BeaCon Open Health Registry
Year 12 Report
April, 2013

This is BeaCon's 13th year in existence and the 12th year of reporting health status of Bearded Collies in out Open Health Registry. Each owner and breeder who participates in the open health registry makes an important contribution to our knowledge.

Participation

What Dogs May Participate?

- **ALL BEARDED COLLIES** of known parentage
- Deceased or living
- Healthy or with a health problem
- From any country

Who May Submit Information?

- Owners with whom the dog lives.
- A co-owner (consent from primary owner is needed before the dog's record is public).
- A breeder. Starting in the spring of 07, a breeder can also submit information. A breeder may enter prior to sale, if their contract notes the pup is in BeaCon's open registry; that suffices as consent. Otherwise, consent from the primary owner is needed before the dog's record is public.
- Primary owners whose co-owner refuses to let a dog be in the open health registry can still enter the dog in a non-public section (started 2008). This is done by entering a co-owner name in the appropriate field. Such dogs' data will remain private; they cannot be found in searches or reports of the database. Those dogs' individual data will be included in the general tabulation of data, such as the number of dogs with a particular disease, ages, causes of death, etc.
- Breeders who enter a sire or dam can indicate if the dog has produced a disease in offspring. This policy was started in year 3 because breeders are not always able to convince their puppy buyers to participate in the open registry. Dams producing progeny with a disease can have the number of cases and the litter (s) indicated. Sires producing progeny with a disease may have the number of cases indicated. The name of a dog with the specific disease produced cannot be listed without permission of the owner.

Submit Information.

Go to www.beaconforhealth.org/sqlweb

Documentation.

No changes have been made from previous years. Copies of health screening test results are requested but the owner is trusted to enter data accurately. Today in the USA health screening results are readily found on-line at the OFA site (www.offa.org); one needs at a minimum the dog's breed; a registered name or AKC registration number can also be used..

Updating.

Reminders are sent each January to owners who have a living dog(s) in the registry as of the most recent data entry. Updating should be done yearly, even if the dog has had no changes. You can also update whenever there has been a change in your dog's health or new health screens done – at any time.

Newer Features

- As of March 2009, the search and report function of the OHR became free to anyone who is registered.

- As of fall 2008, there is a non-public section if an individual prefers that their dog's information not be in the public view or when a co-owner refuses to give the primary owner permission to put the dog into the open registry. "Non-public" entries are collated in the yearly statistics only and are not available to the search and report functions. This year there are 158 dogs in the non-public section.

The Importance of Participation

- A large number gives a more comprehensive view of the extent of health problems in the breed because disease frequency is determined by the number of both affected and normal dogs.
    - For example, if there are 80 dogs with Symmetrical Lupoid Onychodystrophy in a total of 1000 dogs, the frequency of SLO is 8%, but if the total number of dogs is 2000 dogs, the frequency of SLO drops to 4.0%.
- To provide whole family information which breeders can use for relative-risk pedigree analysis in diseases that are autosomal recessive.
- To provide data for researchers.
- To allow prospective puppy buyers data on the health conditions affecting Bearded Collies and their prevalence which may enable them to make more informed choices, or at least know what questions to ask breeders.

Pedigrees and Coefficient of Inbreeding (COI)

Every effort is made to have the pedigree be accurate. As new dogs are entered into the database, a five generation pedigree is generated and posted; this may take several weeks. Owners are notified and asked to confirm accuracy of the pedigree. Data for pedigrees come from many sources including pedigrees submitted by owners and online databases. With the advent of the on-line registry system, fewer hard copy pedigrees have been submitted; thus the dependence on other sources. Pedigrees are generated with Breeder's Assistant. If an error is found in a pedigree, please notify E. Sell (beaconbb@bellsouth.net) with the correct information.

A COI calculates the closeness of relationship in a pedigree. It is usually expressed as a percentage and it was developed by Sewall Wright (Coefficients of inbreeding and relationship. Am Nat. 56:330-8, 1922). The basic concept is that inbreeding only exists if the ancestor appears on both sire's and dam's side of the pedigree.

COI's can be calculated by hand, but it is complex; various online sites describe how to do this. It isn't complex if one uses a pedigree software program with the built in calculation. Breeder's Assistant software is used to calculate a 10 generation COI which is displayed at the top of each dog's pedigree. These values may differ from those obtained by other pedigree programs due to the algorithm used for calculations.

Resistance and Dilemmas

Uncertainty about entering dogs into this open health registry will always exist. Some are fearful of being maligned. BeaCon's board encourages owners and breeders alike to give consideration to balancing such fear with the importance of establishing a comprehensive record of the breed's health.

New breeders in particular face the dilemma of having limited amounts of data on which to make an informed decision about what would constitute a good pairing. One can go to the various registries for information such as the OFA web site or CERF, but it should be understood that the appearance of a dog

in one of these registries does not automatically indicate that the dog has normal results. If the dog is not listed, then a copy of the original test results should be requested. **The BeaCon Open Health Registry should not be used as a definitive source for test results.** Readers are encouraged to contact owners for confirmation and additional information as needed.

Use of Data and Caveats

The purpose of this registry is to offer objective data on disease and wellness from owners and breeders. It is not to draw conclusions about any particular line, sire, or dam. We leave it to the user to interpret the information as they see fit.

For maximum accuracy it is vital that data be current. We therefore make every effort to contact owners each year to up-date their dogs' entry even if it is just to say there has been no change in the dog's health or health clearance status.

The disease frequencies in this report apply solely to this particular population of Bearded Collies. Until more Bearded Collies worldwide are entered into the Open Health Registry, no conclusions can be drawn regarding the general health status of the breed.

As research uncovers more information on inheritance of disease it becomes increasingly obvious that many diseases are neither simple autosomal dominant or recessive traits. For example, the current research leads us to believe that up to 40 genes may be involved in whether or not a dog gets a particular autoimmune disease! Some genes have been found that affect the likelihood of getting any autoimmune disease while others relate to specific diseases. This supports pedigree analyses, which showed autoimmune disease in particular lines no matter which type of disease, while some breeds have higher incidence of a particular autoimmune disease.

Genes have been found that increase risk of disease while others protect against it, and a dog can carry both. The effect of genes can occur either because of changes in the underlying DNA sequence in one of more gene, or because of non-hereditary factors that cause the genes to behave (or express) themselves differently. Study of non-hereditary factors causing a change in gene behavior is called epigenetics.
It has been known that environmental triggers as well as stress – physiological, physical or psychological – is somehow involved in the expression of autoimmune and other diseases, and likely this is the result of epigenetic change.

Other terms that may be heard in this context are penetrance, the % of the population with a genetic variant that shows an associated trait. In some cases penetrance can be quite low meaning other factors are likely involved. If every individual with that variant has the trait there is complete penetrance. Even with complete penetrance some individuals may be more or less severely affected, and this variable is described as expressivity. (Note expressivity is measured only with complete penetrance.)

As the understanding of canine inherited disease increases, identifying individual genes responsible for each disease is not going to be possible for many illnesses. There is however, a strong genetic component to their occurrence. This is where a comprehensive open health registry can be of greatest value. If we can go back through generations of dogs – not just in a linear fashion but looking at siblings, aunts, uncles etc. patterns begin to emerge. If a problem appears repeatedly in a particular line, breeding out to a line that has little or no incidence of that disease for several generations might well reduce the
Incidence of that condition.

