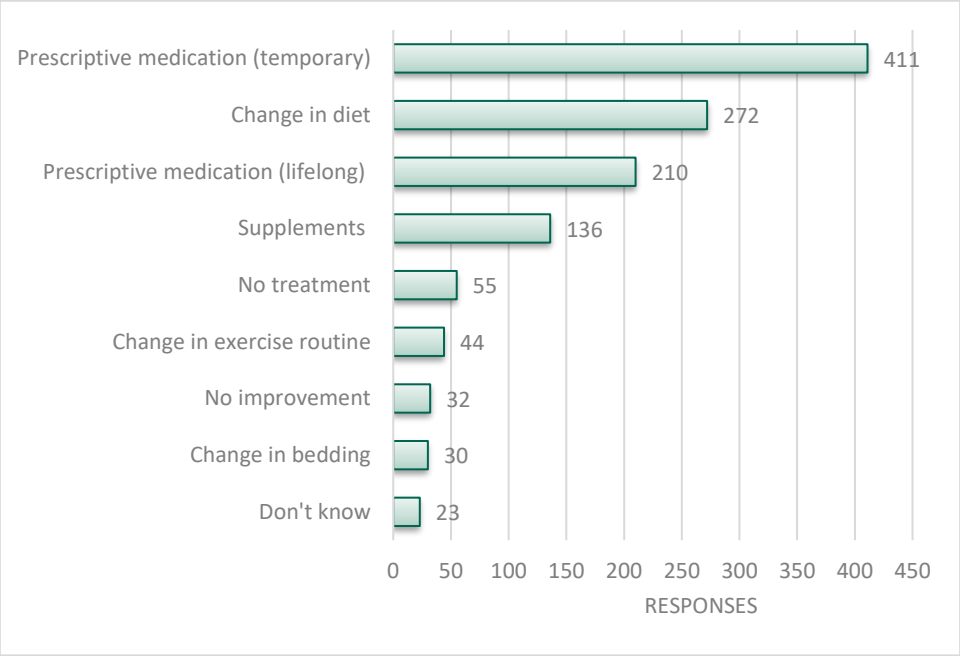


Figure 14: Treatments for skin allergies, as reported in the survey.

Patterned Baldness

When asked if their Dachshund has ever suffered from patterned baldness, out of 2,312 responses, 643 (27.8%) answered “Yes”.

The results show that dilute colours are significantly more likely to be affected by patterned baldness compared to the other coat colours with 75.0% (6 of 8) of isabella Dachshunds affected, 57.1% (16 of 28) of blue Dachshunds affected and 50.0% (1 of 2) of blue dapple Dachshunds affected ($p < 0.001$, OR 3.77 (95% CI 1.95-7.27)).

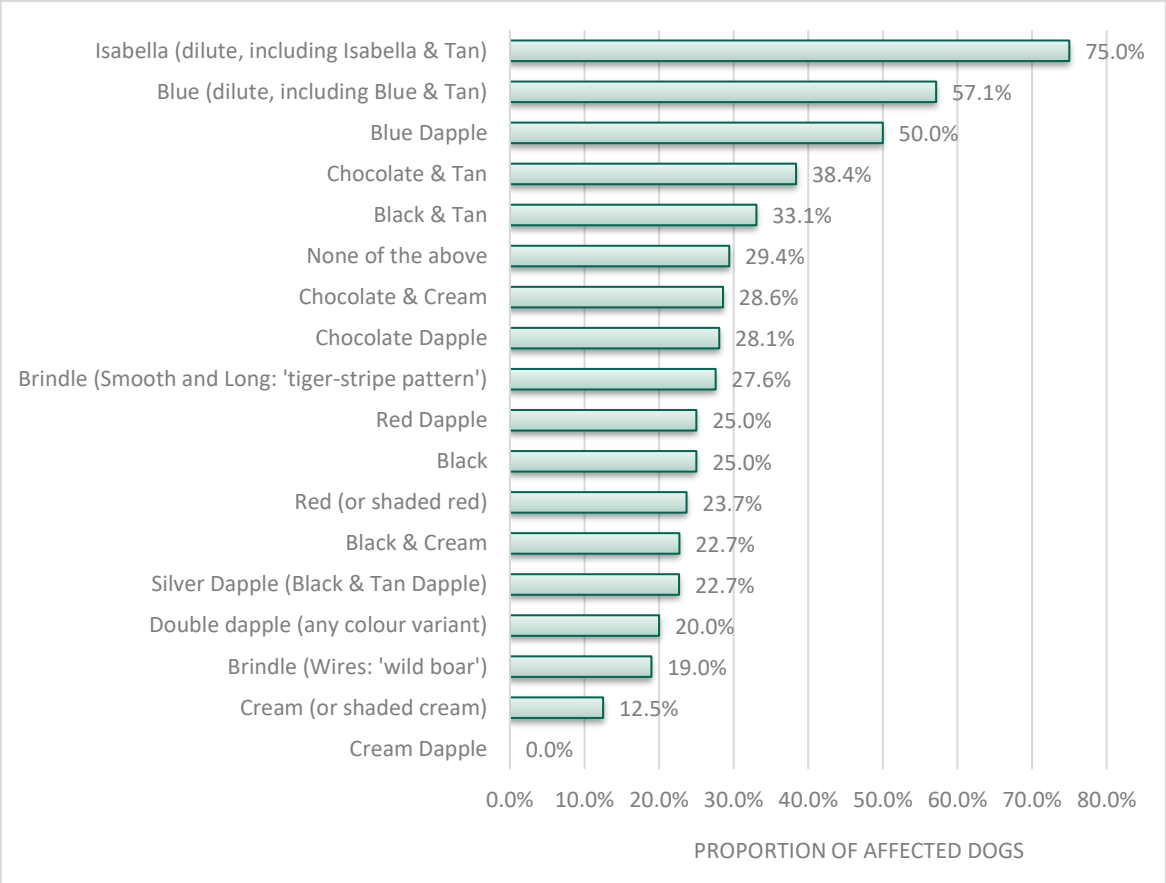


Figure 15: Proportion of dogs affected by patterned baldness per colour, as reported in the survey.

The median age of the affected dogs when they first experienced clinical signs associated with patterned baldness was 2 years old (min: less than 1 year old, max: 14 years old).

The majority of owners reported that their Dachshund is occasionally (e.g. yearly) affected by it (37.9%, 245 of 647).

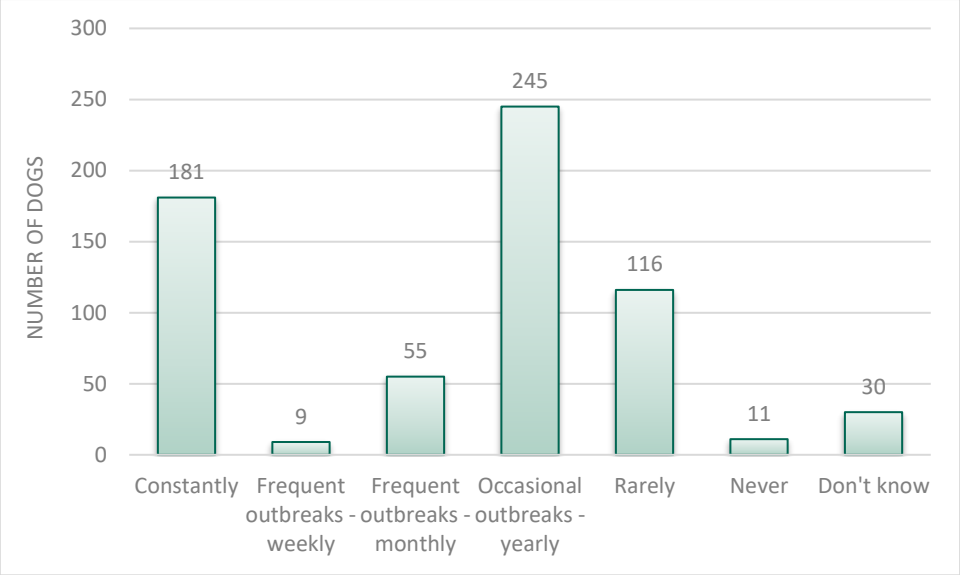


Figure 16: Frequency of patterned baldness outbreaks, as reported in the survey.

When asked if the problems are worse at a particular time of year, out of 647 responses, 317 (49.0%) answered “Yes. The majority reported that their Dachshund’s patterned baldness was worse in the winter (36.8%, 175 of 475).

The majority of owners reported patterned baldness around the chest area (23.6%, 331 of 1,400), followed by the ears (16.6%) and then the back (11.6%). When asked if the skin colour of the bald areas was darker than the surrounding skin, out of 632 responses, 141 (22.3%) answered “Yes”.

The graph below shows what time of year the owners noticed hair loss and hair regrowth. The majority of owners reported spontaneous hair loss in the winter (40.7%, 137 of 337) and spontaneous hair regrowth in the spring (36.2%, 96 of 265).

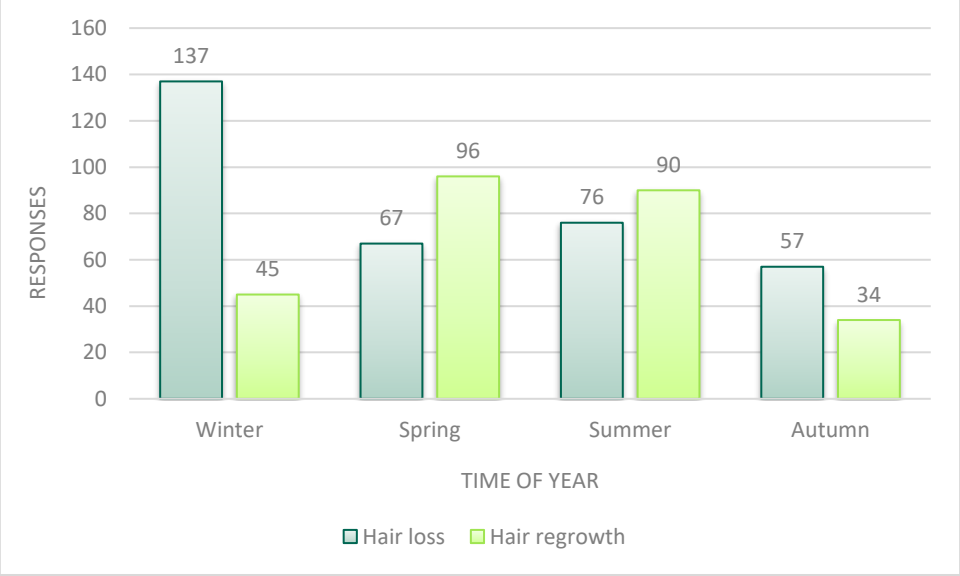


Figure 17: Time of year owners noticed hair loss and hair regrowth, as reported in the survey.

When asked what treatment(s) improved the severity of the condition, the most frequently reported answer was no treatment (23.0%, 169 of 734). This suggests that either there was no treatment that improved the severity of the condition or the condition improved without the need for treatment.

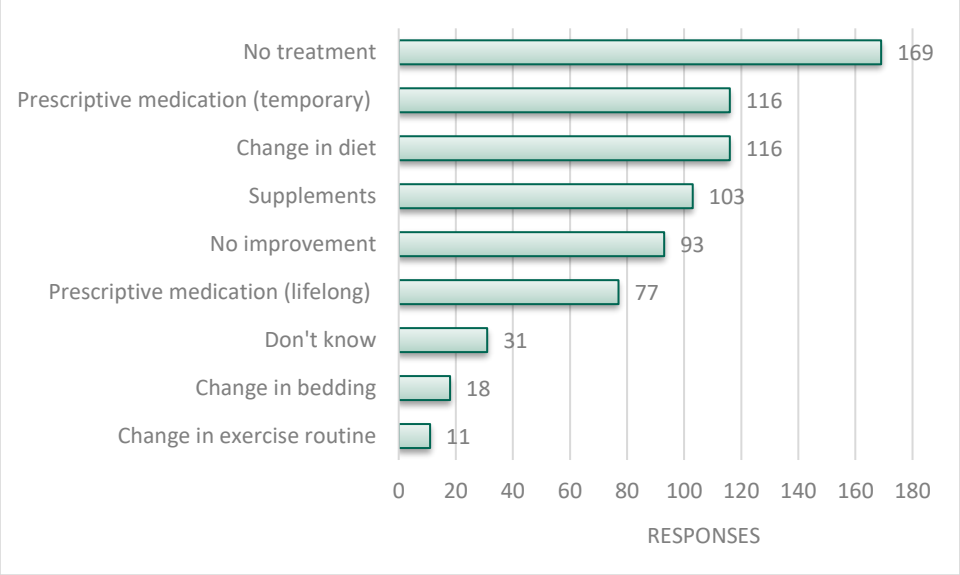


Figure 18: Treatments for patterned baldness, as reported in the survey.

Dermatitis

When asked if their Dachshund has ever suffered from dermatitis, out of 2,345 responses, 559 (23.8%) answered “Yes”.

The median age of the affected dogs when they first experienced clinical signs associated with dermatitis was 2 years old (min: less than 1 year old, max: over 16 years old).

The figure below shows how often these dogs are affected by the condition, with the majority of owners reporting that their Dachshund is occasionally (e.g. yearly) affected by it (35.7%, 204 of 572).

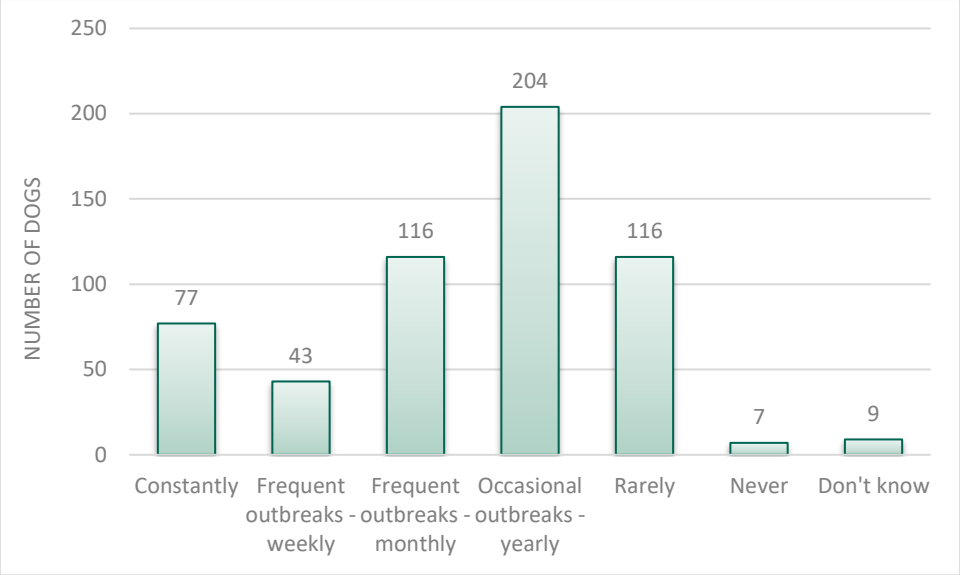


Figure 19: Frequency of dermatitis outbreaks, as reported in the survey.

When asked if the problems are worse at a particular time of year, out of 574 responses, 352 (61.3%) answered “Yes”. The majority reported that their Dachshund’s dermatitis was worse in the summer (41.8%, 251 of 600).

The median age of the affected dogs when the suspected condition was confirmed by veterinary diagnosis was 2 years old (min: less than 1 year old, max: over 16 years old). The the most frequently reported diagnosis method was visual diagnosis by veterinary surgeon (49.7%, 366 of 736).

When asked what treatment(s) improved the severity of the condition, the most frequently reported treatment was prescriptive medication – temporary (32.8%, 238 of 726).

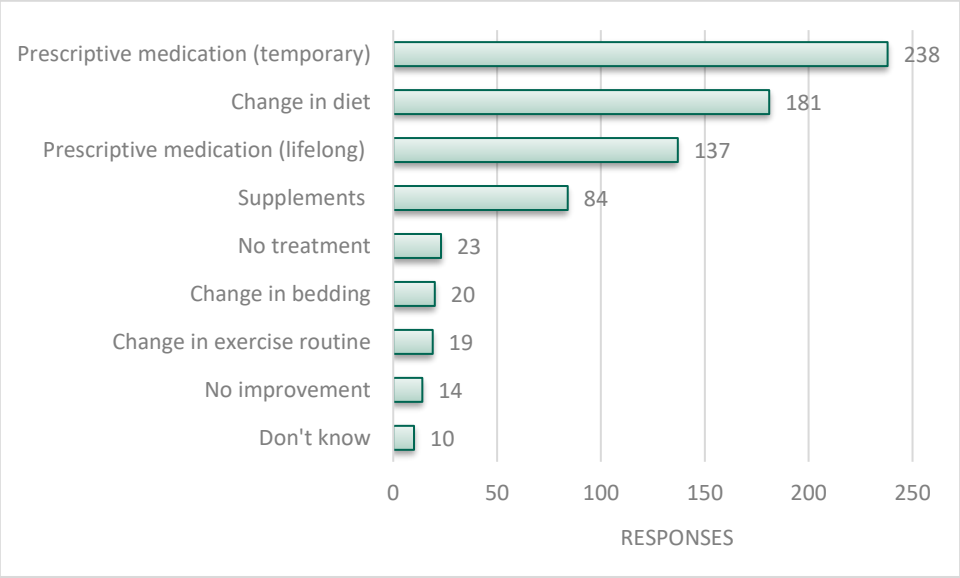


Figure 20: Treatments for dermatitis, as reported in the survey.

