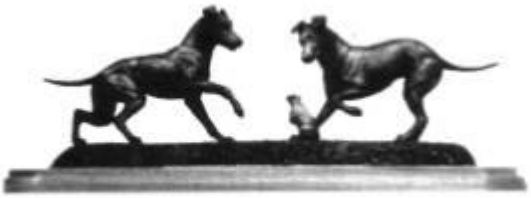

THE BRITISH MANCHESTER TERRIER CLUB

Confidential health survey of The British Manchester Terrier Club

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Part 2: Health, husbandry and breeding

Confidential health survey of The British Manchester Terrier: Health, husbandry and breeding

Introduction

The Manchester Terrier is classified as a "vulnerable native breed" by The Kennel Club as there are fewer than 300 puppy registrations in the UK each year. This survey was conceived in collaboration with The British Manchester Terrier Club (BMTC), with the aim to carry out a confidential survey with a response rate better than that achieved in the 2004 Purebred dog health survey which was anonymous. The aim was to gather health information on as many of the UK's population of Manchester Terriers as possible to establish what health conditions are affecting the breed today and to enable breeders to work at eliminating serious health problems which may have an inherited component.

Methods

The survey forms were created using a questionnaire design package (Cardiff TELEform®). The questions were developed and refined specifically for the Manchester Terrier breed over several months and there were numerous iterations of the questionnaire before the final version was created.

Survey packs were sent out to members of the BMTC and other known owners/breeders of Manchester Terriers in the UK from March to July 2009. The survey pack contained:

1. Main survey form, 1 per live Manchester Terrier.
2. Mortality form, 1 per 4 Manchester Terriers which had died.
3. Owner & vet details form.
4. Covering letter with tear-off slip to request additional forms.
5. Self-addressed postage-paid reply envelope.

A glossary showing a list of some possible conditions with definitions of terms was made available through the BMTC's website and chat group. Reminder cards were sent out at the end of May 2009.

This report relates to the main survey form, which owners were asked to complete for each live Manchester Terriers (MT) they currently own or house on their property. The form was split into 4 sections: general information, breeding history, health problems and comments. Owners were asked to be as specific as possible when reporting cause of death and we suggested contacting their veterinary surgeon if they had difficulty remembering.

Returned questionnaires were scanned and verified using specialised information capture software (Cardiff TELEform®). The scanned and verified data were exported into an Access® (Microsoft) database for checking and recoding and from there were exported to an Excel® (Microsoft) spreadsheet for analysis.

For those closed-ended questions that had a list of possibly responses that the respondents chose one or more choices from, the results are reported as frequency (N) of responses reported as is appropriate for categorical variables. Where descriptive statistics are used to report the 'average' and 'range' of values for questions with continuous responses such as age at neutering, we have reported mean (arithmetic average), standard deviation, minimum and maximum as appropriate for normally distributed results and as median (minimum – maximum) as appropriate for skewed results. The median value is the value where 50% of the values are above it and 50% are below it, and it is a better representation of the 'average', particularly when the data are skewed. This occurs when the majority of responses are clustered closer to one end of the range and there are a few outlying responses at the other end of the range and this pulls the mean value towards these outliers (extreme values); the median is less dependent on extreme values. With a symmetrical distribution of responses, the median would be the same as the mean.

The survey results are presented for the 31 questions in 3 sections. For some of the tables, N refers to the number of responses recorded and the numbers in one column will add up to more than the total number of respondents who answered the question when multiple responses were allowed. In these situations, the total % of responses will also add up to more than 100% and are not reported. Where N is the number of Manchester Terriers, the totals will add up to 216.

Results

Response rate

Survey packs were sent out to 277 Manchester Terrier owners and there were 158 responses, for an overall response rate of 57%, which was significantly higher than the 33% (59/178) response rate achieved in 2004 (Fisher's exact $P<0.0001$). Ten respondents indicated that they did not currently own a Manchester Terrier, and 4 of these completed forms about Manchester Terrier deaths. Forms were completed by 148 owners for 216 live Manchester Terriers.

Section A: General information

Q6. How old is this Manchester Terrier?

The median age of the live Manchester Terriers was 3 years and 5 months (minimum 3 months – maximum 16 years 6 months).

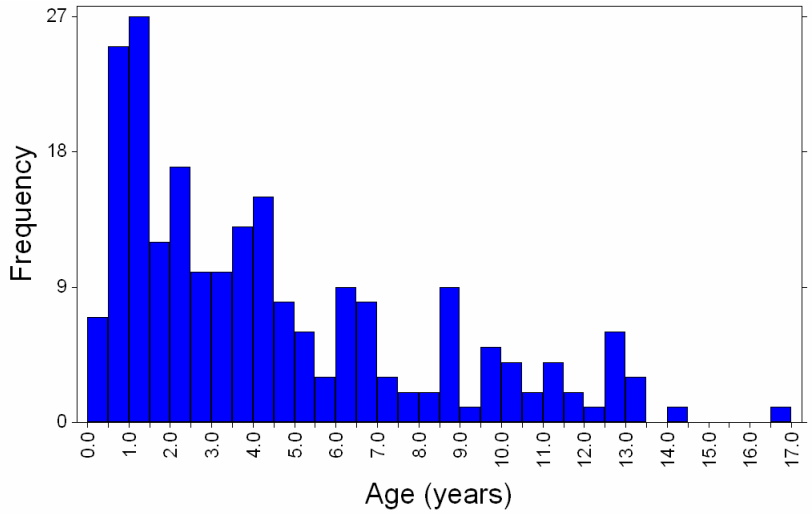


Figure 1: Histogram showing frequency (number of MTs) of age (in years) for the 216 live Manchester Terriers.

Q6c. How long have you owned this MT?

Data regarding how long the MT had been owned were available for 206 Manchester Terriers. The median time was 2 years 11 months (1 month – 16 years 1 month).