Dog breeding is becoming increasingly multinational with frozen semen and surgical implantation. We are increasingly less likely to have hands on experience with every dog we are considering and its extended pedigree. We may not have all the answers ever, but the more pieces we have of a puzzle the better informed we can be to create dogs that are not just superior in structure and type, but also health and temperament.

Our goal continues to be participation by every Beardie possible, whether or not it is used in a breeding program. We therefore discourage selectively entering only certain dogs or not entering some health problems, we want all dogs and all health problems!

BeaCon encourages breeders to enroll pups in the Open Health Registry before they go to their new homes. Having a large number of healthy young dogs to follow over the long term is an optimal resource for determining frequency of diseases in any breed.

The inclusion of dogs in this registry is by the free choice of the owner/co-owner. Absence of dogs from this registry is also by the free choice of the owner/co-owner. Notice of the registry's availability is made through BeaCon's newsletter (Lighting the Way) and web site (www.beaconforhealth.org), and Beardie internet lists.

Notice of Copyright

Respectfully submitted, the Board of Directors for the Bearded Collie Foundation for Health (BeaCon)

Linda Aronson
Peg Caldwell
CJ del Valle
Karen Drummond
Judy Howard
Elsa Sell
Lynn Zagarella

April 2013

WebSite.

The website (www.beaconforhealth.org) was updated in 2012.

Registration Statistics for Dogs, Litters, and Pups

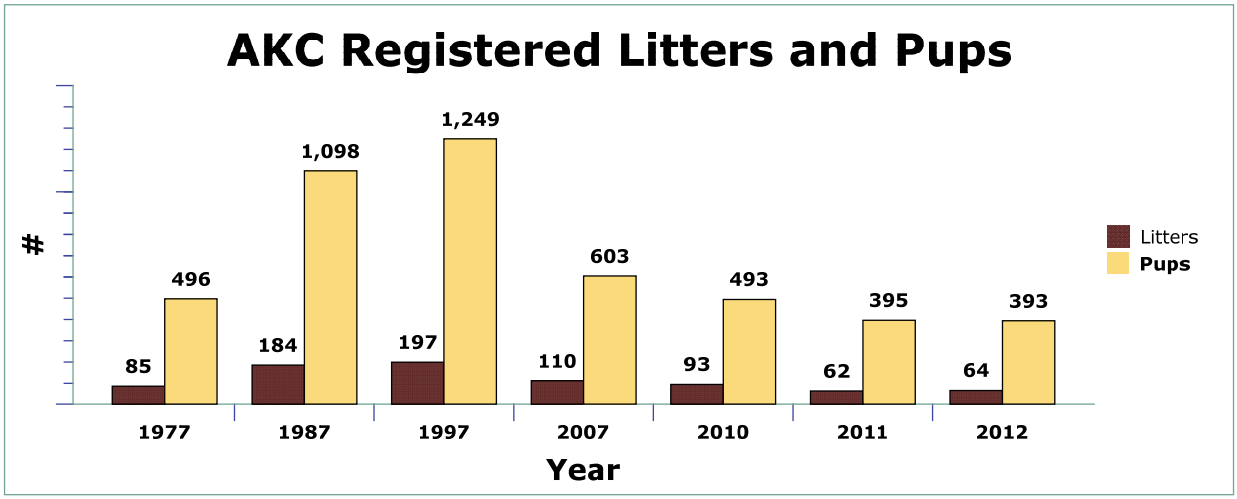
USA registration data begin with 1977 when the breed was recognized by AKC. The decline in number of USA litters and number of pups in registered litters from 2002-2006 was statistically significant. Though the number of litters was not changed in 2012, there were fewer pups; as well the decline in number of registered dogs continues.

For the fifth year in a row, the number of litters and pups (based on AKC litter registration) was below that of the founding year, 1977! Where is this headed? Dialogue is needed.

	USA - AKC				UK - KC		
Year	**# Dogs Registered**	**# Litters Registered**	**# Pups in Litters**	**Av # pups/ Litter**	**# Registered**	**# Litters**	**av# pups per litter**
2012	269	64	353	5.5			
2011	345	62	395	6.4	538	93	5.8
2010	321	93	498	5.4	572	95	6.0
2009	331	84	463	5.5	528	90	5.9
2008	393	82	421	5.1	643	113	5.7
2007	413	110	603	5.5	606	98	6.2
2006	447	90	537	5.2	720	119	6.1
2005	485	109	658	6.0	650	113	5.8
2004	562	150	842	5.6	821	129	6.4
2003	543	154	897	5.8	668	109	6.2
2002	587	159	943	5.9	901	140	6.4
2001	620	165	953	5.8	721	121	6.0
2000	682	183	1031	5.6	952	150	6.4
1999	614	196	1202	6.1	1034	175	5.9
1998	752	175	1077	6.2	1119	179	6.3
1997	711	197	1249	6.3	1286		
1996	720	178	1031	5.8	1318		
1995	762	186	1105	5.9	1467		
1994	640	177	1057	6.0	1337		
1993	749	157	912	5.8	1506		
1992	766	182	1092	6.0	1575		
1991	796	194	1162	6.0	1621		
1990	700	181	1062	5.9	1715		
1989	713	185	1128	6.1	1945		
1988	817	190	1175	6.2			
1987	760	184	1098	6.0			
1986	797	185	1175	6.4			
1985	858	191	1253	6.6			
1984	858	209	1330	6.4			
1983	895	201	1190	5.9			
1982	763	196	1257	6.4			
1981	723	172	1095	6.4			
1980	653	155	909	5.9			
1979	588	127	782	6.2			
1978	472	111	684	6.2			
1977	446	85	496	5.8			
1976	-	-	-	-			

AKC Registration Litter and Pup Numbers

Since AKC recognition of the Bearded Collie in 1977, the number of registered litters and pups in litters went steadily upward for the first two decades to reach a peak high of 196 litters and 1202 pups in 1999. A relentless decline has followed. Overall AKC has seen a reduction in registrations but Bearded Collies numbers have fallen more dramatically, possibly because of change in lifestyle, and people not having the time and space for a larger dog with significant grooming requirements.



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THE OHR – Owners, Dogs and Registry Years

There are 158 dogs are in the private sector of the open registry; their information will not display in searches or reports and their data are used only for the yearly reports. This number is in large part due to the entry by breeders of dogs owned by others who aren't able or willing to participate in the open registry.

Due to incomplete updating by owners, it is uncertain as to how many dogs are completely well. Taking those with updates done in 2012, there were 434 without any health problem; these represent 42% of living dogs (# 1030 – see later section on living dogs). In reality the percentage of healthy living dogs could be higher or lower, depending on the status of the dogs who were not updated in 2012.

Number of Owners and Dogs

There are 755 participating owners, an increase of only 26 in the last year, and 2182 Beardies, an increase of 129. The following table shows the cumulative participation over the years.

