BeaCon Open Health Registry Report
April, 2015

Preamble

This is BeaCon's 15th year in existence and the 14th year of reporting the health status of Bearded Collies in our Open Health Registry. Each owner and breeder who participates in the open health registry makes an important contribution to our knowledge base.

The reader is referred to the year 12 report's introduction for information about participation, use of the database, pedigree information, and use of data. Go to http://www.beaconforhealth.org/Yearly-Reports.html and select 2012.

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 health screening test results. Readers are encouraged to contact a dog's owner for confirmation and additional information as needed.

Our goal continues to be the inclusion of 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 and all lines!

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.

Since participation in the registry is voluntary, there are a number of large holes in the data; this means that some lines are missing. That should not be interpreted as those lines being free of health issues as compared with lines represented in the registry.

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

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April 2015

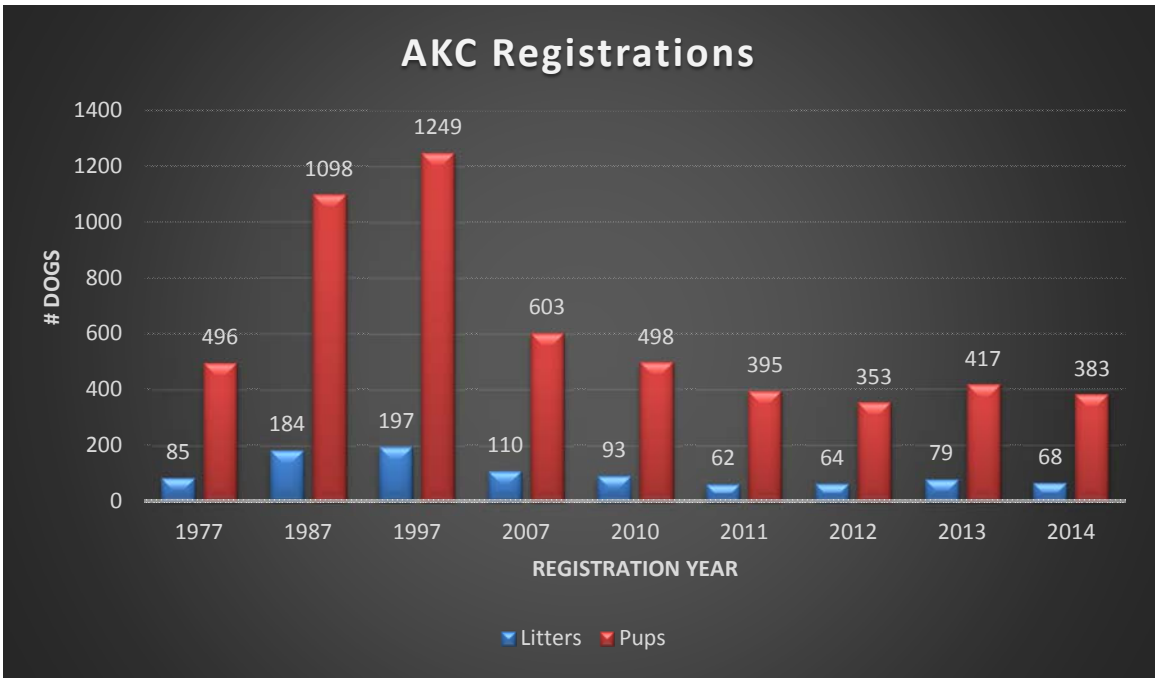
WebSite.

The website (www.beaconforhealth.org) is publicly available.

Registration Statistics for Dogs, Litters, and Pups (AKC and KC)

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. The decline seen in the USA (AKC data) mirrored that seen in the UK (KC data) which is shown in the table on the next page.

There has been no appreciable change in the number of litters, pups in litters, and dogs registered with AKC in the last four years. The numbers remain below those of 1977, the founding year for the Bearded Collie with AKC. There was a decline in the number of litters and dogs registered in the UK in 2014.



USA yearly registration information since 1977, the founding year, and for the UK since 1989 are shown in the table on the next page.

Year	USA - AKC				UK - KC		
	# Dogs Registered	# Litters Registered	# Pups in Litters	Av # pups/ Litter	# Registered	# Litters	av# pups per litter
2014	289	68	383	5.6	371	64	5.6
2013	319	79	417	5.3	543	91	6.0
2012	269	64	353	5.5	463	78	5.9
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	-	-	-	-			

BeaCon Open Health Registry

Data throughout the report represent all Beardies in the registry. Some dogs are in the private section of the registry (by preference or breeder reporting) and they will not appear in the public searches or reports. Data analysis was done in the week starting March 20, 2015.

Number of Owners and Dogs

There are 804 owners with 2451 Beardies, an increase of 139 dogs in the 12 month period. Of the total, 221 dogs are in the private sector of the open registry. Although their information will not display in on-line searches or reports, it is used in this report.

