Health Survey: Irish Red and White Setters.

Based on questionnaires returned before September 1 2013.

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Introduction.

General comment on survey structure and completeness. All health surveys can suffer from gaps in form filling by those who complete them. In this case several areas proved to give difficulties. Neutering status was incompletely filled in, and there was no box on the form for owners to confirm whether the dog is still alive. As deaths were evidently under-recorded amongst dogs that had been born in the 1980's and early nineties, it is clear in hindsight that such a box would have been useful to allow a more detailed understanding of the population structure and a more accurate estimate of breed longevity. It also seems likely that there is some under-recording of health conditions, and most particularly of the more minor ones. Again, records from dogs that have passed away were more obviously affected than those of dogs born recently, but it is impossible to give an estimate of the size of this problem. Confidence intervals for prevalence given within this report assume accurate recording of the population and simply refer to the sampling error in drawing a random sample of the size recorded from a population of infinite size.

There were also some geographical biases in the diseases recorded. It is difficult to be sure whether these reflect owner biases in what to record that vary geographically, or real genetic differences between different dog populations.

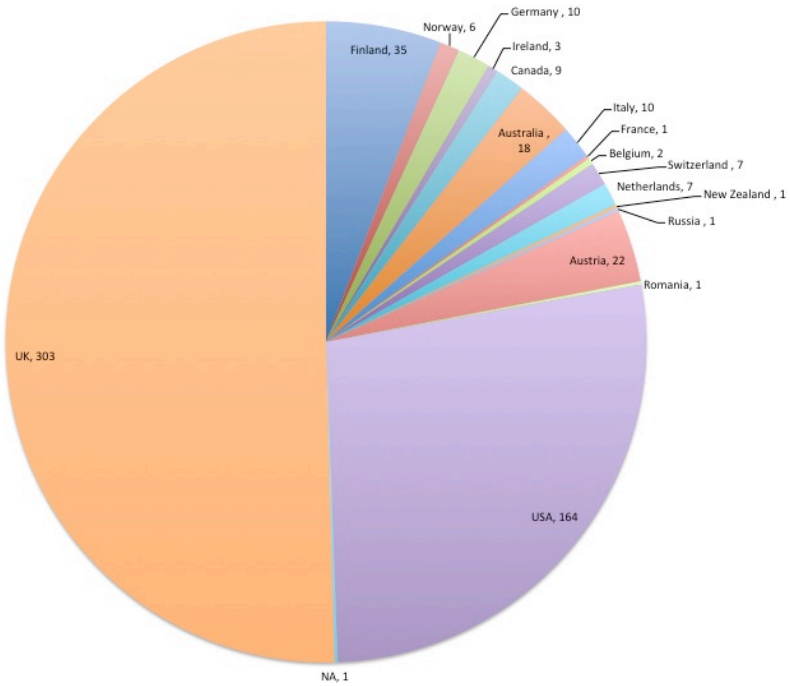
Finally, information given on ages of first diagnosis of the various conditions recorded was rather patchily filled in and even age at death was sometimes not recorded. More detail on possible errors associated with each of these aspects is given within the body of this report.

A great problem with all health surveys is that diseases are recorded under different names and with differing amounts of description by different owners. Thus for example Cushings syndrome is often (although certainly not always) associated with adrenal or pituitary tumours. Occasional the tuour is recorded on a health form, but often it is not. It is impossible to know what proportion of Cushing's animals do in fact have tumours. There are many examples amongst enteric diseases , dermatitis, hypothyroid and other glandular conditions, of diseases which commonly but not always have a cause in autoimmunity. In addition, some diseases such as strokes, are circulatory disturbances in terms of their pathogenesis, but are largely treated by neurologists on the basis of the most significant tissue damage that they cause. I have tried to use the health survey data intelligently to sort out some of these tangles, but it is often difficult to be completely sure I have come up with the correct answer.

I have included 95% confidence intervals (CI_{95}) that tell the reader how much confidence to place in some of the figures in the document. These are based on the idea of what range of disease prevalence values could be present if an infinite population had groups of dogs drawn from it of the size seen in the survey (that is 133 for mortality data or 601 for disease data) and if the numbers affected by the disease were as found in the sample. These confidence intervals do not allow for the problems of interpreting any ambiguities in diagnosis based on the forms, so are minimum estimates of the uncertainties of the survey.

The cohort surveyed.

