

Introduction
December, 2004
BeaCon Open Health Registry, Year 4

Basic Explanations

What is an Open Registry? Open means that the information is available to the public. In other words, the information is not held confidentially and anyone who wishes access may do so by purchasing the registry book.

What Dogs/Owners Fit in the Registry?

ALL BEARDED COLLIES! Deceased or living. Healthy or with a health problem.

Why are All Dogs Important?

- All dogs are essential to get a complete picture of the extent of wellness or health problems.
- To allow calculation of disease incidence. There need to be enough dogs to calculate meaningful disease frequencies – e.g., if there are 44 dogs with Addison's in 678 dogs, the frequency of Addison's is 6.49% (44/678). If the total number of dogs is 1678 dogs, the frequency would be 2.62% (44/1678).
- To provide whole family information which breeders can use for relative-risk pedigree analysis in diseases that are autosomal recessive.
- To have data if needed by researchers.

When To Update? Every year! Even if the dog has had no changes from previous reporting!

Participation. The table below shows the cumulative participation over 4 years.

Year	# Owners	# Dogs
1	169	303
2	205	410
3	278	593
4	315	678

Who Submits Information? There have been no changes this year. Owners are the only ones who can submit health information with two exceptions. The first is that a co-owner may submit information if the primary owner (defined as the person with whom the dog lives) submits a signed consent in the first year the dog goes into the registry.

The second exception is that breeders can report if a sire or dam has produced a disease in offspring. This policy was started last year because breeders are not always able to persuade their puppy buyers to participate in the open registry. It is vital to know about certain health conditions in offspring. Specific diseases of interest are Addison's, symmetrical lupoid onychodystrophy, systemic lupus erythematosus, and hypothyroidism. Any disease can be noted in the "other" category; e.g., autoimmune hemolytic anemia or thrombocytopenia, or polyarthritis. Dams producing a disease may have the number of cases and the

litter (s) indicated. Sires producing a disease may have the number of cases indicated. The name of a dog with the specific disease cannot be listed.

How information is submitted. This is done either by hard copy form or on-line. The latter was started in year 3 and has gone relatively smoothly this year.

Documentation. No changes have been made from previous years. Copies of health screening test results are requested. This is especially important for dogs from countries other than the USA. We attempt to validate the information for USA dogs through the on-line registry databases (OFA or CERF). When that is not possible, it is so noted in the dog's report.

Health screening tests that have not been submitted to the appropriate registry will be included in BeaCon's registry if a copy of the documentation form is sent to BeaCon; e.g., a copy of the CERF ophthalmologists' exam. If nothing is sent, that is considered "no documentation"; those words will appear in the registry record. If lab results without interpretation are submitted, this is noted in the record.

Updating Information. Reminders are sent each spring to owners of all living dogs in the registry as of the most recent data entry. This year, 48 reported no change and 71 indicated a change. The update section has a line at the very bottom of the dog report page indicating what is updated. Pedigrees do not accompany updating dogs, since that was given in previous registry books.

Definition of Years.

- Year 1. July 2000 – Aug 2001
- Year 2. Sept 2001 – Nov 2002
- Year 3. Dec 2002 – Nov 2003
- Year 4. Dec 2004 – Nov 2004

Reports. Information is presented in sections as noted in the table of contents. Conformation and performance titles of dogs are not reported since the focus is on health matters

- Update section.
 - A list of all dogs and the year they first joined the registry update years. The year of death is indicated.
 - A list of dogs with no change since data were last entered.
 - Health pages for all dogs who have updated information this year.
- New dogs. This section has a health page and a five generation pedigree for each new dog.
- Female reproduction. Each dam has a page with this information:
 - registered name of dam
 - number of litters
 - unusual breeding issues
 - sire of each litter
 - breeding method

- number of pups and problems identified prior to placement for each litter, description of mismarks or cause for puppy death
- diseases produced in offspring
- Male reproduction. This section contains the following:
 - registered name
 - number of bitches bred and litters produced; mates are not identified
 - total number and sex of pups
 - diseases produced in offspring
- Dogs by disease. This lists the more serious health problems. It includes the dog's registered and call name, age of diagnosis, and who has documented the disease condition (owner or vet)
- Coefficient of inbreeding (8 generation) for each dog if pedigree is sufficiently complete.
- Miscellaneous information
- Owner contact information

Important! You might wonder If a sire or dam are reported to have produced offspring with a disease, if you can assume that offspring in the open health registry are the ones listed by a breeder or sire owner. No you can't. For dam offspring, you must locate the name of the litter's sire and then search the open registry for dogs with the sire and dam in question. For sire offspring, you must contact the sire's owner for additional information.

