BeaCon Open Health Registry Report
April 2018

Contents

Preamble

This is year 17 for BeaCon's health registry report.

The reader is referred to the year 12 report introduction for information about participation, use of the database, and pedigree information. Go to this link

BeaCon's Registry should not be used as a definitive source for health screening test results. Readers are encouraged to search the OFA database for USA dogs, the BCX database for UK dogs, and a dog's owner.

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.

Anyone wishing additional analyses should contact Elsa (tillyrusty7@gmail.com)

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

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WebSite

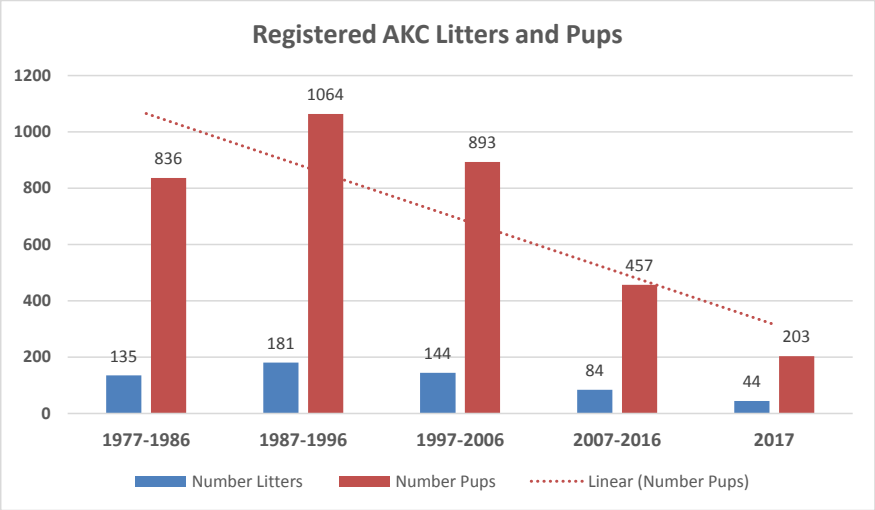
Visit us at this link.

Statistics

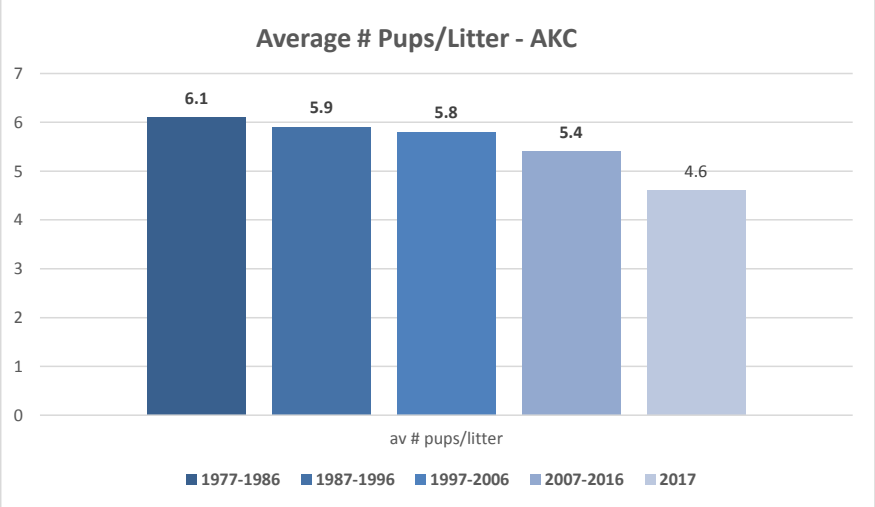
Dogs, Litters, and Pups (Data Sources-AKC and KC)

	USA - AKC				UK - KC		
Year	# Dogs Registered	# Litters Registered	# Pups in Litters	Av # pups/ Litter	# Registered	# Litters	av# pups per litter
2017	208	44	203	4.6	420	65	6.1
2016	224	58	310	5.3	284	51	5.3
2015	247	51	256	5.2	346	53	6.3
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	-	-	-	-			

Bearded Collies were first accepted for AKC registration in 1977. The number of AKC registered litters has been below that of the founding year since 2007. The decline in litter registrations in the USA mirrors that in the UK, until 2017.



