

Report from the Kennel Club/  
British Small Animal Veterinary Association  
Scientific Committee

Summary results of the  
Purebred Dog Health Survey  
for all breeds

Warning: The results of this survey and particularly the breed-specific analyses should be interpreted with caution. The overall response rate was only 24% with breed-specific response rates from 4.5% to 64.7%. While we had hoped to achieve an overall response rate of at least 40% we have, due to the high level of interest expressed, agreed to produce breed-specific summary reports for those breeds where the individual breed response rate was greater than or equal to 15%.

## All breeds

Approximately 56,938 forms were sent out, 13,773 forms were returned of which 13,741 were useable and represented 36,006 live dogs. This was an overall response rate of 24%.

### **Mortality data**

Deaths were reported for 165 breeds with the Bergamasco, Bolognese, Ibizan Hound and Lagotto Romagnolo each reporting no deaths for a total of 15,881 deaths. The median age at death overall was 11 years and 3 months (minimum=2 months, maximum=23 yrs and 5 months). Only 20% of dogs remained alive at 14 years of age and this had fallen to <10% by 15 years (Figure 1). Table 1 shows the twenty most common causes of death. Age at death is presented for the 10 most common causes of death (Figure 2).

Table 1. Cause of death by organ system/category for all breeds.

Cause of death	N*	%†	Most common specific causes in descending order
1 Cancer	4282	27.0	Unspecified, lymphosarcoma, carcinoma
2 Old age	2830	17.8	Old age and old age combinations
3 Cardiac	1770	11.1	Failure, attack, defect, cardiomyopathy, unspecified, MVD
4 Urologic	783	4.9	Chronic kidney failure, acute kidney failure
5 Combinations	732	4.6	Kidney & liver failure, multiple organ failure, cardiac, endocrine, cancer
6 Neurologic	671	4.2	Seizures, intervertebral disc disease (IVDD), unspecified
7 Gastrointestinal	662	4.2	GDV, pancreatitis, colitis, foreign body, HGE, gastroenteritis
8 Cerebrovascular	597	3.8	Stroke or cerebral vascular accident
9 Trauma	384	2.4	Road traffic accident, unspecified, spinal trauma, attacked by dog
10 Hepatic	336	2.1	Failure, unspecified
11 Unknown	295	1.9	Undiagnosed illness
12 Musculoskeletal	272	1.7	Arthritis/osteoarthritis, hip dysplasia
13 Endocrine	234	1.5	Cushings disease (hyperadrenocorticism), diabetes mellitus
14 Perioperative	222	1.4	Perioperative or anaesthetic related, postoperative or after surgery
15 Behaviour	209	1.3	Aggression, unspecified
16 Respiratory	189	1.2	Pneumonia, laryngeal paralysis, unspecified failure
17 Immune mediated	158	1.0	Unspecified, AIHA, immune mediated thrombocytopaenia
18 Reproductive	145	0.9	Pyometra, prostatic disease
19 Poisoning	84	0.5	
20 Sudden death	71	0.4	
Sub-total	14926	94.0	
The rest	955	6.0	
Total	15881	100.0	

\* N=number of cases; † %=proportional mortality=N/15881=N/total number of deaths in ten years.

Cancer: lymphosarcoma=lymphoma

Cardiac: MVD=mitral valve disease

Gastrointestinal: GDV = gastric dilatation/volvulus, HGE = haemorrhagic gastroenteritis

Immune mediated: AIHA = autoimmune haemolytic anaemia

The rest included the following reported causes of death in descending order: uncodeable causes of death categorized as other, senility, internal bleeding, collapse, infection, ocular, dermatologic, portosystemic shunt (PSS), septicaemia, systemic, cardiovascular, pining, hyperthermia and drowning.