Year	# Owners	# Dogs	Dogs added	Months Included
14	804	2451	139	Mar 14 – Mar 15
13	779	2312	130	Mar 13 – Feb 14
12	755	2182	129	Mar 12 – Feb 13
11	729	2053	307	Mar 11 – Feb 12
10	646	1746	176	Mar 10 – Feb 11
9	606	1570	144	Mar 09 – Mar 10
8	560	1426	223	Mar 08 – Mar 09
7	491	1203	242	Mar 07 – Mar 08
6	410	961	153	Feb 06 – Feb 07
5	357	808	130	Dec 05 – Jan 06
4	315	678	85	Dec 04 – Nov 05
3	278	593	183	Dec 02 – Nov 03
2	205	410	107	Sept 01 – Nov 02
1	169	303	-	July 00 – Aug 01

Update Information

Information was updated on 568 dogs, 401 of those living. For all living dogs in the registry (#=1353) that means that only 30% were updated this year. Some of the dogs who are still coded as living are undoubtedly deceased as judged by their dates of birth but the owners have been lost or they have just not updated information.

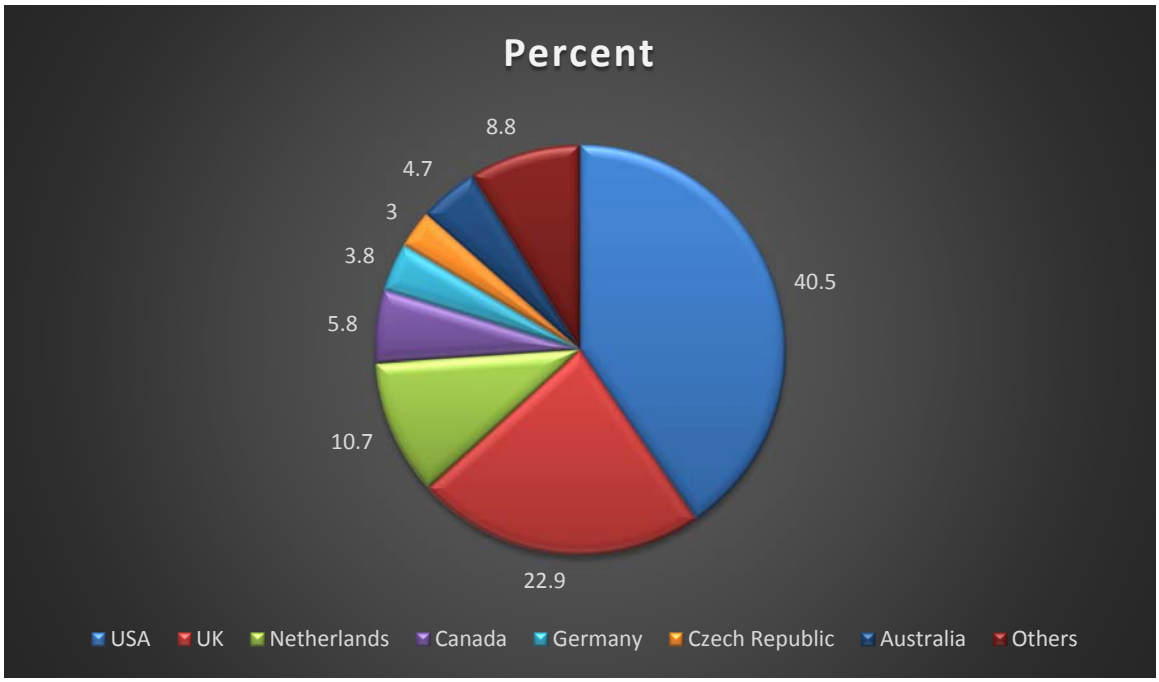
Geographic Location

These are arranged in descending order by number of owners in a country. There was minimal or no increase in owners from any location.

Country	Owners (#)	Dogs (#)
USA	412	992
UK	159	560
Netherlands	45	261
Canada	46	142
Germany	32	92
Czech Republic	23	73
Australia	21	115
Others*	66	216
Total	**804**	**2451**

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

Graph - Dog's Country of Origin



General Dog Information (# = 2451)

Sex and Reproductive Status

These figures are similar to those in past years.

Sex	# Dogs	
Male	1089	
Intact	669	61.4%
Neutered	402	36.9
Unspecified	18	
Female	1368	
Intact	726	53.1%
Spayed	625	45.7%
Unspecified	17	

New Dogs

Of the 139 new dogs entered in the last year, 120 were listed as health and of those, 100 (60%) were born in the last 5 years. This high proportion of healthy new dogs has been noted in previous years.

