

**BeaCon Open Health Registry Report
March 2021**

Introduction 2

 Notice of Copyright 2

UK and USA Bearded Collie Registration Statistics 3

 Frequency of Small Litters 4

Demographics of Registry Dogs 5

 Geographic Location of Dogs..... 5

 Geographic Location of Owners 6

 New Dogs by Registry Period 6

Health Problem Categories 7

 Autoimmune (AI) Diseases (11.0%) 7

 Sex Distribution 8

 Most Common AI Problems Over the Years 8

 Behavioral, Temperament Issues (8.7%) 8

 Fear of Loud Sound 8

 Aggression 9

 Endocrine Problems (8.7%) 9

 Cancer (8.8%) 10

 Immunoglobulin Mediated Disorders (4.0%) 10

 Other Diseases or Problems 11

Health Screening Tests 12

 Results from PawPrints lab (# tested – 201), 11/19/2018 12

 OFA Health Screen Statistics (through Dec 2020) 12

Reproductive Outcome 13

 Dogs (# bred – 254) 13

 Bitches 14

 Breeding Method 14

 Bitches’ Progeny and Early Identifiable Issues 14

 Later Health Problems in Bitches’ Progeny 14

 Sharing of Health Information 15

Mortality 15

General	15
Death Numbers	15
*Dogs for whom a date of death could be calculated	15
Necropsies.....	15
Mode of Death	15
Major Causes of Death by Age Group	15
Coefficient of Inbreeding (COI).....	16
Data	17
Genetic Diversity of US Bearded Collies.....	17
Conclusions	18
Postscript	18

Introduction

This is the twentieth report of Beacon’s open health registry about the life and health of Beardies as recorded by their owners and breeders. The registry is open to Beardies living in any country whose owner or breeder wishes to participate. Most dogs’ information is public. Fewer than 10% are non-public because either a breeder is reporting for the puppy owners or the preference is for anonymity. While only a small number of the world’s Beardies are in this registry, it is the most complete data available about a range of topics. To set the framework for the registry data, first we look at the number of registered litters and pups in the United Kingdom and United States, which comprise 62% of all registry dogs.

Notice of Copyright

All information contained in this report is fully copyrighted by the Bearded Collie Foundation for Health (BeaCon). Permission is granted to print information only *for personal use or for publication in educational materials for Bearded Collie owners*. Nothing obtained from the information available herein may be published in any form, whether for profit or not, without permission of BeaCon. 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>

Registration Statistics for USA and UK

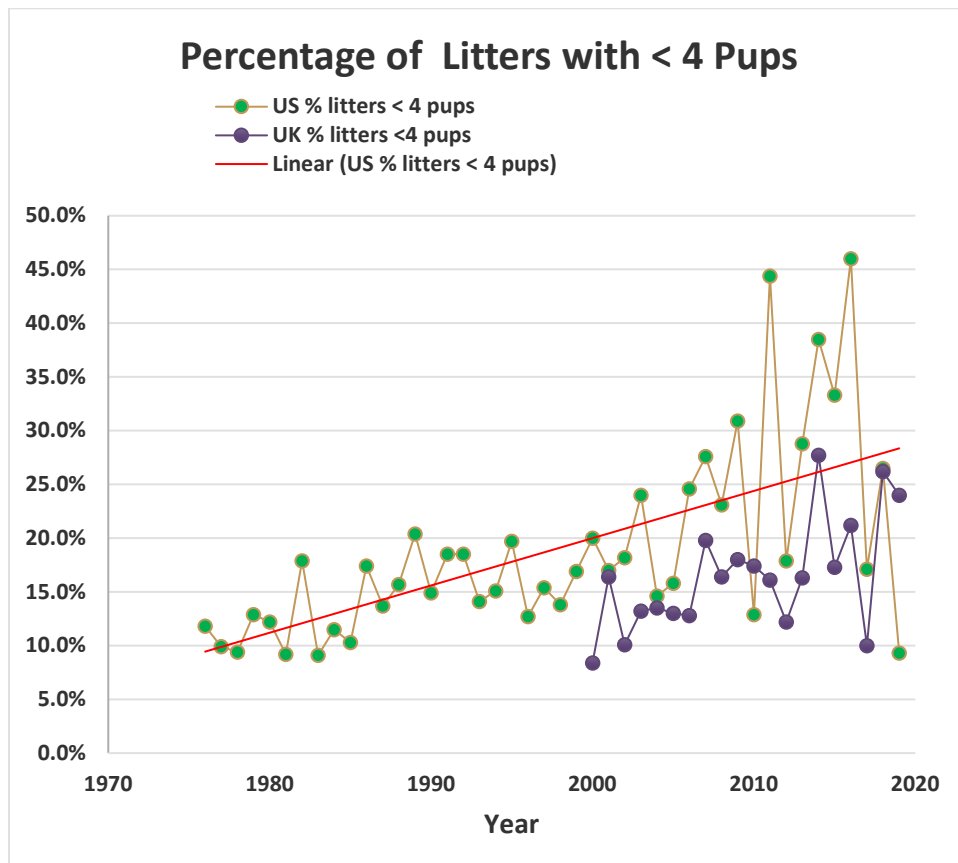
The AKC registration litter and number of pups numbers are based on year of whelp. The number of dogs registered are based on year of registration. The UK figures are based on year of registration. For 2020 there was an increase in the total number of pups compared with the last 3 years. This is a very encouraging indicator for the breed's preservation. The 2020 information is incomplete because some registrations will occur in early 2021.