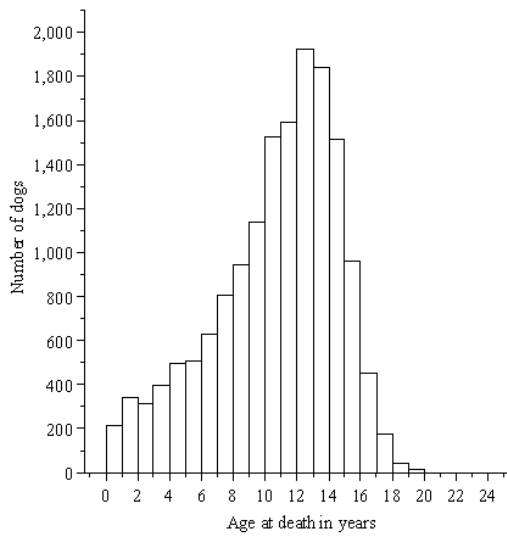


Figure 1. Histogram of the overall longevity for 15,881 deaths representing 165 breeds with reported deaths: overall median age at death was 11 years and 3 months (minimum=2 months, maximum=23 years and 5 months); mean age at death was 10 years and 6 months (SD=4 years).

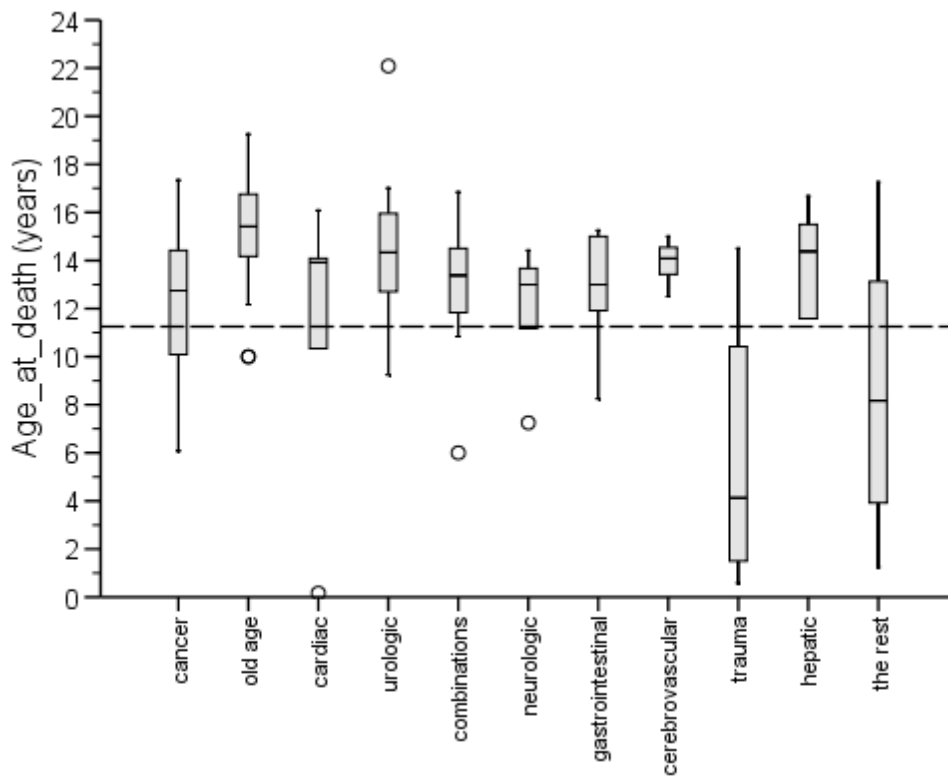


Figure 2. Box and whisker plot of age at death in years for the ten most common causes of death (N=15,881). The dashed line (---) is the overall median age at death for all dogs in the survey. The solid line within each grey box represents the median age at death from the condition. The grey box represents 50% of the dogs and the whiskers represent 95% of the dogs for each condition. The circles (o) represent possible outliers.

### Morbidity data

The median current age of all live dogs with a reported age (N=35,907) was 4 years and 10 months (min=1 month, max=19 years, Figure 3). Health information was reported for 36,006 live dogs of which 22,540 (62.6%) were healthy and 13,466 (37.4%) had at least one reported health condition, resulting in a total of 22,504 reported conditions with a median of 1 condition/dog (min=1, max=14).