Ear Fissures

When asked if their Dachshund has ever suffered from ear fissures, out of 2,320 responses, 184 (7.9%) answered “Yes”. The median age of the affected dogs when they first experienced clinical signs associated with ear fissures was 2 years old (min: less than 1 year old, max: 12 years old).

The majority of owners reporting that their Dachshund is occasionally (e.g. yearly) affected by it (34.0%, 64 of 188).

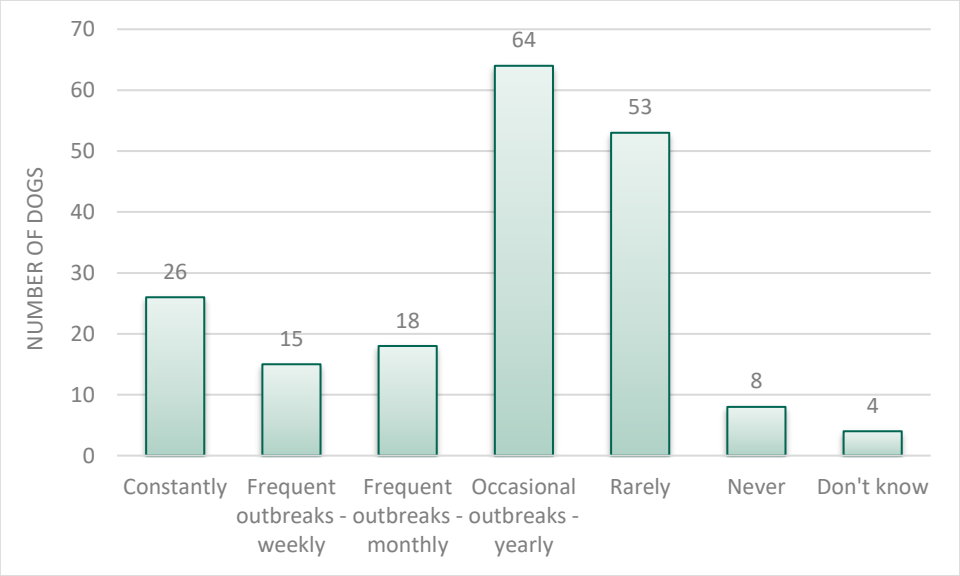


Figure 21: Frequency of ear fissure outbreaks, as reported in the survey.

When asked if the problems are worse at a particular time of year, out of 190 responses, 92 (48.4%) answered “Yes”. The majority reported that their Dachshund’s ear fissures were worse in the winter (52.0%, 64 of 123).

The median age of the affected dogs when the suspected condition was confirmed by veterinary diagnosis was 2 years old (min: less than 1 year old, max: 12 years old). The most frequently reported diagnosis was visual diagnosis by veterinary surgeon (62.6%, 97 of 155). When asked what treatment(s) improved the severity of the condition, the most frequently reported treatment was prescriptive medication – temporary (22.1%, 42 of 190).

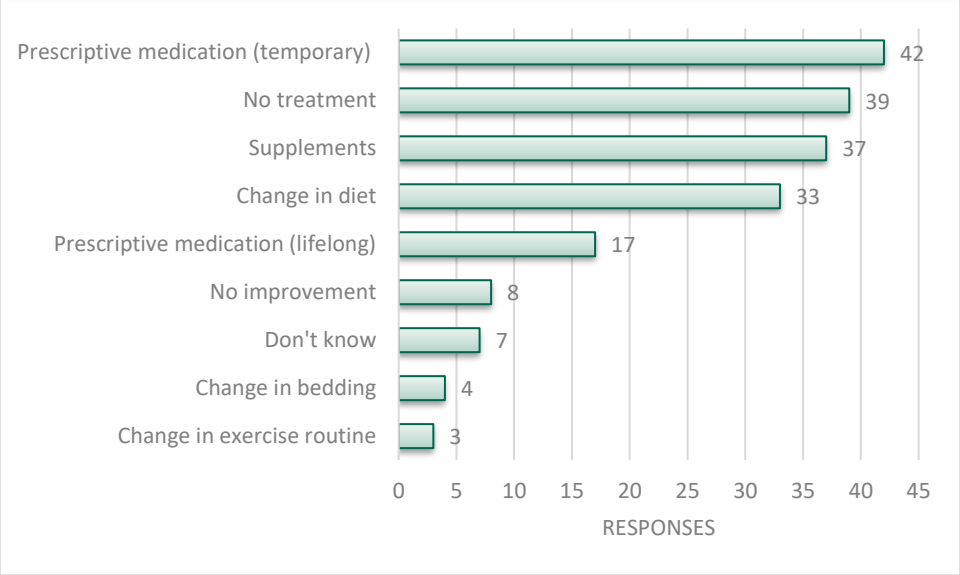


Figure 22: Treatments for ear fissures, as reported in the survey.

Colour Dilution Alopecia (CDA)

When asked if their Dachshund has ever suffered from colour dilution alopecia (CDA), out of 2,363 responses, 135 (5.7%) answered “Yes”, 1,900 (80.4%) answered “No” and 328 (13.9%) answered ‘Don’t know’. The overall prevalence for CDA (1.4%, 135 of 9,908) reported in this survey is greater than the overall prevalence reported in the DachsLife 2018 health survey (0.4%).

Please note, there was a high co-morbidity between CDA and patterned baldness in this survey indicating that owners were likely describing the same condition ($p < 0.001$, OR 10.02 (95% CI 6.51-15.43)).

The results show that dilute colours are significantly more likely to be affected CDA compared to other coat colours with 85.7% (6 of 7) of isabella Dachshunds affected, 82.1% (23 of 28) of blue Dachshunds affected, and 50.0% (1 of 2) of blue dapple Dachshunds affected ($p < 0.001$, OR 77.27 (95% CI 33.16-180.02)).

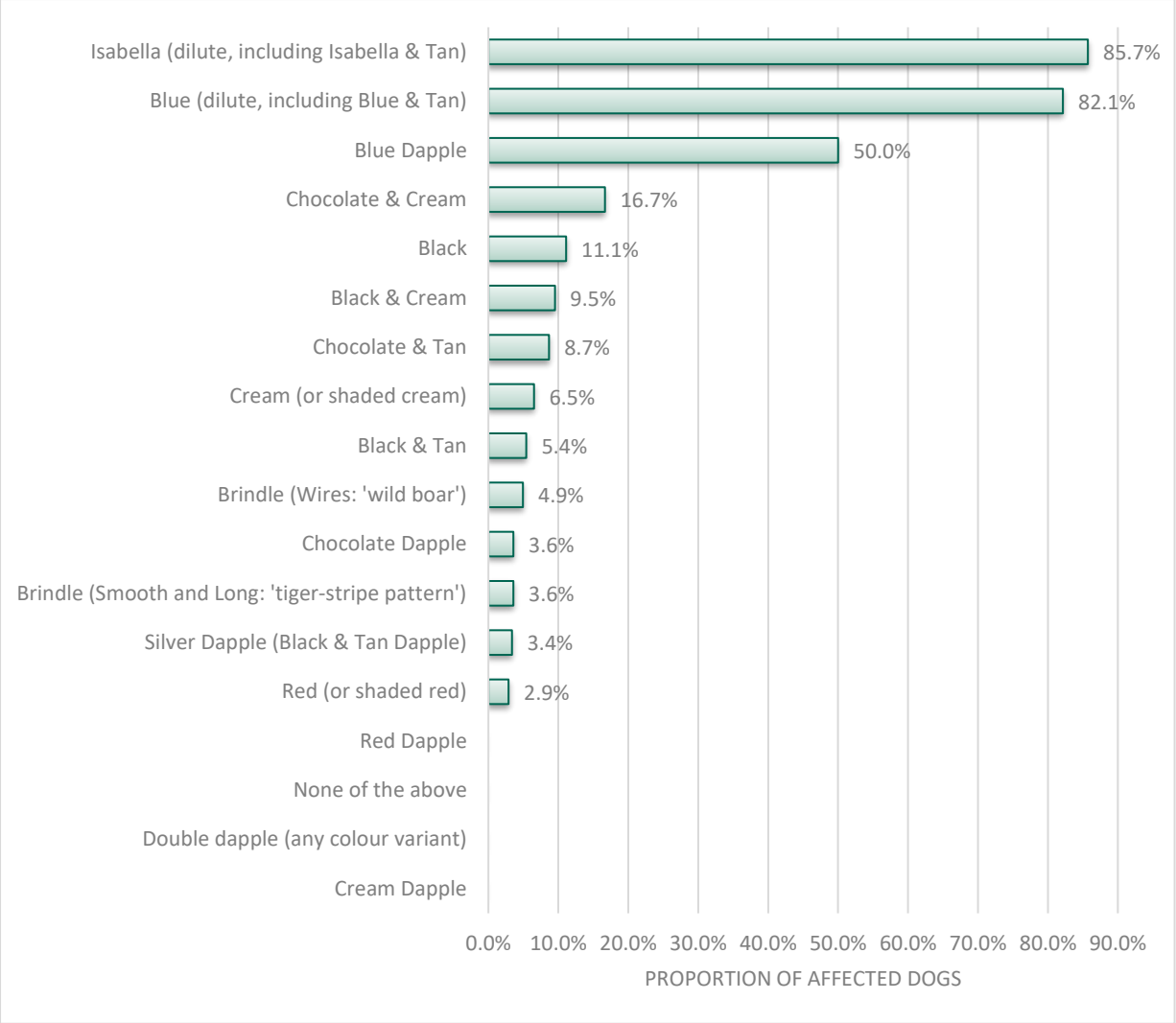


Figure 23: Proportion of dogs affected by CDA per colour, as reported in the survey.

The median age of the affected dogs when they first experienced clinical signs associated with CDA was 2 years old (min: less than 1 year old, max: 12 years old).

Figure 24 shows how often these dogs are affected by the condition, with the majority of owners reporting that their Dachshund is constantly affected by it (37.4%, 52 of 139).

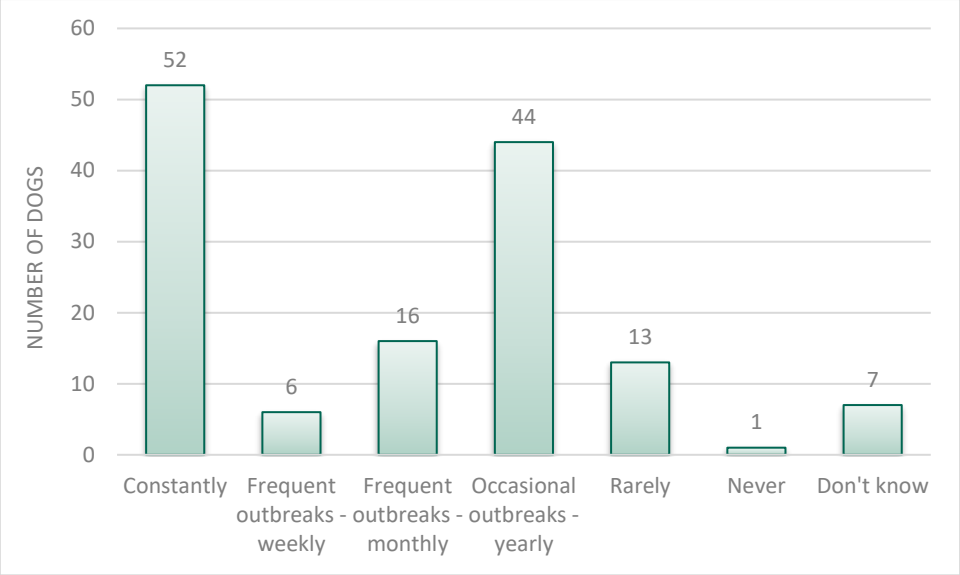


Figure 24: Frequency of CDA outbreaks, as reported in the survey.

When asked if the problems are worse at a particular time of year, out of 140 responses, 60 (42.9%) answered “Yes”. The majority reported that their Dachshund’s CDA was worse in the winter (41.5%, 34 of 82).

The median age of the affected dogs when the suspected condition was confirmed by veterinary diagnosis was 2 years old (min: less than 1 year old, max: 12 years old). The most frequently reported diagnosis method was visual diagnosis by veterinary surgeon (44.4%, 73 of 166).

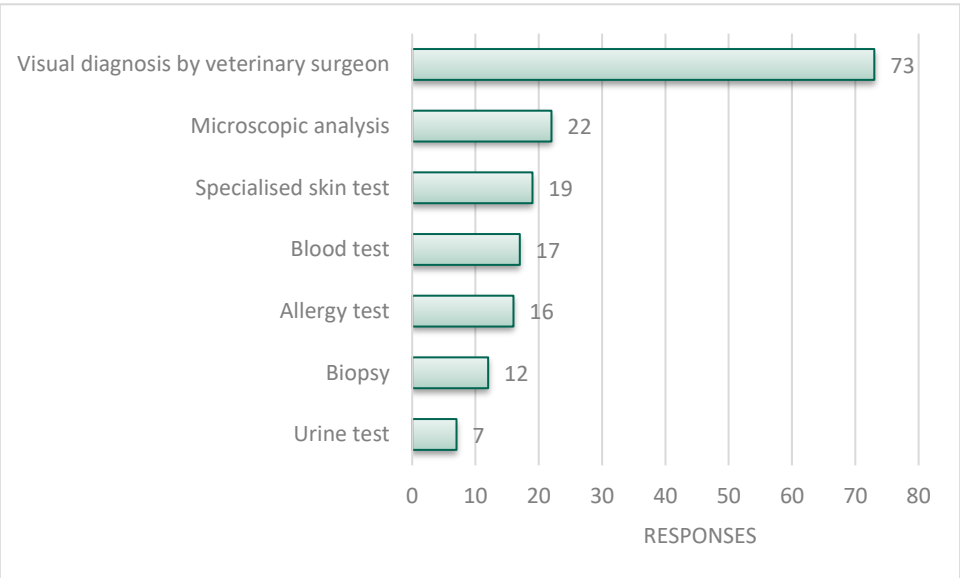


Figure 25: Method of diagnosis for CDA, as reported in the survey.

When asked what treatment(s) improved the severity of the condition, the most frequently reported treatment was a change in diet (21.2%, 36 of 170). A full breakdown of results are shown in Figure 26.

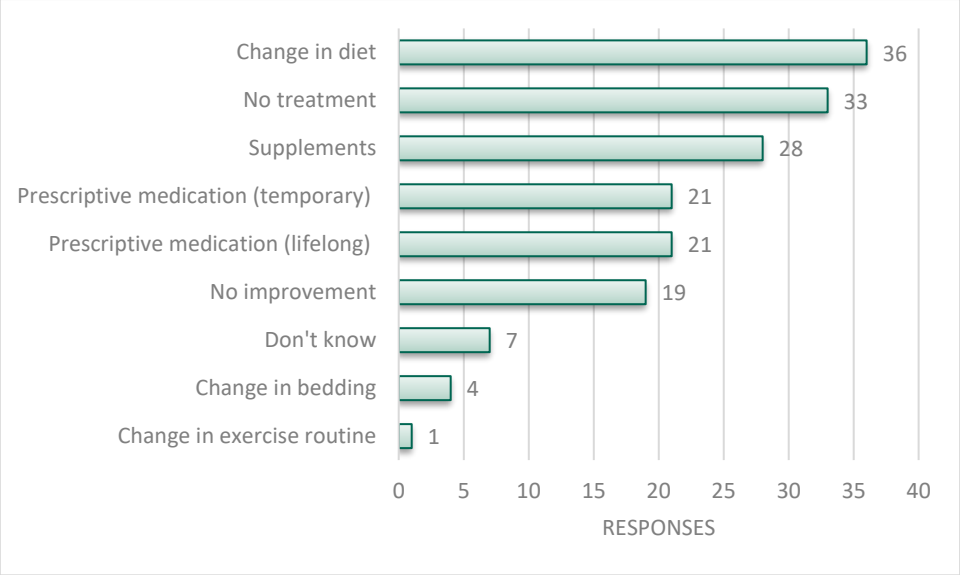


Figure 26: Treatments for CDA, as reported in the survey.

Autoimmune Conditions

When asked if their Dachshund has ever suffered from an autoimmune condition, out of 2,367 responses, 101 (4.3%) answered “Yes”.

The results show that neutered dogs are more likely to be affected by an autoimmune condition, but weakly ($p = 0.03$, OR 1.66 (95% CI 1.05 – 2.63)).

Dilute colours were significantly more likely to be affected by an autoimmune condition ($p < 0.01$, OR 3.79 (95% CI 1.41-10.19)), in particular dogs with an isabella coat colour ($p < 0.01$, OR 8.55 (95% CI 1.55-47.25)) with 33.3% (2 of 6) of isabella Dachshunds in this survey being affected by an autoimmune condition. Unfortunately, there was not enough data to calculate an odds ratio for cream dapple Dachshunds being affected by an autoimmune condition.