	USA - AKC					UK - KC			
	# Dogs Registered	# Litters	# Pups in Litters	Av # pups/Litter	% Litters with < 4 pups per litter	# Dogs Registered	# Litters	av# pups per litter	% Litters with <4 pups per litter
2020	222	43	269	6.3	9.3%	224	36	6.2	13.9%
2019	177	34	181	5.3	26.5%	303	54	5.6	24.0%
2018	201	35	228	6.5	17.1%	274	44	6.5	26.2%
2017	208	37	181	4.9	46.0%	420	65	6.1	10%
2016	224	48	267	5.6	33.3%	284	51	5.3	21.2%
2015	247	39	208	5.3	38.5%	346	53	6.3	17.3%
2014	289	59	346	5.9	28.8%	371	64	5.6	27.7%
2013	319	59	341	5.8	17.9%	543	91	6.0	16.3%
2012	269	54	377	7.0	44.4%	463	78	5.9	12.2%
2011	345	62	395	6.4	12.9%	538	93	5.8	16.1%
2010	321	68	405	6.0	30.9%	572	95	6.0	17.4%
2009	331	78	445	5.7	23.1%	528	90	5.9	18%
2008	393	76	403	5.3	27.6%	643	113	5.7	16.4%
2007	413	108	591	5.5	24.6%	606	98	6.2	19.8%
2006	447	101	596	5.9	15.8%	720	119	6.1	12.8%
2005	485	110	664	6.0	14.6%	650	113	5.8	13%
2004	562	150	842	5.6	24.0%	821	129	6.4	13.5%
2003	543	154	897	5.8	18.2%	668	109	6.2	13.2%
2002	587	159	943	5.9	17.0%	901	140	6.4	10.1%
2001	620	165	953	5.8	20.0%	721	121	6.0	16.4%
2000	682	183	1031	5.6	16.9%	952	150	6.4	8.4%
1999	614	196	1202	6.1	13.8%	1034	175	5.9	
1998	752	175	1080	6.2	15.4%	1119	179	6.3	
1997	711	197	1249	6.3	12.7%	1286			
1996	720	178	1031	5.8	19.7%	1318			
1995	762	186	1105	5.9	15.1%	1467			
1994	640	177	1057	6.0	14.1%	1337			
1993	749	157	912	5.8	18.5%	1506			
1992	766	162	1092	6.7	18.5%	1575			
1991	796	201	1162	5.8	14.9%	1621			
1990	700	181	1062	5.9	20.4%	1715			
1989	713	185	1128	6.1	15.7%	1945			
1988	817	190	1175	6.2	13.7%				
1987	760	184	1098	6.0	17.4%				
1986	797	185	1175	6.4	10.3%				
1985	858	191	1253	6.6	11.5%				
1984	858	209	1330	6.4	9.1 %				
1983	895	201	1190	5.9	17.9%				
1982	763	196	1257	6.4	9.2%				
1981	723	172	1095	6.4	12.2%				
1980	653	155	909	5.9	12.9%				
1979	588	127	782	6.2	9.4%				