Year	# Owners	# Dogs	Dogs added	Months Included
1	169	303	-	July 00 – Aug 01
2	205	410	107	Sept 01 – Nov 02
3	278	593	183	Dec 02 – Nov 03
4	315	678	85	Dec 04 – Nov 05
5	357	808	130	Dec 05 – Jan 06
6	410	961	153	Feb 06 – Feb 07
7	491	1203	242	Mar 07 – Mar 08
8	560	1426	223	Mar 08 – Mar 09
9	606	1570	144	Mar 09 – Mar 10
10	646	1746	176	Mar 10 – Feb 11
11	729	2053	307	Mar 11 – Feb 12
12	755	2182	129	Mar 12 – Feb 13

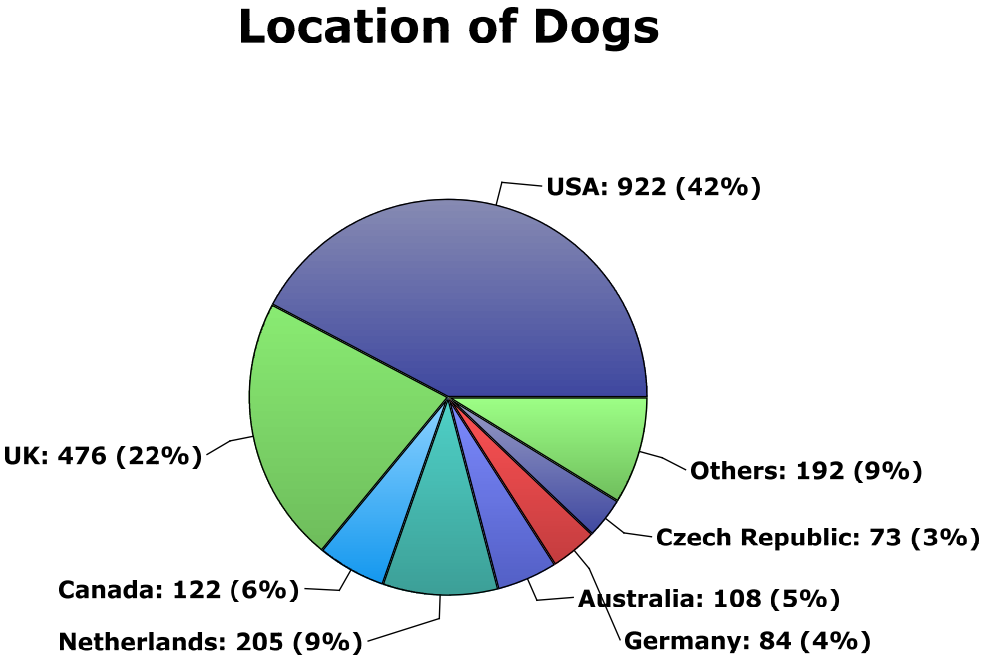
Geographic Location

These are arranged in descending order by number of owners in a country. There was minimal or no increase in owners from any location. The only country with a slight increase in the percentage of the total dogs was the Netherlands which increased from 8.1% last year to 9.4% this year.

Country	Owners (#)	Dogs (#)	Dogs (%)
USA	390	922	42.3%
UK	142	476	21.8%
Netherlands	44	205	9.4%
Canada	43	122	5.6%
Germany	31	84	3.9%
Czech Republic	24	73	3.4%
Australia	21	108	5.0%
Others*	60	192	8.8%
Total	**755**	**2182**	

*Other owner locations include Austria, Belgium, Brazil, Denmark, Finland, France, Hungary, Ireland, New Zealand, Norway, Portugal, Slovakia, South Africa, Spain and Sweden.

Country of Origin.



General Dog Information (2182 Beardies)

Sex and Reproductive Status

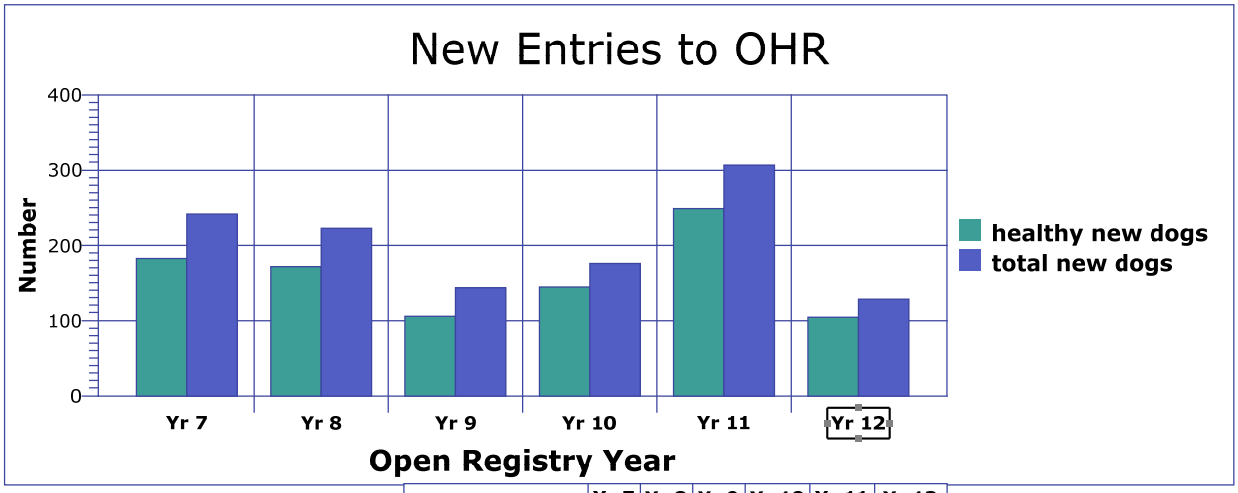
These figures are similar to those in past years although the percentage of intact males was slightly higher.

Sex	# Dogs	%
Male	980	44.5% of total
Intact	595	60.7% of males
Neutered	371	37.9% of males
Unspecified	14	
Female	1203	55.5% of total
Intact	624	51.9% of females
Spayed	570	47.5% of females
Unspecified	9	

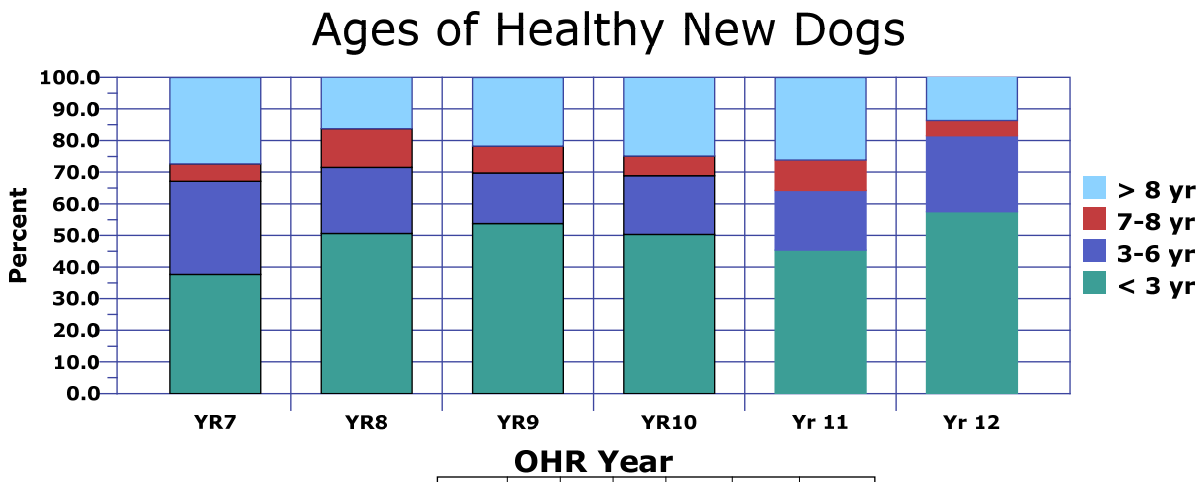
Healthy

The percentage of healthy dogs entered each year is given in the two figures below. 81.4% of the new dogs this year were healthy; this is no doubt related to the fact that 70 of the 105 new dogs are less than two years of age. The youth of new entries provides an excellent opportunity to follow their health over the long term.