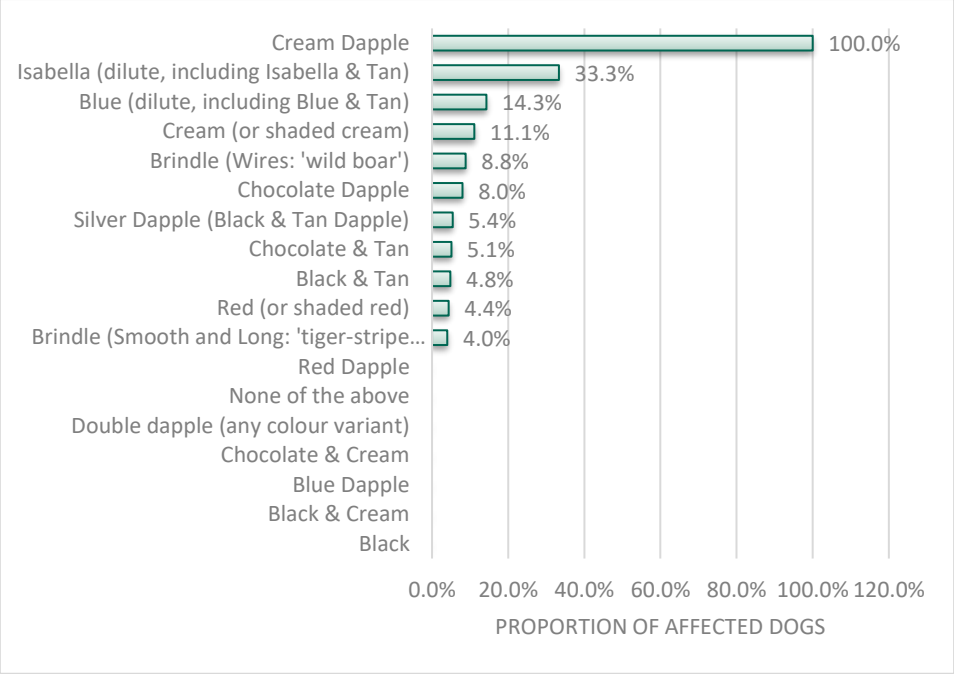


Figure 27: Proportion of dogs affected by an autoimmune condition per colour, as reported in the survey.

The median age of the affected dogs when they first experienced clinical signs associated with their autoimmune condition was 2 years old (min: less than 1 year old, max: 14 years old).

Figure 52 shows how often these dogs are affected by the autoimmune condition, with the majority of owners reporting that their Dachshund is constantly affected by it (37.4%, 37 of 99).

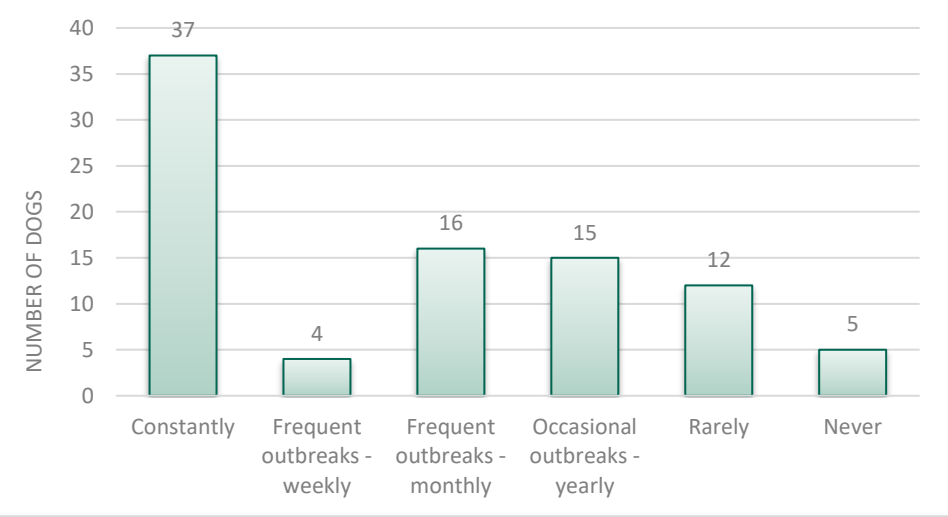


Figure 28: Frequency of autoimmune condition outbreaks, as reported in the survey.

When asked if the problems are worse at a particular time of year, out of 100 responses, 29 (29.0%) answered “Yes”. The majority reported that their Dachshund’s autoimmune condition was worse in the summer (37.0%, 17 of 46).

The median age of the affected dogs when the suspected autoimmune condition was confirmed by veterinary diagnosis was 3 years old (min: less than 1 year old, max: 15 years old). The most frequently reported diagnosis was via blood test (26.6%, 51 of 192).

When asked what treatment(s) improved the severity of the autoimmune condition, the most frequently reported treatment was prescriptive medication – lifelong (32.8%, 45 of 137).

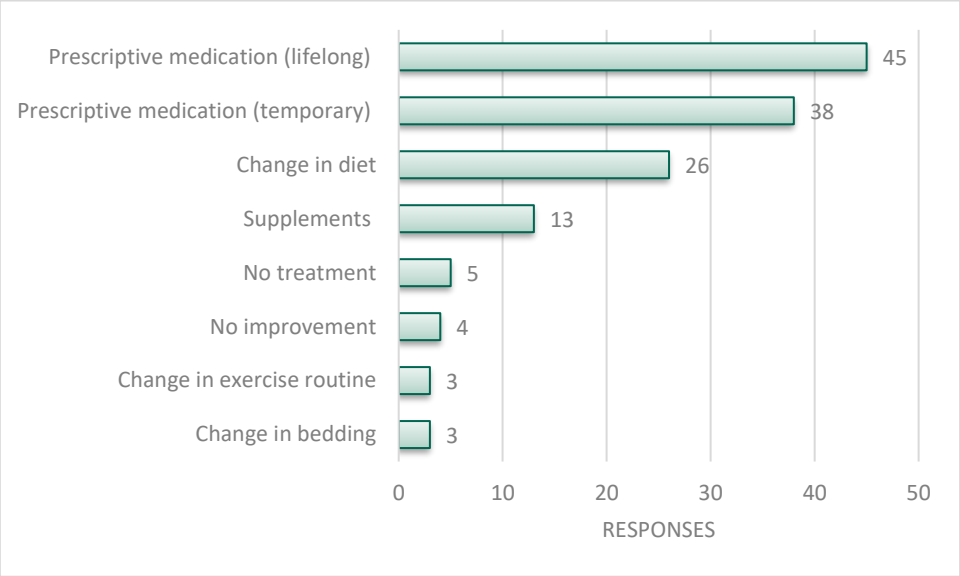


Figure 26: Treatments for the autoimmune condition, as reported in the survey.

Skin Cancer

When asked if their Dachshund has ever suffered from skin cancer, out of 2,229 responses, 22 (1.0%) answered “Yes”.

The median age of the affected dogs when they first experienced clinical signs associated with skin cancer was 9 years old (min: less than 1 year old, max: 15 years old). The median age of the affected dogs when the suspected condition was confirmed by veterinary diagnosis was also 9 years old (min: less than 1 year old, max: 15 years old).

The most frequently reported diagnosis was visual diagnosis by veterinary surgeon (32.4%, 12 of 37). When asked what treatment(s) improved the severity of the condition, the most frequently reported treatment was surgery – lump removal (67.9%, 19 of 28).

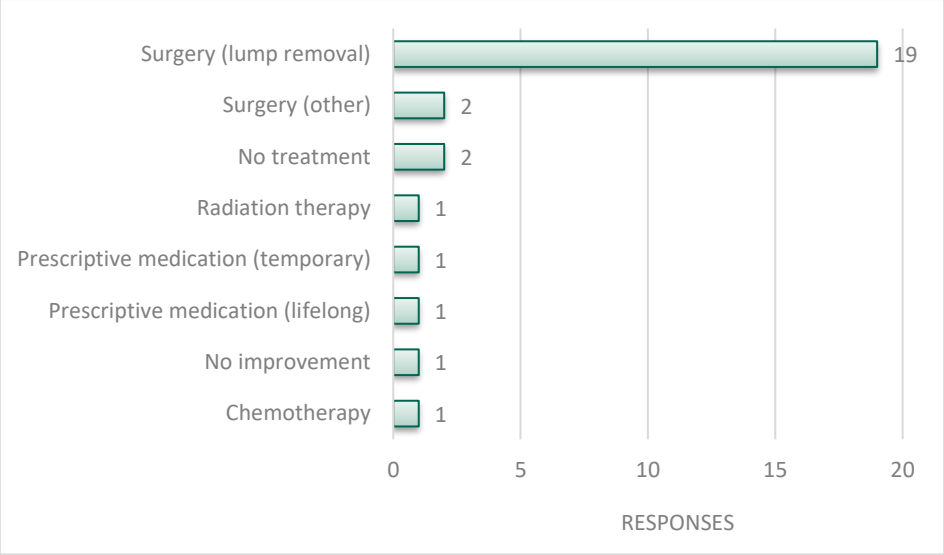


Figure 27: Treatments for skin cancer, as reported in the survey.

Intervertebral disc disease (IVDD)

When asked if their Dachshund has ever suffered from intervertebral disc disease (IVDD), out of 8,542 responses, 937 (11.0%) answered “Yes”.

The median age of the affected dogs when they first experienced clinical signs associated with IVDD was 5 years old (min: less than 1 year old, max: 15 years old). Figure 58 shows an initial increase in cases of IVDD up to 5 years of age followed by a decrease in cases.

Please note that nearly half of the dogs included in this survey were under the age of 4, which is below the general risk age for developing IVDD.

Figure 28: Onset of IVDD, as reported in the survey.

Dogs under the age of 4 were excluded from the following analysis as they are, in general, less likely to have IVDD. Out of 4,354 dogs, that were 4 years or older, 910 (20.9%) had been affected by IVDD at some point in their lifetime.

Of these dogs, 485 (53.3%) were male and 425 (46.7%) were female. The most common Dachshund variety affected by IVDD was Miniature Smooth Haired (62.3%, 567 of 910), followed by Miniature Wire Haired (12.1%) and then Miniature Long Haired (10.7%).

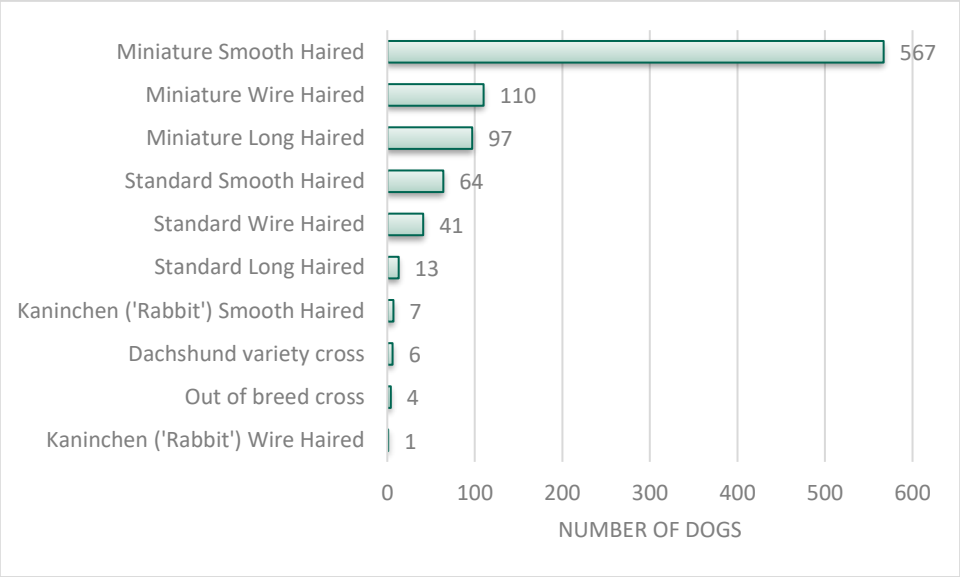


Figure 29: Dachshund varieties affected by IVDD, as reported in the survey.

Previous reports suggest that neutering increases the risk of developing IVDD (Packer et al, 2016). Of the dogs in the survey that were 4 years or older and affected by IVDD, 717 (78.8%) were neutered and 191 (21.0%) were entire. Of the known ages for neutering, 39.7% (276 of 696) were neutered under the age of 1 and 63.5% (442 of 696) were neutered under the age of 2. The results from this survey support previous reports and show that neutered dogs are significantly more likely to be affected by IVDD ($p < 0.001$, OR 1.85 (95% CI 1.55 – 2.20)).

A full report is available on the Dachshund Health UK website here: Survey Results | Dachshund Health UK

IVDD Surveys 2022-23

The breed recently launched two health surveys to compare responses between Dachshunds with IVDD and Dachshunds over 8 years of age without IVDD. As well as this, the survey aimed to gather data on each dog's IVDD journey (surgical or conservative), and to examine recovery rates, timeframes and approaches taken to aid recovery.

A total of 1,869 results were received across both surveys.

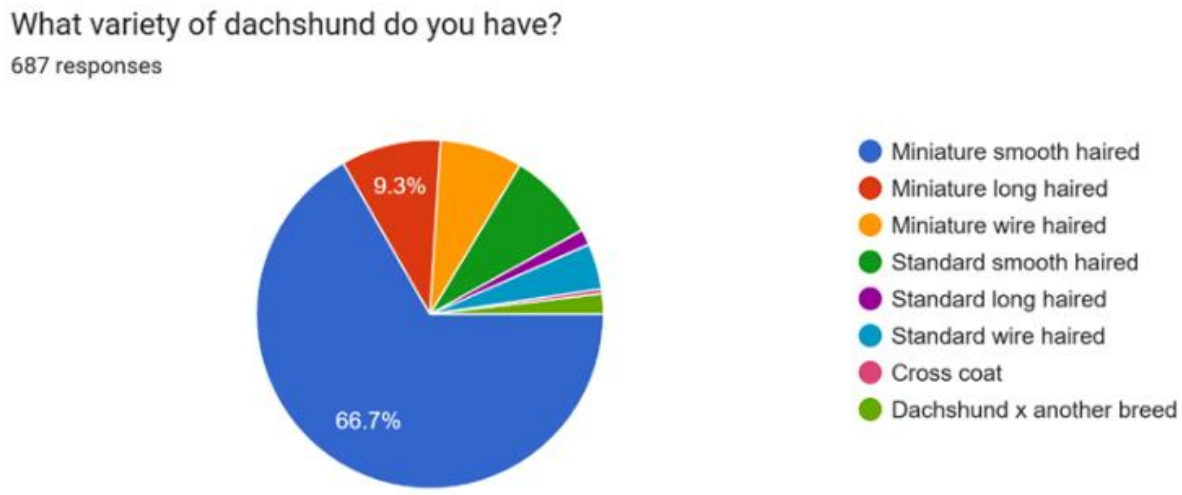
IVDD and other health issues

With respect to the medical history of both groups, a similar number (75%) of each group had no other health issues. In the IVDD group a slightly higher occurrence of allergies and skin issues was noted. Across both groups, IVDD was reported as the leading health issue, and food and environmental allergies affected under 10% of respondents.