1978	472	111	684	6.2	9.9%			
1977	446	85	496	5.8	11.8%			
1976		34	202	5.9	11.8%			

Frequency of Small Litters

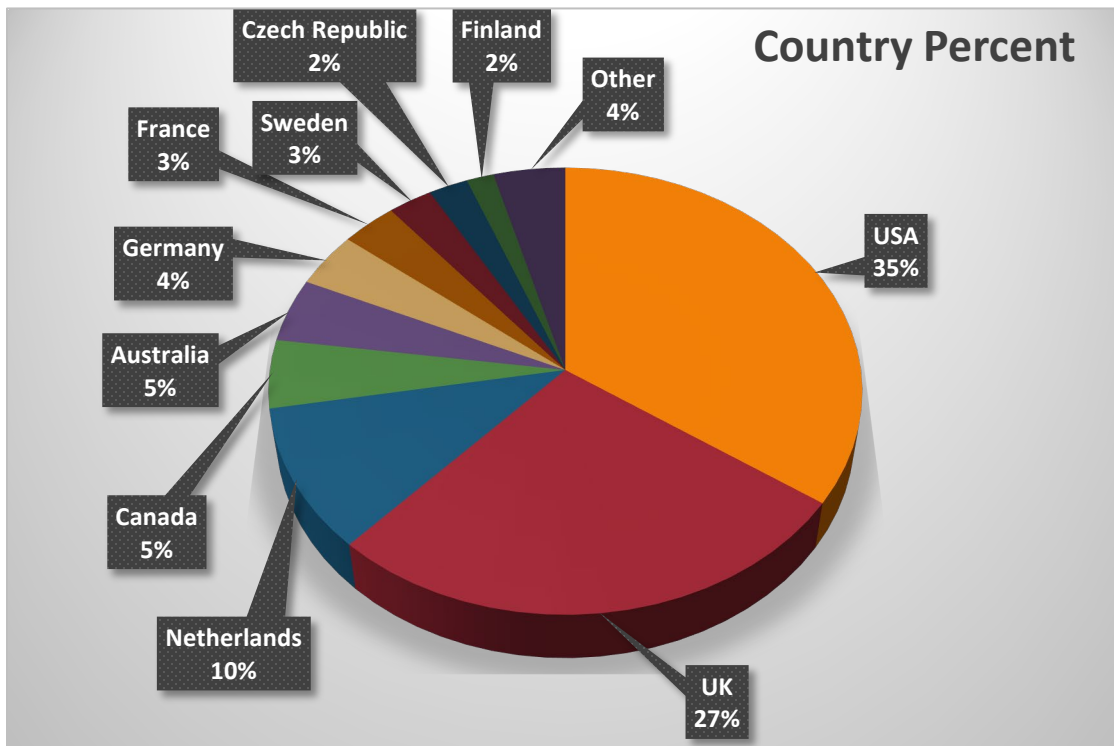
Graphic display of the whelp year data for US dogs included 1976-2020 and for UK, included 2000-2020. Since the late 70's in the US, the trend line has been a steady significant increase in the smaller litters from around 10% to above 25%. Possible reasons for the change range from loss of hybrid vigor (less genetic diversity), basic reproductive problems of mates (e.g., poor semen quality), difficulty assessing optimal time to mate, mothering ability, change in breeding method or some combination thereof. This is a topic of concern for breeder discussion.



