

BeaCon Open Health Registry Report

April 2019

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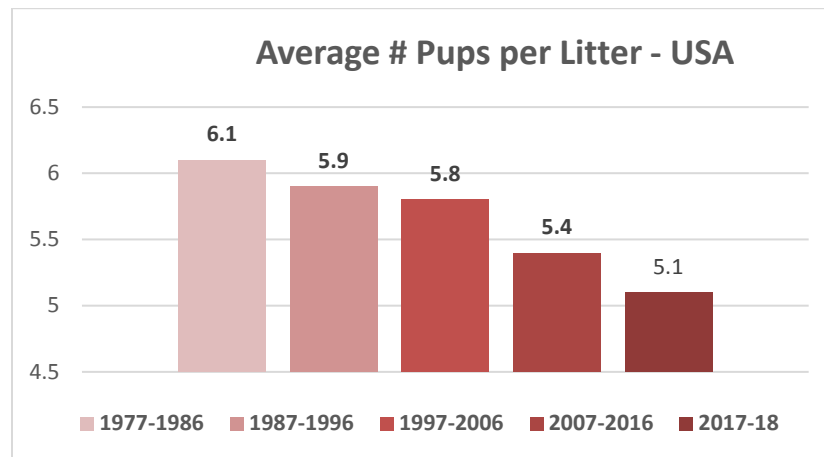
General Population Statistics

The registration numbers for AKC are based on registration year from 1993 to the present and whelp year before 1993. The numbers from the KC since at least 1990 are based on registration year. Regardless, the steadily downward trend in litters in recent years is obvious and significant. It has been seen in many other breeds during the same time frame.

Year	USA - AKC				UK - KC		
	# Dogs Registered	# Litters Registered	# Pups in Litters	Av # pups/ Litter	# Registered	# Litters	av# pups per litter
2018	201	45	247	5.5	274	44	6.5
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
1977	446	85	496	5.8			

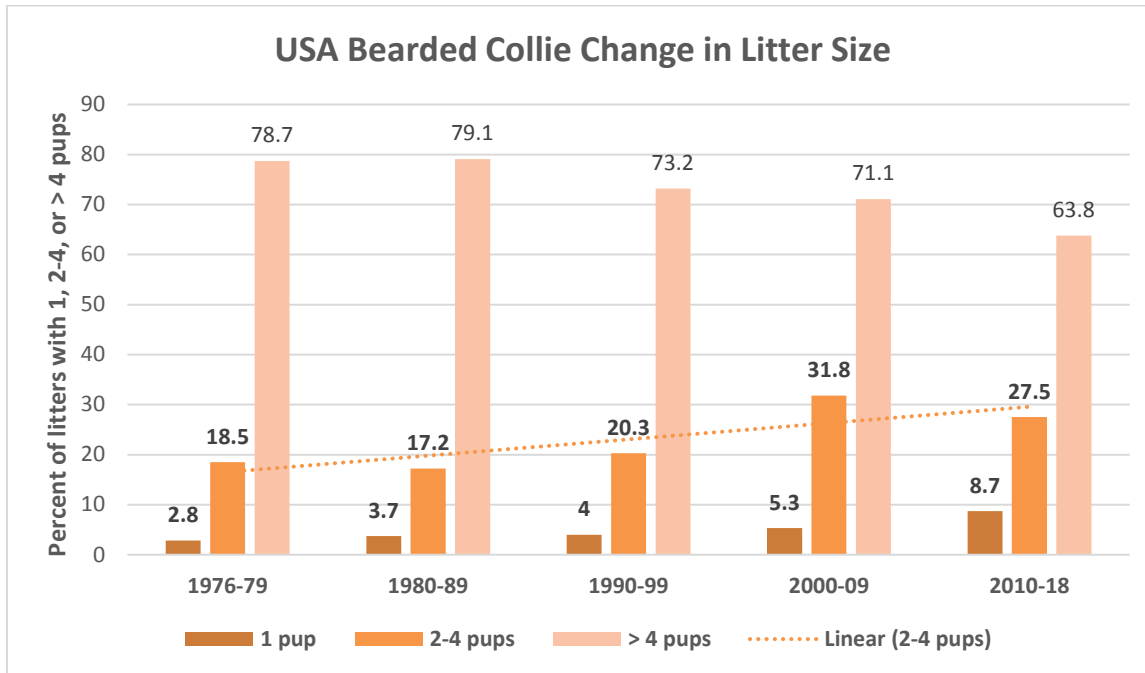
See table 1a (Appendix) for all years' statistics.

Declining average # puppies per litter.