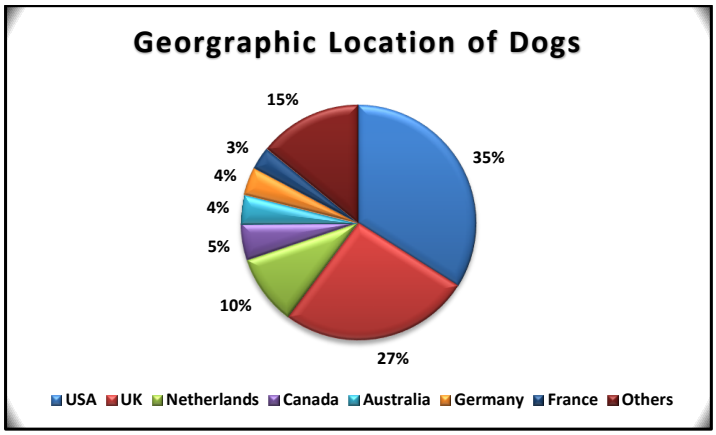
Not only are the numbers of litters in decline, so is the average number of pups per litter. In 2017, 38.6% of the litters had 3 or fewer pups!



Basic Demographic Statistics for Registry Dogs

Analysis done starting week of March 12, 2018

- Number of dogs - 3015
- Private sector dogs – 259 (information not available in public search/report)
- Number of owners – 894
- Location of dogs



Dogs

- Males - #1350 (38.5% neutered)
- Females - #1695 (44.4% spayed)
- Used in breeding
    - Males – 236 (17.5%)
    - Females – 496 (29.3%)

Of the 84 new dogs added in the 2017 year, 72 (86%) were healthy and most were 7 years or younger. The addition of young healthy dogs gives a foundation for longitudinal followup over their lifespans, assuming owners will continue updating on a regular basis.

Health Problems

As in previous report years, there are five major health problem groups.

Group	# cases	# dogs	% of all dogs (3015)
Autoimmune	398	338	11.2%
Behavioral	343	285	9.5%
Endocrine	303	272	9.0%
Cancer	259	243	8.1%
Immune Mediated	156	129	4.3%

Some diseases are included in more than one group. Diabetes mellitus and Addison's disease are in both the autoimmune and endocrine groups. Inflammatory bowel disease is in both allergy and autoimmune groups.

Diseases that are not in the five major groups are at the end of this section.

Autoimmune (AI) Diseases (11.2%)

Disease	*# dogs*	*% of all dogs*	*av age of diagnosis*
Symmetrical lupoid onychodystrophy (SLO)	108	3.6	3.5
Addison's disease (hypoadrenocorticism)	100	3.3	3.8
Inflammatory bowel disease (IBD)	37	1.2	4.1
Autoimmune hemolytic anemia (AIHA)	34	1.0	9.2
Vaccination reaction	21		3.8
Systemic lupus erythematosus (SLE)	20		7.0
Immune mediated arthritis	20		6.8
Autoimmune-mediated thrombocytopenia (AITP)	19		6.8
Discoid lupus erythematosus	9		
Pemphigus	9		
Demodectic mange	6		
Keratoconjunctivitis sicca	5		
Diabetes mellitus	5		
Myositis	4		
Myasthenia gravis	1		

Sex Distribution of AI Disease

Disease	Female Incidence
Vaccination reaction	85.7%
AITP	68.4%
SLE	65%
AIHA	64.7%
Addison's	62%
Immune mediated arthritis	60%
IBD	46%
SLO	41.7%

Behavioral, Temperament Issues (9.5%)

Issue	#	% of all dogs
Fear*	269	8.9%
Aggression**	40	1.3%
Hyperactivity	13	
Obsessive compulsive disorder	12	

Commented [PKC1]: # or No.-- you used # earlier

*loud sharp noises – 216; other – 34; everything – 10; stranger - 9
**dog – 19; family – 4; all – 6; stranger – 3. It is conceivable that some of the dog aggression cases represent fear; with incomplete histories that is an unknown.