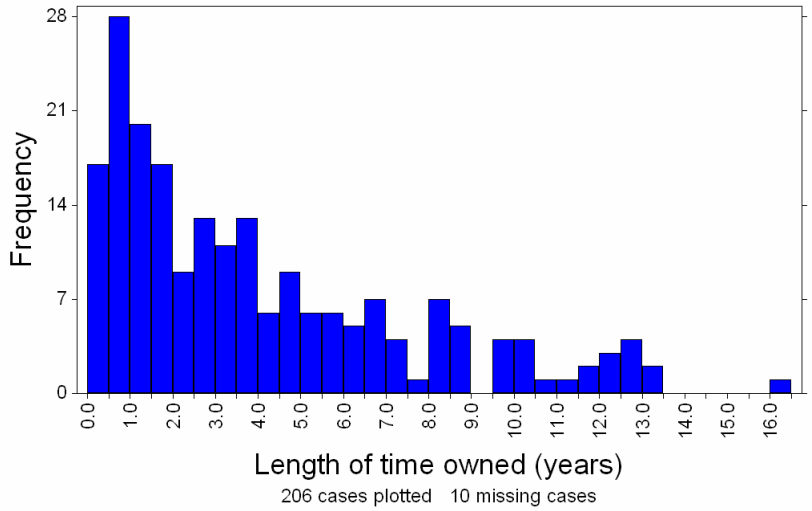


Figure 2: Histogram showing frequency (number of MTs) of length of ownership (in years) for the 206 live Manchester Terriers with this reported.

Q7. Where was this MT born?

One Manchester Terrier was reported to have been born in Italy, all others had been born in the UK.

Q8. Where does this MT live now?

One Manchester Terrier was reported to be living in Kenya, and 1 in Guernsey, but all others resided in the UK.

Q9. Is this MT involved in the following activities? (please mark all that apply)

As multiple responses were expected for this question, the most frequent combinations are shown below followed by the percentage of Manchester Terriers with each activity reported.

Activities	N	%
Pet	84	38.9
Breeding Showing Pet	38	17.6
Other combinations	35	16.2
Showing Pet	32	14.8
Agility Pet	10	4.6
Breed Pet	8	3.7
Breed Showing Agility Pet	8	3.7
Blank	1	0.5
Total responses for 216 dogs	216	100

Activity	N	% of MTs with activity reported
Pet	196	90.7
Showing	102	47.2
Breeding	66	30.6
Agility	34	15.7
Obedience	6	2.8
Working	5	2.3
Good Citizens	3	1.4
Heelwork to music	2	0.9
Ratting and rabbitting	2	0.9
Retired	2	0.9
School visits	1	0.5
Blank	1	0.5
Total responses for 216 dogs	420	

Q10. Where does this MT spend the majority of its time?

This question was intended to be single answer only. Unfortunately, many owners marked more than one category and wrote additional comments. In order to deal with the multiple and "other" answers provided, the answers were recoded into new categories.

Time spent	N	%
Inside free	118	54.6
Inside and outside	63	29.2
Inside confined to crate or room	11	5.1
Inside downstairs	6	2.8
Inside and outside, crated when alone	5	2.3
In kennel at work in daytime, inside free otherwise	5	2.3
Inside free, crated when alone	4	1.9
Outside in a kennel with run	2	0.9
At work/yard day, house at night	1	0.5
Blank	1	0.5
Total	216	100

Q11. At what age did you stop feeding puppy food?

The age at which the owner stopped feeding the MT puppy food was provided for 166 Manchester Terriers. The median age was 9 months (2 months – 2 years), but interestingly the distribution is bimodal – that is to say that there are 2 "peaks", with the majority of pups either stopping puppy food at 6 months or at 1 year. The question was left blank by 13 owners. Of the remaining Manchester Terriers, 18 were still being fed puppy food (all less than 1 year old), 4 had never been fed puppy food and 5 had not been owned by the current owner when they were young.

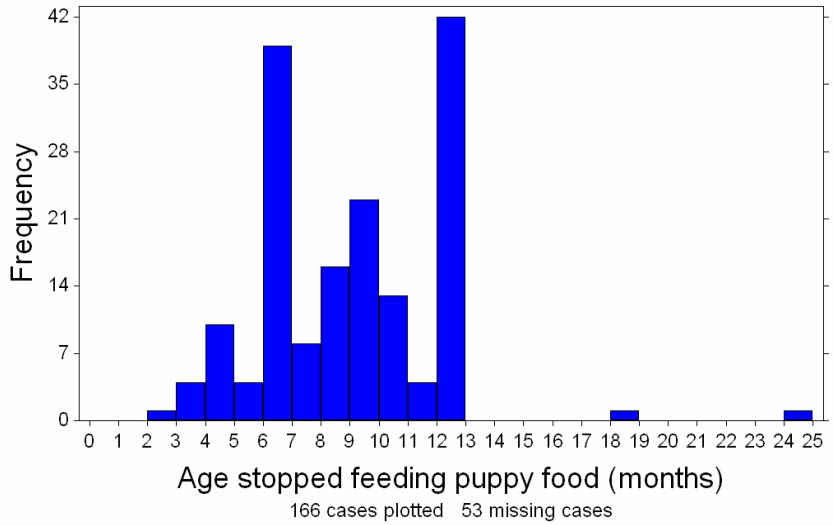


Figure 3: Histogram showing frequency (number of MTs) of age at which the owner stopped feeding puppy food (in months) for the 166 live Manchester Terriers with this reported

Q12. What kind of food do you currently feed this MT?

More than 80% of MTs were reported to be fed dry food, either alone or in combination with other types of food.

Type of food fed	N	%
Dry dog food	37	17.1
Dry + wet dog food	27	12.5
Dry + wet + home prepared food + table scraps	17	7.9
Dry + table scraps	17	7.9
Dry + wet + home prepared food	11	5.1
Dry + home prepared food	9	4.2
Dry + wet + table scraps	9	4.2
Dry + wet + home prepared food + table scraps + raw meat	8	3.7
Dry + raw meat	7	3.2
Dry + wet + home prepared + table scraps + other type of food	6	2.8
Home prepared + raw meat	6	2.8
Dry + home prepared + table scraps + raw meat + other type of food	5	2.3
Dry + wet + raw meat	5	2.3
Raw meat	5	2.3
Dry + other type of food	4	1.9
Home prepared food	4	1.9
Wet dog food	4	1.9
Wet + home prepared food	4	1.9
Dry + wet + table scraps + raw meat	3	1.4
Home prepared food + table scraps	3	1.4
Raw meat + other type of food	3	1.4
Dry + home prepared + raw meat	2	0.9
Dry + other type of food	2	0.9
Dry + table scraps + other type of food	2	0.9
Dry + wet + table scraps + other type of food	2	0.9
Table scraps + raw meat	2	0.9
Wet + other type of food	2	0.9
Dry + home prepared + other type of food	1	0.5
Dry + home prepared + table scraps	1	0.5
Dry + home prepared + table scraps + raw meat	1	0.5
Dry + table scraps + raw meat	1	0.5
Dry + wet + home prepared + other type of food	1	0.5
Dry + wet + raw meat + other type of food	1	0.5
Dry + wet + other type of food	1	0.5
Dry + wet + table scraps	1	0.5
Other type of food	1	0.5
Table scraps + other type of food	1	0.5
Total responses for 216 MTs	216	100