Overall,
1168 (56.9%) dogs have no health issues recorded as of February 15, 2013.



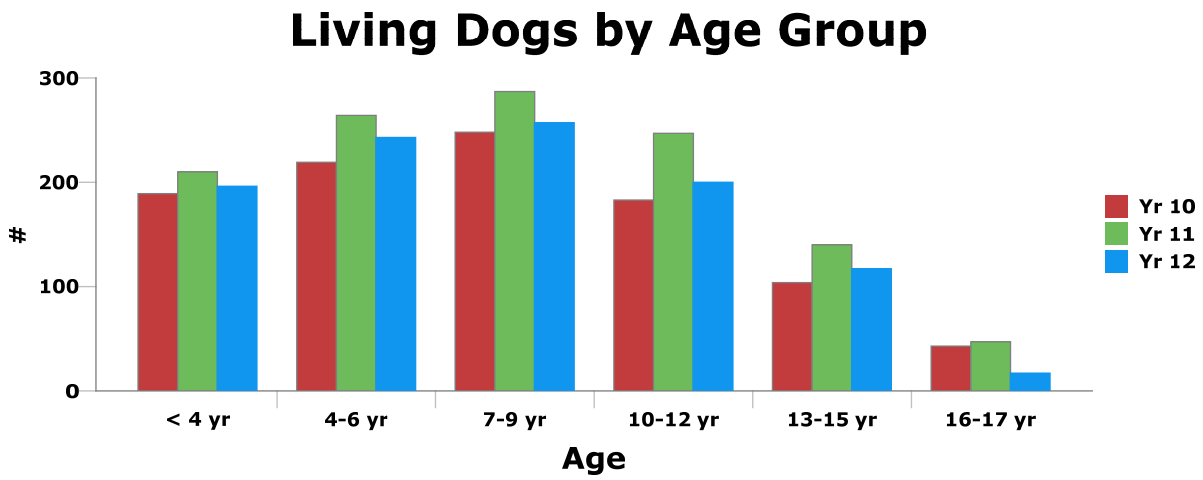
	Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	Yr 12
healthy new dogs	183	172	106	145	249	105
total new dogs	242	223	144	176	307	129



	YR7	YR8	YR9	YR10	Yr 11	Yr 12
< 3 yr	37.7	50.6	53.8	50.3	45.4	57.5
3-6 yr	29.5	20.9	16.0	18.6	18.9	24.0
7-8 yr	5.5	12.2	8.5	6.2	9.6	4.8
> 8 yr	27.3	16.3	21.7	24.9	26.1	14.3

The second graph shows that 70-85% of newly entered healthy dogs entered in the last five years were under the age of nine years.

<u>Ages of Live Healthy Dogs</u>
To determine how many dogs in the registry were alive in different age groups, analysis was done only on those with updates since 2006 using 2/16/2013 for age calculation. This gives an estimate of 1030 living dogs. Most live dogs are below 10 years of age regardless of registry year. This gives a younger population for tracking wellness or development of health problems.



Registry Year	< 4 yr	4-6 yr	7-9 yr	10-12 yr	13-15 yr	16-17 yr
Yr 10	189	219	248	183	104	43
Yr 11	210	264	287	247	140	47
Yr 12	196	243	257	200	117	17

Health Problems.

For the first time this year, groups of disorders are presented first with individual diseases listed for each group. The five major groups are autoimmune (n=305), fear issues (n=247), endocrine problems (n=170), cancer (n=157), and allergy problems (n=128). Autoimmune diseases collectively remain the most common problem. Some diseases are included in more than one group. For examples, diabetes mellitus is in both autoimmune and endocrine groups; inflammatory bowel disease is in both allergy and autoimmune groups.

Other diseases not among the five major groups are presented at the end of this section.

Autoimmune (AI) Disease

This year vaccination reaction and demodectic mange were added to the list of autoimmune disorders. There were 305 cases of AI disease in 252 dogs. The percentage of the total number of dogs with one of more AI diseases was 11.6% (252/2182), virtually unchanged from last year (11.4%). The frequency of individual AI diseases for the total number of dogs is essentially the same as in previous years.

Although autoimmune thyroiditis belongs with AI health problems, its incidence is unknown in this population. A thyroid panel includes thyroid autoantibodies which are the diagnostic hallmark of autoimmune thyroiditis; too few dogs have had a complete thyroid panel. Data from OFA labs for 605 Bearded Collies through December 2012 indicate that autoimmune thyroiditis was present in 1.3%, idiopathic hypothyroidism happened in 1.0% and, 12.1% had equivocal tests. So, 85.7% of tests were normal. Bearded Collies rank 76 out of 99 breeds which have at least 50 OFA thyroid panels performed. One can hope that those with equivocal tests were repeated and found to be normal. One can also hope that breeders are following the BCCA

CHIC thyroid panel testing guidelines to do an OFA thyroid evaluation from an approved lab each year until 5, thereafter every 2 years. Even though hypothyroidism is not listed here as an AI disease, the percentage of dogs with AI diseases and hypothyroidism is reported.

Disease	#	% of All Dogs (n=2182)	% of AI Dogs (n=252)
Addison's disease (hypoadrenocorticism)	81	3.7	32.1
Symmetrical lupoid onychodystrophy (SLO)	73	3.5	29.0
Inflammatory bowel disease (IBD)	27	1.2	10.7
Autoimmune hemolytic anemia (AIHA)	27	1.2	10.7
Systemic lupus erythematosus (SLE)	19	1.5	7.5
Vaccination reaction	19	1.5	7.5
Autoimmune-mediated thrombocytopenia (AITP)	15	0.7	6.0
Rheumatoid arthritis	14	0.6	5.6
Demodectic mange	6		
Pemphigus	6		
Discoid lupus erythematosus	8		
Keratoconjuntivis sicca	5		
Diabetes mellitus	3		
Myositis	2		
Myasthenia gravis	1		

Multiple diseases. 38 dogs had 2 or more AI diseases; 27 dogs had 2, 7 dogs had 3, and 4 dogs had 4 problems. Hypothyroidism was includes in the analysis of multiple diseases, with the caveat listed before the table. Among the combinations were:

- Hypothyroidism
  - Addisons disease - 17 (21% of Addison's)
  - SLO - 3 (4.1% of SLO)
  - IBD – 3 (11.1% of IBD)
  - Vaccination reaction – 2 (10.5% of vaccination reaction)
- AIHA
  - AITP – 4 (26.7% of AITP)

There were 21 dogs (25.9%) with Addison's disease and fear of loud sharp sounds.

Vaccination reactions occurred in a relatively low percentage of AI cases, except for AITP**.** **It is not known in most cases if the vaccination reaction occurred in proximity** to onset of the particular disease. We encourage owners to provide this information.