Living Dogs

The average age of living dogs (n=908) born after 4/1/2000 who have been updated in the past five years is 7.2. It is possible that some of the older dogs are deceased but haven't been updated.

Health Problems

Presentation is by groups. The five major groups being autoimmune (# = 339), behavioral (# = 313), endocrine (# = 272), cancer (# = 183), and allergy (# = 138). Some diseases are included in more than one group; 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

There were 339 cases of AI disease in 279 dogs. The percentage of all registry dogs with one or more AI diseases was 11.4% (279/2451); that percentage is the same as in recent years. The frequency of individual AI diseases is also 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 the OFA database for 724 Bearded Collies through December 2014 (this is 33 more tests in 2014) indicate that autoimmune thyroiditis was present in 1.2%, idiopathic hypothyroidism happened in 0.8%, 11.6% had equivocal tests and 86.3% of tests were normal. Bearded Collies ranked 78 out of 173 breeds which have at least 50 OFA thyroid panels performed. It is hoped that a repeat test was done on the dogs with equivocal tests and 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. There were 147 dogs in the OHR with a diagnosis of hypothyroidism.

Disease	#	% of All Dogs (n=2451)	% of AI Dogs (n=279)
Addison's disease (hypoadrenocorticism)	89	3.6	31.9
Symmetrical lupoid onychodystrophy (SLO)	84	3.4	30.1
Autoimmune hemolytic anemia (AIHA)	31	1.3	11.1
Inflammatory bowel disease (IBD)	30	1.2	10.8
Vaccination reaction	21	0.9	7.5
Systemic lupus erythematosus (SLE)	20	0.8	7.2
Autoimmune-mediated thrombocytopenia (AITP)	20	0.8	7.2
Immune mediated arthritis	18	0.7	6.5
Pemphigus	8		
Discoid lupus erythematosus	8		
Demodectic mange	6		
Keratoconjuntivitis sicca	5		
Diabetes mellitus	4		
Myositis	4		
Myasthenia gravis	1		

There was essentially no change in the frequency of A/I diseases among all dogs or the frequency of individual A/I diseases.

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; the N represents dogs whose age of onset were given.

Disease	Av age	#
Vaccination reaction	3.9	21
SLO	4.0	77
IBD	4.3	30
Addison's	4.8	84
Immune mediated arthritis*	5.0	18
AIHA	5.5	28
AITP	7.0	15
SLE	7.6	19
Keratoconjuncivitis sicca	10.8	5

*Eleven dogs were diagnosed before the age of 7 (av age 2.8). Several older dogs responded to immune suppressing drugs so the cause was listed as an autoimmune problem.

Sex Distribution of AI Disease

The percentage by females having the more frequent diseases in the table below is arranged by descending order of female prevalence.

Disease	# Female	% Female
Vaccination reaction	17	73.9
Immune mediated arthritis	12	66.7
AIHA	20	64.5
SLE	12	60.0
Addison's	52	58.4
AITP	11	55.0
IBD	14	46.7
SLO	37	44.1

Behavioral, Temperament Issues

There were 313 temperament problems reported in 274 dogs. If you have had a Beardie fearful of loud unexpected noises or other behavioral/temperament issue, you are not alone. Various factors can contribute to these issues and it may be a topic to study in greater detail in the future.

General Categories

Issue	#
Fear	261
Aggression	39
Hyperactivity	13
Obsessive compulsive disorder	13

Fear

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).

Object of Fear	# (% of all dogs)
Loud sharp noises	210 (8.6)
Other	29 (1.2)
Everything	9
Stranger	9

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, 45 (21.4%) were also hypothyroid. As many dogs are never tested for hypothyroidism, this percentage could be higher.

Aggression

Object of Aggression	# (% of total)
Dog	19 (.8)
Family	11 (.5)
Strangers	4

Aggressive behavior has led to euthanasia of dogs from many breeds. Sometimes that is the only choice. It is important to rule out medical problems that could be causing the dog physical discomfort, pain, or hypothyroidism. Aggressive behavior can take many forms and families/individuals differ widely in the level of aggression they are prepared to tolerate/live with. Beardies are often willing to test owners and if a growl gets them out of doing something they don't want to do or gets them something they want they will likely try it again. Because they are intelligent and easily bored it is important that they have plenty of exercise both physical and mental, and their owners make clear the behavior expected of them. If the aggression is determined to be behavioral it is often possible to modify the behavior or manage it so that dog and owner can live in harmony. In some cases psychoactive drugs will be helpful in ameliorating the aggression to the point where it is easier to reestablish appropriate behavior. In most cases the dog can then be weaned off the medication. Basket muzzles, gates etc., may also be useful during this time. The help of a skilled trainer and/or veterinarian specializing in behavior will be invaluable.