Respondents

- Unaffected: 87% of respondents were from the UK
- Affected: 90% of respondents were from the UK

The varieties of unaffected dogs reported are shown below:



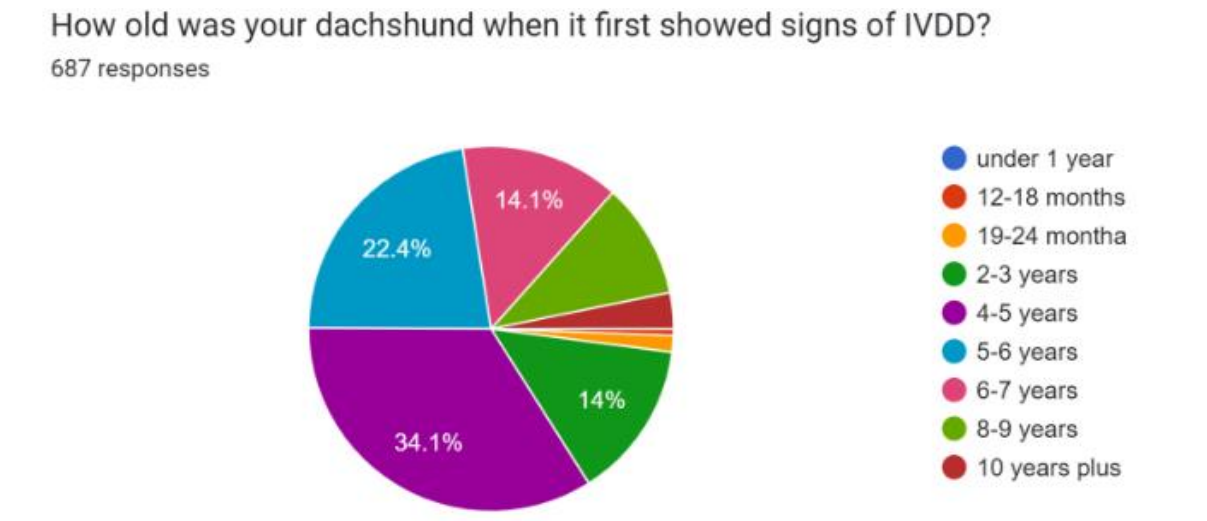
IVDD Treatment and recovery

With respect to the affected dogs:

- 71% were aged between 4-7 years old when they first showed signs of IVDD
- 68% were insured
- 79% were referred to a specialist
- Approximately 4% of dogs presenting with IVDD were euthanised before, during or after treatment

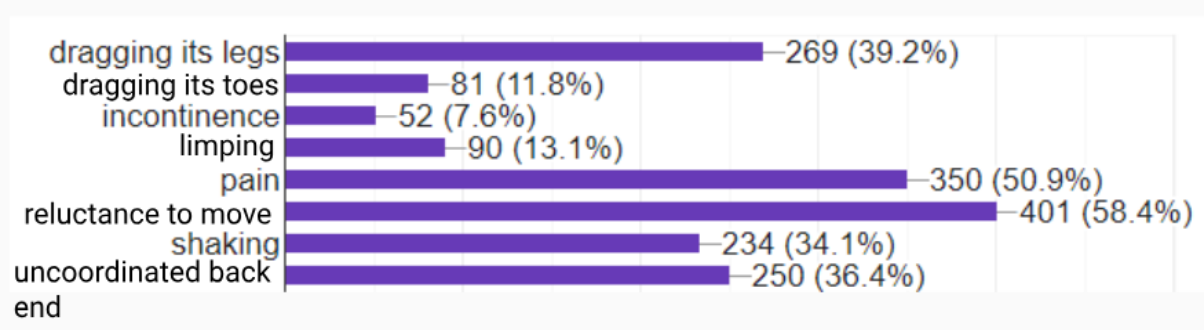
The top 5 groups or charities that supported owners of affected dogs were:

- 42%: Dachshund IVDD UK Facebook page
- 34%: Dedicated to Dachshunds
- 24%: Dachshund IVDD UK Website
- 10%: Dachshund Health UK Website
- 8%: The Red Foundation - Emergency Dachshund Rescue UK

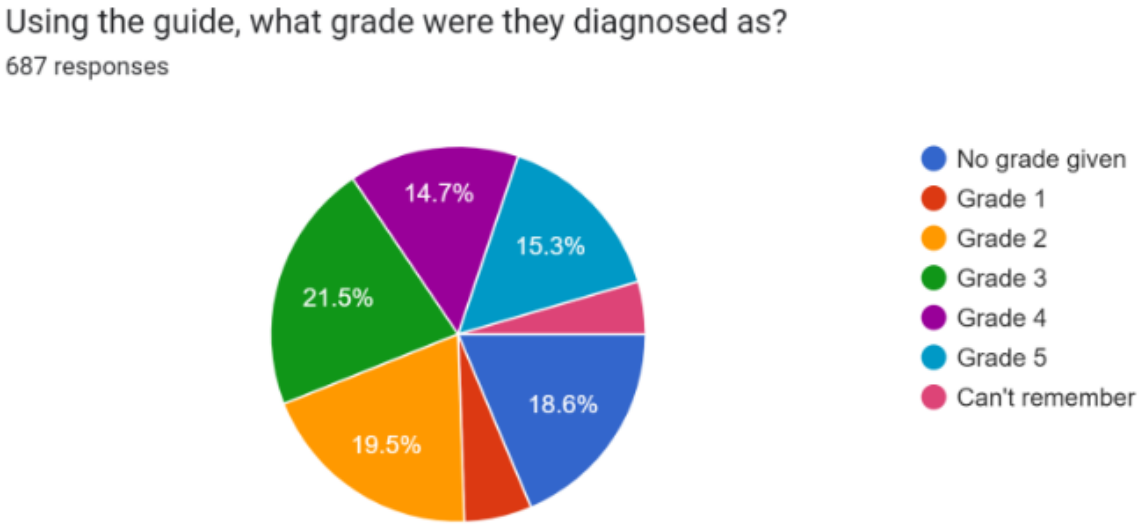


Initial signs of IVDD

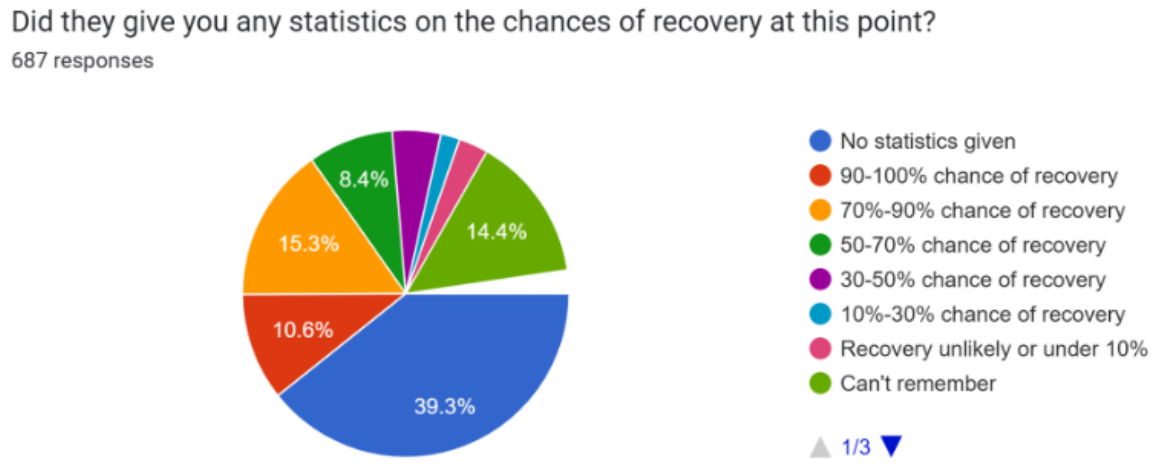
The most common sign was a reluctance to move (58.4%)



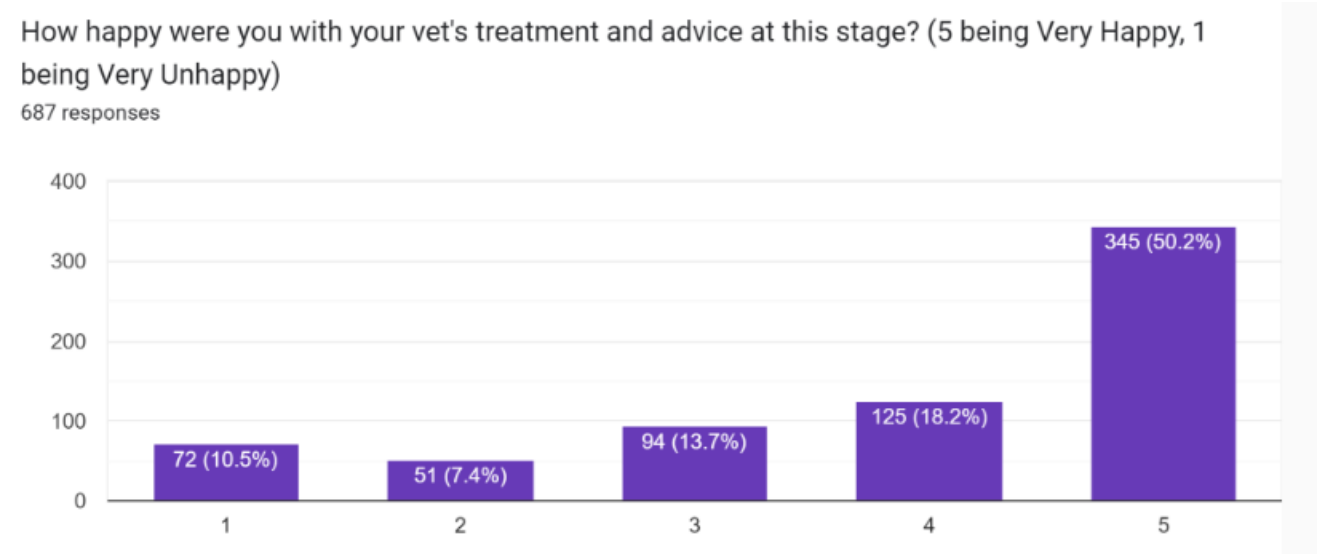
Initial grade of IVDD diagnosed by vet



Initial prognosis by vet



Satisfaction with initial vet's treatment and advice

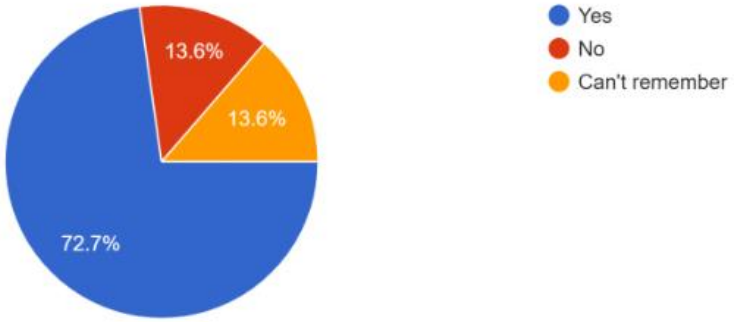


For the affected dogs, 91% received surgery, in which 19% had worsening signs in the first week after surgery. In addition, 72% were continent, 14% were urinary incontinent but did not need expressing, 10% had bowel incontinence, 15% needed bladder expressing and 6% were affected by urinary infections.

Advice from referral vet

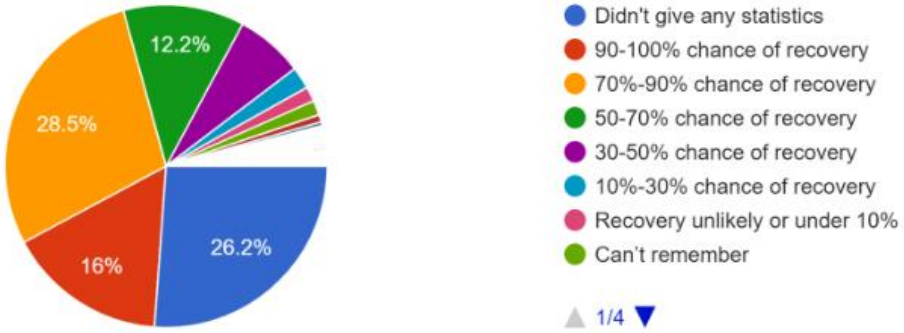
Did the referral clinic discuss surgical recovery statistics with you at your initial consultation?

543 responses



If yes, what were they?

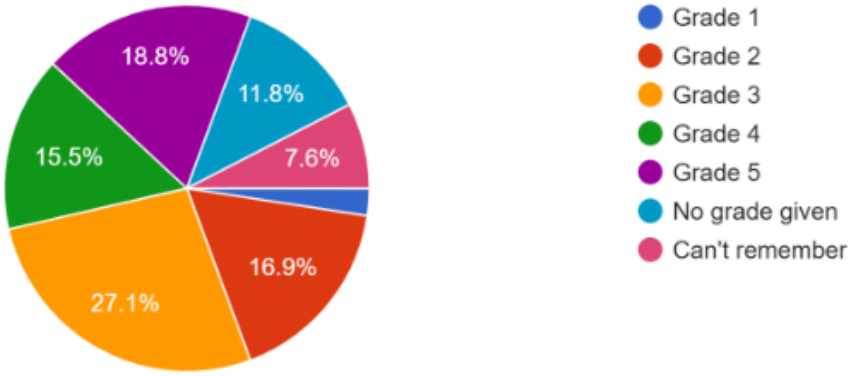
543 responses



Grade of IVDD diagnosed by referral vet

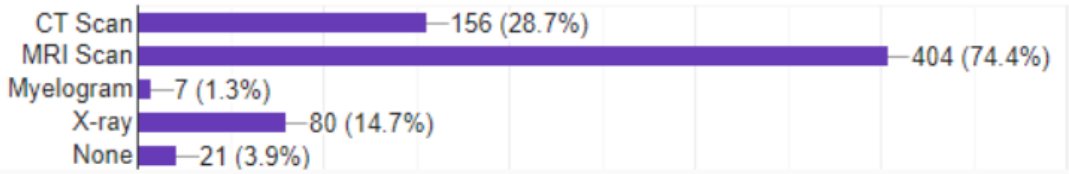
Using the guide, what grade were they diagnosed as by the referral vet?

543 responses



Imaging done by referral vet

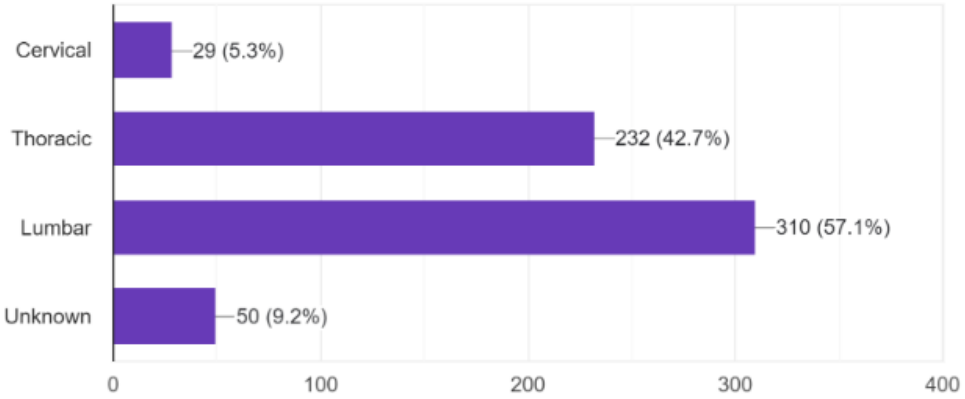
543 responses



Affected discs

Which disc(s) were affected? (see image) C=Cervical, T=Thoracic L= Lumbar. If multiple discs were affected, please check whatever applies.

543 responses



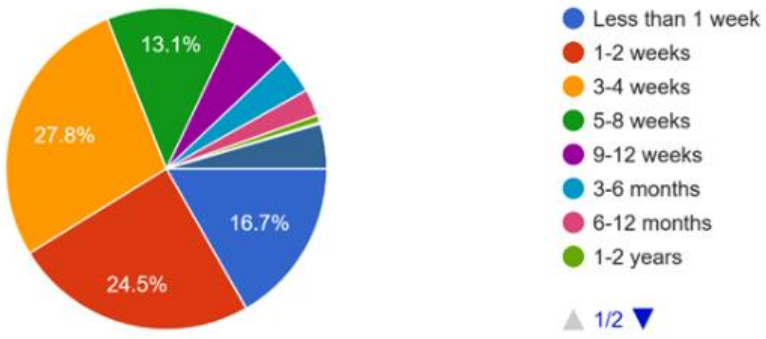
Surgery

Of the 543 dogs, 91% were reported to have had surgery, 7.9% did not, and the remaining 1.1% were sadly euthanised at that stage.

Improvements after surgery

How long did it take to see any improvements?

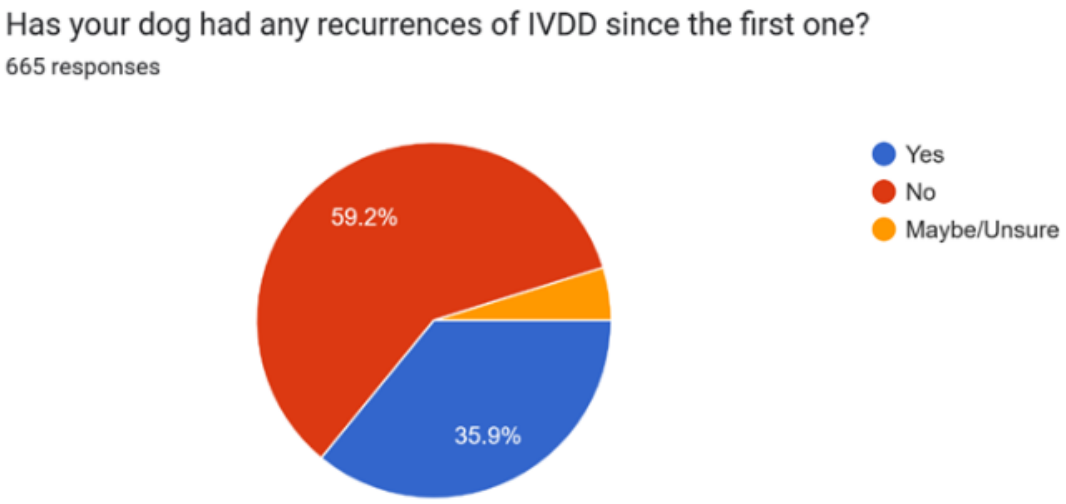
665 responses



Mobility after surgery

Of 665 responses, 81.4% of Dachshunds regained full walking mobility 1 year post-surgery.

Recurrences after first IVDD incident



Lifestyle factors

Neutering

As found in previous research and Dachslife surveys, there was a significantly higher proportion of dogs affected by IVDD who had been neutered under 2 years of age, than those who were left entire.

Of the unaffected dogs:

- 98% had not been chemically castrated
- 75% were surgically castrated
- 42% were surgically castrated under 2 years old

Of the affected dogs:

- 96% had not been chemically castrated
- 75% were surgically castrated
- 55% were surgically castrated under 2 years of age

Collar vs. harness

There was a significant difference found between dogs wearing collars and harnesses, with Dachshunds that wore a harness being twice (2.3 times) as likely to be affected by IVDD than those walked in collars (consistent with previous studies that have determined this to be a risk factor). Of those affected by IVDD in this survey, 29% changed to using a harness after IVDD occurred.

	Collar	Harness
Affected	38% (261)	38% (261)
No IVDD	53% (501)	25% (236)

Body condition

In total, 25% of dogs affected by IVDD were overweight (BCS >5), and 6% were classed as underweight (BCS <4). Of the dogs not affected by IVDD, 31% were overweight, and 5% underweight. No statistical significance was found between weight in this survey.