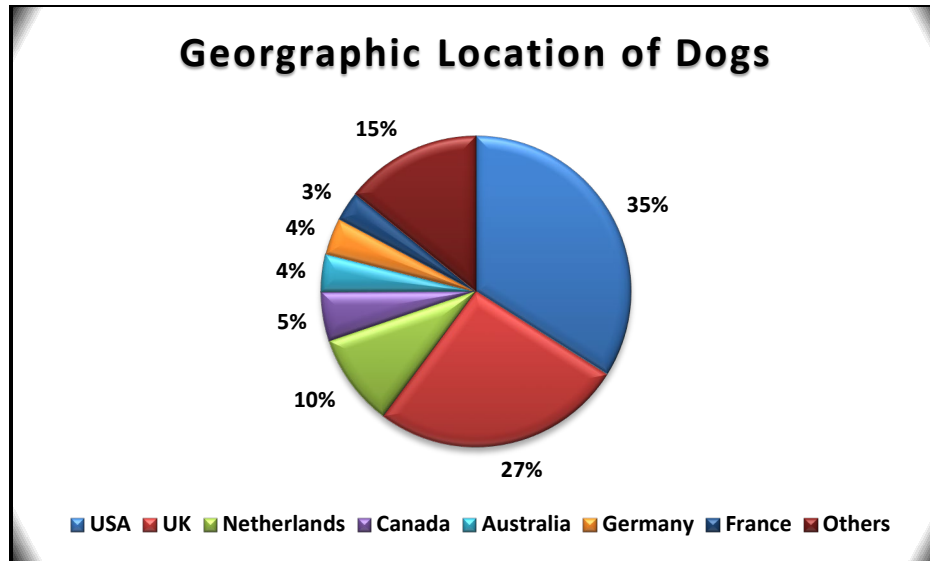
Changing Proportion of Small Litters (USA)

The USA data were also assessed on the basis of whelp year (see table 2a in appendix for number of dogs). Over time the percentage of litters with fewer pups (4 or less) has increased while litters of 5 or more have declined.



Demographics

- > Number dogs – 3072 (57 new dogs)
- > Non-public section of open health registry (not available to search or report) – 264 (8.6%)
- > Number owners – 905
- > Sex
 - Male – 1338 (36% neutered)
 - Female – 1735 (45% spayed)
- > Average age of living dogs updated in last 5 years – 8.2 yrs
- > Geographic location



Health Problem Categories

As in previous report years, major health problem fit into five categories.

Group	# cases	# dogs	% of all dogs (3072)
Autoimmune	411	340	11.1%
Behavioral	340	284	9.2%
Endocrine	307	273	8.9%
Cancer	275	253	8.2%
Immune Mediated	158	127	4.2%

Diabetes mellitus and Addison's disease are in both the autoimmune and endocrine categories.

Inflammatory bowel disease is in both allergy and autoimmune groups.

Autoimmune (AI) Diseases (11.1%)

Disease	# dogs	% of all dogs	av age of diagnosis
Symmetrical lupoid onychodystrophy (SLO)	110	3.6	3.9
Addison's disease (hypoadrenocorticism)	94	3.1	4.9
Inflammatory bowel disease (IBD)	36	1.2	4.6
Autoimmune hemolytic anemia (AIHA)	35	1.1	5.8
Vaccination reaction	31	1.0	4.9
Immune mediated arthritis	22		5.3
Systemic lupus erythematosus (SLE)	21		7.5
Autoimmune-mediated thrombocytopenia (AITP)	20		7.4
Discoid lupus erythematosus	9		
Pemphigus	8		
Addison's atypical*	7		
Demodectic mange	7		

*Atypical Addison's was separated from primary Addison's this year because treatment and physiology are different; if there is genetic cause for either, perhaps the genetics are also different.

There were 5 cases each of keratoconjunctivitis sicca and diabetes mellitus, 4 myositis, and 1 myasthenia gravis.

Some dogs had more than one AI problem which complicated management.

Sex Distribution of AI Disease

Disease	Female Incidence
Vaccination reaction	77.4%
AITP	70.0%
SLE	66.7%
AIHA	65.7%
Addison's	64.9%
Immune mediated arthritis	63.6%
IBD	44.4%
SLO	40.9%

Frequency of AI problems, Addison's and SLO Over Time (all are %)

Report year ending Feb	AI diseases	Addison's disease	SLO
2006	12.4	6.3	2.1
2007	12.7	5.9	2.2
2009	12.0	4.6	2.7
2011	12.4	4.1	3.5
2013	11.6	3.7	3.5
2015	11.4	3.6	3.4
2017	11.6	3.4	3.6
2018	11.2	3.3	3.6
2019	11.1	3.1	3.9

The decreased frequency of Addison's disease and increased frequency of SLO may represent real changes or owner's participating in the registry because of the then current disease emphasis on research; it is impossible to differentiate the reason.