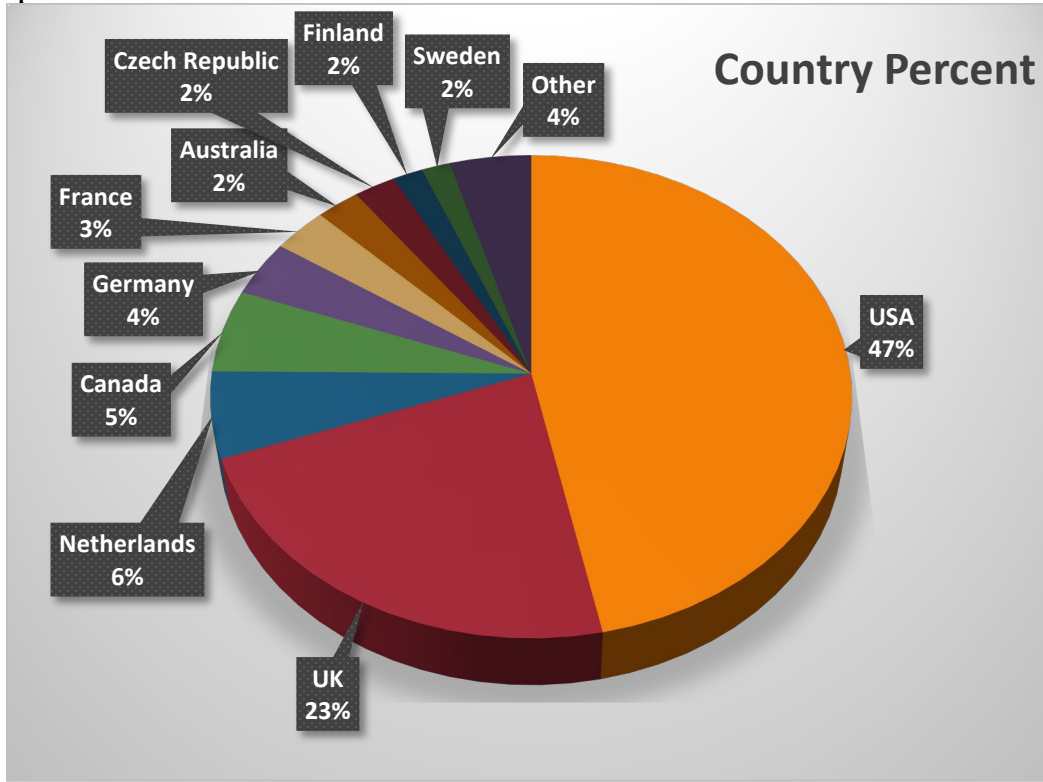
Demographics of Registry Dogs

- Number dogs – 3309 (118 new dogs this period which is the same as last year’s new number)
- Non-public section of open health registry (not available to search or report) – 288 (8.7%)
- Number owners – 954 (new = 28)
- Sex
 - Male – 915 intact; 500 neutered (35.3% neutered)
 - Female – 1013 intact; 834 spayed (45.2% spayed)
- Dogs with updates in last 4 years
 - Number - 653
 - Average age, 8.3 yrs; range 0.33-16.9 yrs, standard deviation 4.0 years.

Geographic Location of Dogs



Geographic Location of Owners



New Dogs by Registry Period

Year	# Owners	# Dogs	Dogs added	Months Included
20	953	3309	118	Mar 20-Mar 21
19	926	3191	119	Mar 19-Mar 20
18	-	3072	57	Mar 18-Mar 19
17	894	3015	83	Mar 17-Mar 18
16	884	2932	210	Mar 16-Mar 17
15	848	2722	271	Mar 15 – Mar 16
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

Health Problem Categories

Health problems are placed into the five categories as in previous years. The percentage of dogs within each category did not change from last year.

Group	# cases	# dogs	% of all dogs (n=3309)
Autoimmune*	439	365	11.0%
Behavioral	345	288	8.7%
Endocrine	324	289	8.7%
Cancer	313	291	8.8%
Immunoglobulin mediated*	162	131	4.0%

Diabetes mellitus and Addison's disease are in both the autoimmune and endocrine categories. Inflammatory bowel disease is in both allergy and autoimmune groups.

*Immune-mediated diseases result from abnormal activity of the body's immune system which may over-react or start attacking the body. Autoimmune diseases are a subset of immune-mediated diseases. Certain of these diseases are known to be mediated by specific immunoglobulins (see the immunoglobulin section).

Autoimmune (AI) Diseases (11.0%)

There were minimal or no changes in the frequency of individual diseases, female incidence, or average age of onset.

AI Disease	# dogs	% of all dogs	av age of diagnosis
Symmetrical lupoid onychodystrophy (SLO)	121	3.7	3.9
Addison's disease (hypoadrenocorticism)	104	3.1	4.9
Inflammatory bowel disease (IBD)	39	1.2	4.5
Autoimmune hemolytic anemia (AIHA)	37	1.1	5.8
Immune mediated arthritis	26		5.6
Vaccination reaction	23		3.25
Systemic lupus erythematosus (SLE)	21		7.5
Autoimmune-mediated thrombocytopenia (AITP)	22		7.1
Discoid lupus erythematosus	10		
Pemphigus	10		
Addison's atypical	9		
Demodectic mange	6		

There were 6 cases of myositis, 5 cases each of keratoconjunctivitis sicca and diabetes mellitus, and 1 myasthenia gravis. Five new cases of atypical Addison's were reported this year.

Some dogs had more than one AI problem which complicated management

- Addison's and hypothyroidism – 19
- Addison's and SLO – 5
- Addison's and vaccination reaction – 2
- Evans syndrome (AIHA and autoimmune thrombocytopenia) - 2

Sex Distribution

Disease	Female Incidence
Vaccination reaction	78.3%
AITP	72.7%
Immune mediated arthritis	69.2%
SLE	66.7%
AIHA	64.9%
Addison's	65.4%
IBD	46.2%
SLO	40.8%

Most Common AI Problems Over the Years

(numbers represent percentage of dogs with a disease divided by the total number of dogs in the registry that report year)

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
2019	11.1	3.1	3.9
2020	11.1	3.2	3.6
2021	11.0	3.1	3.7

The change in frequency of Addison's disease (lower now) and SLO (higher now) with time may represent real changes or owner's decision to participate in the registry because of the then current research focus.

Behavioral, Temperament Issues (8.7%)

Issue	# dogs	% of all dogs
Fear*	279	8.4%
Aggression**	41	1.2%
Hyperactivity	13	
Obsessive compulsive disorder	12	

*loud sharp noises – 220; other – 36; everything – 10; stranger – 9; crowds - 5

**dog – 20; family – 12 (5 were euthanized at a young age); all – 6; stranger – 3. It is possible that some cases of dog aggression represent fear but histories are incomplete.