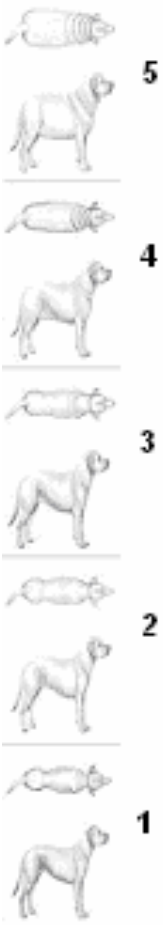
Type of food	N	%
Dry	181	83.8
Wet (tins/pouches)	102	47.2
Table scraps	79	36.6
Home-prepared	79	36.6
Raw meat	49	22.7
Other[1]	51	23.6
Total number of responses for 216 MTs	541	

[1] Other: Treats 12, vegetables 10, fruit 8, fish 7, biscuit 4, tripe 3, BARF 3, cheese 1, natural yoghurt 1, seaweed 1, oil 1

Q13. How frequently do you feed this MT?

Feeding frequency	N	%
Once a day	47	21.8
Twice a day	143	66.2
Three times a day	21	9.7
Four times a day	3	1.4
Food available at all times	2	0.9
Total	216	100

Q14. Please body condition score this MT using the silhouettes of body outlines provided on the right (courtesy of Hill's Pet Foods):



Using the 5-point body condition scoring system, a score of 3 is classified as "ideal". It is interesting to note that it appears as though these Manchester Terrier owners thought that a score of 2 was normal or ideal for the breed – this may reflect the different body shape of the Manchester Terrier and the Labrador Retriever-type pictured. Unfortunately, breed- or type-specific body outlines to illustrate the 5-point body condition scoring system are not currently available.

Body Condition Score	N	%
1	57	26.4
2	143	66.2
3	38	17.6
4	5	2.3
5	0	0
Blank	13	6.0
Total	216	100

Q15. How many Manchester Terriers do you own including this MT?

The median number of Manchester Terriers per owner was 1 (1-6).

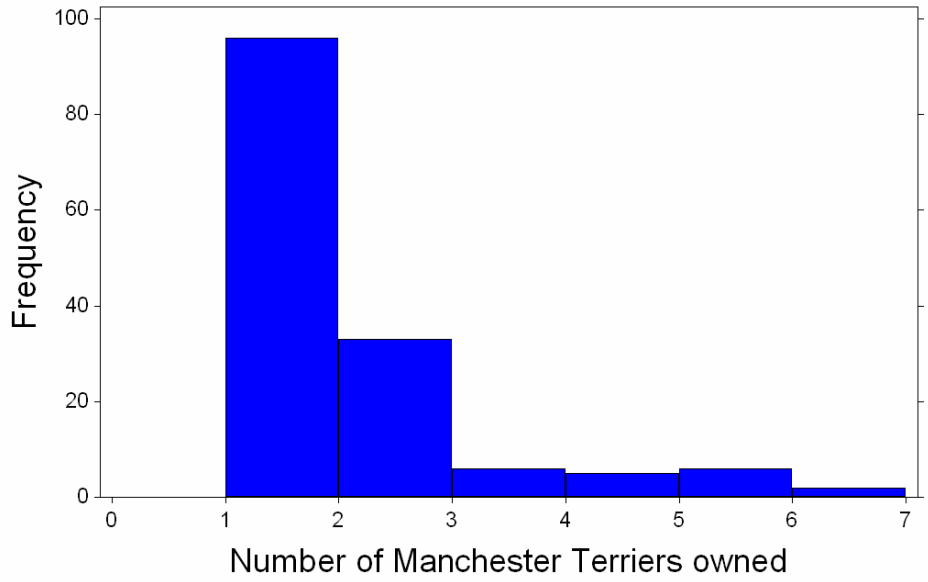


Figure 4: Histogram showing frequency of number of Manchester Terriers owned for 148 Manchester Terrier owners

Q16. How many dogs other than Manchester Terriers do you own?

The median number of other dogs owned was 0 (0-11).

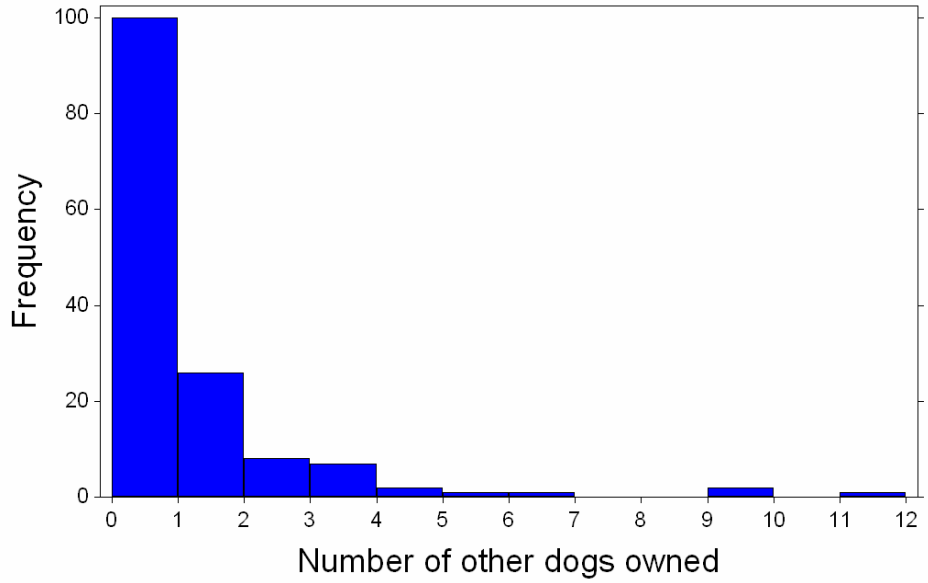


Figure 5: Histogram showing frequency of number of dogs other than Manchester Terriers owned for 148 Manchester Terrier owners

Q17. Did you complete a questionnaire for the 2004 KC/BSAVA Scientific Committee Purebred Dog Health Survey about this Manchester Terrier?

Purebred dog health survey	N	%
Yes	33	15.3
No	165	76.4
Don't know	18	8.3
Total	216	100

Section B. Breeding history

Q18. What sex is this Manchester Terrier?

More than half of the Manchester Terriers were female (122) and 44% were male (94).