Endocrine Problems

There were 272 endocrine problems in 243 dogs. Hypothyroidism is by far the most common endocrine problem both in the Bearded Collie and other breeds. See the autoimmune section for comments about autoimmune hypothyroidism.

Disease	# (%) of All Dogs	Av Age of Diagnosis (yr)
Hypothyroid	147 (6.4%)	8.1
Addison's disease	83 (3.6)	4.6
Cushing's disease	27 (1.2)	10.7
Diabetes mellitus	3	
Insulinoma	2	

Hypothyroidism has a wide range of ages at diagnosis. While it is commonly stated that hypothyroidism is usually detected in dogs age 4-7, this is the age at which the more traditional symptoms of hypothyroidism usually become apparent, behavioral and more subtle signs appear in younger dogs. In general dogs up to age 7 primarily have thyroiditis past that age hypothyroidism increasingly becomes attributable to senescence of the thyroid gland. It is important to understand that hypothyroidism is present from an endocrine perspective of decreased thyroid gland function long before the clinical signs appear. Both factors were the rationale behind the BCCA CHIC recommendation for a yearly thyroid panel until age 5 and then every two years. There were no cases of hypo- or hyperparathyroidism.

Cancer

There were 183 cancer cases (7.5%) reported in 169 dogs.

Location	#
Mammary	19
Liver	19
Spleen	13
Nasal	13
Stomach	10
Abdominal	8
Bone	7
Hemangiosarcoma	6
Testicular	5
Kidney	5
Other	76

The 76 "other" cancers were in no predominant location. A list of the other cancers can be generated online in the open registry by using the search or report function.

Because of the low necropsy rate and uncertainty about location of the cancer by the treating veterinarian, the prevalence and types of cancer within the breed remain indeterminate.

Immunoglobulin Mediated Disorders

It is not known how these problems were diagnosed. The open registry doesn't specifically ask for this information although there is space to provide it. Allergy generally and flea bite 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 (n=138; 5.6%).

Disease	# (%) of All Dogs
Dietary allergy/food intolerance	48 (2.0)
Atopy	32 (1.3)
Inflammatory bowel disease	30 (1.2)
Flea bite allergy	28 (1.1)

Other Diseases or Problems

Frequency is calculated if there were 20 or more cases.

Problem	# Dogs	% All Dogs
Umbilical hernia	71	2.9
Arthritis (note 1)	68	2.8
Hip dysplasia	65	2.7
Cataract	40	1.6
Urinary infection	40	1.6
Eye, other	37	1.5
Pyometra	35	1.4
Depigmentation	34	1.4
Hearing loss (note 2)	32	1.3
Nail problems, other	27	1.1
Cryptorchid	27	1.1
Vestibular disease	21	0.9
Hot spots	20	0.8
Teeth, overshot	20	0.8
Kidney failure, cause unknown (note 3)	20	0.8
Cognitive dysfunction	19	
Monorchid (note 4)	16	
Stroke (note 5)	16	
Epilepsy, idiopathic (note 6)	13	
Exercise induced hyperthermia	13	
Neurological, other	12	
Bladder stones	12	
Elbow dysplasia	11	
Teeth, base narrow	10	

Note 1: Arthritis. Age of onset was given for 60 dogs; it was over 9 years of age in 39.

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. Nine diagnoses 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. 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 several weeks after onset of symptoms.

Note 4: Monorchid means that the dog only has one testicle anywhere 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.

Note 5: All were over the age of 10.5 years.

Note 6: 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 that would be compatible with idiopathic epilepsy in most; namely, few had persisting seizures or required anti-convulsant medication for control.

Health Screening Tests

Screening Test Done	# tests	# dogs	% of all dogs
Hips	875	870	34.2
Eyes	693	533	21.8
Thyroid	496	346	14.1
Elbows	218	218	8.9
Prelim hips	24	24	1.0
Hips and eyes		422	17.2
Hips and thyroid		236	9.6
Hips and elbow		211	8.6
Hips, eyes, and thyroid		192	7.8
MDR-1		26	1.1
DLA		21	0.9
CEA		20	0.8
Von Willebrand's Disease		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; there was no dominant haplotype among those dogs. All MDR-1 results (n=26) were normal. The CEA (Collie Eye Anomaly) exams were normal.

CEA was identified in a Bearded Collie in the UK in 2012. At present there is a program to contact the owners of dogs that shared recent common ancestry to the affected dog to inform them of the situation. Recommendations have been made regarding testing with the offer of financial help. Parentage testing for the CEA affected dog has also been offered.

This year the number having an exam for CEA is 20; last year it was 3.

Reproductive Outcome

Dogs.