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 average age of onset for loud sound fear was 2.5 in the 147 for whom age was given. 57.7% were female. 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 and idiopathic aggression. In between the unpredictable and unprovoked episodes the dogs are normal behaviorally and interactively. Among breeds in which this condition has been diagnosed are Cocker Spaniels, English Springer Spaniels, and Belgian Malinois. Episodic dyscontrol is different and the result of a partial seizure disorder which can be treated with seizure medication and behavioral management.

Endocrine Problems (8.7%)

Disease	Number of Dogs	% of All Dogs	Average Age at Diagnosis (yr)
Hypothyroid	174	5.3%	7.5
Addison's disease	104	3.1%	6.5
Cushing's disease*	41	1.2%	10.5
Diabetes mellitus	5		
Insulinoma	2		

*Average age 10.5 yrs, range 3.4 to 15.3 yrs. 65% were female.

There were no cases of hypo- or hyperparathyroidism

Hypothyroidism has a wide range of ages at diagnosis (from 5 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. Dogs that pull against their collars can damage their thyroids and cause permanent loss of function. **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 for the BCCA CHIC recommendation for a thyroid panel yearly until age 5 and then every two years. See health screening section for OFA information on thyroid testing.

Cancer (8.8%)

Location	#	Average Age of Diagnosis (yr)
Liver	34	12.1
Mammary*	31	10.8
Spleen	22	10.9
Abdominal	22	11.6
Nasal	17	11.2
Hemangiosarcoma	23	12.0
Stomach	12	11.3
Bone	13	10.2
Testicular	10	12.1
Kidney	6	11.5
Other	116	

*One case in a male.

Cancer in the Bearded Collie generally is a later onset disease. Lymphoma was added as a separate category this year. The “other” cancers can be studied by using the search or report function. These are a mixture of location or diagnosis. Lymphoma, mouth, mycoides fungoides (cutaneous T-cell lymphoma), ovarian, pancreatic, adrenal – 2 each; spinal cord – 1; lung – 5; mast cell, spindle cell sarcoma, thyroid, fibrosarcoma – 4 each ; insulinoma, hemangiopericytoma, brain, throat, basal cell – 3 each

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 (4.0%)

Allergy generally and flea bite allergy specifically, are mediated by immunoglobulin E (Ig E) whereas, food sensitivity and intolerance are 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)	% Female
Dietary allergy/food intolerance	52 (1.6%)	3.9	40.4%
Inflammatory bowel disease (IBD)	39 (1.2%)	4.5	46.2%
Atopy	33 (1.0%)	3.3	51.5%
Flea bite allergy	30 (0.9%)	4.0	50.5%
Exocrine pancreatic insufficiency	7	6.4	71.4%

Other Diseases or Problems

At the request of owners, several problems were added to the health problem list – recessed vulva (these are normal in prepubertal bitches and those spayed before and sometimes after the first season), spondylosis, and transitional vertebrae.

Problem	# Dogs	% All Dogs
Arthritis (note 1)	103	3.1
Umbilical hernia	73	2.2
Hip dysplasia	71	2.2
Pyometra	57	1.7
Urinary infection	53	1.6
Eye, other	52	1.6
Cataract (note 4)	46	1.4
Depigmentation	45	1.4
Hearing loss (note 2)	45	1.4
Vestibular disease (note 5)	40	1.2
Kidney failure, cause unknown (note 3)	41	1.2
Nail problems, other	29	
Cryptorchid	27	
Teeth, overshot	23	
Cognitive dysfunction	22	
Hot spots	20	
Stroke	22	
Elbow dysplasia	17	
Exercise induced hyperthermia	16	
Bladder stones	16	
Neurological, other	18	
Teeth, base narrow	13	
Osteochondrosis dissecans	8	
Degenerative disk disease	7	

- Note 1: Arthritis. Average age of onset 10.7 yrs (n=95). The 13 with onset before eight years of age may have had an autoimmune component but there is insufficient information to know.
- Note 2: Hearing loss. 41/43 dogs had age of onset from 10 years up. Two dogs had early onset. One with onset age 5 yr 3 mo and was almost completely deaf by age 7 yr.; she had two deaf littermates, so the cause was considered genetic. The other was born deaf; family history is unknown.
- Note 3: Kidney failure of unknown cause. Average age of onset was 11.1 yrs in 37 dogs. It is not known what lab work was done to attempt diagnosis. This is of concern for the younger dogs when there should be an identifiable cause of failure. Among the younger dogs, one had a biopsy dx of chronic interstitial nephritis, 1 had brothers who died early and dam who died of SLE; 1 was diagnosed with Addison's at the same time of kidney failure; several died at a later age of other causes
- Note 4. Cataracts: av age 10.1 (n=42 dogs). Eleven were below 9 years of age; 4 of those were specified as "juvenile".
- Note 5. Vestibular disease is a problem in older dogs; only 2 were less than 11.5 yrs; average age was 13 years.