- Addison's – 2 (2.5%)
- SLO – 1 (1.4%)
- IBD – 3 (11.1%)
- AIHA – 0

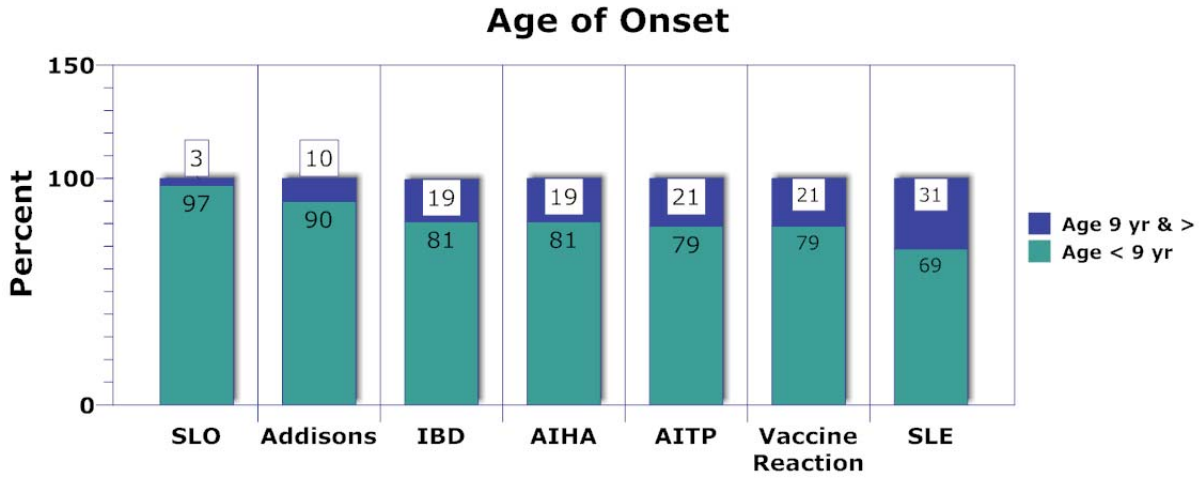
- SLE – 1 (5.3%)
- AITP – 3 (30%)
- Rheumatoid arthritis – 1 (7.1%)

Age of Onset

Age of onset was not given for all dogs so the number in the table below may be fewer than those in the preceding table. The diseases are arranged in order of increasing average age of onset.

Disease	Av	Min	Max	N
SLO	4.12	0.83	13.58	66
IBD	4.27	0.5	12	27
Vaccination reaction	4.27	0.17	12.75	19
Addison's	4.50	0.5	12.5	78
AIHA	5.64	0.17	10.5	26
AITP	6.96	1.33	8.92	14
SLE	7.6	1.5	13.5	16

When the onset of disease was grouped by percent before age 9 years or after (see graph below), it is apparent that at least 79% of the seven most common autoimmune problems begin before age 9 years. The lone exception is systemic lupus erythematosus.



Sex Distribution

The percentage by sex distribution of the more frequent AI diseases was calculated; in most problems, the percentage was higher for females.

- Vaccination reaction – 84% female
- SLE and AIHA – 67% female
- Rheumatoid arthritis – 64% female
- Addison's disease – 61% female
- SLO – 47% female

Whether the female predominance in these diseases holds for a larger population of Bearded Collies is not known at present.

Fear Issues.
For those who have dogs fearful of loud unexpected noises (thunder, gun shots, motorized vehicles or equipment you are not alone.

The fear reactions of Bearded Collies reported in the open registry are predominantly to loud sounds which can't be anticipated by the dog (other than thunder which follows the lightening precursor). All fear issues are listed in the table below.

Object of Fear	N (% of all dogs)
Loud sharp noises	209 (9.6%)
Other	20 (0.9%)
Everything	8
Stranger	7

The fear of loud sounds has been recognized for some years. Although an association between fear and hypothyroidism exists, it is unclear whether that signifies causation. Certainly the fear is ameliorated in some dogs when hypothyroidism is corrected by treatment. Among those who were fearful to loud sharp noises, 44 (21.9%) are documented to be hypothyroid. As many dogs are never tested for hypothyroidism, this percentage could be higher.

Endocrine Problems
Hypothyroidism is by far the most common endocrine problem. See the autoimmune section for comments about autoimmune hypothyroidism.

Disease	N (%) of All Dogs	Age Diagnosis (yr) (av, min, max)
Hypothyroid	138 (6.3)	7.3, 0.5, 15.8
Addison's disease	81 (3.7)	4.5, 0.5, 12.5
Cushing's disease	22 (1.0)	10.4, 5.4, 14
Diabetes mellitus	3	
Insulinoma	1	

Both hypothyroidism and Cushing's disease had a wide range of ages at diagnosis. There were no cases of hypoparathyroidism

Cancer

The reported locations for cancer are given in the following table. The frequency considering all cases (# 157) was 7.2% of all dogs.

Location	#

Mammary	17
Liver	14
Spleen	12
Nasal	11
Stomach	9
Bone	7
Abdominal, hemangiosarcoma	5 each
Testicular	4
Kidney	3
Other	69

The 69 "other" cancers were in no predominant location. As a result of low necropsy rate (so few pathology studies) and uncertainty about location by the treating veterinarian, the prevalence and types of cancer within the breed remain indeterminate. If desired, a list of the 69 other cancers can be generated online in the open registry by using the search function.

Immunoglobulin Mediated Disorders

It is not known how diagnosis of these problems was made – i.e., whether the most sophisticated tests were used. The open registry doesn't specifically ask for this information although there is space to provide it. For examples, allergy generally and flea bit allergy specifically, are mediated by immunoglobulin E (Ig E) whereas, food sensitivity and intolerance is mediated by immunoglobulins A and M (IgA and IgM). Inflammatory bowel disease is related to food sensitivity or intolerance. This group of disorders is the fourth most common. Together (n=129) they occurred in 5.9%.

Disease	# (%) of All Dogs
Dietary allergy/food intolerance	44 (2.0)
Atopy	31 (1.4)
Inflammatory bowel disease	28 (1.3)
Flea bite allergy	26 (1.2)

Other Diseases

Frequency is calculated if there were 20 or more cases.

Problem	# Dogs	% All Dogs
Umbilical hernia	64	2.9
Hip dysplasia	59	2.7
Arthritis (note 1)	57	2.6
Cataract	39	1.8
Eye, other	31	1.4
Depigmentation	30	1.4
Hearing loss (note 2)	25	1.2
Pyometra	24	1.1
Cystic ovaries	22	1.0
Teeth, overshot	20	0.9
Cryptorchid	20	0.9
Hot spots	19	
Cognitive dysfunction	17	

Vestibular disease	17	
Kidney failure, cause unknown (note 3)	16	
Monorchid (note 5)	14	
Aggression, dog	15	
Hyperactivity	13	
Obsessive compulsive disorders	13	
Epilepsy, idiopathic (note 4)	12	
Stroke	12	
Bladder stones	11	
Aggression, family	10	
Exercise induced hyperthermia	10	
Neurological, other	10	

Note 1: Arthritis. Age of onset was given for 59 dogs and it was over 6 years of age in 54

Note 2: Hearing loss. Two dogs had early onset. One was deaf at a month of age; the other began to go deaf at age 5 yr 3 mo and was almost completely deaf by age 7 yr. The latter dog had two deaf littermates, so the cause was considered genetic by the owner.