The Irish Red and White Setter Survey was conducted in the months before July 2013. Forms that were analysed described 303 (+102)UK resident dogs together with 162 dogs resident in the USA and 136 resident in other countries (total = 601, Fig 1). These dogs originated from a total of 318 litters.



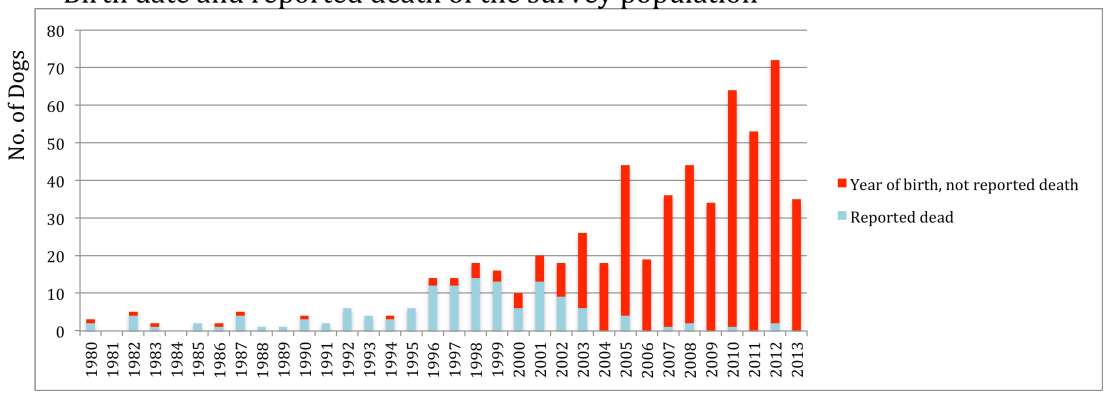
For 599 individuals gender was specified: 291 male and 308 female.
399 individuals were entire and 140 neutered (55 male, 85 female). For the other 60 individuals neutering status was not given. Females were sometimes neutered after breeding or attempts at breeding but a larger proportion of males were neutered earlier for behavioural or breeding control reasons. Exceptions to this earlier neutering of males were usually where neutering was to remove a tumour or for some other medical reason.

No standard method was used to measure coefficient of inbreeding. Hence I have not pursued relationships between presence of health problems and inbreeding in this report.

Mortality.

Death was reported for 133 individuals, although it seems likely that there is some under-reporting of deaths, as a proportion of dogs born before 1996 (and including a dog born as early as 1982) are not recorded as having died. If it is assumed that all dogs in the survey born before 1994 are now dead, then about 1 in 7 deaths are not recorded by Figure 1, which shows birth years of dogs in the survey.

Birth date and reported death of the survey population



Unfortunately only a very few dogs were reported as still alive at the census date but little mortality is recorded for dogs born in the last 9 years.

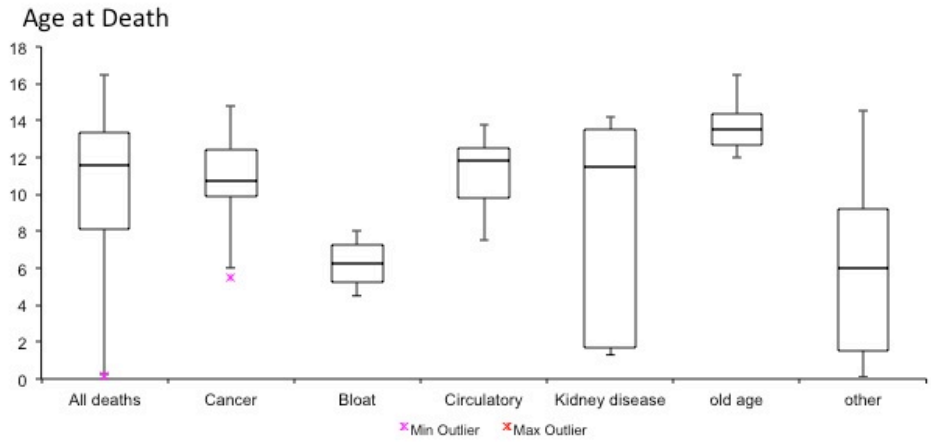
Causes of death.