Health Screening Tests

Screening Test	# Tests	# Dogs	% Dogs Having Test
Hips	1253	1213	36.7%
Eyes	888	654	19.8%
Thyroid	540	365	11.0%
Elbows	343	341	10.3%
CEA/CH*	231	224	6.8%
MDR1	57	57	1.7%
Prelim hips	29	29	
DLA	32	32	
Von Willebrand's	20	20	
Canine multifocal retinopathy	10	10	
pred PRA	33	22	
Exercise induced collapse mutation	7	7	
Embark Genetic COI**	-	31	
Hips and eyes		561	17.0%
Hips and elbow		333	10.0%
Hips and thyroid		272	8.2%
Hips, eyes, & thyroid		222	6.7%

*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 have not been reported to OFA which lists 51 normal CEA Beardies.*
- 0 at risk BB

**With the recent BCCA partnership with Embark to offer Genetic Diversity Panel testing for Bearded Collies, BeaCon added a field to the dog home page for the Embark Genetic COI. To date 31 Beardies in the open health registry have this recorded. Remember that the genetic and pedigree COI's are determined by very different methods and are not comparable or interchangeable.

OFA Bearded Collie Health Screen Statistics (through Dec 2020)

Registry	# Evaluations	Abnormal	Normal	Carrier	Equivocal
CEA	51	0%	100%	0	0
Congenital Cardiac	76	3.9%	90.8%	0	5.3%
Elbow	939	2.6%	97.2%	9	0.2%
Eyes	470	1.1%	98.9%	0	0
Hips	5078	6.2%	92.9%	0	0.9%
Patella	20	0	100%	0	0
PRA	8	0	100%	0	0
Thyroid	1069	1.5%	87.8%	0	10.7%

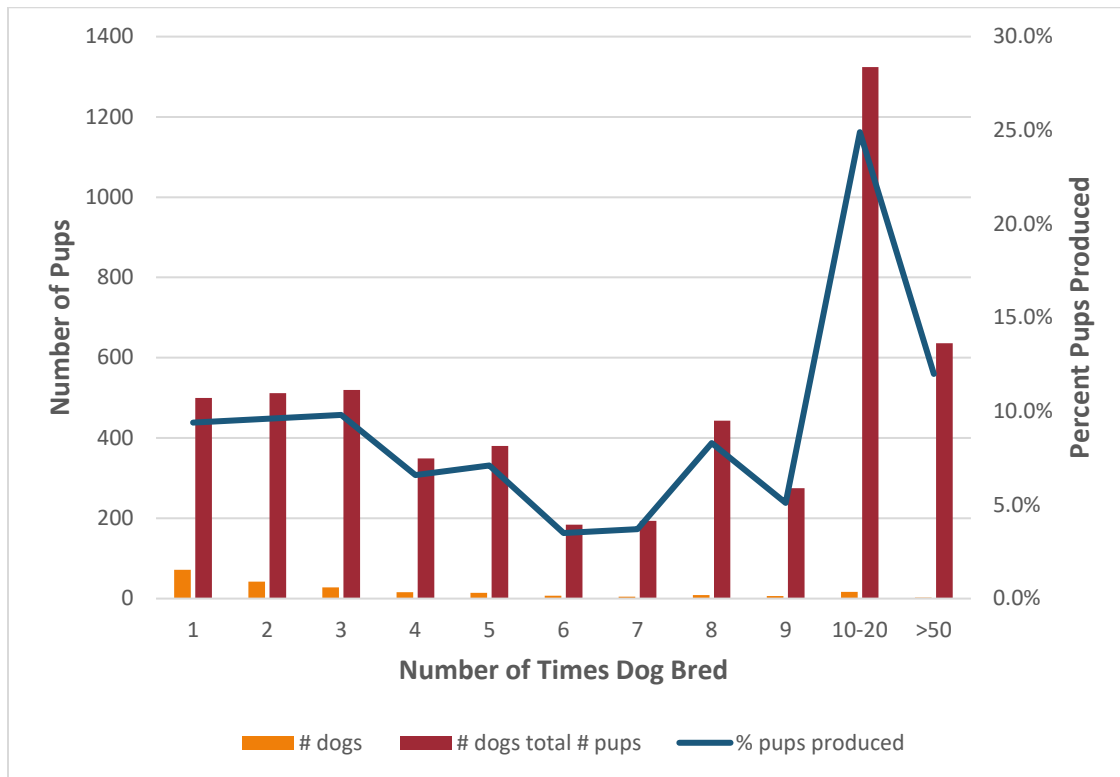
Reproductive Outcome

Dogs (# bred – 254)

- Semen check was done on 92 dogs (39%). Breeding soundness testing is essential for the best possible outcome in terms of conception.
- Seven dogs produced no litters. Data in the table and graph are for the 218 sires with complete information about litters and total pups produced.