Behaviour

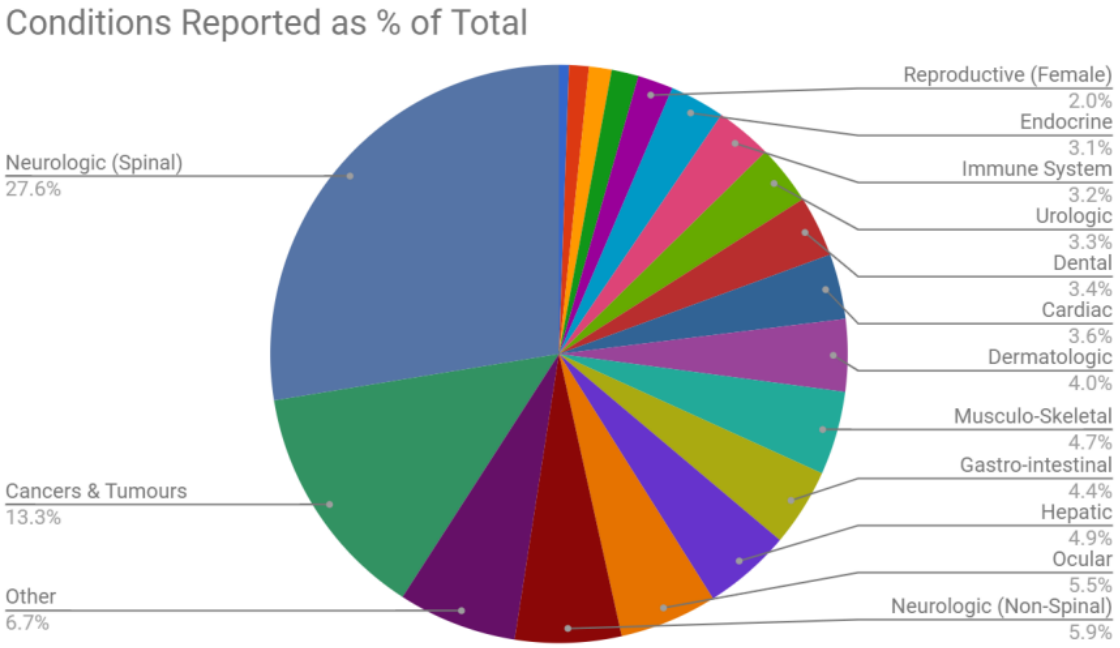
There was a notable increased number of behavioural issues in dogs that went on to suffer with IVDD, which may open up an area to be explored further.

	No IVDD	**IVDD Affected**
No behavioural issues	49%	42%
Reactivity to dogs	24%	31%
Reactivity to strangers	17%	25%
Separation anxiety	13%	22%
Hyper-attachment	6%	7%
Food resource guarding (human)	4%	6%
Food resource guarding (dogs)	7%	5%

The full report can be found here:
https://www.dachshundhealth.org.uk/welcome/ivdd-survey-results-2022-23

Rolling online health survey

The Dachshund Breed Council have been running an online health survey since 2009 and have received 1,077 reports to date. The number of reports of each category of health condition is shown below.



Owners can submit a new report through the following link: [Submit a report | Dachshund Health UK]

LITERATURE REVIEW

The literature review lays out the current scientific knowledge relating to the health of the breed. We have attempted to refer primarily to research which has been published in peer-reviewed scientific journals. We have also incorporated literature that includes dogs residing within the UK primarily, and literature that was released relatively recently to try to reflect current publications and research relating to the breed. However, papers from overseas have been included too, as it is acknowledged that dog populations are not restricted to any one country, and new findings in other countries may be relevant to the population within the UK.

Cancers

Gastrointestinal epithelial tumours: A Japanese study of 131 tumour samples identified Miniature Dachshunds as predisposed, with the breed making up 49 of these tumours (Saito et al, 2020). The most common tumours in the Miniatures were adenomas (benign, n=25) and acinar (n=21). Odd ratios were not provided in this paper, so it may be that the breed were over-represented due to their larger population size. The authors did mention the below papers and possible links of gastrointestinal tumours with inflammatory colorectal polyps, but this association needs further exploration.

Lymphoma: Another Japanese study determined that Miniature Dachshunds were predisposed to lymphoma, making up 108 of 257 cases reviewed, with onset at a younger age, and a longer survival time than compared breeds (Rimpo et al, 2021). The most common type of lymphoma was gastrointestinal (52 of 108), followed by

multicentric (n=33), and cutaneous (n=11), with Miniature Dachshunds being significantly more likely to be affected by a gastrointestinal lymphoma than the other breeds included. The age of onset in Miniature Dachshunds showed a peak in dogs under 4 years of age, and another over 10 years, with the authors suggesting that a genetic influence may have a role to play. Again, the relatively recent explosion in popularity may account for the breed's over-representation, as well as the younger age of onset and longer survival time.

Cardiovascular conditions

Mitral valve disease/ prolapse (MVD): Studies going back to the late 90s describe MVP affecting the Dachshund (Pedersen et al, 1996; Olsen et al, 1999; Olsen et al, 2003). These papers found that the dogs with heart murmurs had a higher correlation of clinical disease, and suggested a polygenic mode of inheritance. A more recent Polish study determined that dogs affected at their small animal clinic were of later age (11.9 years for females and 11.3 years for males) and apart from enlarged heart size with increased disease severity, found few other cardiac complications (Garncarz et al, 2013). Another Polish paper estimated a prevalence of 63.6% of Dachshunds (n=124) were affected by MVP upon Doppler echocardiogram (ultrasound), despite being diagnosed as clear during auscultation (stethoscope) (Garcarz et al, 2017). The percentage of dogs affected increased significantly with age over 5 years, and males were seen to be more affected than females (not shown to be statistically significant). An American paper in 2018 attempted to determine genetic factors for disease in the breed, using canine variants orthologous to human genes, but were unsuccessful in finding any candidates associated with MVD (Meurs et al, 2017).

In terms of the UK population, one VetCompass paper investigated the odds of breeds as part of a breed-wide study (Mattin et al, 2015). Out of a total of 111,967 dogs attending primary care veterinary practices 405 were diagnosed as affected by DMVD, and a further 3,557 with heart murmurs. The breed (all varieties) were listed as being at a slightly increased risk of heart murmurs (odds ratio of 1.42, 95% CI: 1.06 – 1.90) but not of degenerative mitral valve disease (DMVD), with only six affected cases of DMVD. An action to explore this further is included in the action plan.

Dermatological conditions

Merle: Dappling in Dachshunds (named merle in other breeds) is a recognised colour for the breed, but can cause health problems where two dapples are bred together, such as deafness, blindness, and severe ocular abnormalities (Ballif et al, 2021). The merle trait is inherited in an incomplete autosomal dominant inheritance, and dogs can carry the allele as a hidden, mosaic or cryptic, meaning the phenotype does not clearly show merle characteristics. The trait is known to be caused by mutations within *PMEL,* with the authors of this paper recommending that dogs that do not appear merle are tested to prevent inadvertently producing affected puppies.

Colour dilution alopecia (CDA): CDA is a rare condition affecting dogs with diluted coat colour in which aggregation of the melanocytes leads to dysplasia of the hair follicles (follicular dysplasia) and breakage of the hair shafts, resulting in irreversible hair loss (Kim et al, 2005). Dogs are born with normal coat and skin, with gradual hair thinning starting typically between three and 12 months. The hair loss is the primary symptom of CDA and in itself does not cause itching or skin lesions, however, the alopecic skin can become dry and scaly, with increased risk for secondary bacterial and fungal infections, which can subsequently lead to pruritus (itching). There are no publicly available estimates of how many of CDA-affected dogs go on to develop secondary bacterial infections.

In Dachshunds, two studies have documented CDA in all dogs with diluted colour, however, both of these studies examined familial groups of dogs (Austin, 1975; Beco et al, 1996). Given that there has been a clear rise in the popularity of Miniature Dachshunds, and with this, a rise in fashionable colours such as dilutes, a “Colour Watch” scheme has been established to monitor the trends in colour overtime.

Endocrine conditions

Diabetes mellitus: Dachshunds were reported to be more likely to develop anti-insulin antibodies than crossbreeds in a study of blood samples collected in the UK between 2002 and 2010 from 942 cases (including 14 Dachshunds) and 100 controls (Holder et al, 2015). Development of anti-insulin antibodies can lead to higher doses of insulin being needed to control blood glucose levels.

Immunological conditions

Inflammatory colorectal polyps: A number of Japanese papers have been published which explore an apparent increased risk of colorectal polyps in Miniature Dachshunds in Japan, based on an initial paper which found that the varieties made up 48% of colorectal polyps (of 33 samples) (Ohmi et al, 2011). These polyps appear to have an immunological nature and marked upregulation of several genes involved in immune cell expression (Ohta et al, 2013; Uchida et al, 2016; Konishi et al, 2019; Ohta et al, 2020). Similarly, other cellular regulating genes that mediate the movement of immune cells have been found to be highly expressed in affected samples, further supporting the immunoregulatory influence on this condition in the breed (Nagata et al, 2020; Nagata et al, 2022). Further, given the inflammatory basis of this condition, affected dogs appear to respond well to immunosuppressive treatment (Ohmi et al, 2011). To date, no reports of this condition have been seen in the UK population.

Nonregenerative immune-mediated anaemia: A relatively recent paper explored medical records retrospectively of dogs presented with this form of haemolytic anaemia (Woolhead et al, 2020). Miniature Dachshunds were suggested to be predisposed, making up 5% of the 59 dogs examined, and with an odds ratio of 5.49 (95% CI 1.71 – 17.59). A Japanese paper also found the breed to be predisposed when considering records of dogs presented with non-neoplastic bone marrow

disorders with nonregenerative anaemia, with the Miniature Dachshund having an odds ratio of 12.2 (95% CI not provided) (Tani et al, 2020).

Musculoskeletal conditions

Elbow incongruity: The Miniature Dachshund has a particular conformation which is termed as chondrodystrophy, characterised by short legs, which in other breeds has been found to predispose dogs to incomplete closure of the growth plates, resulting in limb deformity and secondary pain and lameness (Lappalainen et al, 2016). In this previous paper, a specific chondrodystrophic grading scheme was suggested to determine the degree of elbow incongruency in dogs with similar conformation. More recently the inter-reliability of scrutineers has been assessed, and shown a high repeatability, suggesting this could be an accurate tool (Pulkkinen et al, 2020).

Limb girdle muscular dystrophy (LGMD): This degenerative myopathy was initially detailed in four related Miniature Dachshunds submitted to veterinary specialists in Australia (Mickelson et al, 2021). The dogs presented with exercise intolerance, elevated creatinine kinase levels, difficulties swallowing, and weakness, with all between seven to 17 months of age. Based on the pedigrees, an autosomal recessive mode of inheritance was suspected, and confirmed following genome sequencing of a total of nine related dogs, with the mutation determined within the *SGCA* gene. This mutation has also been found in South African and American dogs. A DNA test is available for the breed, and research is underway between the breed and Kennel Club Genetics Centre to determine the mutation frequency within the UK population.

Osteogenesis imperfecta (OI): OI is a congenital, inherited disease involving defects of type I collagen, with affected individuals therefore having fragile, fracture-prone bones and other signs. 1352 Dachshunds of all sizes and coat types from 12 different European countries were genotyped for the mutation; the overall frequency of carriers was 12.9%, while Wire Haired Dachshunds of both sizes were overrepresented with 17.3% carriers (Eckardt et al, 2013).

Pes varus: The cause for this angulation deformity of the tibia is not yet fully known, however is thought to be due to a premature closure of the distal tibial physis (Chau and Wilson, 2021). If left untreated, dogs may suffer with joint instability, cartilage degeneration, osteoarthritis and lameness. The incidence of this disorder in the breed has not been published to date, however several papers have explored treatment options for affected dogs and determined that surgical correction of the tibia stabilised with external pins are well tolerated by patients (Chau and Wilson, 2021; Radasch et al, 2008; Petazzoni et al, 2012).

Neurological conditions

Intervertebral disc disease (IVDD): Dachshunds have long been known to be predisposed to IVDD. A full review of the literature relating to IVDD in the breed is beyond the scope of this document; however, some key points and recent highlights are described here. A recent study of patient records of over 90,000 dogs examined

at a university in America between 1995 and 2010 found the Dachshund to be the most frequently affected breed with IVDD, with a breed-specific prevalence of 34.92% compared to a mixed breed-prevalence of 4.43% (Bellumori et al, 2013).

Clinical recurrence has been studied in the breed, with 4.5-36% of dogs showing clinical signs following treatment (Sedlacek et al, 2022; Longo et al, 2021; Peschard et al, 2023). Additional information and UK prevalence estimates can be found in the breed-specific health surveys section.

An American study of 61 dogs of the breed found that Dachshunds with less than three calcified intervertebral discs at 24 months of age were less likely to develop, and had less severe, IVDD than dogs with several disc calcifications (Jensen et al, 2008). A recent conformational study determined that Miniature Dachshunds affected with IVDE had a significantly lower thoracic to lumbar vertebral column length ratio than unaffected dogs (Fletcher et al, 2023). Further, Miniature Dachshunds with IVDE had shorter thoracic vertebral columns compared to the unaffected group.

In Finland, Denmark and Norway screening spinal radiography for intervertebral disc calcification (IDC) has been used for more than 15 years. A study of the 1553 Finnish Dachshunds which had been radiographically screened up to 2015 reported that the number of calcified discs was highest in the Miniature Smooth Haired and lowest in the Miniature Long Haired and standard Long Haired variants (Lappalainen et al, 2015). The authors estimated a heritability of 53.4% (standard error 5.2%) for the number of calcified discs, suggesting that phenotypic selection against the number of calcified discs should be possible and effective, but that estimated breeding values (EBVs) for the trait would enable faster genetic progress to be made.

In 2017, an American study identified a *FGF4* retrogene insertion on chromosome 12 which segregates with the chondrodystrophoid phenotype including limb length and Hansen's Type I IVDD and the authors suggested that this presented an opportunity for genetic testing over time to eliminate Type I IVDD (Brown et al, 2017). However, all Dachshunds that have been tested for this have been found to be homozygous, which implies the mutation for this is fixed in this breed, and cannot be selected against. Studies comparing DNA selection versus screening have concluded that using calcification status is the most reliable method to reduce disc herniation in the breed (Bruun et al, 2020).

In 2021, Dachshund Health UK and The Kennel Club launched an IVDD screening scheme for all of the Dachshund varieties, using radiographs to determine the number of calcifications, and subsequent grades, of an individual. More information about participation to date can be found on page 49.

More recently, the inter-observer reliability of CT scans was assessed, with this showing higher corroboration in comparison to radiography (Formoso et al, 2023). However, the authors did note that it is currently not known whether CT scores

correlate well with risk of future IVDE, and if this method were to be utilised in the future, the current grading system would need to be modified for the higher sensitivity of CT scoring, and further to preserve a reasonable breeding population to prevent a genetic bottle neck from occurring.

Ocular conditions

Corneal endothelial dystrophy (CED): A relatively recent American study looking at 99 medical records found both Miniature and Standard Dachshunds to be over-represented for this condition, with an odds ratio of 7.2 (95% CI not provided) for the Miniature varieties (Leonard et al, 2021).

Progressive retinal atrophy (PRA): PRA is the collective name for a group of inherited and progressive retinal diseases characterised by gradual retinal degeneration resulting in initial night blindness and progressing to total vision loss. A form caused by a cone-rod dystrophy has been described in a breeding colony of Miniature Long Haired Dachshunds at the Animal Health Trust (Turney et al, 2007). The causal mutation was subsequently identified as a 44-nucleotide insertion in exon 2 of the *RPGRIP1* gene (Mellersh et al, 2006). A DNA test for the mutation, designated PRA (cord1) is available. However, after launch of the test doubt was cast on the penetrance of this mutation, with some homozygotes retaining vision until late in life.

In 2016, researchers identified a 22kb deletion ~30Mb upstream from *RPGRIP1* as a modifier locus, fusing two genes (*MAP9* intron 10 and *MAP9* pseudogene) (Forman et al, 2016). Other researchers have purported that these two genes are not sufficient to explain all cases, and posit that 'cord1 is a multigenic disease in which mutations in neither *RPGRIP1* nor *MAP9* alone lead to visual deficits, and additional gene(s) contribute to cone specific functional and morphological defects (Das et al, 2017). However, more recently modelling of *RPGRIP1/ MAP9* mutated cells has supported that this combination is associated with an accelerated early onset disease (Takahashi et al, 2023).

Sudden acquired retinal degeneration syndrome (SARDS): The Dachshund is thought to be over-represented for SARDS, with the breed found to make 21% of the affected population (Auten et al, 2017). Although this is primarily an ocular condition, there are other concurrent signs, such as polyuria, polydipsia, polyphagia, lethargy and weight gain. The role of major histocompatibility complexes (MHCs – a class of genes that regulate the immune system, also known as dog leucocyte antigens, or DLAs) has been investigated as a possible influence towards complex conditions that have an immune-mediated basis, and may feature in SARDS (Stromberg et al, 2019). In this paper, a number of alleles were found to have protective/ risk effects within the Dachshund population tested and may be candidates for future investigation.