The fear of loud sounds has been recognized for some years. The cause(s) are not known though both genetics and acquired over time likely play a role.

An association exists between fear and hypothyroidism but whether they are causally related is not known. The fear is ameliorated in some dogs treated for hypothyroidism.

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 physical discomfort or 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 may be invaluable.

Endocrine Problems (9.0%)

Disease	# (%) of All Dogs	Average Age at Diagnosis (yr)
Hypothyroid	163 (5.4)	5.5
Addison's disease	100 (3.3%)	3.8
Cushing's disease	45 (1.5%)	9.4
Diabetes mellitus	5	
Insulinoma	2	

Cushing's disease is a later onset disease in the breed. There were no cases of hypoparathyroidism.

Hypothyroidism has a wide range of ages at diagnosis (from 8 months to 15 years). 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 a thyroid panel yearly until age 5 and then every two years. There were no cases of hypo- or hyperparathyroidism.

Commented [PKC2]: ? yearly until age 5 and then yearly ????

The OFA Bearded Collie database gave these stats for 905 dogs through December 2017 - AI thyroiditis in 1.1%, idiopathic hypothyroidism in 0.7%, 11.3% equivocal, and 87% normal. 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.

Cancer (8.1%)

The more frequent cancers are listed in descending order of frequency.

Location	#	Av Age of Diagnosis (yr)
Liver	27	10.9
Mammary	23	11.5
Spleen	20	11.1
Nasal	16	10.7
Abdominal	18	14.8
Hemangiosarcoma	16	11.0
Stomach	11	9.1
Bone	10	13.8
Testicular	9	10.8
Kidney	6	12.5
Other	98	

The 98 "other" cancers were in no predominant location. A list of the other cancers can be generated online by using the search or report function.

Because of the low necropsy rate or lack of biopsy for diagnosis, the prevalence of cancer and location remains indeterminate. For example, the liver, spleen, or cancers could be primary hemangiosarcoma with metastatic spread. Abdominal cancer is non-specific, too.

Immunoglobulin Mediated Disorders (4.3%)

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.

Disease	# (%) of All Dogs	Av age onset (yr)
Dietary allergy/food intolerance	50 (1.8%)	8.4
Inflammatory bowel disease (IBD)	37 (1.1%)	4.6
Atopy	32 (1.1%)	3.5
Flea bite allergy	29 (1.0%)	7.5
Exocrine pancreatic insufficiency	7	

Other Diseases or Problems

Frequency is calculated if there were 22 or more cases.

Problem	# Dogs	% All Dogs
Arthritis (note 1)	88	2.9
Umbilical hernia	72	2.4
Hip dysplasia	69	2.3
Urinary infection	51	1.7
Pyometra	50	1.7
Eye, other	49	1.7
Cataract	44	1.5

Depigmentation	41	1.4
Hearing loss (note 2)	37	1.2
Vestibular disease	33	1.1
Kidney failure, cause unknown (note 3)	30	1.0
Nail problems, other	29	
Hot spots	20	
Epilepsy, idiopathic (note 4)	18	
Exercise induced hyperthermia	16	

*Pyometra frequency calculated by # cases/# bitches
**Cryptorchid frequency calculated by # cases/# dogs

Note 1: Arthritis. Age of onset was over 8 years of age in 70; among the younger ones, only 1 had multiple joint involvement

Note 2: Hearing loss. Three dogs had early onset. Two were deaf by 1 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. The cause might also have been in utero exposure to ototoxic chemicals or drugs.