Q19. Is this Manchester Terrier neutered? (spayed or castrated)

A total of 152 Manchester Terriers were intact and 64 had been neutered; similar proportions of females (29%) and males (31%) had been neutered.

Gender	Intact	Neutered	Total
Female	87	35	122 (56.5%)
Male	65	29	94 (43.5%)
Total	152 (70.4%)	64 (29.6%)	216 (100%)

Q20. How old was this Manchester Terrier at neutering?

The age at neutering was provided for 63 Manchester Terriers. Median age (age by which 50% had been neutered) at neutering was 1 year 8 months (5 months - 12 years and 1 month). The modal age (most frequently reported age) at neutering was between 6 months and a year, which reflects the most common age for elective neutering of dogs in the UK.

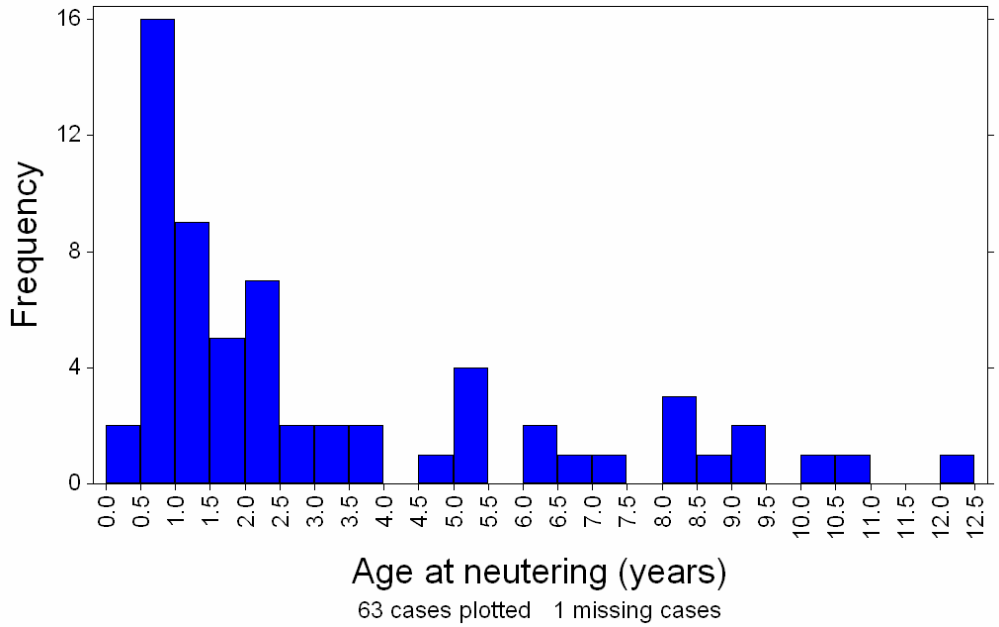


Figure 6: Histogram showing frequency (number of MTs) of age at neutering (in years) for 62 Manchester Terriers with age at neutering reported.

Q21. Why was this Manchester Terrier neutered?

Reason for neutering	N	%
Didn't want male mating behaviour	13	20.6
Vet recommended	10	15.9
Didn't want puppies	9	14.3
Finished breeding	9	14.3
False pregnancy	4	6.3
Unsuitable for breeding	4	6.3
Cryptorchid	3	4.8
Pyometra	2	3.2
Would not mate	2	3.2
Neutering was done before we acquired this MT	1	1.6
Unspecified	1	1.6
Other *	5	7.9
Total responses for 63 neutered MTs	63	100

*1 each of umbilical hernia, mammary tumour, persistent bleeding at season, after difficult whelping and caesarean section, aggression.

Q22. If female, how old was this bitch at first season?

The age at first season was provided for 104 bitches with a median age at first season of 8 months (6 months - 1 year and 3 months). Eight bitches were too young to have had a season, 5 had been neutered before they had a season, 1 owner did not know and this was left blank on 4 forms (total 18).

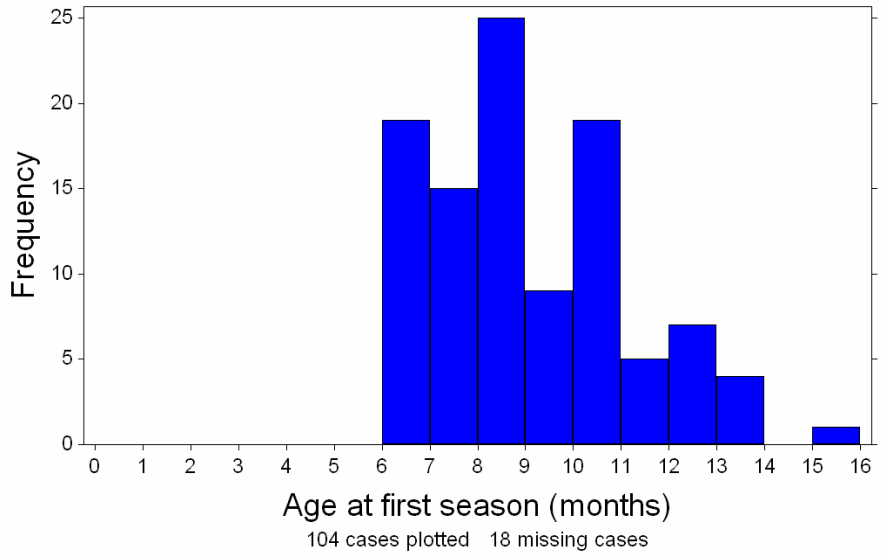


Figure 7: Histogram showing frequency (number of bitches) of age at first season (in years) for 104 Manchester Terriers with age at first season reported.

Q23. Has this MT been bred?

A total of 46 females (37.7%) and 15 males (16.0%) had been bred.

Breeding status	N	%
No	152	70.3
Yes	61	28.2
Don't know	3	1.4
Total	216	100

Q24. How many litters has this Manchester Terrier sired or given birth to?

The majority of Manchester Terriers (54% of females and 33% of males) which had been reported to have been bred had only sired or given birth to one litter.

	Females		Males		Both sexes	
Number of litters	N	%	N	%	N	%
1	25	54.3	5	33.3	30	49.1
2	7	15.2	2	13.3	9	14.8
3	12	26.1	1	6.7	13	21.3
4	1	2.2	0	0	1	1.6
5	1	2.2	2	13.3	3	4.9
6	0	0	1	6.7	1	1.6
8	0	0	2	13.3	2	3.3
10	0	0	1	6.7	1	1.6
Unspecified			1	6.7	1	1.6
Total	46		15		61	100

Q25. Please complete the following table as fully as possible for the litters this Manchester Terrier has had.