No. of Deaths		%age of all deaths (95%CI of sampling error)		Mean age at death (y)	Cause	
51		38.3 (30-47)		10.7	All Cancers	
	14		10.5 (6.4-17)			splenic/splenic haemangiosarc./ other haemangiosarc.
	7		5.3 (2.6-10.5)			mammary
	5		3.8 (1.6-8.2)			liver
	4		3.0 (1.2-7.5)			kidney
	3		2.3 (0.8-6.4			osteosarcoma
	2		1.5 (0.4-5.3)			pituitary
	2		1.5(0.4-5.3)			gastric
	14		10.5 (6.4-17)			Other
23			17.3(11.8-24.6)	13.6	Old age	
13			9.8 (5.8-16)	10.4	Cardiac, circulatory & strokes	

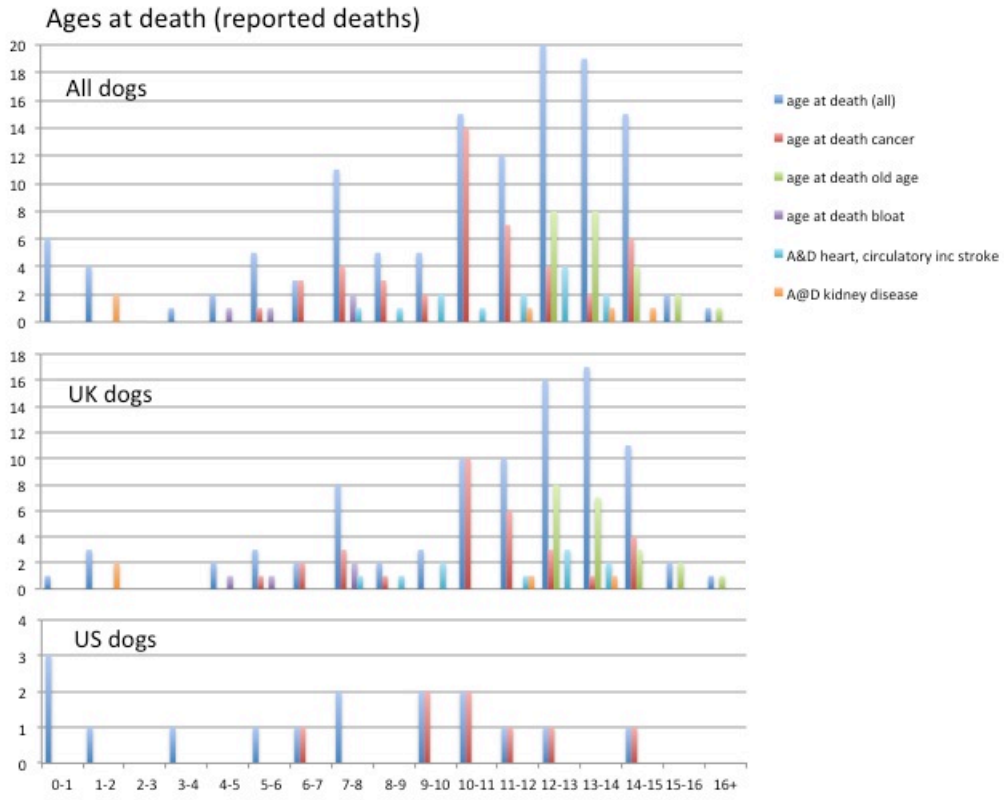
5			3.8 (1.6-8.2)	8.5	Kidney Disease	(mean is of infantile and geriatric cases)
4			3.0 (1.2-7.5)	6.3	Bloat	
23			17.3(11.8-24.6)	6.15	Other causes	Includes aggression, Cushings syndrome, bowel obstruction, metrititis, road traffic accident (RTA), etc.
14			10.5 (6.4-17)	14.6*	No cause given	* mean age at death excludes 1 dog died in first year. The death profiles of the remainder suggests old age.

Because numbers are not large, sampling errors, given as 95% confidence intervals above are proportionately high. So although the rate of cancers as cause of death in the breed seems quite high, we cannot say that the survey proves that it is unusually so. We can be sure that hemagiosarcoma and splenic tumours together are commoner than osteosarcoma or pituitary tumours, for example.

The age distribution of dogs for which mortality is noted is shown in the following box plot. The boxes stretch from the first to the third quartile and the median age of death is shown by the horizontal line within the box. Whiskers show 1.5 times the interquartile range and outliers are shown.