Reproductive history is recorded for 187 dogs and 172 were used for breeding with a total number bitches bred being 660. Only 81 (43.3%) had semen checked and a few 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	60
2	38
3	18
4	11
5	14
6	5
7	3
8	6
9	5
10 or more	12
Total # bitches bred	660
Litters produced	588
Total puppies produced	3477
Total female puppies produced	1555
Total male puppies produced	1495

As would be expected, a pregnancy did not result from each breeding. The number of bitches bred and the number puppies produced was not listed for some dogs.

Later Health Problems in Dogs' Progeny

Health Problem	# dogs producing problem	# progeny with problem
Cryptorchid	21	47
Other	16	See notes below
Symmetrical lupoid onychodystrophy	11	16
Hypothyroid	9	12
Addison's	9	20
Systemic lupus erythematosus	2	2

One dog produced 5 offspring with SLO. Two dogs produced 5 pups with Addison's, 1 dog produced 3 pups with Addison's and another produced 2 pups with Addison's.

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.

Bitches.

382 individual bitches have been bred 697 times; 627 litters and 4088 pups were produced. Average number of pups per litter was 6.2. Cesarean section delivery was done in 12.3% of the litters (77/627=12.3%). The percent live born (average 90%) and alive at six weeks (average 84%) is unchanged from previous years.

The number of times a bitch has been bred is below.

Number of times bred	#
1	148
2	107
3	60
4	26
5	9
6	1

Breeding Methods Resulting In Live Pups. (Unknown in 47).

Method	**# Bitches**
Natural	430
A/I fresh	67
A/I chilled	23
A/I frozen	16
Natural and A/I fresh	23
A/I operative	22

Bitches' Progeny and Early Identifiable Issues

Information about the number of puppies and early issue was provided for 621 litters.

Male pups		
	#	% of total
total born	2130	-
live born	1904	89.4
live @ 6 wks	1781	83.6
		% of live born
cryptorchid	94	4.9
mismark	81	4.3
umbilical hernia	73	3.8
bad bite	17	
poor pigment	15	
cleft palate	3	
Female pups		
	#	% of total
total born	1967	-
live born	1792	91.1
live @ 6 wks	1663	84.5
		% of live born
mismark	88	4.9
umbilical hernia	73	4.1
bad bite	15	
poor pigment	6	
cleft palate	4	

The most prevalent identifiable early issues remain cryptorchid in male pups, mismarks and umbilical hernias in both sexes.

Later Health Problems in Bitches' Progeny

	# Bitches
Addison's	19
Symmetrical lupoid onychodystrophy	16
Systemic lupus erythematosus	4
Hypothyroid	14
Other	52

There is incomplete reporting of the number of progeny produced by some bitches, so this is no longer being reported.

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; pyelonephritis (1 died at 3 wks, other at 21 mos) *(note: it is rare to die from pyelonephritis, so it is so it is likely there was a more serious kidney or other issue that was not detected)*; seizures (1 diagnosed with idiopathic epilepsy); autoimmune hemolytic anemia; ulnar shortening (1 noted to be from premature closure of growth plate; the other associated with elbow deformity ? related to metabolic disorder)
- 1 each - hyperthyroid, discoid lupus, kidney failure (several died as young dogs), myositis, hip dysplasia, sudden collapse, loss of pigment, AIHA

Sharing of Health Information.

Puppy owners, breeders (defined normally as owner(s) of a litter's dam), and stud dog owners all have a vital role sharing health information. When any party fails that responsibility it is to the detriment of future breeding programs and the breed's long term health prospects.

Mortality

General

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.

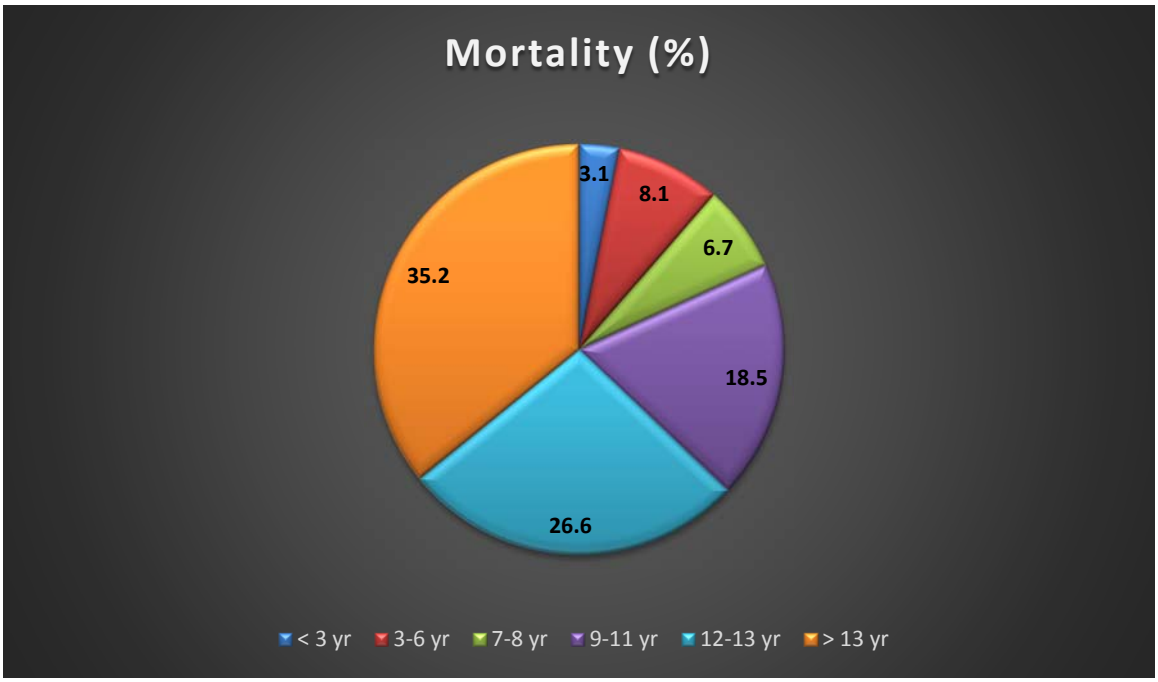
There were 751 deaths reported (20.6% of all dogs). The average of death was 12.0 yrs., the minimum was 0.1 year, the maximum 18.9 years (assuming the correct year of death was entered for this dog).