Pedigrees and Coefficient of Inbreeding (COI). Every effort is made to be accurate. Data for pedigrees come from many sources including pedigrees submitted by owners, the Kennel Club Breed System Bearded Collie database updates, and various online databases. With the advent of the on-line registry system, many fewer pedigrees were submitted; thus the dependence on other sources. Pedigrees are assembled and printed using the Kennel Club Breed System software. Readers should notify E. Sell (beaconbb@bellsouth.net), if an error is found.

The COI's are calculated using the Kennel Club Breed System software. A COI is the mathematical definition that elucidates closeness of relationship in a pedigree. It is usually expressed as a percentage and it was developed by Wright, S (Coefficients of inbreeding and relationship. Am Nat. 56:330-8, 1922). Basic principles are that inbreeding only exists if the ancestor appears on both sires' and dam's side of the pedigree. If inbreeding is calculated to a certain dog then that to his sire and dam is ignored unless they also appear through other lines. Lines already counted once must not be counted twice.

This sounds complex. It is if you want to hand calculate COI's for more than a few generations. Willis' books (references) and various online sources describe how to do this. It isn't complex if one uses a pedigree software program with the built in calculation.

Use of Data and Caveats. Readers of this book are responsible for interpretation and use of the information.

The purpose of this registry is to give objective data on disease and wellness, not to draw conclusions about any particular line, sire, or dam.

The occasional case of a disease does not mean that it is inherited. We caution the reader that a sire or dam is not necessarily a carrier of an undesirable genetic trait simply because that health problem is reported in a single progeny. Furthermore, some genetic diseases may be influenced by environmental factors, not yet defined.

Geneticists (see references) believe the following circumstances are indicative of heritability:

- Relatively frequent occurrence of the disease
- When mating a sire and dam several times results in the same health problem in more than one litter.
- When a dog or bitch mated with different mates results in the same health problem in several litters.

If several dogs from the same kennel are reported with the same problem, you cannot assume that the problem occurs with high frequency. You have to know the status of the other dogs from that kennel before making any assessment regarding prevalence.

Many hereditary problems, other than those transmitted by an autosomal dominant mode of inheritance, involve healthy parents, one or both of whom are carriers of the genes responsible.

Information that a particular dog or bitch has produced a problem is vital to any breeder. This is especially critical for novice breeders just establishing their programs because they are least likely to have a good network for finding and verifying such information.

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

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

Notice of Copyright. BeaCon's Open Health Registry Book is copyrighted with the USA Library of Congress Copyright Office. Therefore it is illegal to copy this book without written consent from BeaCon. Any such infringement will be prosecuted to the full extent of the law.

Future Availability of Registry Data. BeaCon conducted an anonymous mini-survey this year on use of the registry and on participation in the registry. When those results have been studied, changes may be made in accessibility and form of the registry information.

Corrections/Additions. The female reproductive section published in the year 3 book is missing some dams. This is due to changes in some field names with the advent of the on-line data entry system in year 3. That particular field name did not get changed in the report and thus, missing cases. Anyone who purchased the year 3 book and is not

purchasing the year 4 book can have a free copy of the current (year 4) female reproductive section to insert into their 3 ring binder.

Please contact Elsa (beaconbb@bellsouth.net) or send a letter to: Elsa Sell, 764 Liberty Rd, Milner, GA 330257.