The median current age of all healthy dogs with a reported age (N=22,467) was 3 years and 10 months (min=1 month, max=19 years). The distribution of gender and neuter status is shown in Table 2.

The median current age of all dogs with one or more disease conditions and a reported age (N=13,432) was 6 years and 9 months (min=1 month, max=18 years and 11 months). The median age at diagnosis for all disease occurrences with a reported age at diagnosis (N=21,551) was 3 years and 4 months (min=1 month, max=16 years and 11 months, Figure 4). Table 3 shows the frequency of occurrence of all reported disease conditions. Age at diagnosis is presented for the most common disease conditions (Figure 5).

Table 2. Distribution of gender and neuter status for dogs with reported gender and neuter status.

Gender	Neuter status		Totals
	Intact	Neutered	
Female	15,038	7,162	22,200 (62%)
Male	10,493	2,986	13,479 (38%)
Totals	25,531 (72%)	10,148 (28%)	35,679 (100%)

Females were 1.7 times more likely to be neutered compared with males (95% confidence interval: 1.6-1.8, P<0.0001).

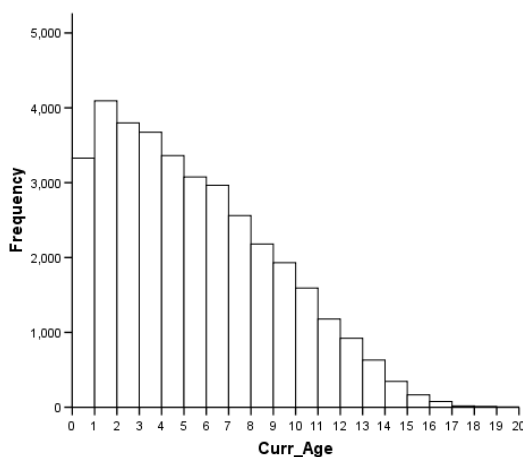


Figure 3. Histogram showing frequency of current age in years for live dogs with age reported (N=35,907).

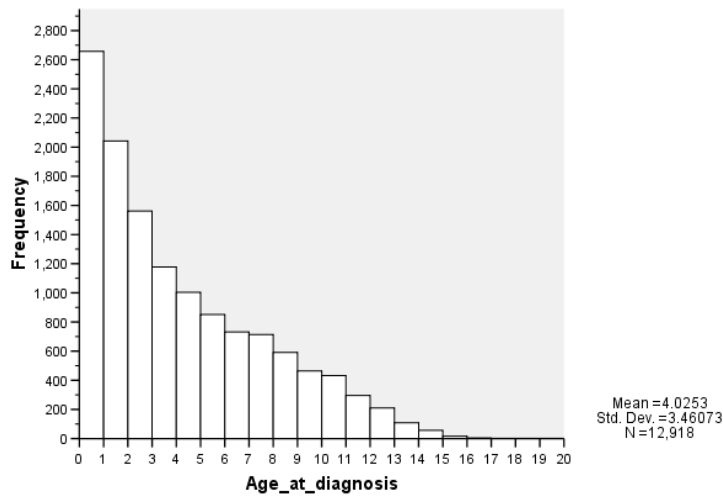


Figure 4. Histogram showing frequency of age at diagnosis for the 12,918 dogs with one or more disease conditions, using the youngest age at which a disease condition was first reported for those dogs with more than one disease condition or episode.