Necropsies were conducted on 41 (5.5%). It should be remembered 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 and therefore more accurate information for the registry.

Mode of death was natural in 100, euthanasia in 589, accidental in 23, and undocumented in 39.

Age Group Distribution

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.

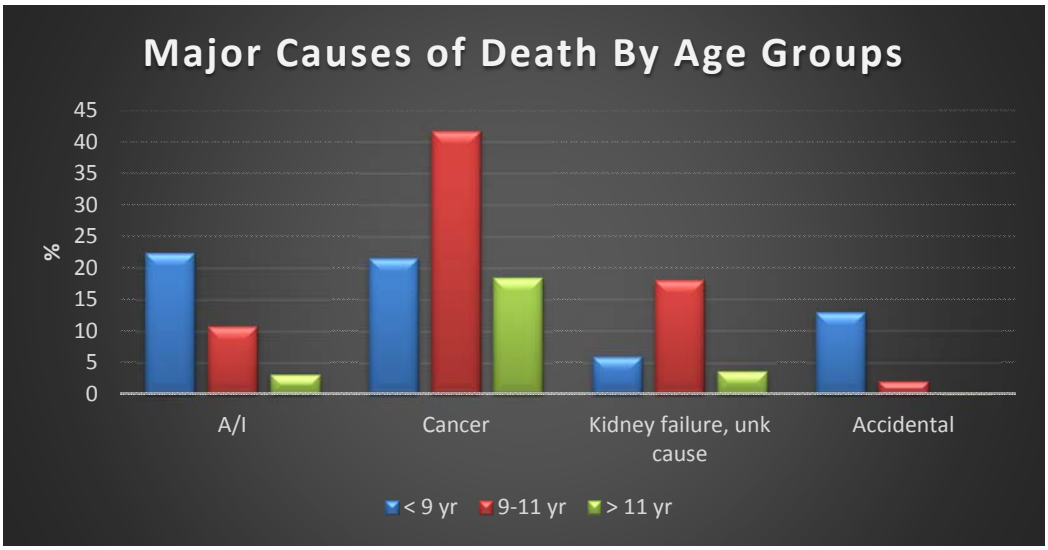


Leading Causes of Death

	Age at Death (yrs)					
	< 3	**3-6**	**7-8**	**9-11**	**12-13**	**>13**
# Dogs	23	61	50	139	200	265
Problem/Issue	**# cases**					
Cancer	-	12	17	58	50	36
Old Age	-	-	-	4	30	122
Autoimmune	9	12	9	15	14	1
Stroke*	-	-	-	1	10	17
Accidental	6	8	3	3	2	1
Kidney failure, unknown cause	-	6	2	7	10	7
Aggression	2	2	1	-	1	-
Other	4	11	7	29	47	37**
Unknown	2	10	11	28	36	44