INFORMATION SOURCES

Websites (checked 11/04)

OFA www.offa.org
CERF www.vmdb.org/cerf.html
AKC CHF www.akcCHF.org
Canine Inherited Disorders Database www.upei.ca/~cidd/intro.htm
Animal Genetics (Sue Ann Bowling) <http://bowlingsite.mcf.com/Genetics/Genetics.html>
Bernier Garded On-Line Searchable OHR www.bernergarde.org/dbaccess/default.aspx

Behavioral Genetics and Animal Science

Temple Grandin, Mark J. Deesing www.grandin.com/references/genetics.html
Dr. John B. Armstrong <http://workingdogs.com/doc0134.htm> (the Nature of Genetic Disease)
John Pollack, PhD <http://workingdogs.com/doc0189.htm> (Heritability)
On-line canine genetics course <http://www.ansci.cornell.edu/cat/cg01/dogcourses.html>
Relative-risk pedigree analysis <http://www.purinaproclub.com> click on Purina research link, then Using Relative-Risk Pedigree Analysis

Books, etc.

Battaglia, C.L. Breeding Better Dogs, 1995, 5th edition, BEI Publishing, Atlanta
Cook, L.M. Genetic and Ecological Diversity. 1991.
The Kennel Club Breed System by PEDS, version 4 (www.peds.co.uk/kcbs.htm)
Little, CC. Inheritance of Coat Color in Dogs. 1988 (9th printing), Howell Book House.
Mrode, R.A. Linear Models for the Prediction of Animal Breeding Values. 1996.
Padgett, G.A. Control of Canine Genetic Diseases. 1998, Howell Book House, New York
Scott, J.P. and Fuller, J.L. Genetics and the Social Behavior of Dogs. 1965, University of Chicago Press
Walkowicz, C. and Bonnie Wilcox, DVM Successful Dog Breeding: The Complete Book of Canine Midwifery. 1994, Howell Book House, New York
Willis, M.B. Practical Genetics for Dog Breeders. 1992, Howell Book House, New York

Respectfully Submitted, Board of Directors of The Bearded Collie Foundation for Health (BeaCon)

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Report

Contents.

- Demographic data
- Health problems
- Autoimmune health problems
- Health screening tests
- Mortality
- Coefficient of inbreeding

Demographic Data for Complete Open Health Registry. (Note: Owners are requested to update their and their dog's information yearly. Not all do. Also, not all owners fill in all the information requested, so some data are missing).

Item	#	
Owners	315	
Australia	8	
Belgium	1	
Brazil	1	
Canada	23	
England	35	
France	1	
Germany	9	
New Zealand	3	
Northern Ireland	1	
Portugal	1	
Scotland	1	
Sweden	1	
USA	228	
Wales	2	
Dogs	678	
Dog sex (1 not given)		
male	289	42.6% of all dogs
intact	129	44.6% of males
neutered	154	53.3% of males
unknown reproductive status	6	
female	389	57.4% of all dogs
intact	173	44.5% of females
spayed	212	54.5% of females
unknown reproductive status	4	
Dogs with no health problem	245	36% of all dogs

Health Screening Tests.

Screening Test	Number (% of all dogs)
Hips only	91 (13.4%)
Hips combined with other tests	286 (42.2%)
Thyroid only	44 (6.5%)
Thyroid combined with other tests	160 (23.6%)
Eyes only	18 (2.7%)
Eyes combined with other tests	167 (24.6%)
Hips, eyes, and thyroid	157 (23.2%)

Elbows combined with other tests	46 (6.8%)
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Penn Hip was done on just 4 dogs. Preliminary OFA hip xrays were done on 15 dogs.

Health Problems (no frequencies are calculated because of the very small number of total dogs in the registry)

Health Problem	#
Fear, loud sharp noises	123
Autoimmune diseases (see table below)	97
Hypothyroidism*	55
Umbilical hernia	47
Cancer (all types)**	48
Hyperactivity	46
Hot spots	45
Fear, other	40
Hip dysplasia	32
Allergy, flea bite	20
Depigmentation***	20
Atopy	20
Dietary allergy/food intolerance	20
Nail problems other than lupoid onychodystrophy	15
Inflammatory bowel disease	15
Vaccination reaction	12
Demodectic mange	3
Exocrine pancreatic insufficiency	2
Diabetes mellitus	1

* It is not yet clear what proportion of hypothyroidism cases are caused by autoimmunity. Some breeds are reported to have a higher frequency of autoimmune thyroiditis; e.g., OFA Thyroid panel data - English Setter 22.1%, German Wirehaired Pointer 21.3%, Boxer 14.6%, Rhodesian Ridgeback 10.4%.