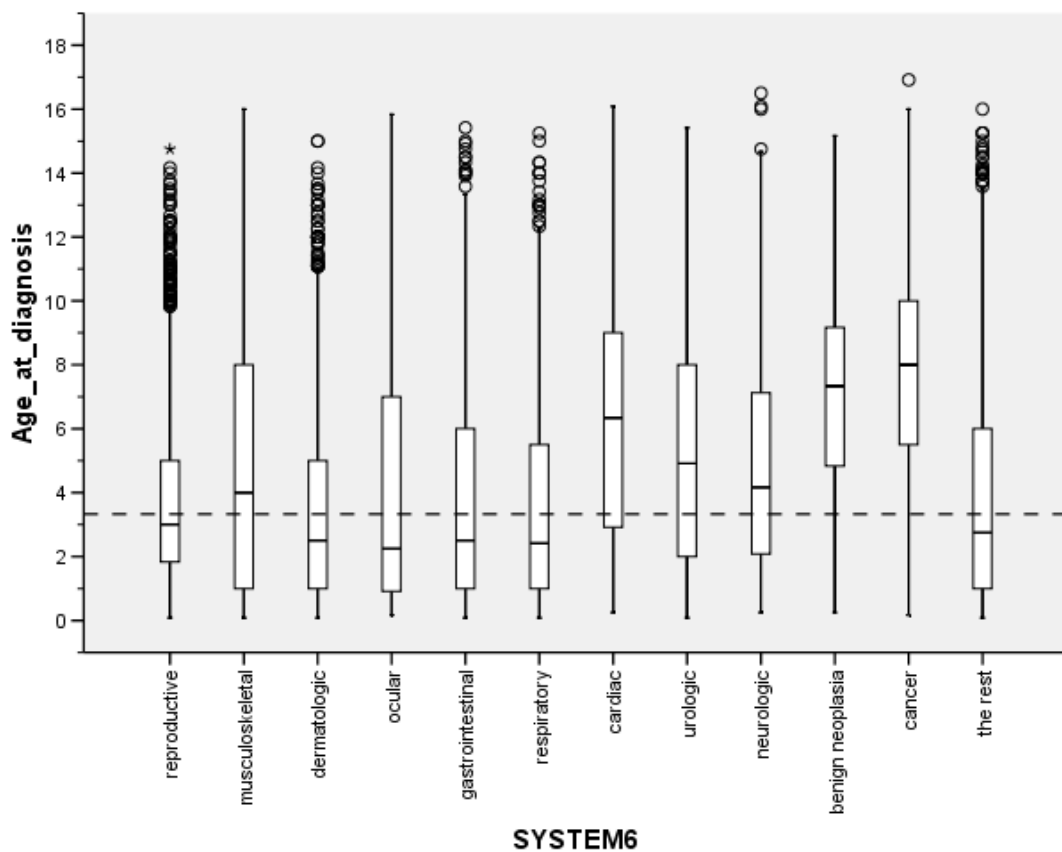


Figure 5. Box and whisker plot of age at diagnosis in years for the most common disease conditions in descending order. The dashed line (---) is the overall median age at diagnosis for all dogs in the survey. The solid line within each grey box represents the median age at diagnosis from the condition. The box represents 50% of the dogs and the whiskers represent 95% of the dogs for each condition. The circles (o) represent possible outliers and the asterisks (\*) represent extreme outliers.

Table 3. Disease condition by organ systems for all breeds (N=36,0006 live dogs).