Note 3: Kidney failure of unknown cause. Eight (50%) with this diagnosis had onset of disease before age 9 years (average age of onset was 5.5 yrs). 1 case was diagnosed as chronic interstitial nephritis by biopsy. 1 case was associated with SLE; a littermate also died early of kidney failure and their dam died of SLE. In three the kidney failure resolved according to the information provided. In three, the course of the kidney failure isn't known. Beyond these cases, it should be remembered that kidney failure is a common finding in dogs with Addison's disease at first presentation.

Kidney and liver failure are symptoms of leptospirosis (as is uveitis). Antibiotic therapy should be instituted immediately in all suspected cases of leptospirosis, even if the dog was vaccinated as vaccines are unreliable at best. It should also be realized that titers are unlikely to be positive until at least 10 days after symptoms first appear, so the dog should be titered again.

Note 4: There is insufficient information given in the cases of idiopathic epilepsy with respect to how the diagnosis was made. Review of the cases doesn't provide history for most that would be compatible with the diagnosis; namely, few had persisting seizures or required anti-convulsant medication for control.

Note 5: Monorchid means that the dog only has one testicle anywhers in its body and is extremely rare, likely some dogs reported as monorchid are actually cryptorchid which means that one or both testicles have failed to settle in to the scrotum by age 12 weeks but are present elsewhere in the abdomen. This is a relatively common condition.

Health Screening Tests

Screening Test Done	# tests	# dogs	% of all dogs
Hips	785	780	35.8
Eyes	639	486	22.3
Thyroid	463	324	14.9
Elbows	195	195	8.9
Hips and eyes		384	17.6
Hips and thyroid		216	9.9
Hips and elbow		189	8.7
Hips, eyes, and thyroid		173	7.9
MDR-1	24	24	1.1
DLA	18	18	0.8
Von Willebrand's Disease	11	11	

The number of individual health screens done increased only minimally this year. It can be seen that some dogs had some health screens done more than once (e.g., eye and thyroid). DLA (dog leukocyte antigen) haplotype testing is a recently available screen in Europe and this test was done on 18. All MDR-1 results were normal.

Reproductive Outcome

Dogs. Reproductive history was recorded for 170 dogs and 154 were bred; 75 (44%) had semen checked and 7 provided additional information beyond "excellent" or "motility good". Ideally a semen exam should include information about color, sperm count, sperm motility, and sperm morphology. In addition to the semen exam, the dog should have an exam of external organs and for scrotal torsion or prolapse.

Item	#
# times a dog used at stud	
1	51
2	37
3	18
4	9
5	12
6	3
7	3
8	5
9	5
10 or more	11
Total # bitches bred	596
Litters produced	527
Total puppies produced	3091
Total female puppies produced	1356
Total male puppies produced	1419

As would be expected, a pregnancy did not result from each breeding. The number of puppies produced was not listed for some dogs, so the number of total male and female puppies is less than the total number of puppies.

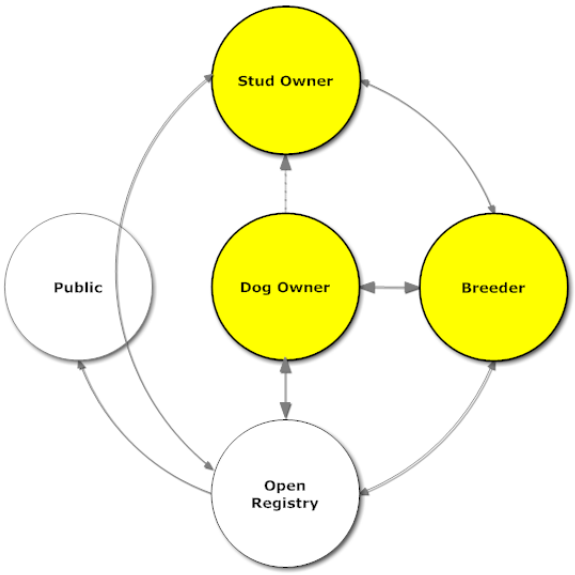
Later Health Problems in Dogs' Progeny

Health Problem	# dogs producing problem	# progeny with problem
Cryptorchid	20	46
Other	16	See notes below
Symmetrical lupoid onychodystrophy	10	16
Hypothyroid	10	12
Addison's	9	20
Systemic lupus erythematosus	2	2

Other problems produced by 16 dogs included: umbilical hernia 5 (produced by 2 dogs), heart anomaly type not identified 3, overshot bite 2, and 1 each – monorchid, persistent pupillary membrane, patent ductus arteriosus, immature kidney syndrome, AIHA, transitional vertebrae, low platelets, nail problems, and myositis.

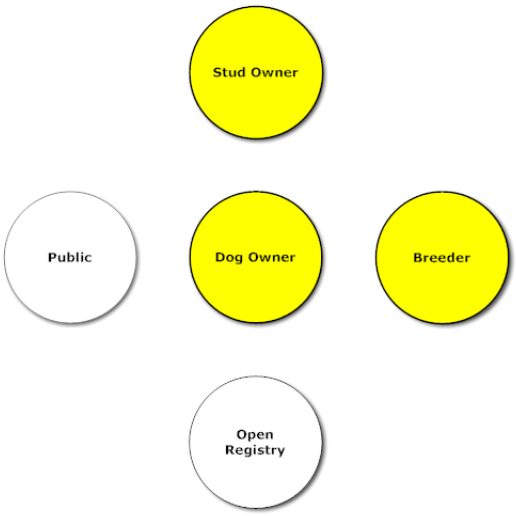
Fourteen dogs produced more than one problem. A number had "unknown" recorded for whether a problem had been produced or not. As one stud dog owner wrote, "I can only attest to the problems I've been informed about". Thus, it would be prudent if many more breeders (AKA bitch owners who produce litters) would communicate more often with the owners of stud dogs. Even then, the breeder can only attest to problems they have been informed about. Thus, the gap in the flow of information can only be closed by an owner's informing their breeder of a dog's wellness status or health problem.

Ideal Diffusion of Health Information



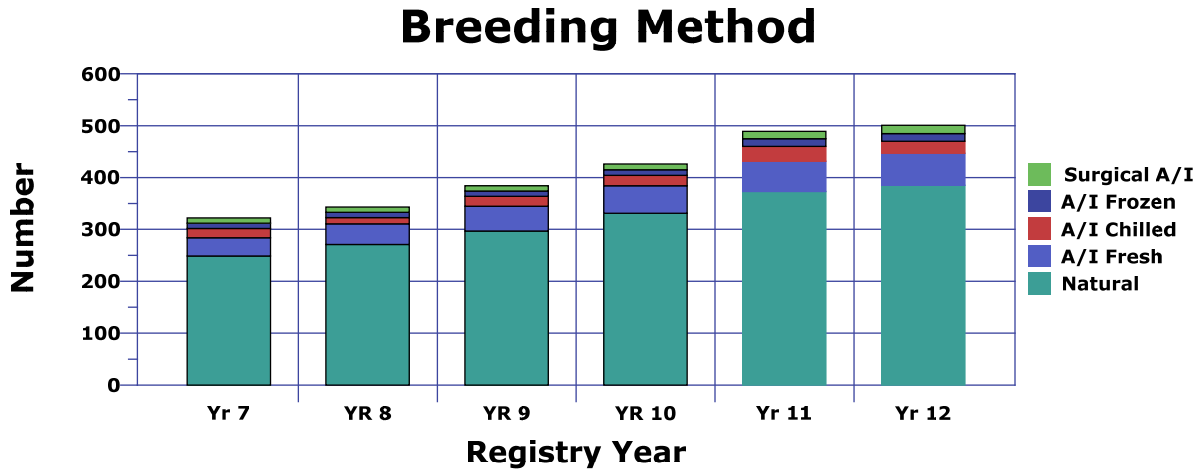
Any open registry (e.g., BeaCon, OFA, or CERF) is a repository for various types of information (e.g., health screening test results from approved laboratories) that is available to others. If health information doesn't get deposited in an open registry, then it isn't available other than by word of mouth which has limited distribution and is where rumors are born. These tend to spread widely and with much exaggeration.