A total of 84 litters were reported, born to 46 bitches. Litters reported as sired were excluded from the analysis to avoid counting the same litter more than once. Litter size was not reported for 1 litter. Median number of pups per litter was 4 (1-8), while the median number of pups successfully reared per litter was also 4 (1-7). Twenty six puppies were reported either to have been born dead or to have died in the first 4 weeks, which is a pre-weaning mortality rate of 7%. Six litters (7.2%) were delivered (in whole or in part) by caesarean section.

	Total pups born	Total pups successfully reared	Number of puppies born naturally				Number of puppies born by caesarean section			
			Dead	Alive	Died in 1st 24 hours	Died in 1st 4 weeks	Dead	Alive	Died in 1st 24 hours	Died in 1st 4 weeks
Minimum	1	1	0	0	0	0	0	0	0	0
Maximum	8	7	3	7	2	3	1	5	0	1
Median	4	4	0	4	0	0	0	0	0	0
Totals*	369	343	6	325	6	11	2	18	0	1

* 343=325+18
369=343+6+6+11+2+1

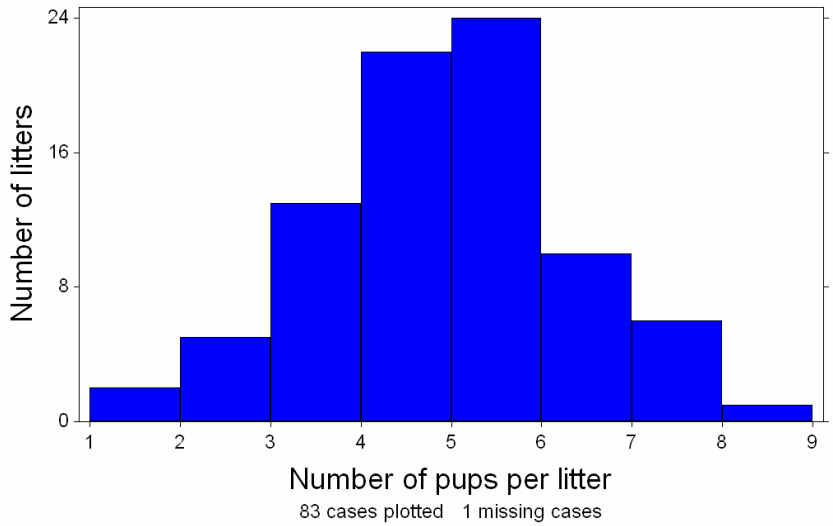


Figure 8: Histogram showing frequency (number of litters) of litter size for 83 litters of Manchester Terriers with litter size reported

Q26. Has this Manchester Terrier ever suffered from any reproductive conditions which required veterinary treatment?

A total of 41 Manchester Terriers (19%) were reported to have suffered from any reproductive conditions which required veterinary treatment. The 3 male Manchester Terriers who were reported to have suffered from a reproductive condition had all been cryptorchid. The estimated prevalence of cryptorchidism in the Manchester Terrier is therefore 3.2% (95% confidence intervals: 0.8-9.7%). In female Manchester Terriers which were reported to have suffered from a reproductive condition, by far the most frequently reported condition was false pregnancy.

Reproductive condition	N	%
False pregnancy	35	92.1
Failure to conceive	4	10.5
Dystocia - anatomical	3	7.9
Mastitis	2	5.3
Pyometra	2	5.3
Dystocia – hormonal (uterine inertia)	1	2.6
Eclampsia	1	2.6
Total conditions reported for 38 bitches	48	

Q27. Did this Manchester Terrier's dam have a reproductive condition?

The dam of 19 Manchester Terriers (9%) was reported to have suffered a reproductive condition. Twelve (63%) were reported to have had false pregnancy (with one also having a pyometra), 3 had needed caesarean sections, 2 had had mammary tumours, 1 had experienced dystocia and 1 had suffered from uterine inertia.

Dam repro condition	N	%
Yes	19	8.8
No	108	50.0
Don't know	78	36.1
Blank	11	5.1
Total	216	100

Q28. Did this Manchester Terrier's sire have a reproductive condition?

As the only reproductive condition reported in male Manchester Terriers was cryptorchidism, and all 3 of these dogs were neutered without ever having sired a litter, it is not surprising that no sires were reported to have had a reproductive condition.

Sire repro condition	N	%
Yes	0	0
No	125	57.9
Don't know	85	39.4
Blank	6	2.8
Total	216	100

Section C. Health problems

A total of 110 (50.9%) Manchester Terriers were reported to have no health conditions. The median number of health conditions reported per Manchester Terrier was 1 (1 - 8) for the 106 (49.1%) Manchester Terriers with at least 1 reported health condition. The 2 most frequently reported reproductive conditions are also considered to be health problems and are included here. The most frequently reported health conditions were false pregnancy (35 cases), anal gland conditions (51 cases), conjunctivitis (17 cases) and gastroenteritis (13 cases). (Fig. 12, table C1a & b).

Prevalence was estimated as the number of reported cases of each condition divided by the total number of Manchester Terriers. For cryptorchidism the male-specific prevalence used the number of males as the denominator and for false pregnancy the female-specific prevalence was used.

Table C1: All reported health conditions for 216 Manchester Terriers, with age at onset when reported.

				Age at onset (years)		
Health condition	Yes	No	Unsure	Median	Max	Min
ANAL GLANDS						
Anal gland condition[1]	51	165	0	2.17	14.0	0.25
CANCER						
Mammary tumour	4	212	0	8.0	8.25	4.5
Mast cell tumour	3	215	0	3.17	6.0	2.75
CARDIOVASCULAR						
Heart murmur	10	206	0	2.0	10.0	0.17
“Stroke”	1	215	0	11.0		
Other cardiovascular condition[2]	2	214	0	0.5		
DERMATOLOGIC						
Alopecia	3	212	1	0.42	2.0	0.17
Atopy/allergies	5	207	4	1.0	13.0	0.33
Bacterial infections	4	210	2	3.25	0.75	3.67
Pattern baldness	3	213	3			
Other skin condition[3]	13	203	0	3.92	9.67	0.5
DIGESTIVE						
Gastroenteritis	13	203	0	1.83	10.0	0.33
Colitis	4	211	1	1.17	1.33	1
Pancreatitis	0	215	1			
Other GI condition[4]	4	212	0	1.5	12.0	0.17
EARS						
Infections	5	211	0	1.08	3.67	0.33
Deafness	3	213	0	12.33	14.0	11.5
ENDOCRINE						
Hypothyroidism	3	213	0	5.0	5.67	2.92
EYES						
Conjunctivitis	17	199	0	0.83	6.33	0.25
Cataracts	2	212	2	10.5	13.0	8.0
Lens luxation	0	215	1			
Other ocular condition[5]	5	211	0			
HAEMATOLOGIC						
Von Willebrand’s disease	1	202	13	3.25		
NEUROLOGICAL						
Epilepsy (seizures)	1	215	0	5.5		
ORAL & DENTAL						
Missing teeth	4	212	0	8.0	11.17	2.0
Other oral/dental condition[6]	14	202	0	9.0	15.0	0.17
ORTHOPAEDIC						
Arthritis	6	210	0	11.0	13.0	3.0
Patellar luxation	1	213	2	0.33		
Other orthopaedic condition[7]	2	214	0	5.5	9.0	2.08
RESPIRATORY						
Respiratory condition[8]	2	214	0	3.67		
UROLOGIC						
Urologic condition[9]	2	214	0			