Note 3: Kidney failure of unknown cause. 10 dogs 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: 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	# Tests	# Dogs	% Dogs Having Test
Hips	1135	1094	36.3
Eyes	787	577	19.1
Thyroid	520	346	11.5
Elbows	279	277	8.1
CEA/CH	152	145	4.8
MDR1	44	44	1.5
Prelim hips	26	26	
DLA	26	25	
Von Willebrand's	17	17	
Hips and eyes		497	16.5
Hips and elbow		271	9.1
Hips and thyroid		255	8.5
Hips, eyes, & thyroid		209	6.9

Collie Eye Anomaly/Choroidal Hypoplasia (CEA/CH) was identified in a Bearded Collie in the UK in 2012. A discounted testing program was offered for North American Beardies in 2017; it was sponsored jointly by BeaCon, the BCCA, and the Beardies of the World Calendar Crew (BOW). This contributed in part to the big increase in CEA/CH testing from 82 in 2016 to 145 in 2017. Test results were given for 149; 5 were carriers and the remainder were normal.

OFA Bearded Collie Health Screen Statistics.

Hips (# evaluated – 4867)

- Excellent – 17.0%
- Dysplastic – 6.3%

Thyroid (# evaluated – 905)

- AI thyroiditis – 1.1%
- Idiopathic hypothyroidism – 0.7$
- Equivocal – 11.3%
- Normal – 87%

Elbow (# evaluated - 810)

- Normal - 97.2%
- Dysplastic – 2.6%
- Grade I - 2%
- Grade II – 0.5%
- Grade III – 0.1%

Reproductive Outcome

Dogs

Used for breeding (# 220)

- Semen check done – 87. Consult with your reproductive veterinarian to review what constitutes a complete male reproductive examination.
- Frequency of use at stud

Number of times used	#
1	73
2	44
3	26
4	14
5	15
6	9
7	7
8	7
9	6
10 or more	19

- Breeding outcome

Outcome	#
Total # bitches bred	957
Litters	834
Total puppies	4954
Male puppies	1886
Female puppies	1942

Later Health Problems in Dogs' Progeny

Health Problem	# dogs producing problem	# pups with problem
Cryptorchid	29	62
Addison's	14	25
SLO	16	22
Hypothyroid	10	12
SLE	2	2

Bitches

Used for breeding (# 496)

- Number bred – 496

# of times bred	#
1	182
2	139
3	82
4	29
5	11
6	2

- Litters produced - 838
- Puppies produced - 5443
- Average number pups/litter – 6.5
- Early Puppy Loss

Early Puppy Loss		
Male Puppies	#	
Total born	2821	
Live born	2459	87.2%
Live @ 6 wks	2257	80.0%
Female Puppies		
Total born	2627	
Live Born	2340	89.1%
Live @ 6 wks	2110	80.3%

Breeding Method

Method	# Bitches
Natural	620
A/I fresh	84
Natural and A/I fresh	26
A/I frozen	19
A/I chilled	18
A/I operative	23

C-section Delivery

- 90/838 = 10.7%

Bitches' Progeny and Early Identifiable Issues

Issue	Male Pups	Female Pups
Cryptorchid	120	
Mismark	106	114
Umbilical hernia	81	79
Bad bite	22	19
Poor pigment	10	6
Cleft palate	3	4

Later Health Problems in Bitches' Progeny

Problem	# Bitches	# Pups with Problem
Addison's	25	32
Symmetrical lupoid onychodystrophy	26	30
Systemic lupus erythematosus	4	4
Hypothyroid	14	15

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

Deaths by age group

The average of death for 1008 dogs was 12.2 years.

Age Group (yr)	#	% all deaths	% all dogs
< 3	25	2.2	0.1
3-6	72	6.2	2.4
7-8*	67	5.8	2.2
9-11	182	15.7	6.0
12-13	282	24.4	9.4
>13	529	45.7	17.6
Total	1157		

*Deaths in those below 9 years (# 164) accounted for 14% of all deaths

Necropsies

These were conducted in 53 deaths (4.6%). Necropsies will sometimes be helpful in establishing the cause of death; if more were done there would be more identifiable causes of death