INSURANCE DATA

There are some important limitations to consider for insurance data:

- Accuracy of diagnosis varies between disorders depending on the ease of clinical diagnosis, clinical acumen of the veterinarian and facilities available at the veterinary practice.
- Younger animals tend to be overrepresented in the UK insured population.
- Only clinical events that are not excluded and where the cost exceeds the deductible excess are included (O'Neill et al, 2014)

However, insurance databases are too useful a resource to ignore as they fill certain gaps left by other types of research; in particular they can highlight common, expensive and severe conditions, especially in breeds of small population sizes, that may not be evident from teaching hospital caseloads (Egenvall et al, 2009).

UK Agria Data

Insurance data were available for Wire Haired Dachshunds insured with Agria UK. 'Exposures' are equivalent to one full policy year; in 2017 (July 2016 to June 2017) there were 34 free exposures, 414 full exposures and 307 claims, in 2018 (July 2017 to June 2018) these figures were 40, 422 and 281 respectively. Full policies are available to dogs of any age. Free policies are available to breeders of Kennel Club registered puppies and cover starts from the time the puppy is collected by the new owner; cover under free policies lasts for five weeks from this time. It is possible that one dog could have more than one settlement for a condition within the 12-month period shown.

The top 10 conditions by number of settlements, for authorised claims where treatments started between July 2017 and June 2018, are shown in Table 2 below.

Table 2: Top 10 conditions and number of settlements for each condition between 1st July 2017 and 31st June 2018 for Wire Haired Dachshunds insured with Agria UK.

Condition	Number of settlements
Lameness finding	13
Intervertebral disc extrusion/herniation/prolapse	13
Diabetes mellitus	12
Epilepsy - idiopathic generalised	12
Hypersensitivity (allergic) skin disorder (unspecified)	11
Atopy finding	9
Gastroenteritis	9
Endocardiosis	9
Inflammatory bowel disease (IBD)	8
Skin (cutaneous) disorder (unspecified)	8

[$] *N.B. - Allergy is any exaggerated immune response to a foreign antigen regardless of mechanism. A dog can be allergic without being atopic. Atopy is a genetic predisposition to an exaggerated Immunoglobulin E (IgE)-mediated immune response to allergens in the environment. The treatment of atopy will be different to the treatment of non-atopic allergy.*

Swedish Agria Data

Swedish morbidity and mortality insurance data were also available from Agria for the three Standard Dachshund varieties grouped together. Reported rates are based on dog-years-at-risk (DYAR) which take into account the actual time each dog was insured during the period (2011-2016). The number of DYAR for Standard Dachshunds in Sweden during this period was between 50,000 < 100,000.

Swedish Agria insurance morbidity data

The most common specific causes of veterinary care episodes (VCEs) for Agria-insured Standard Dachshunds in Sweden between 2006 and 2011 are shown below. The top five specific causes of VCEs were vomiting/ diarrhoea/ gastroenteritis, disc/ vertebral, mammary tumour, spinal pain and skin tumour.

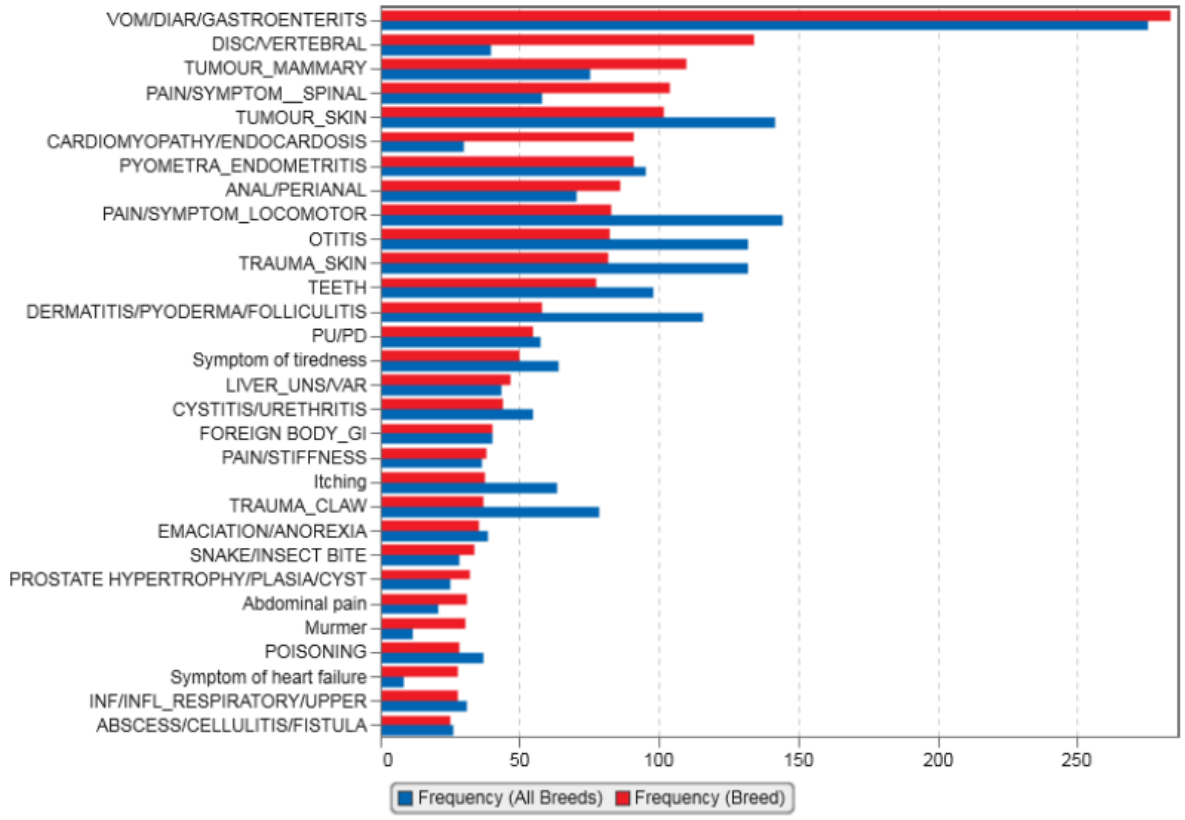


Figure 31: The most common specific causes of VCEs for Standard Dachshunds compared to all breeds in Sweden between 2011 and 2016, from Swedish Agria insurance data.

When relative risk of specific causes of VCEs was compared for the Standard Dachshund to all breeds, the top five specific causes of VCEs ordered by relative risk were disc/ vertebral, congenital hernia, signs of heart failure, cardiomyopathy/ endocardiosis, malformation/ deviation – skeletal.

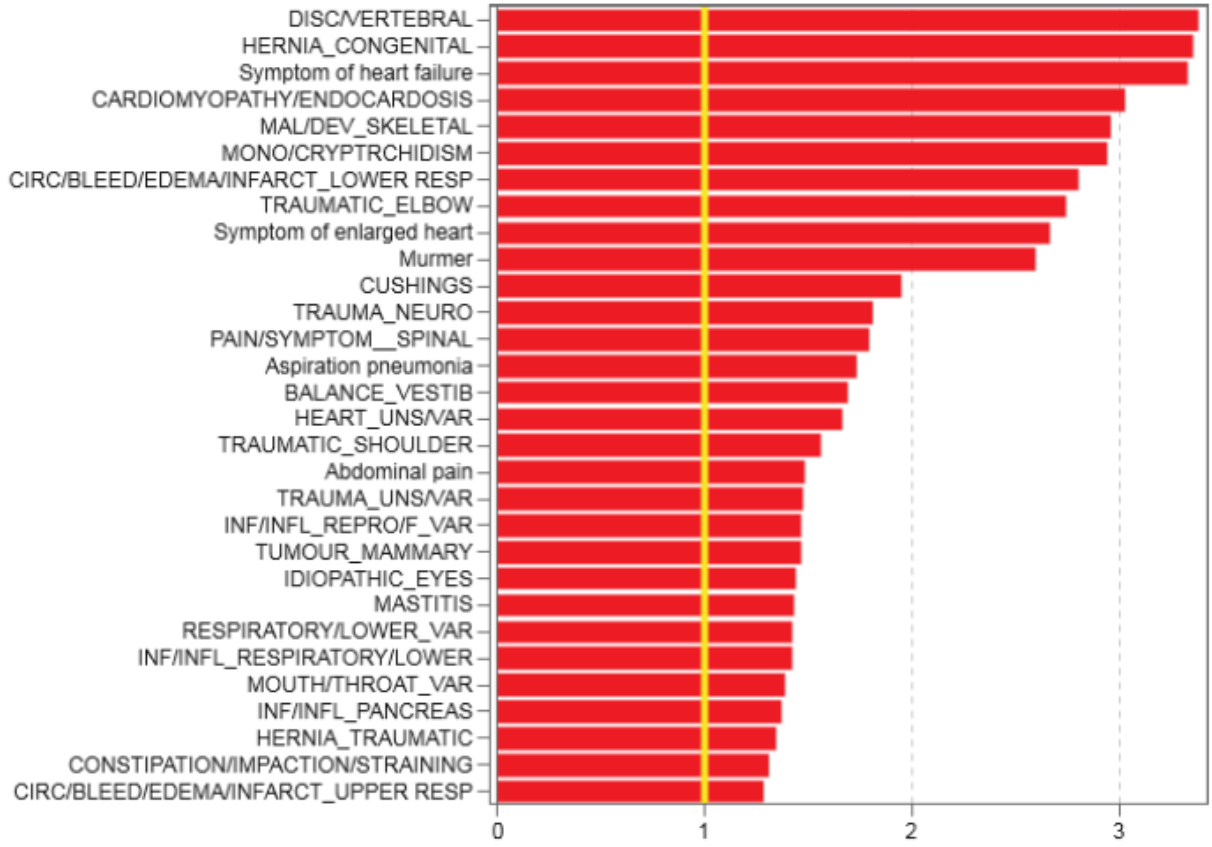


Figure 32: The specific causes of VCEs for Standard Dachshunds ordered by relative risk compared to all breeds in Sweden between 2011 and 2016, from Swedish Agria insurance data. The yellow line indicates the baseline risk for all breeds.

Swedish Agria insurance mortality data

The most common specific causes of death or euthanasia for Agria-insured Standard Dachshunds in Sweden between 2011 and 2016 are shown below. The number of DYAR for Standard Dachshunds in Sweden for this analysis was between 25,000 < 50,000. The top specific causes of death were disc/ vertebral, hit by car/ train/ vehicle, dead/ euthanised, skin trauma and pyometra/ endometritis.

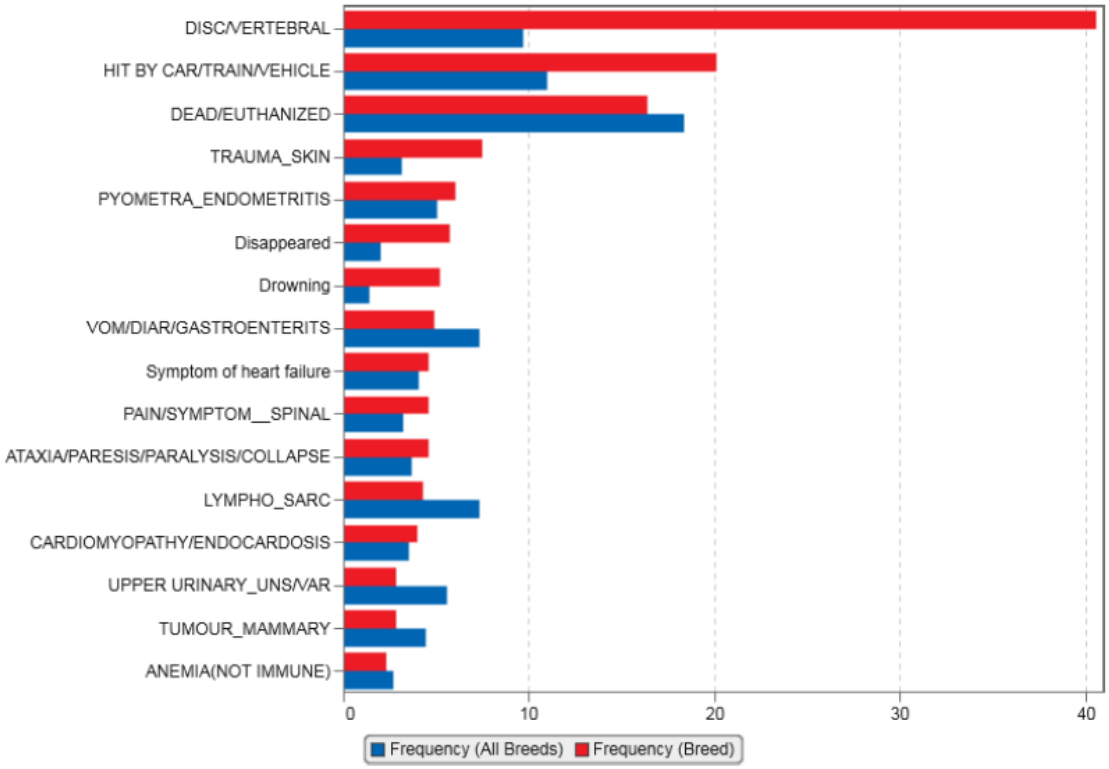


Figure 33: The most common specific causes of death for Standard Dachshunds compared to all breeds in Sweden between 2011 and 2016, from Swedish Agria insurance data.

When relative risk of specific causes of death was compared for the Standard Dachshund to all breeds, the top five specific causes ordered by relative risk were disc/ vertebral, drowning, disappeared, skin trauma and hit by car/ train/ vehicle.

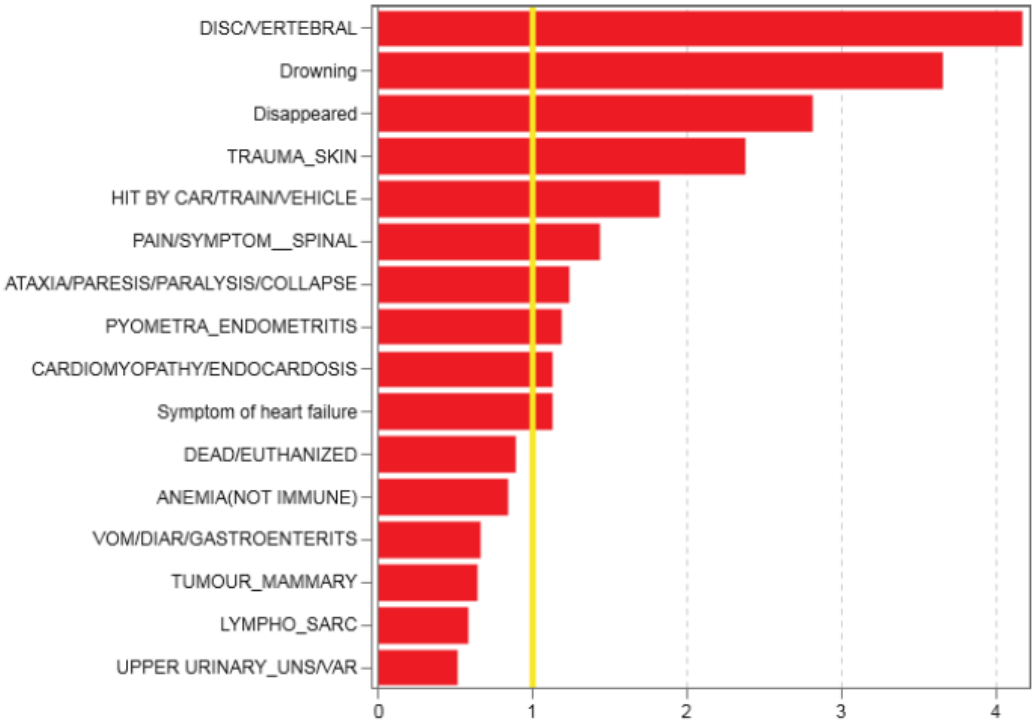


Figure 34: The specific causes of death for Standard Dachshunds ordered by relative risk compared to all breeds in Sweden between 2011 and 2016, from Swedish Agria insurance data. The yellow line indicates the baseline risk for all breeds.

BREED WATCH

The Wire Haired Dachshund is a category 2 breed on Breed Watch, meaning judges are required to complete a mandatory monitoring form following a judging appointment at Championship Certificate level. As of the 23rd January 2020, the following are points of concern for the Long Haired Dachshund on Breed Watch:

- Incorrect hindquarter/ unsound movement
- Sore eyes or excessive tearing

Unfortunately, due to the COVID-19 pandemic and the lack of shows due to a national lockdown, there are little data for 2020 and so these have not been included. Further, from this time, The Kennel Club have been unable to send reminders to judges, which has resulted in a clear drop in monitoring form submissions. This is clearly reflected in the number of dogs reported from 2021.

Update (July 2023) – The Kennel Club are currently reviewing the entirety of Breed Watch, and have taken a number of recommendations to the Board. Following approval, these recommendations will begin to be implemented from January 2024.

Table 7: Percentage of Wire Haired Dachshunds exhibited at dog shows with points of concern for 2021 – 2022.

Point of concern	2021	2022
Incorrect hindquarter/ unsound movement	3.1%	-
Significantly underweight	-	-
Sore eyes or excessive tearing	-	-
Total dogs shown	**64**	**48**

PERMISSION TO SHOW

As of the 1st January 2020 exhibits for which permission to show (PTS) following surgical intervention has been requested will no longer be published in the Breed Record Supplement and instead will be detailed in BHCPs, and a yearly report will be collated for the BHC. In the past five years, five PTS have been granted for the Wire Haired Dachshund (not including neutering or caesarean), with four being for the removal of a tooth/ teeth, and one unspecified.