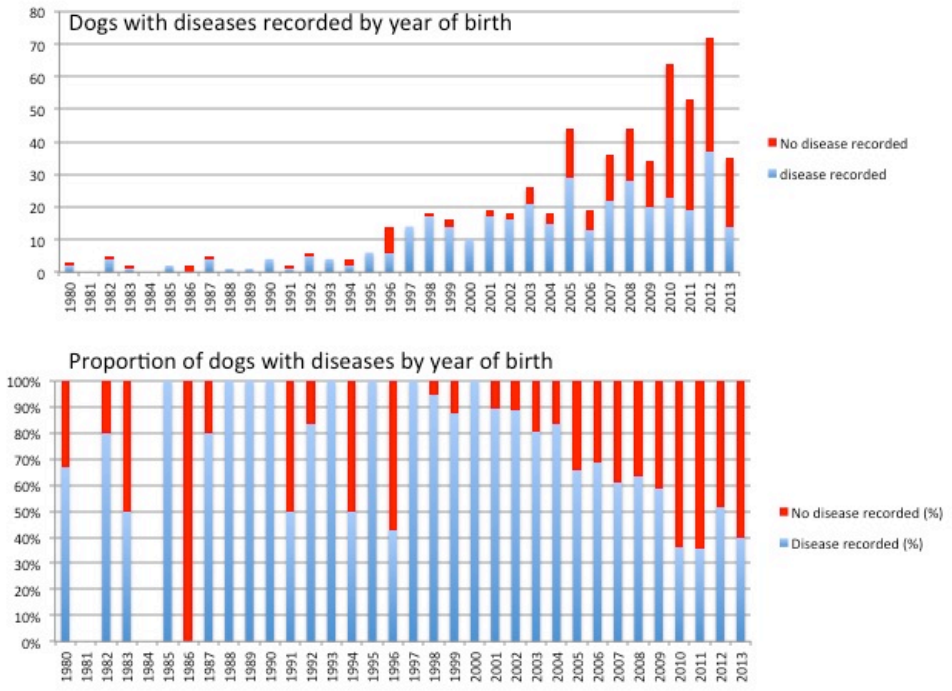


Age at death can be broken down further by geographical area, although numbers of dogs in the rest of the world other than the UK and USA are too small for significance.
The young population of dogs in the USA shows a different pattern of death from the mature population in the UK, which dominates the overall distribution of deaths in the entire survey.



Morbidity in the cohort

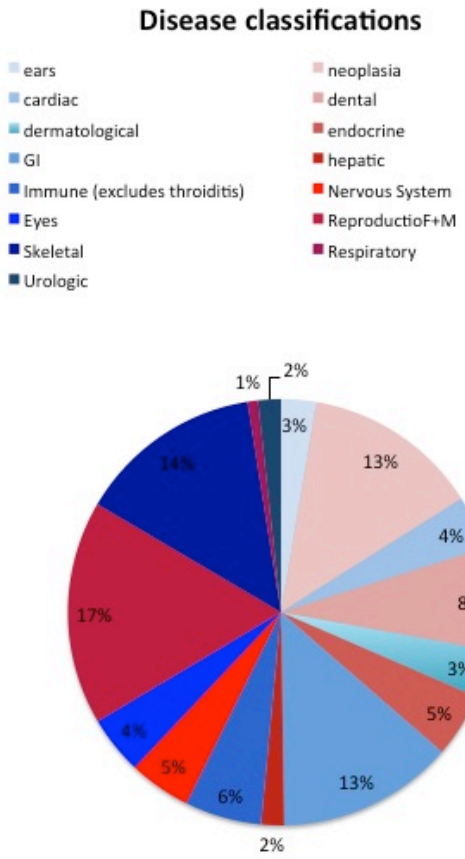
In analyzing morbidity, I have considered reports of illnesses in dogs that are now dead as well as in dogs not reported to have died. I have also considered congenital defects and disorders as well as later onset diseases.



Remarkably, under-recording of disease in dogs from early birth cohorts although possibly present at a low level, appears not to be significant. In 95 dogs born between 1997 and 2002 less than 8% have no disease or morbidity recorded (CI_{95} 86-96%, p). In later births a diminishing proportion of dogs by birth year are recorded with diseases, as their current age decreases, so that for the most recent 4 cohorts on average more than half of dogs have had no recorded diseases. For 21 dogs in the survey born before 1990, 16 are recorded with diseases (76%, CI_{95} 55–89%, difference not significant).