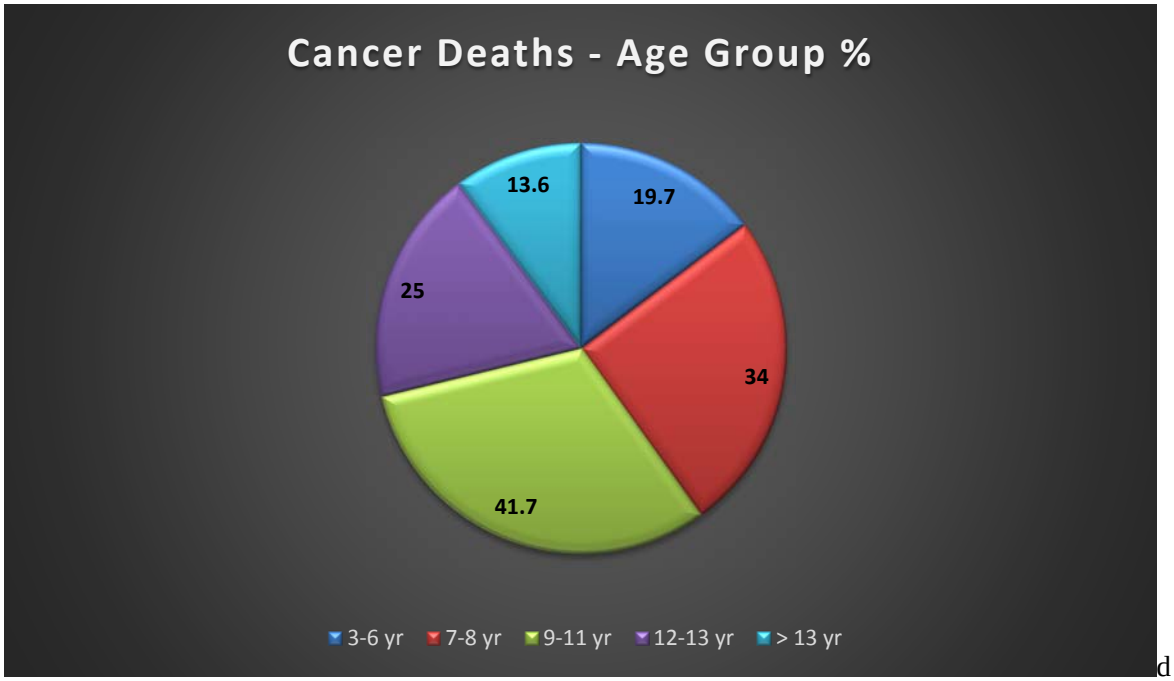
The “other” problems are mostly single cases.
*Old dog vestibular disease from which dogs routinely make complete recovery in 3-21 days is often mistaken for stroke (and vice versa) which may also resolve usually in a slightly longer time period; it could also be mistaken for brain tumors which obviously do not resolve but are uncommon.
**> 13 age group other included 6 with arthritis, 7 with vestibular disease, 4 with cognitive dysfunction and 3 with seizures.

A comparison of the major causes of death across age groups is shown in the graph below.



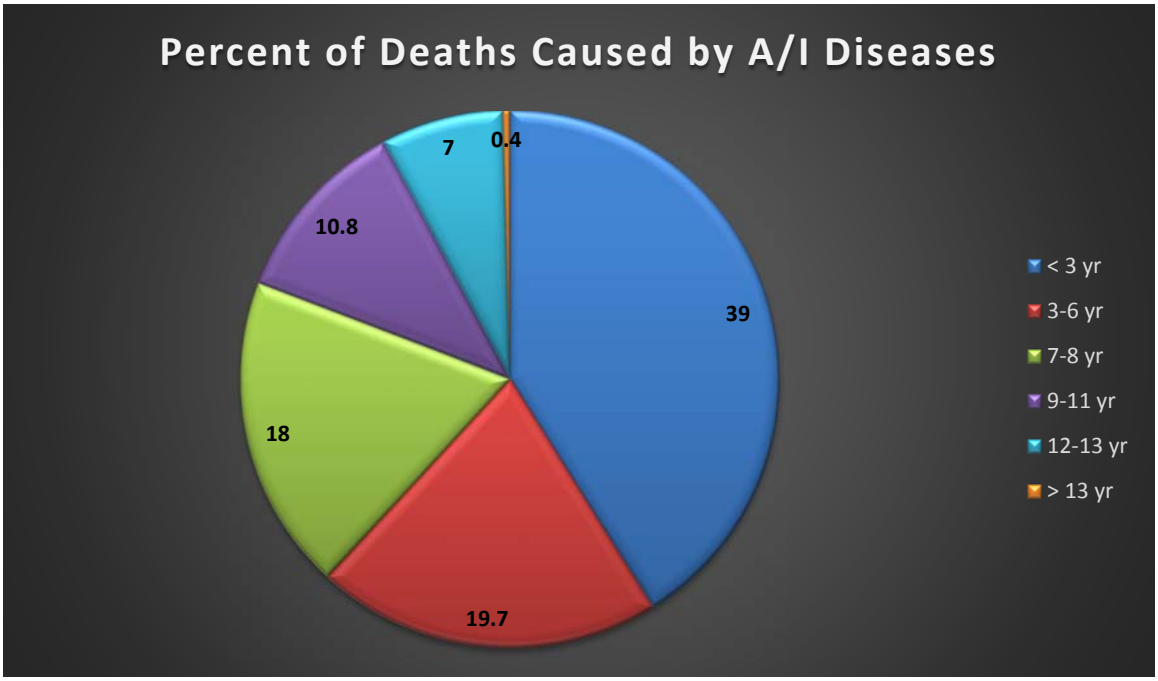
The Coefficient of Inbreeding (COI) was similar across death age groups, ranging from 24.3 to 25.3.