ASSURED BREEDERS SCHEME

It is a recommendation that breeding stock are IVDD screened under The Kennel Club/ Dachshund Health UK scheme.

DNA TEST RESULTS

There are currently no recognised DNA tests for this variety.

Whilst other DNA tests may be available for the breed, results from these will not be accepted by the Kennel Club until the test has been formally recognised, the process of which involves collaboration between the breed clubs and the Kennel Club in order to validate the test's accuracy.

CANINE HEALTH SCHEMES AND ESTIMATED BREEDING VALUES

All the British Veterinary Association (BVA)/KC Health Schemes are open to dogs of any breed. Estimated breeding values are only available to breeds where a significant proportion of the population have been tested.

HIPS

Two Wire Haired Dachshunds have been hip scored under the BVA/KC Hip Dysplasia Scheme in the past 20 years, with a score of 11 and 12, respectively.

ELBOWS

No Wire Haired Dachshunds have been elbow graded under the BVA/KC Elbow Dysplasia Scheme in the past 20 years.

EYES

The Wire Haired Dachshund is not currently on the BVA/KC/ISDS Known Inherited Ocular Disease (KIOD) list (formally Schedule A) for any condition.

KIOD lists the known inherited eye conditions in the breeds where there is enough scientific information to show that the condition is inherited in the breed, often including the actual mode of inheritance and in some cases even a DNA test.

Schedule B has been replaced with sightings reports, which are in place to monitor any emerging or existing eye conditions in the breed. The results of Eye Scheme sightings reports of Wire Haired Dachshunds which have taken place since 2012 are shown below.

Table 9: Reports on dogs of the breed which have participated in the BVA/KC/ISDS Eye Scheme since 2014.

Year	Number seen	Comments
2012	4 adults 0 litters	No comments
2013	6 adults 0 litters	2 – persistent pupillary membranes (PPM) 1 – nuclear cataract 1 – post segment coloboma 1 – distichiasis
2014	7 adults 0 litters	1 – post segment coloboma 1 – other cataract
2015	11 adults 0 litters	1 – corneal lipid deposition
2016	3 adults 0 litters	No comments
2017	1 adults 0 litters	No comments
2018	1 adult 0 litters	No comments
2019	16 adults 0 litters	No comments
2020	6 adults 0 litters	No comments
2021	10 adults 0 litters	1 – anterior capsular cataract
2022	23 adults 1 litter	1 – anterior capsular cataract 1 - PPM

AMERICAN COLLEGE OF VETERINARY OPHTHALMOLOGISTS (ACVO)

Results of examinations through ACVO are shown in Table 6 below. Between 2015 and 2019, 1,019 Dachshunds were examined, of which 72.2% (1,470 of 2,037 dogs) were found to be unaffected by any eye condition. 'Dachshunds' includes all six varieties. Whilst it is important to note that these data represent dogs in America, the organisation tend to examine a higher number of dogs than that in the UK, and therefore are a valuable source of information.

Table 10: ACVO examination results for Dachshunds, 1993 – 2022.

Disease Category/Name	Percentage of Dogs Affected	
	1993-2017 (n=6,683)	**2018-222** (n=2,037)
Eyelids		
Distichiasis	6.3%	9.1%
Cornea		
Corneal dystrophy	0.8%	1.2%
Uvea		
Persistent pupillary membranes (iris to iris)	4.2%	5.0%
Persistent pupillary membranes (lens pigment foci/ no strands)	1.5%	7.0%
Lens		
Cataract (significant)	5.4%	3.8%
Retina		
PRA	1.9%	0.1%

Adapted from: https://www.ofa.org/diseases/eye-certification/blue-book

IVDD SCREENING SCHEME (THE KENNEL CLUB/ DACHSHUND HEALTH UK)

The IVDD screening scheme was launched in May 2021 for all six varieties.

To date, 15 results for Wire Haired Dachshunds have been received, the results of which are shown in the graph below. This represents just 0.22% of the total number of dogs born and registered in the past 8 years.

In total, 60.0% of dogs have been graded 2 or above.

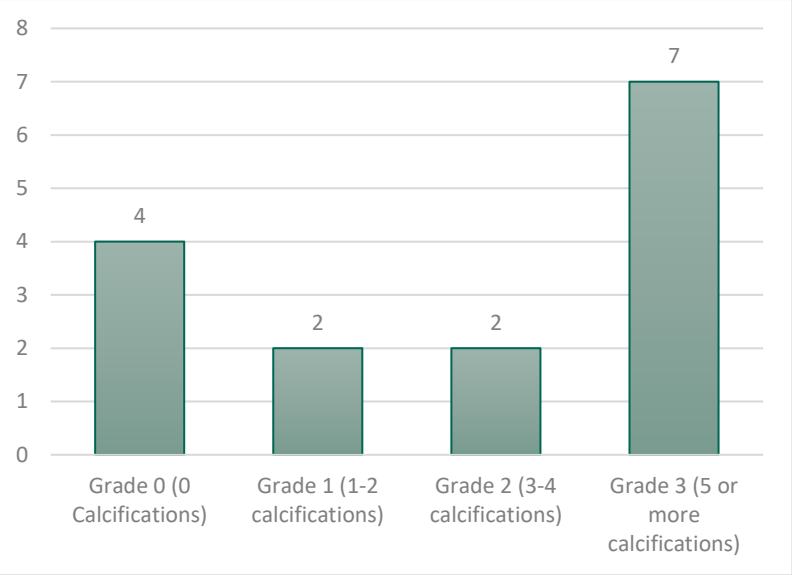


Figure 35: Grades received for Wire Haired Dachshunds.

The count of calcifications received overall are also provided in the graph below.

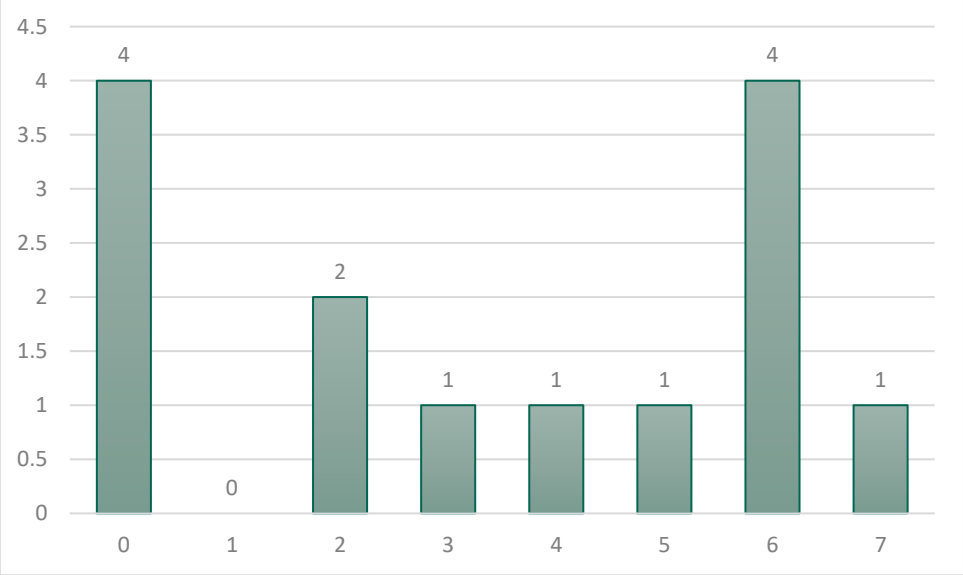


Figure 36: The count of calcifications recorded by the IVDD screening scheme for Wire Haired Dachshunds.

The recorded calcification location is also provided in the graph below. The most commonly affected was T1-T2, T2-T3, and T17-18.

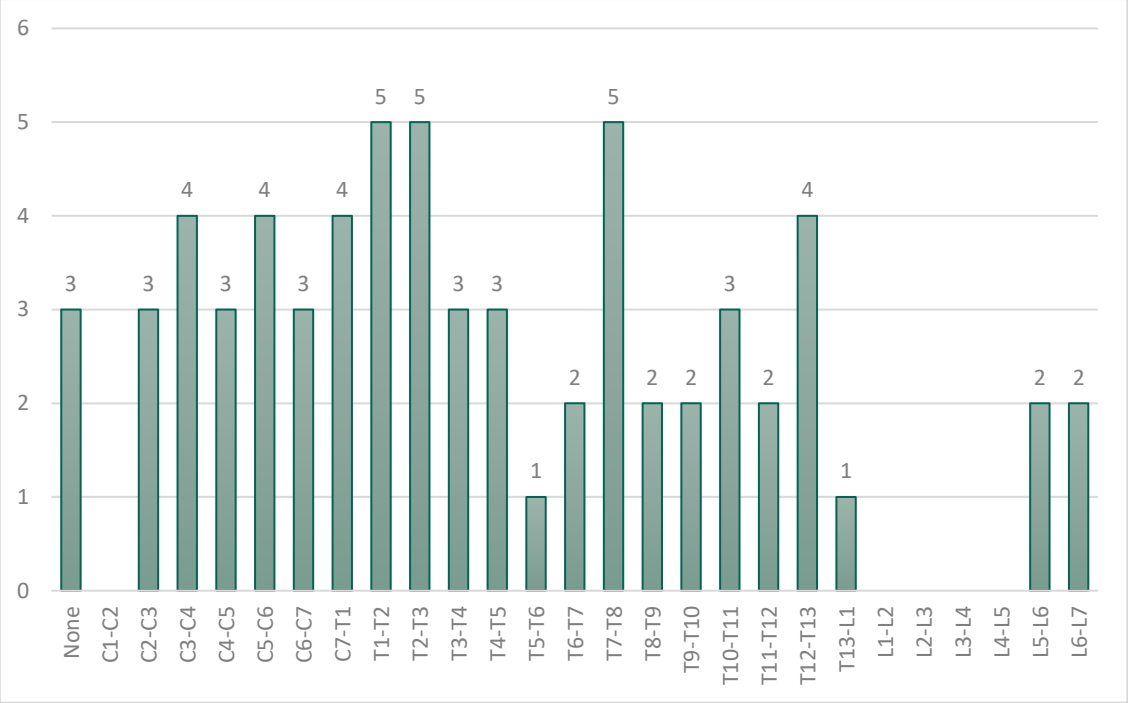


Figure 37: Location of calcifications in Wire Haired Dachshunds.

Before the scheme was formalised with The Kennel Club the breed had been running IVDD testing for a number of years. In total, 270 dogs across the varieties had been tested and recorded under this scheme, with a summary given below.

Table 11: Count of results per variety.

COUNTA of Vari Variety							
Year screened	Long	Mini Long	Mini Smooth	Mini Wire	Smooth	Wire	Grand Total
2016			1				1
2017		4	7	3	1	2	17
2018	2	10	21	4	4	3	44
2019	1	12	26	8	3	4	54
2020		2	26	7	2	10	47
2021		1	37	11		6	55
2022		3	22	5	3	6	39
2023			4	3		6	13
Grand Total	**3**	**32**	**144**	**41**	**13**	**37**	**270**

The breakdown of each grade by variety under this scheme is provided below. In total, 53.2% of Miniature Smooth Haired Dachshunds were graded 2 or above.

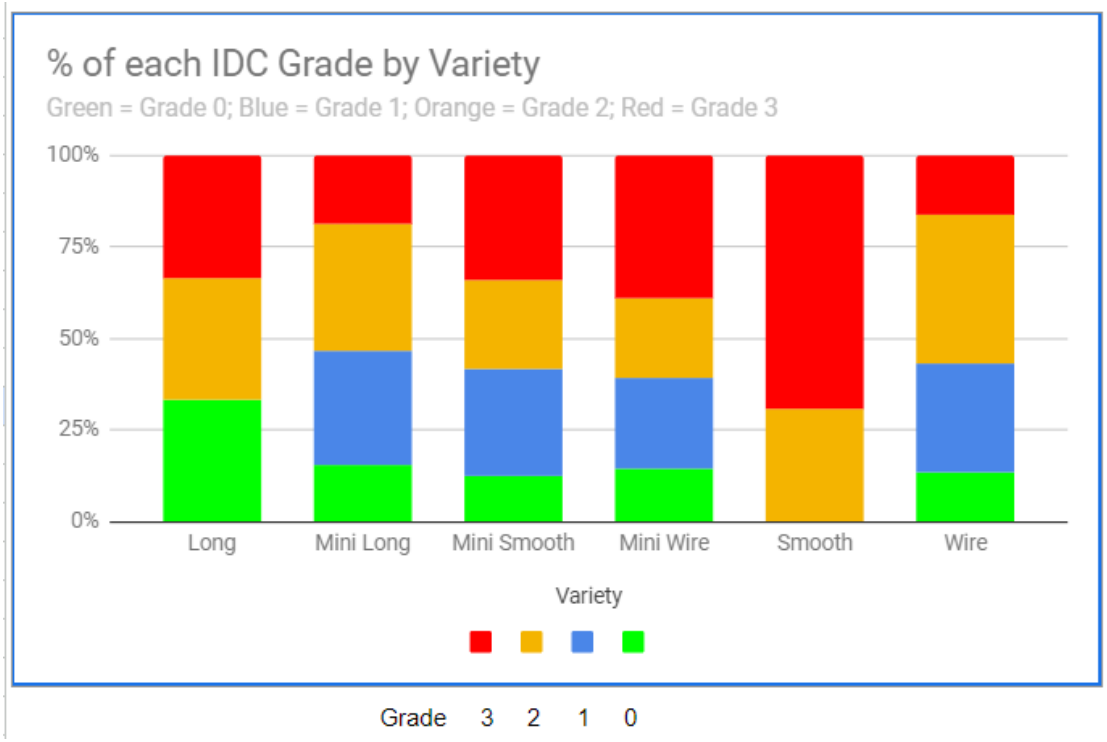


Figure 38: Grades received for all varieties of Dachshunds.

The count of calcifications received overall are also provided in the graph below.

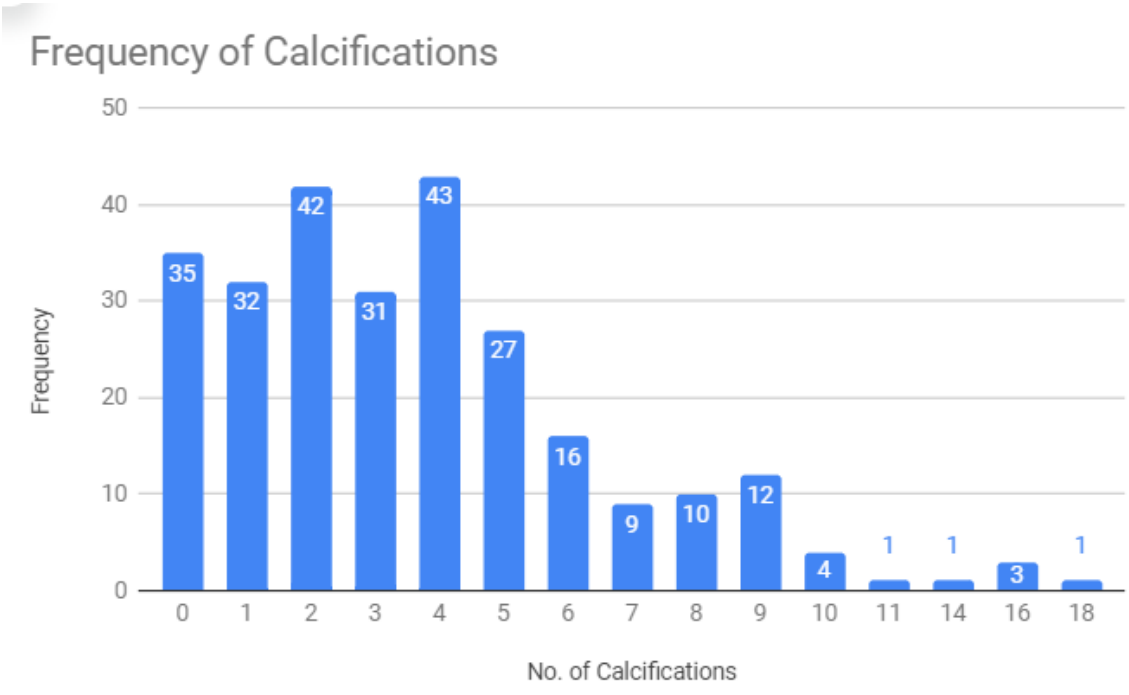


Figure 39: The count of calcifications recorded by the Dachshund Health IVDD screening scheme for all varieties of Dachshunds.

The recorded calcification location is also provided in the graph below. The most commonly affected areas, similarly to the formal scheme above, was T11-T12 and T12-T13.