Disease condition	All conditions		Prevalence	Most common specific conditions in descending order
	N*	%†	%††	
1 Reproductive	3233	14.4	8.98	Pyometra, false pregnancy, dystochia, infertility, cryptorchid, irregular heats
2 Musculoskeletal	2910	12.9	8.08	Arthritis, cruciate ligament injury, hip dysplasia, patellar luxation, OCD
3 Dermatologic	2320	10.5	6.44	Dermatitis, mites, pyotraumatic dermatitis, alopecia, pyoderma, fading nose pigment
4 Ocular	2167	9.6	6.02	Cataract, entropion, corneal ulcer, epiphora, KCS, cherry eye, distichiasis
5 Gastrointestinal	1690	7.5	4.69	Colitis, GDV, diarrhoea, pancreatitis, foreign body obstruction, vomiting
6 Respiratory	1242	5.5	3.45	Kennel cough, noisy breathing, coughing, rhinitis, long soft palate
7 Cardiac	1159	5.2	3.22	Heart murmur unspecified, arrhythmia, MVD, CHF, DCMP
8 Urologic	1009	4.5	2.80	Cystitis, incontinence, cystouroliths, haematuria, kidney failure (chronic>acute)
9 Immune mediated	990	4.4	2.75	Food allergy, atopy, flea allergy, allergy unspecified, AIHA
10 Neurologic	937	4.2	2.60	Seizures, IVDD, deafness, meningitis, vestibular disease
11 Aural (ears)	825	3.4	2.29	Otitis externa, earmites, excessive ear wax, aural haematoma
12 Benign neoplasia	762	3.4	2.12	Lipoma, histiocytoma, unspecified
13 Cancer	646	2.9	1.79	Type unspecified, MCT, carcinoma, lymphoma, soft tissue sarcoma, SCC
14 Dental	613	2.7	1.70	Retained puppy teeth, dental disease, defect other than extra teeth
15 Endocrine	573	2.6	1.59	Hypothyroidism, Cushings disease, diabetes mellitus, Addisons disease
16 Unknown	457	2.0	1.27	Dermatologic, hepatic, musculoskeletal, ocular, neurologic, unspecified undiagnosed illness
17 Trauma	342	1.5	0.95	Musculoskeletal, ocular, dermatologic, neurologic
18 Other	213	1.0	0.59	Hernia (umbilical>inguinal), poisoning, fever of unknown origin, uncodeable conditions
19 Anal gland	127	0.6	0.35	Anal sacculitis (anal gland impaction or infection or removal)
20 Behaviour	87	0.4	0.24	Unspecified, aggression
21 Hepatic	78	0.4	0.22	Hepatitis, portosystemic shunt, liver disease/failure (chronic>acute)
22 Cerebrovascular	55	0.2	0.15	Stroke or cerebrovascular accident
23 Haematopoietic	53	0.2	0.15	Anaemia, bleeding disorder, platelet disorder
24 Cardiopulmonary	16	0.1	0.04	Coughing, pleural effusion, pulmonary oedema
Total	22504	100.0	62.50	

\* N = number of cases of disease; † % = proportional morbidity as N/225044 dogs with disease conditions; †† prevalence % = N/360006 live dogs

Reproductive: dystochia= uterine inertia (failure to push)>physical blockage (stuck puppy), cryptorchid=undescended testicle or monorchid as missing testicle

Musculoskeletal: arthritis=osteoarthritis or degenerative joint disease (hindlimbs>forelimbs), OCD=osteochondrosis dissecans (elbow=shoulder>hock>stifle)

Dermatologic: dermatitis=undiagnosed skin irritation or scratching or itchy skin or pruritis, mites in descending order – sarcoptes>cheyletiella> demodex, pyotraumatic dermatitis=hot spot or wet eczema, alopecia=hairloss (unspecified), pyoderma=skin infection

Ocular: entropion=inward turning eyelid, epiphora=overflow of tears or excessive tearing, cherry eye=prolapsed gland of the third eyelid, KCS=keratoconjunctivitis sicca or dry eye, distichiasis=extra eyelashes,

Gastrointestinal: colitis=chronic large bowel diarrhea, GDV=gastric dilatation/volvulus

Respiratory: kennel cough or infectious tracheobronchitis, rhinitis=chronic rhinitis or nasal discharge

Cardiac: MVD=mitral valve disease, CHF=congestive heart failure, DCMP=dilated cardiomyopathy

Urologic: cystitis=bladder infection, incontinence (unspecified>after spay), cystouroliths=bladder stones (unspecified>struvite or magnesium ammonium phosphate>calcium oxalate>urate>cystine>mixed), haematuria=blood in urine

Immune mediated: atopy=inhalant allergy, AIHA=autoimmune haemolytic anemia

Neurologic: seizures include idiopathic epilepsy and unspecified fits, IVDD=intervertebral disk disease

Cancer: lymphoma=lymphosarcoma, MCT=mast cell tumour, SCC=squamous cell carcinoma

Endocrine: Cushings disease=hyperadrenocorticism, Addisons disease=hypoadrenocorticism

Haematopoietic: blood conditions excluding those reported as immune mediated and all were non-specific conditions

Information for the breed-specific reports:

Breeds with a response rate of >15% and having had >50 completed questionnaires returned were included as separate breeds and the remaining breeds were combined into 'other breeds' for the scientific papers.