Worst Diffusion of Health Information



Bitches. 336 bitches were bred with 565 litters and 3611 pups produced. Average number of pups per litter was 6.0. Cesarean section delivery was done in 63 (18.8%). The stillborn rate is approximately 8%; an additional 6-8% have deceased by 6 weeks of age.

Breeding Methods Resulting In Live Pups.



	Yr 7	YR 8	YR 9	YR 10	Yr 11	Yr 12
Natural	249	271	297	331	373	385
A/I Fresh	35	40	48	53	58	62
A/I Chilled	18	12	19	20	29	23
A/I Frozen	10	10	10	11	15	15
Surgical A/I	10	10	10	11	14	16

Additionally, there were 16 (4.6%) bred with a combination of natural and A/I fresh; for 45 the method of breeding is not known.

Information on 549 litters was given about number of pups and early issues.

Progeny and Early Identifiable Issues.

Male pups		
	#	% of total
total born	1873	-
live born	1710	91.3%
live @ 6 wks	1585	84.6%
		% of those alive at 6 weeks with
cryptorchid	88	5.6%
mismark	75	4.7%
umbilical hernia	63	4.0%
bad bite	15	
poor pigment	14	
cleft palate	3	
Female pups		
	#	% of total
total born	1738	-
live born	1609	92.6%
live @ 6 wks	1493	85.9%
		% of those alive at 6 weeks with
mismark	78	5.2%
umbilical hernia	65	4.4%
bad bite	15	
poor pigment	6	
cleft palate	2	

Later Health Problems in Bitchs' Progeny.

Health Problem	**# dams**	**# progeny**
Addison's	15	21*
Symmetrical lupoid onychodystrophy	14	14
Systemic lupus erythematosus	4	3
Hypothyroid	12	10
Other	33	25**

* One bitch produced 6 Addisonian puppies; one bitch produced 2 Addisonian pups

** Among the other are early, potentially congenital or heritable conditions:

- 6 heart problems (3 PDA; 1 persistent right aortic arch; 1 murmur, diagnosis unknown; 1 heart anomaly, diagnosis unknown)
- 3 exocrine pancreatic insufficiency
- 2 renal dysplasia
- 1 each - hyperthyroid, discoid lupus, autoimmune hemolytic anemia, pyelonephritis (early death at 3 wks), kidney failure (several died as young dogs), myositis, hip dysplasia, ulnar shortening.

As noted in the male reproductive section, there is a need for owners, breeders, and stud owners to have better communication about health problems. Until that happens, there will continue to be gaps in knowledge about progeny health problems that may be heritable.

Mortality

General

As last year, the percentage of deaths in each age group is calculated by # deaths/total deaths regardless of whether or not the cause of death was given.

There were 652 (29.5%) deaths reported and 619 dogs with a known date of death and birth. For the latter dogs, the average of death was 11.9 yrs., the minimum was 0.1 yr, the maximum 17.6 yrs.

Necropsies were conducted on 38 (5.8%). Owners should remember that necropsies will sometimes be helpful in establishing the cause of death. If more necropsies were done in those where death is not due to very old age, there would certainly be more identifiable causes of death.

Mode of death was natural in 88, euthanasia in 466, accidental in 21, and not documented in 36.

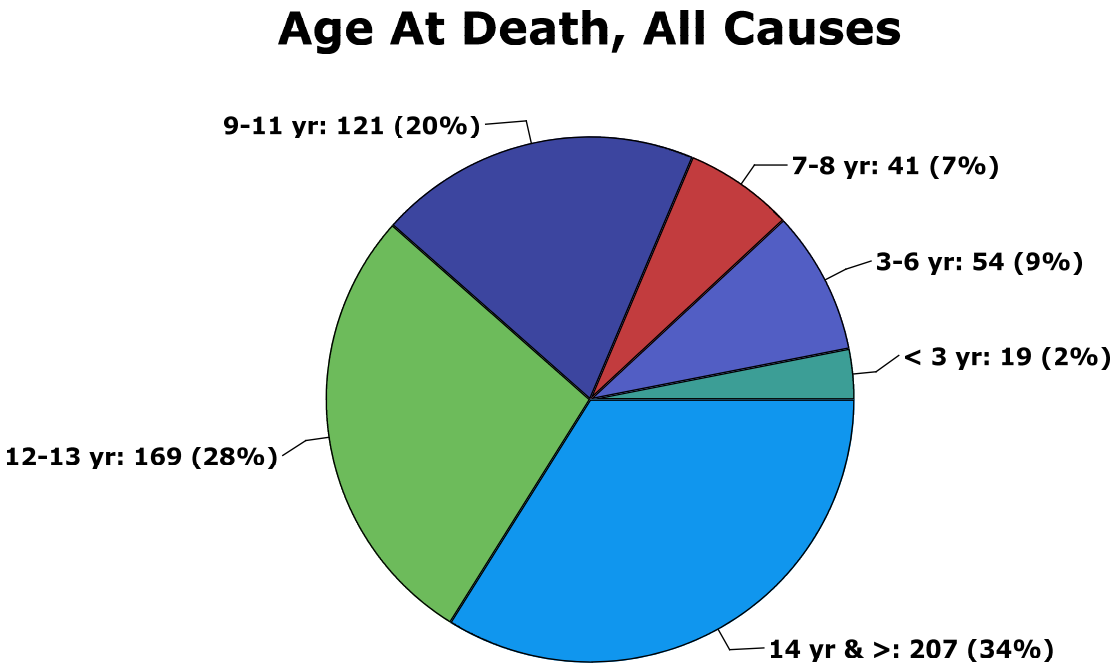
Owners may have given month and year, or sometimes only year, for age of death. For those, an estimated exact date of death was assigned by using the first day of the month (if month and year were given) or assigning the date as 1/1/yyyy (if only year was given). In no case did the assignment of estimated exact date of death change the age group that the dog was in for purposes of evaluating causes of death.

The leading causes of death before 9 years of age were autoimmune (n=24), accidental (n=14), and cancer (n=11 in the 7-8 yr group). The high number dying from autoimmune disease at a young age is of concern and should be the focus of research to identify cause(s) and trigger(s), and hopefully elimination of these problems where feasible.