Mode of Death

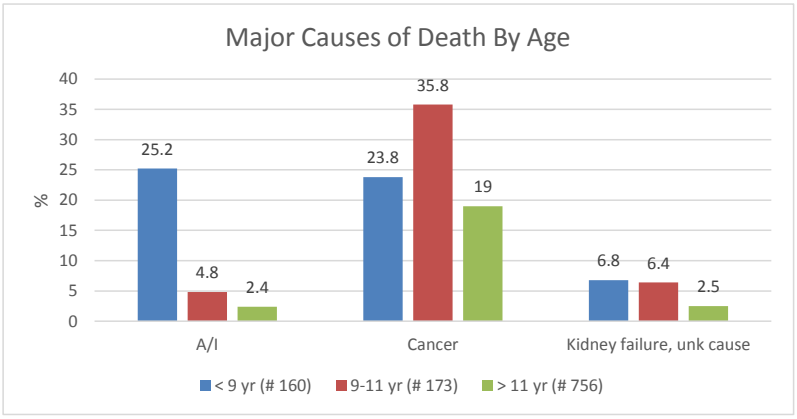
- Natural – 124
- Euthanasia – 816
- Accidental – 31
- Undocumented – the remainder

Leading Categories Causing Death

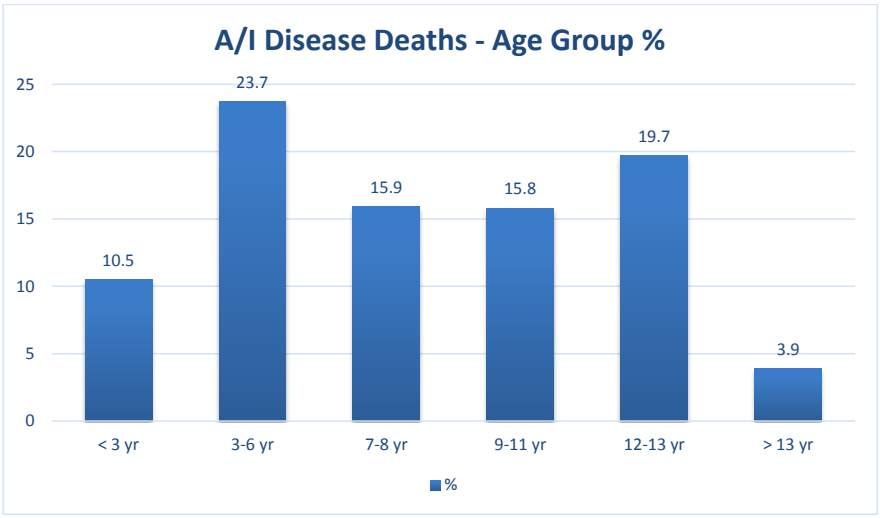
This information is somewhat incomplete because owners don't always indicate a cause of death in the death form; if it is only written on the dog's home page in the "other info", it does not transfer to either the health problem form or the death info form. As for the health problem analysis, a veterinarian's guess as to diagnosis or cause of death is insufficiently scientific. Even so, the basic data about general caterogy of diseases causing death and incidence of death at different ages can be useful. For example, death in younger dogs is not a normal happening in the Bearded Collie; greater effort should be made to understand what has happened and this needs to

be done shortly before or immediately after euthanasia or natural death. Naturally, the most common cause of death in the older dogs is "old age".