Over the whole cohort, 317 of 601 dogs were recorded as having any form of health problem (52.8%, CI_{95} 48.8-56.7%), but as explained earlier, for cohorts who were born more than 11 years before the census date, the proportion with at least one health problem was higher (84%, CI_{95} 77.4- 88.9%). The total number of recorded health problems was 634: exactly two entries for every animal for which any health problem was recorded.

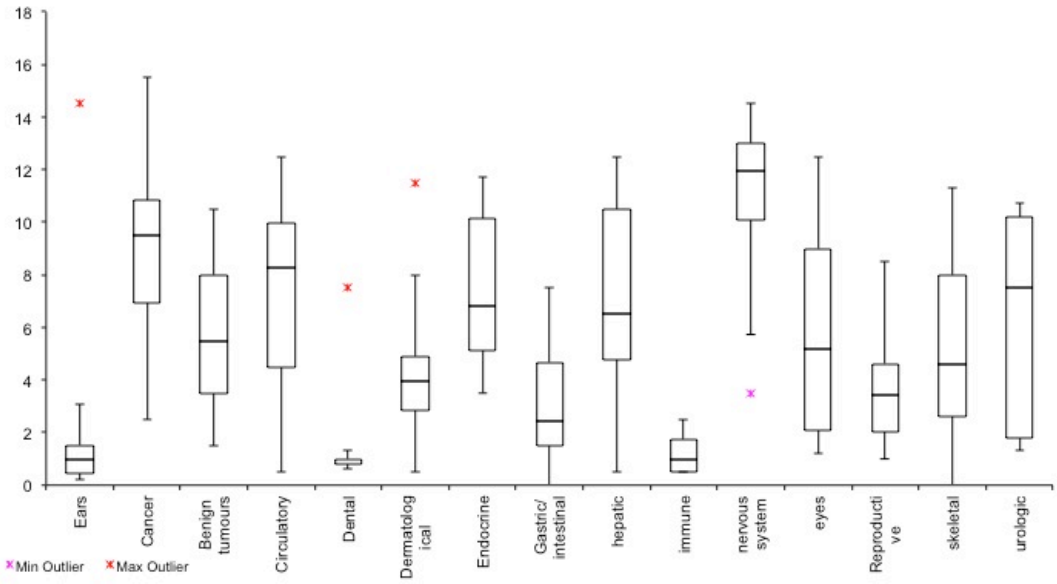
Major disease types as laid out in the health leaflet are given in the pie chart below.



The largest numbers of recorded problems were reproductive (and in particular false pregnancies where nearly 30% of all females were affected), together with skeletal (including congenital problems such as kinked tail), GI (includes umbilical hernias in 11.7% of animals) and neoplasia (includes benign tumours, but the latter are probably under-recorded). A fuller table with sampling errors is given in the appendix.

Ages of onset for each group of conditions have been used to compile the box plot, Laid out as before. Note that this does not show the period in which a given animal suffering the health problem can expect to be under treatment. This was not recorded by the survey. Rather it shows the age at which the disease type was first noted across all animals that were sick. This was reported rather patchily, particularly for survey returns from outside the UK. Consequently the box plot is derived from UK data only, and represents the 273 records for which age of onset was given in a total of 406 health problem records. Often diseases of early onset such as autoimmune conditions and allergies require long periods of treatment and may last a lifetime. Once again, kidney an urologic diseases show early and late forms with few onsets in middle age.

Age at presentation

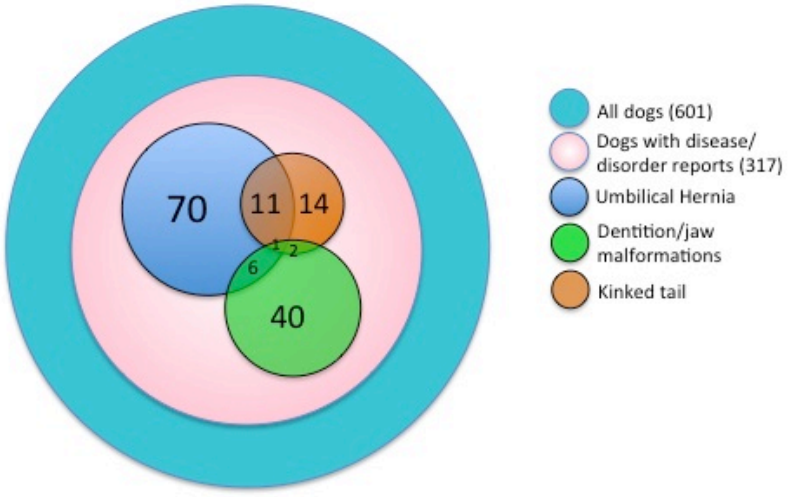


Associations between health problems.