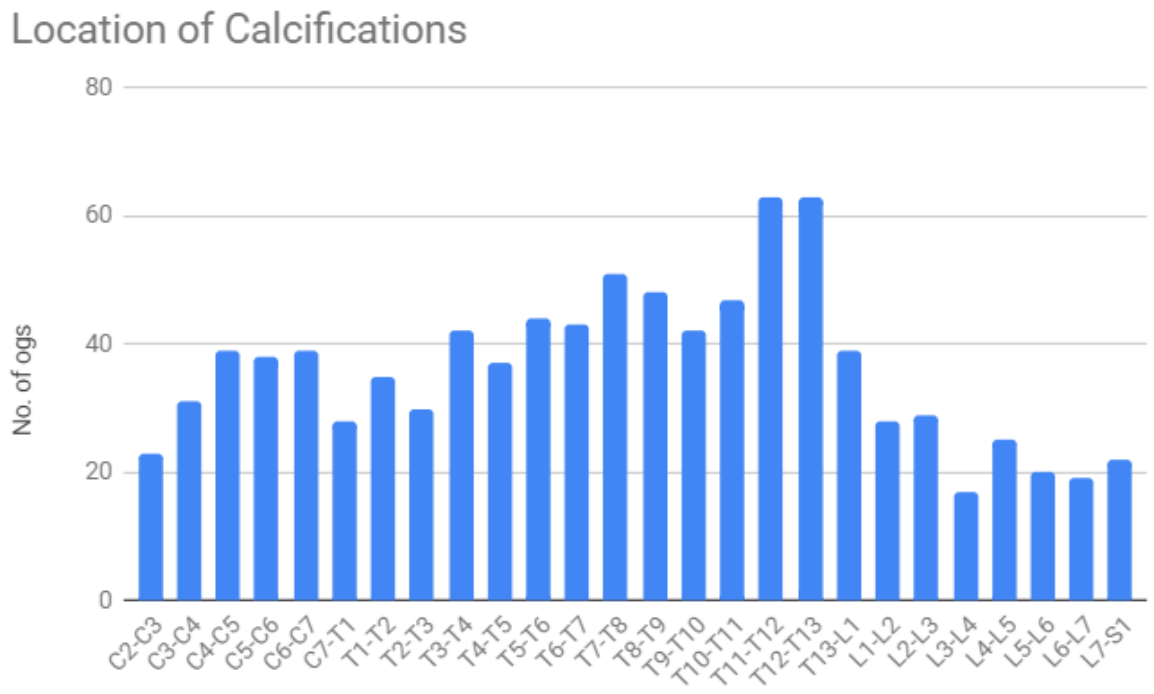


Figure 40: Location of calcifications in all varieties of Dachshunds.

REPORTED CAESAREAN SECTIONS

When breeders register a litter of puppies, they are asked to indicate whether the litter was delivered (in whole or in part) by caesarean section. In addition, veterinary surgeons are asked to report caesarean sections they perform on Kennel Club registered bitches. The consent of the Kennel Club registered dog owner releases the veterinary surgeon from the professional obligation to maintain confidentiality (vide the Kennel Club General Code of Ethics (2)).

There are some caveats to the associated data;

- It is doubtful that all caesarean sections are reported, so the number reported each year may not represent the true proportion of caesarean sections undertaken in each breed.
- These data do not indicate whether the caesarean sections were emergency or elective.
- In all breeds, there was an increase in the number of caesarean sections reported from 2012 onwards, as the Kennel Club publicised the procedure to vets.

The number of litters registered per year for the breed and the number and percentage of reported caesarean sections in the breed for the past 10 years are shown in Table 12.

Table 12: Number and percentage of litters of Wire Haired Dachshunds registered per year and number of caesarean sections reported per year, 2013 to 2022.

Year	Number of Litters Registered	Number of C-sections	Percentage of C-sections	*Percentage of C-sections out of all KC registered litters (all breeds)*
2013	59	25	42.4%	10.0%
2014	70	15	21.4%	10.6%
2015	73	29	39.7%	11.7%
2016	88	27	30.7%	13.9%
2017	118	28	23.7%	15.0%
2018	125	28	22.4%	17.2%
2019	139	24	17.3%	15.7%
2020	181	36	19.9%	16.8%
2021	200	30	15.0%	16.5%
2022	185	26	14.1%	12.0%

GENETIC DIVERSITY MEASURES

The Kennel Club are currently undertaking a full analysis of breed populations, and will be develop breed-specific reports at the beginning of 2024. Once available, this report will be fed into the BHCP for the Miniature Smooth Haired Dachshund.

The effective population size is the number of breeding animals in an idealised, hypothetical population that would be expected to show the same rate of loss of genetic diversity (rate of inbreeding) as the population in question; it can be thought of as the size of the ‘gene pool’ of the breed. In the population analysis undertaken by the Kennel Club in 2015, an estimated effective population size of 298.2 was reported (estimated using the rate of inbreeding over the period 1980-2014). An effective population size of less than 100 (inbreeding rate of 0.50% per generation) leads to a dramatic increase in the rate of loss of genetic diversity in a breed/population (Food & Agriculture Organisation of the United Nations, “Monitoring animal genetic resources and criteria for prioritization of breeds”, 1992).

Annual mean observed inbreeding coefficient (showing loss of genetic diversity) and mean expected inbreeding coefficient (from simulated ‘random mating’) over the period 1980-2014 are shown in Figure 9. As with most breeds, the rate of inbreeding was at its highest in this breed in the 1980s and 1990s. This represents a ‘genetic bottleneck’, with genetic variation lost from the population. However, since the mid-1990s the rate of inbreeding has been negative, implying moderate restoration of genetic diversity (possibly through the use of imported animals). It should be noted

that, while animals imported from overseas may appear completely unrelated, this is not always the case. Often the pedigree available to the Kennel Club is limited in the number of generations, hampering the ability to detect true, albeit distant, relationships. For full interpretation see Lewis et al, 2015 https://cgejournal.biomedcentral.com/articles/10.1186/s40575-015-0027-4.

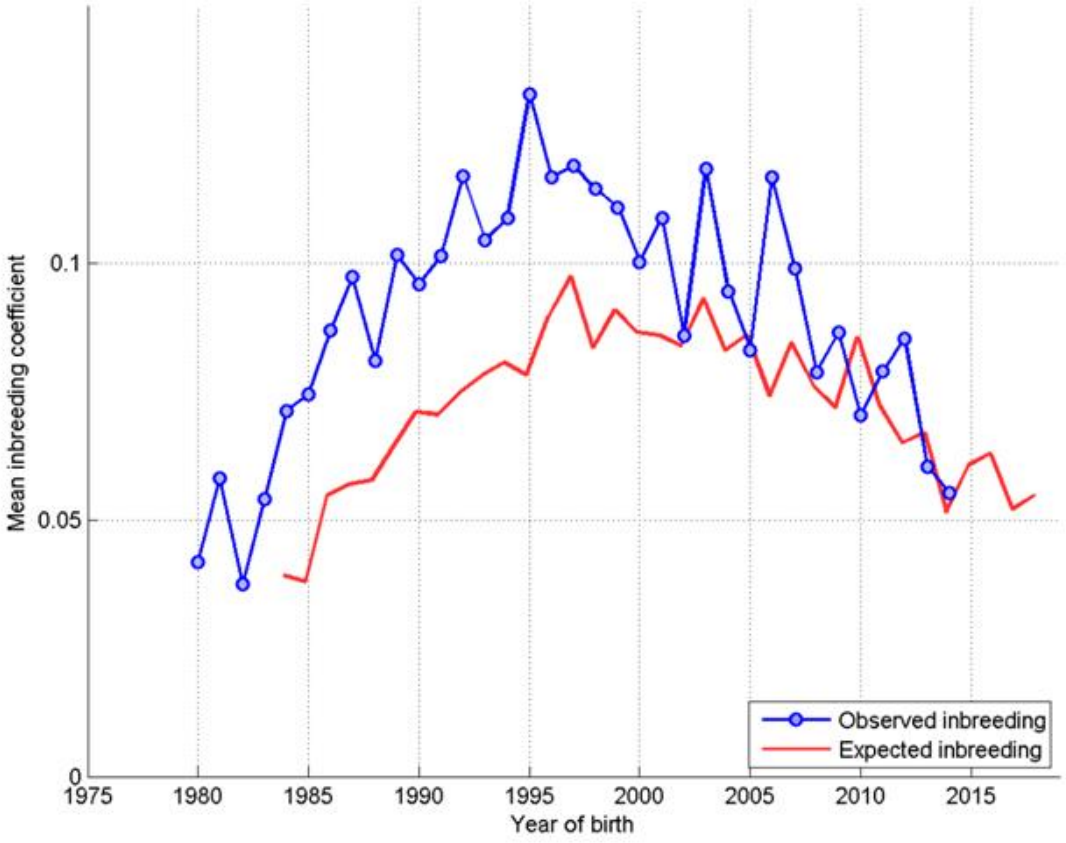


Figure 41: Annual mean observed and expected inbreeding coefficients.

Below is a histogram ('tally' distribution) of number of progeny per sire and dam over each of seven five-year blocks. A longer 'tail' on the distribution of progeny per sire is indicative of 'popular sires' (few sires with a very large number of offspring, known to be a major contributor to a high rate of inbreeding). There appears to be extensive use of popular dogs as sires in this breed (the 'tail' of the blue distribution).

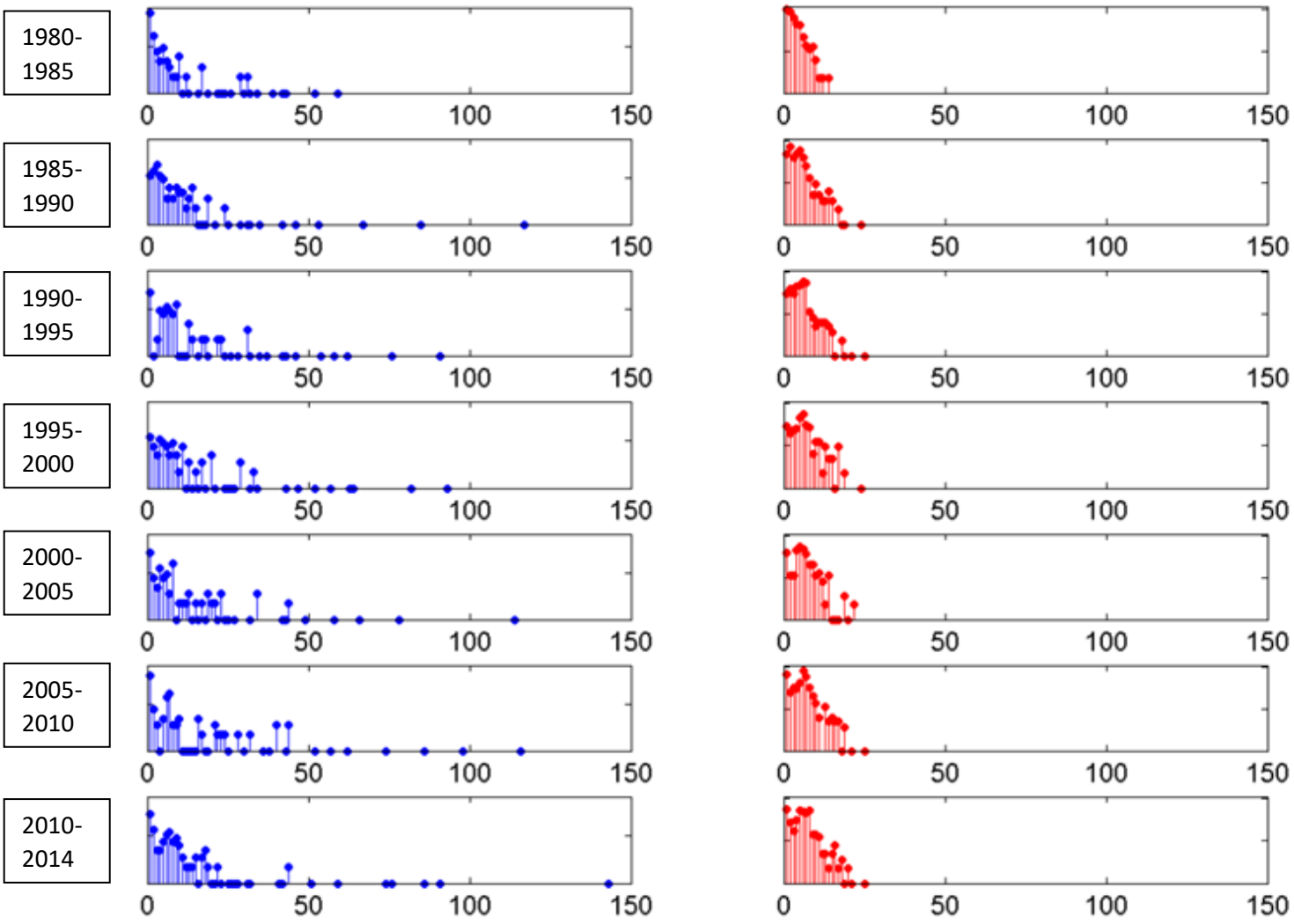


Figure 42: Distribution of progeny per sire (blue) and per dam (red) over 5-year blocks (1980-4 top, 2010-14 bottom). Vertical axis is a logarithmic scale.

CURRENT RESEARCH

An excerpt is included below from the Cambridge IVDD Research Group:

The Intervertebral disc disease research group at Queen's Veterinary School Hospital (QVSH), University of Cambridge, has grown steadily over the last few years. Our first project looking at the calcification of the disc led to a Masters degree and has formed the basis for one of our current PhD students' work which is now entering it's 3rd year, funded by the charity Dachshund Rescue UK. This work is exploring the mechanisms underlying IVDD with the aim of identifying ways to stop the process of disc degeneration which leads to the disease.

Our first completed PhD consisted of a landmark study involving conservative management of severely affected dogs, where we were able to show conclusively for the first time that the recovery rate of affected dogs without surgery can be very

good. In addition, through follow-up MRI we were able to document, again for the first time, the disappearance of many severe disc extrusions from the spinal canal. This work was jointly funded by the KCCT and Dachshund Health UK (DHUK).

Our latest PhD student has just begun work in collaboration with the KC Genetics Centre, and will be looking at the genetic basis for IVDD. The aim is to identify more useful genetic abnormalities than the now well-known CDDY disorder, which may allow more targeted breeding strategies to reduce the frequency of IVDD among susceptible breeds. This work is funded partly by DHUK as well as Camvet, the charity dedicated to supporting the QVSH. A link to read more about our work can be found here: Professor | Department of Veterinary Medicine (cam.ac.uk)

Our latest trial is available to owners of dogs affected by IVDD who are unable to afford MRI and surgery, and involves the injection of an enzyme called chondroitinase into affected discs. So far we have recruited more than 10 dogs with promising results. A link to the trial details is available here: IVDE Chondroitinase trial | The Queen's Veterinary School Hospital (cam.ac.uk)

PRIORITIES

A meeting was held with Dachshund breed club representatives in August 2023 to discuss the evidence base of the BHCP and agree the priority issues for the health of the breed. The group agreed from the information provided and their own experience that the priority for the Dachshunds were:

- IVDD
- Eye disease

A number of conditions were also agreed to be kept at watch, and can be found in the Dachshund Health 2022 annual report here:

https://www.dachshundhealth.org.uk/welcome/annual-breed-health-report-for-2022

ACTION PLAN

The following actions were decided between the breed clubs and the Kennel Club to tackle the priorities agreed (see previous page). Completed actions can be found under Annex A.

Breed club actions include:

- The breed council to continue to encourage participation in IVDD testing with the potential for subsidising tests. In 2023, less than 0.0% of Dachshund (Wire Haired) litters had a single IVDD screened parent, and none had both parents screened. The goal is to substantially elevate these figures to a minimum of 10%. – **ONGOING**

Kennel Club actions include:

- The Kennel Club to encourage participation in IVDD screening through the use of The Kennel Club/ Dachshund Health UK IVDD Scheme. – **ONGOING**

- The Kennel Club to keep the breed updated with respect to review of Breed Watch, and how this may impact the breed going forward.

- The Kennel Club to share details of the revised population analysis with the breed, once drafted.

- The Kennel Club to work with the Veterinary Cardiology Society (VCS) and breed clubs to collate data with respect to onset, prevalence and severity of MVD within the UK Dachshund populations, to further understanding of its relevance and prioritisation amongst other known conditions in the breeds.

ANNEX A - COMPLETED ACTIONS

Breed club actions

- The breed council to send a list of genetically possible coat colours to the Kennel Club to be discussed at the next Colour Not Recognised working group meeting. – **COMPLETE** *(this action was completed in 2020)*

- A Breed Watch proposal to be made for all varieties. Incorrect hindquarter movement, especially in the miniatures, as a possible result of pes varus and sore or runny eyes which may be due to distichiasis. – **COMPLETE** *(this action was completed in 2020. As a note, the Breed Watch system is currently under review)*

- Two proposals to be made to the Assured Breeder Scheme for IVDD testing and participation in the BVA/KC/ISDS Eye Scheme to become recommendations across all Dachshund varieties. – **COMPLETE** *(this action was completed in 2019)*

Kennel Club actions

- The Kennel Club to review and assist in promoting the Dachshund cancer survey, to determine whether particular cancers should also be considered a priority issue. – **COMPLETE** *(no particular issues were identified in the 2018 cancer survey, however a further survey focussing on skin conditions was completed in 2021, with both reports available at the Dachshund Health website)*

- The Kennel Club to request an update from the AHT with regard to progress in development of a swab test for Lafora disease. – **COMPLETE** *(the development of a swab test for Lafora was not completed by the AHT but a test has been developed by another laboratory, although there are some concerns about the test's accuracy and the use of blood samples is still the recommended test route)*

- To keep the breed updated as to the feasibility of developing a spinal scheme – **COMPLETE** *(the IVDD scheme was formally launched by us in 2021, and is being promoted and subsidised by The Kennel Club and Dachshund Health UK)*

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