Behavioral, Temperament Issues (9.2%)

Issue	#	% of all dogs
Fear*	275	9.0%
Aggression**	40	1.3%
Hyperactivity	13	
Obsessive compulsive disorder	12	

*loud sharp noises – 218; other – 34; everything – 10; stranger – 9; crowds - 4

**dog – 19; family – 12 (5 were euthanized at a young age); all – 6; stranger – 6. It is conceivable that some of the dog aggression cases represent fear; with incomplete histories that is an unknown.

Fear of Loud Sound.

The fear of loud sounds has been recognized for many years. The cause(s) are not known though possibilities include inheritance, association with a sudden aversive event, or even medical causes. For example, an association exists between fear and hypothyroidism but doesn't necessarily mean cause; the fear is reduced in some dogs treated for hypothyroidism.

The age of onset for loud sound fear was less than four years in 73% of the 145 dogs for whom age was given. A consideration in the older dog who newly develops this fear, could be musculoskeletal pain, as noted in this [report](#).

Aggression.

Aggressive behavior has led to euthanasia of dogs from many breeds; sometimes it 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 or manage the behavior 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.

There is the occasional dog with aggression for whom there is no effective solution; those are euthanized out of safety concerns for the family and at a relatively young age. This condition has been given different names, including rage syndrome, idiopathic aggression, and episodic dyscontrol. In between the unpredictable and unprovoked episodes the dogs are normal behaviorally and interactively. Families are very distressed by the sequence of events and is likely equally difficult for the professionals who are consulted. Among breeds in which this condition has been diagnosed are Cocker Spaniels, English Springer Spaniels, and Belgian Malinois.

Endocrine Problems (8.2%)

Disease	# (%) of All Dogs	Average Age at Diagnosis (yr)
Hypothyroid	167 (5.4%)	7.5
Addison's disease	94 (3.1%)	4.9
Cushing's disease	34 (1.1%)	10.2*
Diabetes mellitus	5	
Insulinoma	2	

*1 case in a 3 ½ year old.

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 biological aging 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.

See health screening section for OFA information on thyroid testing.

Cancer (8.2%)

Location	#	Av Age of Diagnosis (yr)
Liver	28	12.2
Mammary	26	11.0
Spleen	21	10.8
Abdominal	18	11.9
Nasal	16	11.0
Hemangiosarcoma	15	11.6
Stomach	13	11.3
Bone	11	11.1
Testicular	9	12.0
Kidney	6	11.5
Other	108	

Cancer is a later onset disease based on average age of diagnosis. The “other” cancers can be studied 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 abdominal cancers could be primary hemangiosarcoma with metastatic spread.

Immunoglobulin Mediated Disorders (4.1%)

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	49 (1.6%)	3.8
Inflammatory bowel disease (IBD)	36 (1.2%)	4.6
Atopy	33 (1.1%)	3.2
Flea bite allergy	29 (0.9%)	4.0
Exocrine pancreatic insufficiency	7	

Other Diseases or Problems

Problem	# Dogs	% All Dogs
Arthritis (note 1)	93	3.0
Umbilical hernia	72	2.3
Hip dysplasia	70	2.3
Urinary infection	53	1.7
Pyometra	50	1.7
Eye, other	50	1.7
Cataract	44	1.4
Depigmentation	43	1.4
Hearing loss (note 2)	41	1.2
Vestibular disease	35	1.1
Kidney failure, cause unknown (note 3)	35	1.0
Nail problems, other	15	
Hot spots	20	
Epilepsy, idiopathic (note 4)	19	
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 66, with an average of 10.6 yrs; among the younger ones, only 1 had multiple joint involvement

Note 2: Hearing loss. Average age of onset was 12 years, so aging likely was a major contributing factor. 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.

Note 3: Kidney failure of unknown cause. Six dogs had onset of disease before age 8 years. For the others, the average age was 11.8 years, suggesting that aging contributed.

Note 4: There is insufficient information given about how the diagnosis was made; at best this is an uncertain diagnosis.