[1] 24 unspecified, 12 impaction, 8 infection, 4 abscess, 2 impaction and infection, 1 sebaceous cyst

[2] 1 enlarged heart, 1 hole in heart (believed healed)

[3] 4 warts, 2 lipoma, 2 ringworm, 1 sarcoptic mange, 1 allergy to bee stings, 1 benign cyst, 1 calcinosis circumscripta, 1 swollen eyes

[4] 1 episodic diarrhoea, 1 Giardiasis, 1 Parvovirus, 1 allergy to cow's milk

[5] 2 myopia, 1 dry eye, 1 corneal ulcers, 1 very watery eyes

[6] 5 decay, 2 abscess, 2 worn teeth, 1 blocked salivary gland, 1 malocclusion, 1 incorrect bite, 1 front tooth crossbite, 1 unknown facial swelling

[7] 1 cruciate ligament rupture, 1 unable to jump (under investigation)

[8] 1 kennel cough, 1 respiratory infection

[9] 1 urinary tract infections, 1 mild incontinence

Table C2: Top 19 health conditions reported for 216 Manchester Terriers, in order of prevalence.

Condition	N	%	95% CIs	
			lower	upper
False pregnancy[1]	35	28.9	21.0	37.7
Anal gland conditions	51	23.6	18.2	30.0
Conjunctivitis	17	7.9	4.8	12.5
Gastroenteritis	13	6.0	3.4	10.3
Heart murmur	10	4.6	2.4	8.6
Cancer	7	3.2	1.4	6.8
Cryptorchidism[2]	3	3.2	0.8	9.7
Arthritis	6	2.8	1.1	6.2
Atopy/allergies	5	2.3	0.9	5.6
Ear infections	5	2.3	0.9	5.6
Tooth decay	5	2.3	0.9	5.6
Colitis	4	1.9	0.6	5.0
Bacterial skin infections	4	1.9	0.6	5.0
Missing teeth	4	1.9	0.6	5.0
Warts	4	1.9	0.6	5.0
Hypothyroidism	3	1.4	0.4	4.3
Alopecia	3	1.4	0.4	4.3
Pattern baldness	3	1.4	0.4	4.3
Deafness	3	1.4	0.4	4.3

[1] denominator for female-specific prevalence = 122
[2] denominator for male-specific prevalence = 94

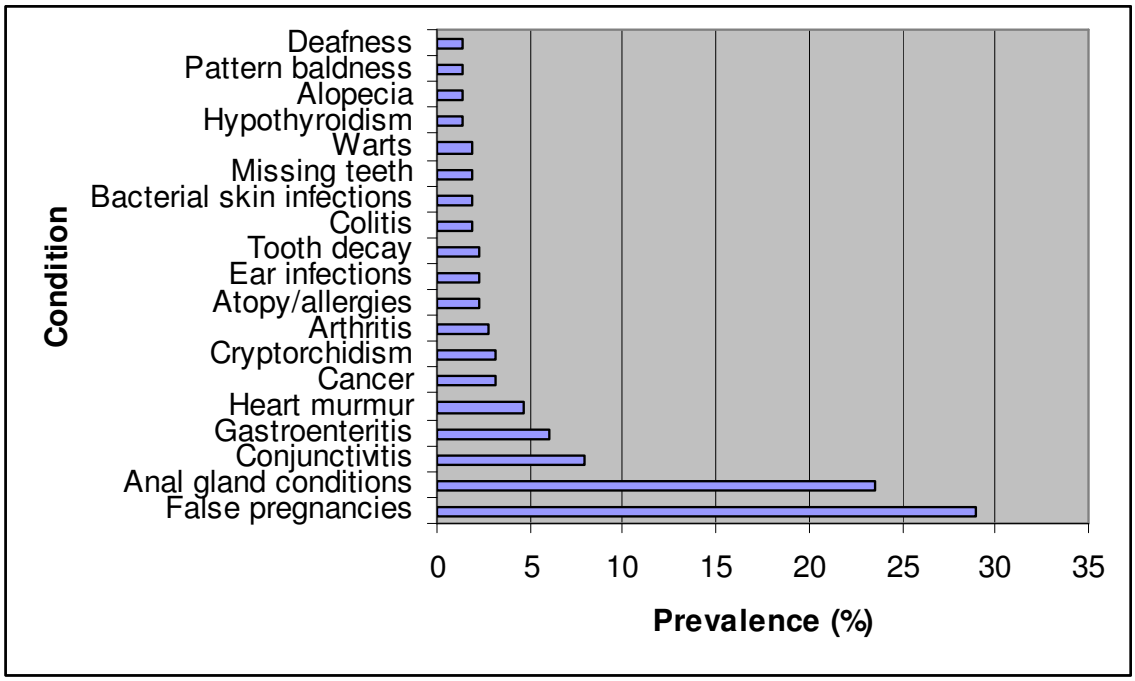


Figure 9: Histogram showing the top 19 health conditions reported in order of prevalence (%)

Although there was not a question about DNA testing for Von Willebrand's Disease, information about this was provided for 28 Manchester Terriers.

VWD DNA test result	N
Clear	18
Carrier	6
Awaiting test results	2
Affected	1
Clear by parentage	1
Total	28

Q30. Which health problem do you consider to be most serious in your Manchester Terrier?

The top 5 conditions listed as being among the most serious affecting the individual Manchester Terrier:

Condition	N	%
None	128	59.3
Anal gland conditions	12	5.6
Heart murmur/ heart disease	6	2.8
False pregnancy	4	1.9
Skin conditions	4	1.9

For a full list of all the responses, refer to the appendix.