The survey size was too small to allow much analysis of associations of different diseases in a given animal that might suggest that they were syndromic or related to a common disease causing factor. For example it would be useful to know whether particular immune system disorders and endocrine disorders go together, about complexes involving cardiac malfunctions and about neutering status and mammary cancer. But the numbers are too small to give most such analyses statistical power.

One area in which analysis was possible was in the developmental defects: jaw and tooth malformations, a kinked tail, and umbilical hernia. As shown in the Venn diagram below, whilst there are dogs that have both dental malformations and hernia or kinked tail, these are few, and do not occur more often than would be expected by chance. On the other hand of 28 dogs with a kinked tail 12 also suffered umbilical hernia, a relative risk of 3.7 (CI_{95} 2-6.9) relative to the population of dogs without kinked tails, suggesting that these defects are associated.

Venn diagram of the overlap between dogs carrying developmental disorders



The propensity to umbilical hernia is found more commonly in groups of sibs of kinked tailed dogs than the remainder of the population. For half sibs related through sires (in which uterine environment is less likely to have a role) the trend remains strong but is just below the 0.05 significance level. At this stage there are hints from the survey that breeding away from umbilical hernia an/or kinked tail should bring down the rates of both. A larger specific study could make the evidence much more definite.

Although umbilical hernias are usually not a serious problem, the rate seen in the Irish Red and White Setter is of some concern, one of the highest recorded. This high rate, together with the association with kinked tail may suggest that there is still too little genetic diversity in the breed for robust genetic health.

Appendix: Table of Health Problems seen.

No. of dogs with condition		**%age of dogs with this condition (95%CI of sampling error)**	**Condition**	
109		18.1 (15.3 - 21.4)	Gastro-intestinal	
	70	11.7 (9.3 – 14.5)		Umbilical Hernia
	27*	4.5 (3.1 – 6.5)		Food allergies/IBD specified under intestinal or immune
	6	1.0 (0.5 – 2.2)		Bloat
	6	1.0 (0.5 – 2.2)		others/unspecified(2) (inguinal hernia, megaoesophagus, necrotic bowel, obstruction)
89		14.8 (12.2 - 17.9)	Skeletal	
	28	4.7 (3.2 – 6.7)		Kinked tail
	15	2.5 (1.5 – 4.1)		arthritis, not further located
	9	1.5 (0.8 – 2.8)		lameness (other or not specified)
	8	1.3 (0.7 – 2.6)		hip dysplasia
	7	1.2 (0.6 – 2.4)		spondylitis, spondylosis, disc disease
	4	0.7 (0.3 – 1.7)		shoulder/ ocd
	4	0.7 (0.3 – 1.7)		elbows
	2	0.3 (0.1 - 1.2)		Panosteosis
	2	0.3 (0.1 - 1.2)		anterior cruciate
	2	0.3 (0.1 - 1.2)		trauma
	8	1.3 (0.7 – 2.6)		others
89		28.9 (24.1 – 34.2)	Reproductive (f) - 308 dogs	
	54	17.5(13.7-22.2)		False pregnancy
	15	4.9 (3.0 – 7.9)		pyometra
	13	4.2 (2.5 – 7.1)		unproductive matings
	3	1.0 (0.3 – 2.8)		Caesars
	2	0.7 (0.2 – 2.3)		miscarriage/ stillbirth
	2	0.7 (0.2 – 2.3)		others (eclampsia, abnormal reproductive organs)
85		14.1 (11.6- 17.2)	All Cancers	
	20	3.3 (2.2 - 5.1)		mammary (all types)
	11	1.8 (1.0 – 3.2)		splenic/splenic haemangiosarc./ other haemangiosarc.
	3	0.5 (0.2 – 1.5)		mast cell
	3	0.5 (0.2 – 1.5)		soft tissue sarcoma
	3	0.5 (0.2 – 1.5)		osteosarcoma
	2	0.3 (0.1 - 1.2)		gastric
	2	0.3 (0.1 - 1.2)		pituitary
	41	6.8 (5.1 – 9.1)		Other or unidentified
49		8.2 (6.2 – 10.6)	Dental	All but one, malformations/misplaced teeth
37		6.2 (4.5 – 8.4)	Immune system	(excluding thyroiditis**)
	27*	4.5 (3.1 – 6.5)		Food allergies etc*
	5	0.8 (0.4 – 1.9)		Flea allergy
	4	0.7 (0.3 – 1.7)		Grass allergies/ other respiratory allergies
	3	0.5 (0.2 – 1.5)		Pancreatitis* with colitis or general allergies
	2	0.3 (0.1 - 1.2)		Autoimmune heamolytic anemia
	17	2.8 (1.8 – 4.5)		Other or unspecified (10) includes masticatory muscle myositosis, anaphylaxis after wasp sting, immune med. thrombocytopenia, conjunctivitis, excema.
31		5.2(3.7 – 7.2)	Endocrine	
	21	3.5 (2.3 – 5.3)		Hypothyroidism
	8	1.3 (0.7 – 2.6)		Cushings disease
	3	0.5 (0.2 – 1.5)		Others, Diabetes (1)
30		5.0 (3.5 – 7.0)	Nervous system	