Cancer Deaths (n=173)



d

Autoimmune Disease (n=54)



Autoimmune diseases take their toll across all age groups. Number of cases for each disease cumulatively across age groups were: Addison's 23, AIHA 13, SLE 8, AITP 4, IBD 4, pemphigus 3, SLO 2 and others 8. There were additional dogs with A/I diseases whose primary cause of death was a different problem.

Coefficient of Inbreeding (COI)

COI indicates the closeness of relationship in a pedigree. A higher number means more closely related; a lower number indicates less closely related. It is usually expressed as a percentage. The concept was developed by Sewall Wright (Coefficients of inbreeding and relationship. Am Nat. 56:330-8, 1922). The basic concept is that inbreeding exists when an ancestor appears on both sire's and dam's side of the pedigree.

Methodology

Explanation added April 2015 is in italics. BeaCon uses Breeder's Assistant software to calculate COI's. It is possible to choose the number of ancestor generations and to fine tune the calculation by controlling the treatment of ancestors beyond the number of generations that are visible to the calculation because of multiple occurrences of the same ancestor in different generations of the pedigree. The fine tuning possibilities with Breeder's Assistant are:

1. *Strict options mean that the program is to strictly observe the ancestor generation limit imposed on the calculation; these cannot go beyond the last generation even though that information may be available in the database.*
    a. ***Strict with Minimal Common Ancestor Inbreeding** considers only the inbreeding of a common ancestor that is visible within the pedigree at both the sire and dam side occurrences, on a path by path basis.*

   b. ***Strict with Maximum Common Ancestor Inbreeding*** *uses the maximum inbreeding of the common ancestor as can be deduced by examining its sire and dam side occurrences, again on a path by path basis.*
2. *Relaxed options are faster when computing inbreeding to any significant depth of ancestors.*
   a. ***Relaxed with Maximal COI*** *includes all possible common ancestors that can be deduced from the pedigree, subject only to the generation limit.*
   b. ***Relaxed with Maximal Speed*** *computes the inbreeding coefficient as fast as possible by ignoring knowledge of the parents of ancestors that only occur in the last generation.*

BeaCon has used 10 generations and relaxed with maximal speed for COI calculations. When comparing COI values obtained with other software programs the calculation methodology needs to be identical.

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 litters. Foundation stock on October 1, 1976 consisted of 939 dogs.

The data by country are arranged by decreasing COI. Given the large standard deviations, the differences between countries are not significant. The values simply reflect the breeding pools of the dogs in the open health registry. Almost all countries have a maximum COI over 40; the two exceptions are Belgium and Finland. All countries have a minimum COI of 6-14 except for the UK which is zero, due to one breeder who has used non-KC registered sires.

	Coefficient of Inbreeding (10 gen)				
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 14					
All dogs	2399	23.1	0.00	52.9	6.9
UK	539	25.0	0	52.9	8.0
USA	971	23.6	11.2	49.0	6.0
Canada	139	22.9	9.2	47.5	7.0
Belgium	26	22.4	14.3	38.9	6.7
Czech Republic	72	21.7	11.2	47.3	6.3
Finland	51	21.6	9.9	31.4	5.6
Australia	115	21.2	5.6	42.1	5.7
Germany	89	20.0	8.9	42.4	6.7
Netherlands	258	19.8	9.2	40.8	6.6

A list of 5 and 10 generation COIs for dogs in the public sector of the Open Registry is available in the Breeder's Section of the web site.

Conclusions

There were no major changes from previous years. The predominant health issues continue to be autoimmune diseases (Addison's and SLO leading the list), behavioral and temperament issues, endocrine disorders, immune mediated problems, and cancer. Reproductive outcome and problems in progeny are similar to that of previous years.

The distribution of diseases responsible for death at certain ages continues as in previous years. Cancer deaths are more prevalent in dogs over 8 years of age. Deaths from autoimmune diseases occur across the age spectrum except for those over 13 years of age. The lack of necropsy and the large number of unknown causes of death gives uncertainty regarding causes of mortality.

The OHR requires as many Beardies as possible, living and dead, to be entered and updated regularly to increase its value as a predictor of emerging health issues, monitor existing ones, and be a useful tool for breeding healthy dogs in future generations.

BeaCon's Directors thank everyone who has contributed to the open health registry.