Q31. Which health problem do you perceive to be the most serious in Manchester Terriers?

The top 5 conditions listed as being among the most serious conditions in the Manchester Terrier as a breed:

Condition	N	%
Von Willebrand's Disease	35	23.6
Kidney failure	16	10.8
Anal gland conditions	3	2.0
Cancer	2	1.4
Skin conditions	2	1.4

For a full list of responses refer to the appendix.

Discussion

These results are similar to those of the 2004 survey of morbidity in the Manchester Terrier, as far as the most commonly reported conditions although the response rate for this confidential survey was significantly higher than that achieved in the 2004 anonymous survey (Table D1) (The Kennel Club, 2006). The lack of overlap between the 95% confidence intervals for the prevalence of anal gland conditions in the 2004 survey and this survey suggest that these conditions may be becoming more prevalent.

Table D1Comparison of these results with previous survey:

		2004 Purebred Dog Health Survey	2009 Confidential health survey of the BMTC
Reported results			
Response rate		33.1%	57.0%
Number of live MTs		117	216
Median age		4.58	3.42
Top 5 conditions			
	1	False pregnancy (16%; 95% CIs 8-27%)	False pregnancy (29%; 95% CIs 21-38%)
	2	Kennel cough (8%; 95% CIs 4-15%)	Anal gland conditions (24%; 95% CIs 18-30%)
	3	Gastroenteritis (4%; 95% CIs 2-10%)	Conjunctivitis (8%; 95% CIs 5-13%)
	4	Heart murmur (4%; 95% CIs 2-10%)	Gastroenteritis (6%; 95% CIs 3-10%)
	5	Anal gland conditions (3%; 95% CIs 1-9%)	Heart murmur (5%; 95% CIs 2-9%)

In a review of false pregnancy (also called pseudopregnancy, pseudocyesis, phantom pregnancy), the authors wrote “The single term “pseudopregnancy” does not distinguish the clinical condition from “covert pseudopregnancy”, i.e. the “physiological pseudopregnancy” that occurs in every non-pregnant ovarian cycle in bitches.” (Gobello et al, 2001). This is an important point. All bitches, if not mated during oestrus, develop a physiological pseudopregnancy with a varying amount of mammary development but with no clinical signs. Overt or clinical pseudopregnancy is a syndrome in non-pregnant bitches, typically occurring 6-12 weeks after estrus, characterised by clinical signs such as nesting, mothering inanimate objects, weight gain, mammary enlargement and lactation. Susceptible bitches have a high recurrence rate in successive oestrous cycles (Gobello et al, 2001). The estimated prevalence of false pregnancy in this survey seems quite high at 29% (95% CIs: 21.0-37.7%). The overall prevalence of clinical pseudopregnancy in the UK is not known, but the estimated prevalence in the 2004 Purebred Dog Health Survey across all breeds was 2.7% (592 cases reported from 22,200 bitches, 95% CIs: 2.5-2.9%). It has been suggested that there may be a link between clinical pseudopregnancy and later development of mammary tumours, although this is still debated. In this survey, 50% (2 of 4) of the bitches reported to have had mammary tumours were also reported to have had false pregnancy. Bitches in the current survey were much more likely to suffer from false pregnancy if their dam was reported to have suffered from false pregnancy ($p<0.0001$). The prevalence of false pregnancy among bitches whose dam had suffered from false pregnancy was 83% (10 of 12, 95% CI: 50.9-97.1%), compared with a prevalence of 23% (25 of 110, 95% CI: 15.5-31.9%) among bitches whose dam was not reported to have suffered from false pregnancy. The recommendation is that predisposed bitches not intended for breeding should be spayed (Gobello et al, 2001). Considering the relatively high prevalence of false pregnancy within Manchester Terriers in this survey, this recommendation could be applied to all non-breeding bitches, especially those whose dam suffered from false pregnancy.

The prevalence of anal gland conditions in Manchester Terriers in this survey is quite striking, at 24% (95% CIs: 18.2-30.0%). Most cases were reported to have been treated by manual emptying, sometimes with antibiotic therapy. Surgical removal, with the associated risks, is generally reserved for recurrent and/or severe anal sac disease (van Duijkeren, 1995). Six Manchester Terriers in this survey were reported to have had their anal glands surgically removed. In 1976, the prevalence of anal sacculitis in dogs in the UK was estimated as 13% based on a population of 2,300 dogs seen in consultation in 2 clinics in England (Halnan, 1976). The estimated prevalence of anal gland conditions (apart from cancer) in 36,006 pedigree dogs in the UK in the 2004 Purebred Dog Health Survey was 0.33% (95% CIs: 0.28-0.40). There was reported to be no association between a dog’s sex and the development of anal sacculitis (anal gland infection) in the 1976 study (Halnan, 1976a). This is also the case in this survey, with there being no significant difference between the prevalence of anal gland conditions in bitches and dogs. Many owners of bitches with anal gland conditions reported that the conditions developed or became worse after the bitch’s season, and 30% of entire bitches in the 1976 study showed anal sacculitis 1-3 weeks after oestrus (Halnan, 1976b).

Von Willebrand's disease (VWD) is the most common inherited bleeding disorder of dogs and humans. By 1985, 31 breeds of dog had been identified with the disease and 7 breeds had been found to have a high prevalence of the disease as indicated by a gene frequency of 15-60% (Littlewood et al, 1987). The Manchester Terrier is 1 of these 7 breeds, as is the Dobermann Pinscher. Type I VWD is the most common form of the disease, and it is this type that occurs in Manchester Terriers. The severity of Type I VWD ranges from mild to severe (Thomas, 1996). The mutated gene responsible for the condition has been identified and a DNA screening scheme is now in place (The Kennel Club, 2009). Test results are either "clear" (homozygous normal), "carrier" (1 abnormal and 1 normal gene) or "affected" (homozygous for the abnormal gene, at risk of bleeding). By not breeding from affected or carrier Manchester Terriers, the condition may in time be eliminated from the breed.