# times bred	# dogs bred	# litters produced	total # pups	% pups produced
1	72	78	500	9.4%
2	42	77	512	9.6%
3	28	82	520	9.8%
4	16	58	349	6.6%
5	14	60	380	7.1%
6	7	30	184	3.5%
7	5	30	194	3.7%
8	9	64	443	8.3%
9	6	45	275	5.1%
10 - 20	17	215	1324	24.9%
>50	2	105	636	12.0%
TOTAL	218	844	5317	

- 15.6% (number = 34) of sires bred 8 or more times produced 50.3% of pups



- Later Health Problems in Dogs' Progeny

Problem	# dogs producing problem	# pups with problem
Cryptorchid	30	63
Addison's	14	25
SLO	16	22
Hypothyroid	9	10
SLE	2	2

Bitches

The number of bitches bred one or more times was 447 and the total number of breedings was 539.

# times bred	# bitches bred	# litters produced	pups born		
			# born	# live born	# live @ 6 wk
1	171	173	1147	998	901
2	144	279	1772	1553	1372
3	87	241	1478	1178	1146
4	30	112	662	554	514
5	11	55	380	332	325
6	4	18	76	59	54
Total	447	87	5515	4674	4312

Average litter size was 6.3 pups.

Mortality at birth was 15.2%; there was an additional 7.7% mortality by 6 weeks of age.

Delivery was by C-section for 111 litters (12.6%).

Breeding Method

Method	# Bitches
Natural	638
A/I fresh	93
Natural and A/I fresh	31
A/I frozen	26
A/I chilled	25
A/I operative	26

Bitches' Progeny and Early Identifiable Issues

Issue	# Pups
Cryptorchid	138
Mismatch	163
Umbilical hernia	132
Bad bite	27
Poor pigment	20
Cleft palate	3

Later Health Problems in Bitches' Progeny

Problem	# Bitches
Addison's	25
Symmetrical lupoid onychodystrophy	29
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. Omitting that responsibility is to the detriment of future breeding programs and the breed's long term health prospects.

Mortality

General

There were 1332 deceased dogs or 40.2% of all registry dogs; birth and death dates were available on 1188 to calculate age at death and analyze death cause by age.

Death Numbers

The average of death dogs was 12.2 years and the range was 1 mo – 17.4 yr

Age Group (yr)	#	% deaths (# 1188)*	% all dogs (# 3309)	Av COI
< 3	29	2.4	0.9	23.3
3-6	79	6.6	2.4	22.5
7-8	74	6.2	2.2	22.7
9-11	227	19.1	6.9	23.8
12-13	322	27.1	9.7	23.8
>13	455	38.3	13.8	24.0

*Dogs for whom age of death could be calculated.

Necropsies

These were conducted in 61 deaths (4.6%). 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 – 159
- Euthanasia – 973
- Accidental – 34
- Undocumented – the others

Major Causes of Death by Age Group

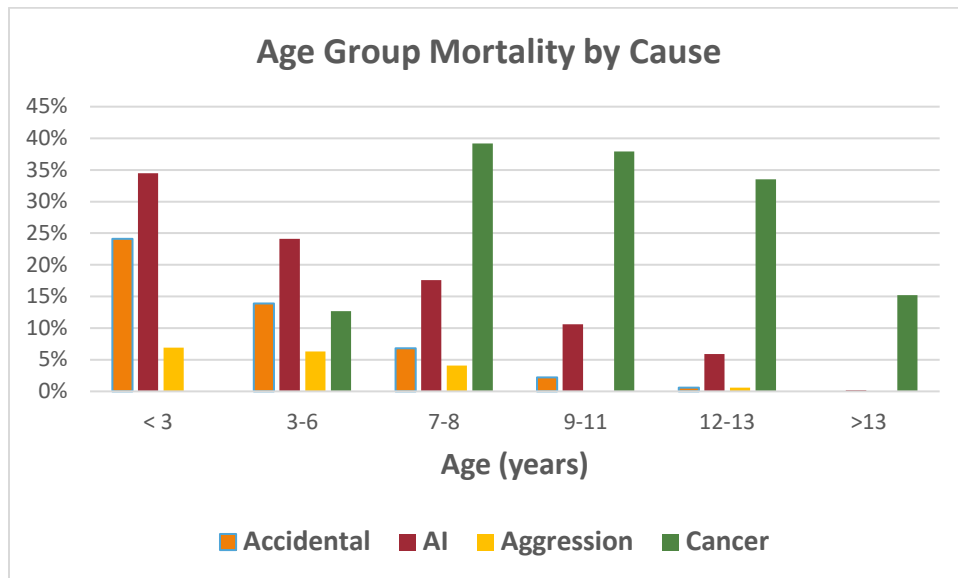
Disease or Problem	< 3 yr n = 29	3-6 yr n = 79	7-8 yr n=74	9-11 yr n=227	12-13 yr n=322	>13 yr n=455
Accidental	24.1%	13.9%	6.8%	2.2%	0.6%	-
Autoimmune	34.5%	24.1%	17.6%	10.6%	5.9%	0.2%
Aggression	6.9%	6.3%	4.1%	-	0.6%	-
Cancer	-	12.7%	39.2%	37.9%	33.5%	15.2%
Kidney, unk cause	3.5%	10.1%	4.1%	7.1%	4.0%	3.1%
Stroke	-	-	-	1.3%	5.0%	4.6%
Old Age	-	-	-	4.0%	16.5%	53.2%