Health Screening Tests

Screening Test	# Tests	# Dogs	% Dogs Having Test
Hips	1148	1127	36.7%
Eyes	802	601	19.6%
Thyroid	514	349	11.4%
Elbows	292	292	9.5%
CEA/CH	177	172	5.6%
MDR1	52	52	1.7%
Prelim hips	26	26	
DLA	29	29	
Von Willebrand's	20	20	
prcd PRA	3	3	
<hr/>			
Hips and eyes		516	16.8%
Hips and elbow		286	9.3%
Hips and thyroid		258	8.4%
Hips, eyes, & thyroid		212	6.9%

Collie Eye Anomaly/Choroidal Hypoplasia (CEA/CH) was identified in a Bearded Collie in the UK in 2012. Subsequently many have been tested. Information from public databases is available on individual dogs in Irena Fransson's online database (<http://www.bcpedigree.se/>)

Results from PawPrints lab (# tested – 201), 11/19/2018

- 176 clear AA (87.6%)
- 25 carriers AB (12.4%). *These are not being reported to OFA which has only 44 CEA Beardies.*
- 0 at risk BB

Most Frequent Geographic Location of CEA Tested Dogs (n=177)

- Germany – 25.8%
- Netherlands – 12%
- United Kingdom – 8.2%
- United States – 1.6%

Most Frequent Geographic Location of MDR1 Tested Dogs (n=52)

- Germany – 12
- Netherlands – 11
- United States – 10
- United Kingdom – 9

OFA Bearded Collie Health Screen Statistics.

Hips (# evaluated – 4932)

- Excellent – 17.0%
- Normal – 92.9%
- Dysplastic – 6.2%

Thyroid (# evaluated – 963)

- AI thyroiditis – 1.7%
- Equivocal – 11.0%

- Normal – 87.3%
- Elbow (# evaluated - 849)**
- Normal - 97.2%
 - Dysplastic – 2.6%
 - Equivocal – 0.2%
- Collie Eye Anomaly (# reported - 44)**
- Normal – 100%

Reproductive Outcome

Dogs (# bred - 257)

- Semen check done – 87 (34.9%).
- Production outcome. Note that slightly over 1/3 of all puppies came from 19 of the dogs who were bred 10 or more times; in other words a popular sire effect which is a contributor to genetic bottle necks with potential negative effects.

# times bred	# dogs bred	# litters produced	total # pups	% pups produced
1	72	71	472	9.4%
2	47	80	487	9.7%
3	27	79	469	9.3%
4	15	54	295	5.9%
5	15	65	351	7.0%
6	9	42	184	3.7%
7	6	35	224	4.4%
8	8	57	336	6.7%
9	6	44	268	5.3%
10 or more	19	320	1960	38.9%
TOTAL		861	5046	

For the population in this registry, over 1/3 of the puppies were produced by 7.4% of the dogs. This is recognized as the popular sire phenomenon and it can create a significant bottleneck for any breed.

Later Health Problems in Dogs' Progeny

Problem	# dogs producing problem	# pups with problem
Cryptorchid	29	62
Addison's	14	25
SLO	16	22
Hypothyroid	9	10
SLE	2	2

Bitches (# bred - 503; litters produced – 830)

# times bred	# bitches bred	# litters produced	pups born		
			# born	# live born	# live @ 6 wk
1	172	188	1244	1121	948
2	130	261	1653	1460	1317
3	77	217	1319	1060	1032
4	27	99	551	481	438
5	11	56	380	334	326
6	2	9	29	14	14
Total	845	830	5258	4514	4150

Average litter size was 6.3 pups; mortality at birth was 14% with an additional 8% between birth and 6 weeks of age.

Delivery was by C-section for 98 litters (11.6%).

Breeding Method

Method	# Bitches
Natural	610
A/I fresh	87
Natural and A/I fresh	28
A/I frozen	19
A/I chilled	19
A/I operative	24

Bitches' Progeny and Early Identifiable Issues

Issue	# Pups
Cryptorchid	121
Mismatch	154
Umbilical hernia	120
Bad bite	26
Poor pigment	20
Cleft palate	3

Later Health Problems in Bitches' Progeny

Problem	# Bitches
Addison's	25
Symmetrical lupoid onychodystrophy	27
Systemic lupus erythematosus	4
Hypothyroid	14

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 a party omits that responsibility it is to the detriment of future breeding programs and the breed's long term health prospects.

Mortality

General

There were 1148 deceased dogs or 37.4% of all registry dogs. Only 1071 had information to analyze causes of death in age groups or by disease categories.

Deaths by age group

The average of death for 1029 dogs was 12.2 years.

Age Group (yr)	#	% all deaths (# 1148)	% all dogs (# 3072)
< 3	26	2.3	0.9
3-6	77	6.7	2.5
7-8*	69	6.0	2.3
9-11	190	16.6	6.2
12-13	289	25.3	9.4
>13	388	34.0	12.6
Information unavailable	119		
Total	1148		

*Deaths below age 9 years (# 171) accounted for 15% of all deaths

Necropsies

These were conducted in 55 deaths (4.8%). Necropsies can sometimes be helpful to identify the cause of death, even one limited to the organs thought to be involved.