Major Causes of Death by Age Group

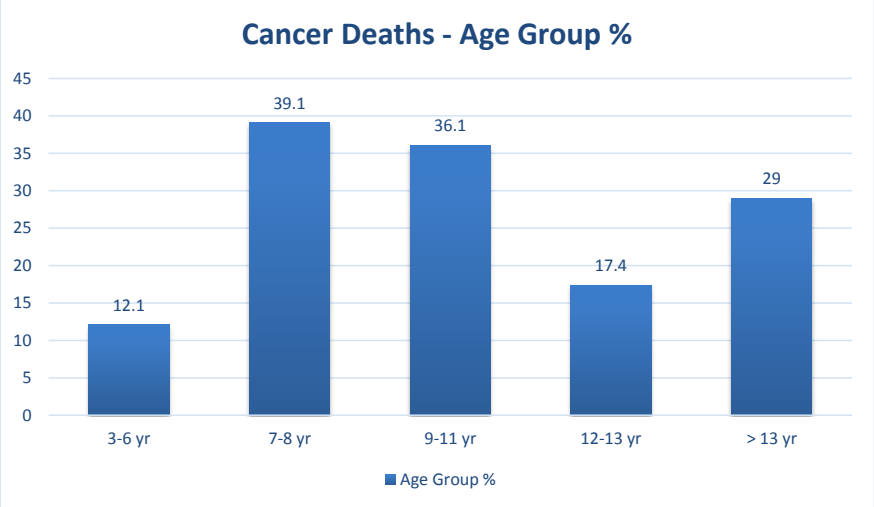


Percentage of A/I Disease Deaths (n=76) in Different Age Groups



There were few deaths from A/I diseases in the most elderly; the major toll was before the age of nine.

Percentage of Cancer Deaths (n=286) in Different Age Groups



There were no cancer deaths before the age of 3.

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. See explanation in Year 14 report.

BeaCon uses 10 generations and relaxed with maximal speed for COI calculations in Breeder's Assistant**.** When comparing COI values obtained with other software programs the calculation methodology and the number of generations need to be identical. All pedigrees in the OHR were recalculated in 2015-16 to assure that each one was done with the identical calculation rule.

Pedigree Display of COI. Starting with dogs added from early 2017 on, COI are displayed for the OHR dog and the two most recent generations of ancestors.

Data

The data for the USA 1977 foundation stock were calculated by using just one dog from each litter. The number of foundation stock on October 1, 1976 was 939 dogs. Analysis of USA stud book pedigree information through late 2016 is in a report by Dr. Jerry Bell; it is on BeaCon's website.

The OHR inbreeding coefficients are arranged by decreasing COI. All countries have a minimum COI of 6-14 except for the UK which is zero (in 20 dogs).

Year Report/Other	Coefficient of Inbreeding (10 gen)	
	# dogs	Av COI
USA stud book – birth years		
1960's	56	14.9
1970's	1396	19.8
1980's	1434	23.8
1990's	1203	25.7
2000's	723	25.9
2010 on	99	24.2
Open Health Registry		
Year 17		
All dogs	2913	22.3
UK	781	23.8
USA	1033	23.0
Belgium	26	22.4
Canada	153	21.7
Czech Republic	73	21.4
Finland	52	21.6
Australia	120	20.9
Germany	110	20.6
Netherlands	289	18.7

Genetic Diversity of US Bearded Collies

This lay summary was written by CA Sharp of the Australian Shepherd Genetics and Health Institute.

Dr. Bell used the Bearded Collie AKC studbook pedigree data on 4911 dogs to perform a genetic diversity analysis of the breed in the US. He used that data to determine who the UK breed founders (pedigree unknown) and earliest ancestors were, who their descendants were and what impact they have had on the breed in the United States since AKC recognition in 1977. The founders and earliest ancestors represent the original genetic potential in the population. Breeder selection over time, both in the UK and the US, has favored lines of descent from some founders over those of others. A few founders have no living descendants and thus their contribution has been lost.

This is not necessarily a negative. The failure of those lines to persist probably arises from generations of breeders who found those descendants either had undesirable traits that they did not wish to perpetuate or those dogs were less desirable than other lines present at the time. However, the **breed's current decline in population size may lead to a significant loss of genetic diversity should it continue**.

The breed today has a slightly higher average coefficient of inbreeding (measure of relatedness of the sire and dam) than do other breeds. This is not unusual for small-population breeds with a relatively complete database of dogs from the founders on down and that are comparatively new to registration. Bell's analysis indicates that **the Bearded Collie presently has sufficient genetic diversity to remain viable IF the population recovers in size** – something that requires the recruitment of new generations of breeders as well as continued effort by established breeders.

Dr. Bell's complete report is available at this link

Conclusions

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 needs 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.