Other Causes:

- < 3 yr (n=7): 1 each – epilepsy, intussusception, myocarditis & cardiac arrest, meningitis, bleed into myocardium, pyometra, post op
- 3-6 yr (n=22): unknown 6; neurological (other) 3; 1 each – atopy, hepatitis, chronic pancreatitis, acute pancreatitis after whelp, infection (kennel cough/pulmonary), liver failure, aspiration

pneumonia, canine Crohn's disease (or IBD), chronic interstitial nephritis, respiratory failure, difficulty with SARDS, suspect warfarin poisoning, vestibular disease

- 7-8 yr (n=22): unknown 5; 2 sudden breathing problems followed by death, 1 each pyometra, idiopathic interstitial pneumonia, extreme pain with inability to walk, pet food poisoning, sudden complete paralysis of back legs, hepatocutaneous syndrome, aneurysm rupture, anaplasmosis, heart failure, amyloidosis, neurological other
- 9-11 yr (n=68): 10 unknown; 6 Cushing's (1 iatrogenic from steroid use for AIHA); 4 arthritis; 3 each chronic pancreatitis, congestive heart failure; 2 each, epilepsy, leptospirosis, hip dysplasia, neurological other, disc degeneration; 1 each cognitive dysfunction, amyloidosis, degenerative disc disease, exocrine pancreatic insufficiency, fear loud sharp sounds, patent ductus arteriosus, Lyme disease with kidney failure. Miscellaneous others (many just a symptom without diagnosis)
- 12-13 yr (n=100): 16 unknown; 10 cardiac (6 heart failure); 6 rear leg weakness and unable to walk; 8 arthritis; 6 neuro, other; 5 Cushing's disease; 2 each - chronic pancreatitis, hip dysplasia, urinary infection, megaesophagus; 1 pyometra, spondylosis, bloat; 3 each vestibular disease, cognitive dysfunction/senility, laryngeal paralysis. Miscellaneous others.
- > 13 yr (n=102): 11 unknown; 12 arthritis; 8 vestibular disease; 8 seizures; 8 cardiac (5 congestive heart failure); 6 unable to stand, degenerative disc disease/or severe pain; 3 Cushing's disease; 5 cognitive dysfunction; 3 each - neurological other, internal bleeding; 2 each - acute pancreatitis, laryngeal paralysis. Miscellaneous others.



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.

The COI is calculated on 10 generations 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 which is accessible on BeaCon's website.

The inbreeding coefficients are arranged by decreasing value. 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	1411	19.8
1980's	1453	23.7
1990's	1203	24.0
2000's	684	22.3
2010's	228	17.3
Open Health Registry		
Year 20		
All dogs	3241	22.0
UK	878	23.1
USA	1126	22.6
Belgium	26	22.3
Canada	160	21.5
Czech Republic	72	21.2
Finland	53	21.2
France	109	21.1
Netherlands	339	20.6
Australia	143	19.9
Germany	129	19.9

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](#). Dr. Bell will be presenting an updated detailed analysis at the fall 2021 BCCA specialty.

Conclusions

The predominant health issues continue to be autoimmune diseases (SLO and Addison's 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 is as for 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 20 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 use the following resources - the OFA database for USA dogs, the BCX database for UK dogs, and a dog's owner.

BeaCon invites participation by all dogs from all lines whether they have health problems or not. 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, some breeders have entered their puppies for owners and some of those data are not public.