	7	1.2 (0.6 – 2.4)		Vestibular syndrome
	6	1.0 (0.5 – 2.2)		Laryngeal paralysis
	4	0.7 (0.3 – 1.7)		Fitting
	13	2.2 (1.3 – 3.7)		Others – includes dementia, NS tumours, strokes
28		4.7 (3.2 – 6.7)	Eyes	
	15	2.5 (1.5 – 4.1)		Posterior polar cataract (PPC)
	4	0.7 (0.3 – 1.7)		Distichiasis
	3	0.5 (0.2 – 1.5)		Progressive Retinal Atrophy (PRA)
	3	0.5 (0.2 – 1.5)		Cataract (unspecified)
	3	0.5 (0.2 – 1.5)		Others: iris papilloma, iris cyst, cherry eye
27			Cardiovascular	
	13	2.2 (1.3 – 3.7)		Heart Murmur
	5	0.8 (0.4 – 1.9)		Cardiomyopathy (type not specified)
	3	0.5 (0.2 – 1.5)		Atrial fibrillation
	3	0.5 (0.2 – 1.5)		cardiac effusion, congestive heart disease
	2	0.3 (0.1 - 1.2)		Hypertension
	2	0.3 (0.1 - 1.2)		Other: Infection, heart attack after fireworks
24			Dermatological	(Immune conditions, cycsts etc
	11	1.9 (1.1 – 3.4)		Pyoderma/ rashes /excema
	4	0.7 (0.3 – 1.7)		Lipomas and other lumps
	3	0.5 (0.2 – 1.5)		Folliculitis
	3	0.5 (0.2 – 1.5)		Sebacious and other cysts
	2	0.3 (0.1 - 1.2)		Juvenile cellulitis
	1	0.2 (0 – 1.0)		Other – yeast infection
19		6.5 (4.2 – 10)	Reproductive (m) – 291 dogs	
	8	2.8 (1.4 – 5.3)		mono-orchidism
	6	2.1 (1.0 – 4.4)		cryptorchisim
	5	1.7 (0.7 – 4.0)		infertility
17		2.8 (1.8 – 4.5)	Ears	
	15	2.5 (1.5 – 4.1)		Infections, mainly juvenile otitis externa
	2	0.3 (0.1 - 1.2)		deafness of old age
11			Urologic	
	5	0.8 (0.4 – 1.9)		Kidney disease
	4	0.7 (0.3 – 1.7)		Incontinence
8			Hepatic	
	6	1.0 (0.5 – 2.2)		Liver (incl 2 tumours*)
	5	0.8 (0.4 – 1.9)		Pancreatitis
5		0.8 (0.4 – 1.9)	Respiratory	bronchitis (2), 3 other infections

* some conditions are deliberately double counted in this table, as they are recorded by some owners under 1 heading, some under another, and some under both.

** Hypothyroid is often but not always an autoimmune condition (thyroiditis). In this survey the full diagnosis is not always clear. Here all hypothyroidism is included under endocrine, and not immune disease.