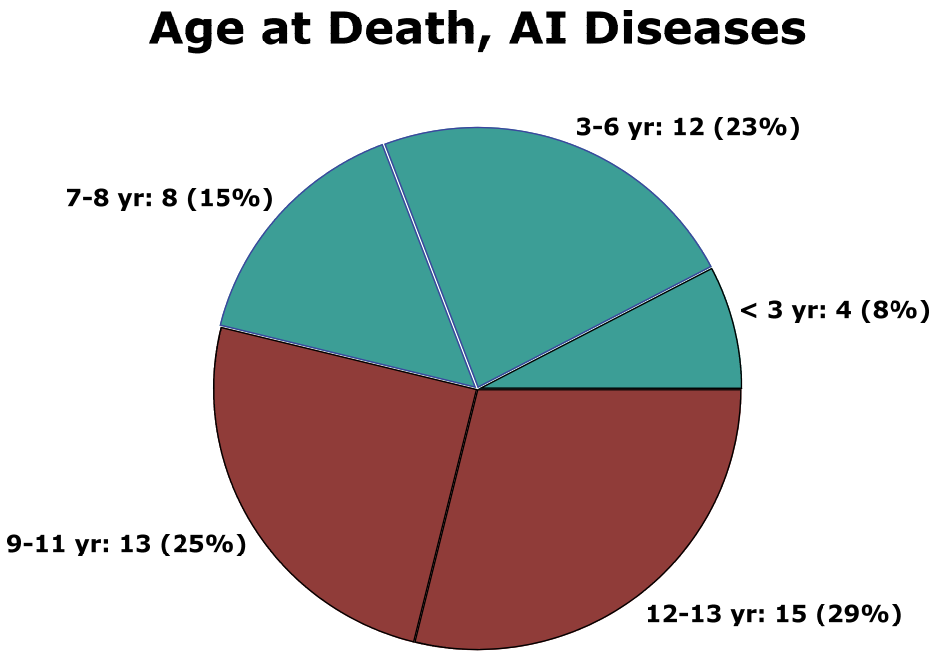
The next table gives the number and percentage of deaths in age groups used in previous years' registry reports. Unfortunately a relatively large percentage (14-29.6%) of dogs had no cause of death given. The "other" problems are made up of a single or just a few cases of any given diagnosis and at this point in time, are not listed. The percentage with unknown cause of death and the very low rate of necropsies are unfortunate and contribute to only partial understanding of deaths in Bearded Collies. Yet we must make do with the data available. Thus, before the age of 9 years, there are 114 deaths; 21.1% were due to AI disease, 16.7% were due to cancer; 12.3% were accidental. After the age of 11 years, there were 376 deaths; 35.4% were due to old age; 19.1% were due to cancer; 4% were due to AI disease.

Demographics	Age at Death (yrs)					
	< 3	3-6	7-8	9-11	12-13	>13
#	19	54	41	121	169	207
% of deaths	3.1	8.7	6.6	19.6	27.3	33.4
Problem/Issue	**Percent Deaths in Age Group Caused by Problem/Issue**					
Autoimmune	21.1	22.2	19.5	10.7	8.9	-
Cancer	-	16.7	24.4	38.0	24.2	15.0
Accidental death	26.3	11.1	7.3	2.5	1.2	1.0
Stroke	-	-	-	1.0	4.7	4.3
Old Age	-	-	-	1.7	16.6	50.7
Other	31.5	20.4	29.3	22.1	29.3	14.3
Unknown	21.1	29.6	19.5	24.0	15.4	14.0
Autoimmune Disease	**# Cases**					
Addison's	1	2	4	5	6	1
SLO	1	1	1			
IBD	1	1			1	
AIHA	1	3	2	5	1	
SLE		3	1	1	2	
AITP		1		1	1	1
Other		1		1	4	

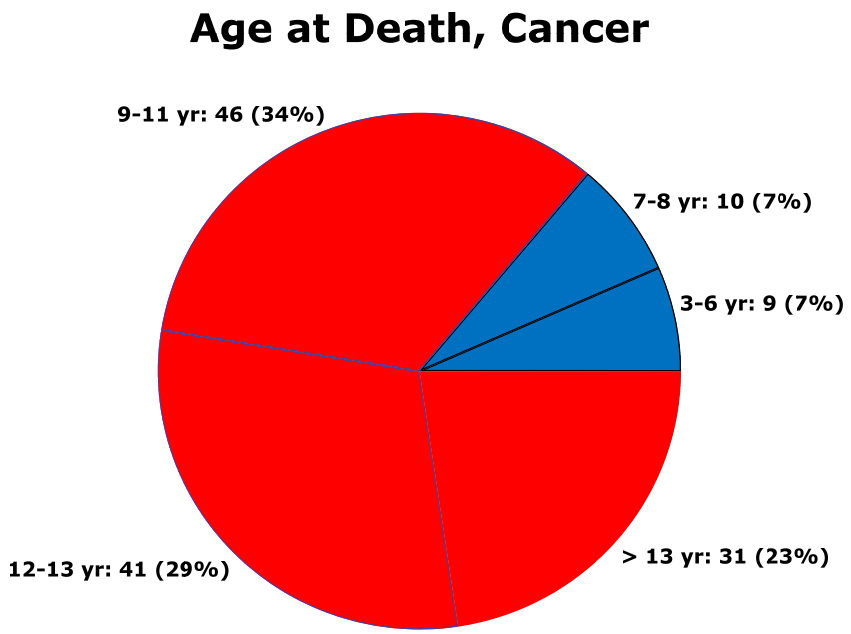
Mortality Charts



Although only 19% of all deaths occurred before 9 years of age, 57% of these were due to autoimmune disease, as shown in the turquoise color of the second chart.



The reverse is true for cancer as the cause of death; 86% of cancer deaths occurred over the age of 8 years as shown in the red color of the chart below.



Coefficient of Inbreeding (COI)

The COI values were calculated using the Breeder's Assistant (BA) Pedigree Software **for ten generations of ancestors.** Further information about COI's and their meaning can be found on the internet and also on BeaCon's web site in the section on open health registry data.

The data for the USA 1997 AKC stud book were calculated by trying to use just one dog from each litter so as to represent unique breedings. There were 939 Bearded Collies registered as foundation stock as of October 1, 1976.

The data are arranged by decreasing COI by country. Given the large standard deviations, the differences between countries are not significant. The values simply reflect the current breeding pool and practices with respect to more or less line breeding. Almost all countries have a maximum COI over 40; the two exceptions are the Netherlands with a maximum of 37.5 and Finland with a maximum of 31.4. All countries have a minimum COI of 9-14 except for the UK which is zero, due to one breeder who is utilizing non-KC registered sires in their breeding program.

	Coefficient of Inbreeding				
Year Report/Other	**# dogs**	**Av**	**Min**	**Max**	**Std dev**
USA – 1977 stud book	318	18.3	3.8	40.1	
USA – 2011 Specialty BOB	72	22.9	11.9	40.3	
Year 12					
All dogs	2141	23.3	0	49.9	6.5
UK	459	24.0	0	44.0	7.3
USA	907	23.8	11.2	49.0	5.8
Canada	119	23.0	9.2	47.5	7.0
Belgium	26	22.4	14.3	38.9	6.7
Finland	51	21.6	9.9	31.4	5.6
Czech Republic	72	21.8	11.2	47.3	6.2
Australia	107	21.6	10.8	42.1	5.5
Netherlands	201	21.3	9.2	40.8	6.0
Germany	83	20.1	8.9	42.4	6.7