As well as Von Willebrand's disease, Gough and Thomas state that Manchester Terriers are predisposed to pattern baldness, Ehler-Danlos syndrome, lens luxation, cataracts and generalised progressive retinal atrophy (GPRA) (Gough and Thomas, 2008). They do not make clear what evidence they are basing these assertions on and, as the BMTC was adamant that these conditions were not problems in the Manchester Terrier in the UK, questions about all of these conditions were included in the survey. Pattern baldness and cataracts were the only conditions from this list which were reported in the 216 Manchester Terriers in this survey. Pattern baldness is seen in several breeds including the Manchester Terrier, Whippet and Dachshund (Bond, 2004). Hair loss occurs on the ventral neck and ventrum (brisket) and may extend down the forelimbs, with signs first developing between 6-12 months of age most commonly. Unfortunately, age at onset was not provided for the 3 Manchester Terriers reported to have pattern baldness in this survey. The underlying pathology of this condition is unknown and there is no treatment. According to owner reports, the estimated prevalence of pattern baldness in the Manchester Terrier in this survey was very low at 1.4% (95% CI: 0.4-4.3%). Cataracts were reported in 2 Manchester Terriers in this survey with ages at onset of 8 and 13 years which is typical of age-related cataracts. Breed-related cataracts, which are thought to be inherited, have been reported in the Manchester Terrier in the United States of America (USA), with a prevalence above the baseline prevalence of 1.61% seen in mixed-breed dogs (Gelatt & MacKay, 2005). The estimated prevalence of cataracts in the Manchester Terrier in this survey was also very low at 0.93% (95% CI: 0.2-3.7%), and no reports suggesting breed-related cataracts in the breed in the UK were found.

At the end of 2008, The Kennel Club sent out information regarding the presence and prevalence of diseases and conditions within each breed to all breed club secretaries. This information was obtained from the 2004 Purebred Dog Health Survey, insurance data of purebred dogs covered under the Kennel Club Healthcare Plan for the previous 5 years and a list of conditions included in published material in peer-reviewed scientific literature. They stated that there was a greater reported prevalence of diseases/conditions affecting the respiratory system and the anal glands in the Manchester Terriers than in other breeds. The most common insurance claims were reported to be for feet/pad conditions and anal gland conditions. The review of scientific

literature indicated that haemophilia A, Legg-Calvé Perthes' disease and Type I von Willebrand's disease are known to affect the breed. All the reported cases of respiratory disease in the 2004 Purebred Dog Health Survey were kennel cough, a ubiquitous infectious disease affecting all breeds of dog. Therefore there is no evidence of a breed predisposition to respiratory disease. Haemophilia A is described as occurring sporadically, affecting a single individual or litter, in the Manchester Terrier (Brooks, 1999). It is caused by a deficiency of clotting factor VIII, and its inheritance is X-linked recessive. In humans, mutations in this gene occur quite frequently so it is possible for an individual to be born with the condition despite having no relatives who carry the gene. It is likely this is also the case in dogs, as the condition occurs sporadically in many breeds and crossbred dogs. Therefore, unless a familial incidence pattern is demonstrated (as in the German Shepherd Dog, for example), it cannot really be said that there is a breed predisposition to the condition. Legg-Calvé Perthes' disease (LCP) is a disorder of hip joint conformation which occurs in both dogs and humans – it is caused by an interruption in blood supply to the femoral head leading to necrosis of the bone. In the USA the Manchester Terrier is considered to be a breed at risk of LCP, and it has been shown to be an inherited condition (Vasseur et al, 1989). No cases of LCP were reported in this survey.

In North America, the Manchester Terrier is divided into two varieties, the UK-type Manchester Terrier and the Toy Manchester Terrier. In the UK the toy variety is a separate breed, the English Toy Terrier (Black and Tan). LCP has been seen in English Toy Terriers in the UK and hereditary cataracts have also been described in the breed in Continental Europe. It may be that the conditions reported to affect Manchester Terriers in the USA which have not been seen in the UK are more prevalent in the Toy variety. Given the apparent presence of some inherited diseases in American Manchester Terriers which have not been seen in the UK, any imports of Manchester Terriers from the USA for breeding purposes should only be undertaken with extreme caution.

Further analysis of the data collected in the present survey could include pedigree analysis to attempt to assess potential inheritance of some of the health conditions reported. Moving forward, it could be extremely valuable to follow the Manchester Terriers about whom we now have data forward in their lives, using a longitudinal study design. At the same time it would also be important to pick up additional individual Manchester Terriers about whom we currently have no information and also Manchester Terriers that have been born since this survey was undertaken.

In summary, the results of this survey challenge suggestions of breed predispositions to Ehler-Danlos Syndrome, lens luxation, cataracts, generalised progressive retinal atrophy, respiratory disease, haemophilia A and Legg Calvé Perthes' disease in Manchester Terriers in the UK. There was no evidence to suggest that these inherited conditions occur in the breed in this country. However, the results indicate higher prevalences than might be expected, which could be termed breed predispositions, for false pregnancy and anal gland conditions (non-cancerous). They also suggest that the frequency of deaths or euthanasia due to renal failure should be carefully monitored.

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Appendix

Q30. Which health problem do you consider to be most serious in your Manchester Terrier?

Health condition	N	%
None	128	59.3
Anal gland conditions	12	5.6
Heart murmur	5	2.3
False pregnancies	4	1.9
Arthritis	3	1.4
Bad teeth	3	1.4
Skin conditions	3	1.4
Mammary tumour	2	0.9
Weight	2	0.9
Weight (keeping it on)	1	0.5
Age-related benign tumours	1	0.5
Allergies	1	0.5
Alopecia	1	0.5
Claws break easily	1	0.5
Digestive problems	1	0.5
Dry eye	1	0.5
Dust allergy	1	0.5
Dystocia	1	0.5
Epilepsy	1	0.5
Gurgly tummy	1	0.5
Hypothyroidism	1	0.5
Hypothyroidism, heart disease	1	0.5
Low number of puppies in second litter	1	0.5
Mental health	1	0.5
Myopia	1	0.5
Pyometra	1	0.5
Required resuscitation at birth	1	0.5
Sore eyes	1	0.5
VWD (asymptomatic)	1	0.5
Blank	34	15.7
Total	216	100

Q31. Which health problem do you perceive to be the most serious in Manchester Terriers?

Manchester Terriers serious health condition	N	%
Von Willebrand's Disease	33	22.3
None	29	19.6
Kidney failure	14	9.5
Anal gland conditions	3	2.0
Cancer	2	1.4
Skin conditions	2	1.4
Kidney failure + Von Willebrand's Disease	2	1.4
False pregnancies	1	0.7
Heart disease	1	0.7
Hypothyroidism, cancer, heart disease	1	0.7
Liver problems	1	0.7
Liver problems, VWD	1	0.7
Temperament	1	0.7
Undershot jaws, temperament	1	0.7
Undetected hypothyroidism	1	0.7
Don't know	22	14.9
Blank	33	22.3
Total	148	100