Breed-specific reports have been prepared for those breeds with response rates  $\geq 15\%$  regardless of the total number of completed questionnaires returned.

Mortality or cause of death data are reported as breed-specific proportional mortalities.

Breed-specific proportional mortality is reported as the number of deaths due to a specific cause affecting a specific organ system divided by the total number of deaths for the breed in the past ten years reported in the survey.

Table 1:

N=number of deaths due to a specific cause for the breed

% = proportional mortality as  $N/\text{total number of deaths for the breed in the past ten years}$

For Figure 2:

Box and whisker plot of age at death in years for the most common causes of death in the breed (N=total number of deaths in the breed). The dashed line (---) is the overall median age at death for all dogs in the survey and the dotted line (----) is the overall median age of death for the breed. The solid line within each grey box represents the median age at death from the condition. The box represents 50% of the dogs and the whiskers represent 95% of the dogs for each condition. The circles (o) represent possible outliers and the asterisks (\*) represent extreme outliers.

Morbidity or frequency of disease occurrence data are reported as breed-specific proportional morbidities.

Breed-specific proportional morbidity is reported as the number of cases of a specific disease condition divided by the total number of diseased dogs for the breed.

For Table 3:

N = number of cases of a specific disease for the breed

% = proportional morbidity as  $N/\text{total number of dogs with disease conditions for the breed}$

For Figure 5:

Box and whisker plot of age at diagnosis in years for the most common disease conditions in descending order for the breed (N=total number of dogs with n conditions and age at diagnosis reported). The dashed line (---) is the overall median age at diagnosis for all dogs in the survey and the dotted line (----) is the overall median age at diagnosis for the breed. The solid line within each grey box represents the median age at diagnosis from the condition. The box represents 50% of the dogs and the whiskers represent 95% of the dogs for each condition. The circles (o) represent possible outliers and the asterisks (\*) represent extreme outliers.

Medians with minimum and maximum values are reported throughout the reports as these are the most appropriate statistics for skewed distributions such as age at death. When data are not normally distributed, the median value is a more appropriate measure of the central tendency or average for the data. The median value represents the middle value, below which lie 50% of the values and above which lie 50% of the values.

Coding and abbreviations for disease conditions (abbreviations also apply to causes of death):

Organ system code	Meaning (abbreviation for graphs)
Anal gland	(anal gla)
Aural	ears
Behaviour	
Benign neoplasia	non-cancerous masses, lumps or cysts (benign n)
Cancer	malignant neoplasia
Cardiac	heart
Cardiopulmonary	conditions that affect the heart & lungs (cardiopu)
Cerebrovascular	stroke or cerebrovascular accident (cerebrov)
Dental	
Dermatologic	skin (dermatol)
Endocrine	conditions of the hormonal system (endocrin)
Gastrointestinal	stomach, intestines and pancreas(gastroin)
Haematopoietic	blood
Hepatic	liver and gall bladder
Immune mediated	conditions involving the immune system (immune m)
Musculoskeletal	muscles, tendons, ligaments and bones (musculos)
Neurologic	nervous system including the brain (neurolog)
Ocular	eyes
Other	uncodable conditions* (uncode a or other)
Reproductive	male and female reproductive organs including the prostate gland (reproduc)
Respiratory	nasal cavity, nasopharynx, larynx, trachea and lungs (respirat)
Trauma	traumatic conditions affecting any organ system
Unknown	undiagnosed illness
Urologic	urinary tract (kidneys, ureters, bladder & urethra)

\* conditions that could not be coded to one of the specified organ system categories.

Other abbreviations used in the breed-specific reports include:

CDRM	Chronic degenerative radiculomyelopathy
CHD	Canine hip dysplasia
CLR	Cruciate ligament rupture
EPI	Exocrine pancreatic insufficiency
GME	Granulomatous meningoencephalitis
IBD	Inflammatory bowel disease
MMM	Masticatory muscle myositis
OCD	Osteochondrosis dissecans
PLE	Protein losing enteropathy
PLN	Protein losing nephropathy
PPM	Persistent papillary membrane