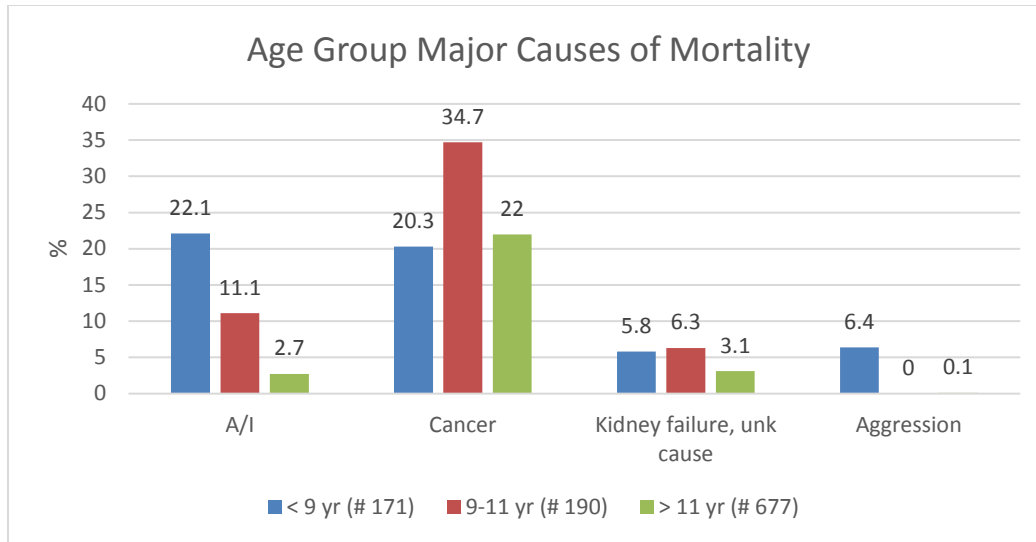
Mode of Death

- Natural – 129
- Euthanasia – 848
- Accidental – 32
- Undocumented – the remainder

Leading Causes of 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 insufficient. Even so, the basic data about general category 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. The most common cause of death in the older dogs is "old age".

Major Causes of Death by Age Group



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.

BeaCon uses 10 generations and relaxed with maximal speed for COI calculations in Breeder's Assistant software. These COI values should only be compared with values obtained with other software programs if the calculation methodology and the number of generations used are identical.

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 Dr. Jerry Bell's report (https://www.beaconforhealth.org/Final_Stud_Book_Analysis%20with%20edit%20restrictions.pdf).

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 18		
All dogs	3021	22.1
UK	820	23.6
USA	1042	22.9
Belgium	26	22.4
Canada	157	21.6
Czech Republic	76	21.4
Finland	53	21.4
France	106	21.0
Australia	123	20.6
Germany	122	20.0
Netherlands	307	18.4

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.

Postscript

This is year 18 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.

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.

With BeaCon's goal of including every Bearded Collie possible we invite all dogs, health problems or none, and lines. Breeders are encouraged to enroll pups before they go to their new homes; this provides healthy young dogs for long term follow up.

Since participation in the registry is voluntary, there are a number of large holes in the data; this means that some lines are missing, some dogs in a line are not reported, some problems for an individual dog are not reported etc.

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

Linda Aronson
Liz Ayrton
Peg Caldwell
CJ del Valle
Karen Drummond
Judy Howard
Elsa Sell

WebSite: <https://www.beaconforhealth.org>

Appendix

Table 1a. Complete Registration Stats.

	USA - AKC				UK - KC		
	# Dogs Registered	# Litters Registered	# Pups in Litters	Av # pups/ Litter	# Registered	# Litters	av# pups per litter
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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	-	-	-	-			

Table 2a

Years	Number Litters	Number Singleton litters	Number Litters with 2-3 pups	Number Litters with 4 pups	Number Litters with > 4 pups
1976-1979	357	10	28	39	291
1980-1989	1868	69	173	148	1478
1990-1999	1823	72	221	149	1335
2000-2009	1234	65	172	120	877
2010-2018*	539	47	79	69	344

*2018 registrations may not yet be complete so these numbers could change slightly when the next report is available in early 2020

Diagnoses added to list of health problems/causes of death

- › Atypical Addison's
- › Immune mediated polyarthritis
- › Rage syndrome/idiopathic aggression/episodic dyscontrol
- › Lymphoma