“The disease has variable onset, but tends to clinically manifest itself at 2 to 5 years of age. Dogs may be clinically normal for years, only to become hypothyroid at a later date. The marker for autoimmune thyroiditis, thyroglobulin autoantibody formation (and other autoantibodies), usually occurs prior to the occurrence of clinical signs. Therefore, periodic retesting is recommended.

The majority of dogs that develop autoantibodies have them by 3 to 4 years of age. Development of autoantibodies to any time in the dog’s life is an indication that the dog, most likely, has the genetic form of the disease. Using today's technology only a small fraction of false positive tests occur.

As a result of the variable onset of the presence of autoantibodies, periodic testing will be necessary. Dogs that are negative at 1 year of age may become positive at 6 years of age. Dogs should be tested every year or two in order to be certain they have not developed the condition. Since the majority of affected dogs will have autoantibodies by 4 years of age, annual testing for the first 4 years is recommended. After that, testing every other year should suffice. Unfortunately, a negative at any one time will not guarantee that the dog will not develop thyroiditis.” (The material in quotes was taken directly from the OFA web site on hypothyroidism).

Data for Bearded Collies with OFA thyroid panels through December 2003 showed that 2.8% of 109 tested had autoimmune thyroiditis, 76.1% were normal and 19.3% had equivocal tests (in which case

retesting ~ 6 months later is recommended). Data for Bearded Collies with the thyroid panel done by Michigan State University (the panel differs slightly in tests done from the OFA panel) showed that of 678 tested, 5.0% had autoimmune thyroiditis and 5.9% had equivocal tests. This information can be viewed at: www.offa.org/thystatbreed.html

** Cancer diagnosis was nasal in 9, liver in 7, mammary 4, testicular and bone 2 each, stomach, abdominal, kidney, bladder, and spleen 1 each, “other” 19. Age at diagnosis was given in 42 cases; only five were under the age of eight when diagnosed.

*** Note: some cases of depigmentation can be autoimmune in nature (e.g., vitiligo, or associated with lupus or pemphigus). Since some cases of depigmentation can be non-autoimmune, it was not placed into the table with autoimmune diseases.

Autoimmune Problems (# diseases = 97; # dogs having diseases = 64, or 9.4% of all dogs)

Disease	#
Addison’s disease (hypoadrenocorticism)	44
Lupoid onychodystrophy	13
Systemic lupus erythematosus	11
Autoimmune hemolytic anemia	10
Rheumatoid arthritis	7
Pemphigus	4
Idiopathic thrombocytopenia	3
Keratoconjunctivitis	1
Discoid lupus erythematosus	1
Myositis	1

dogs with more than one disease:

11 dogs had 2 A/I diseases

3 dogs had 3 A/I diseases

6/44 Addisonian dogs are hypothyroid

19/44 Addisonian’s had a thyroid panel.

11/19 were normal

3/19 were hypothyroid

The additional 3 Addisonians who recorded hypothyroidism as a diagnosis apparently used other than a thyroid panel for the diagnosis – it is not possible to know.

Mortality. There were 134 deaths (19.8% of all dogs) with av age at death of 10.9 yr (SD 4.1, minimum 0.9, maximum 17.1).

Age Group (yr)	Health Problem	# Dogs
0 through 4 (n=15)	Accidental	4
	Family aggression	2
	Acute fulminating pancreatitis, chronic interstitial nephritis, idiopathic thrombocytopenia (low platelets), inflammatory bowel disease, liver failure, lupoid onychodystrophy	1 each
	Unknown	3
5 through 8 (n=17)	Aggression (1 secondary to lupoid onychodystrophy), cancer of small intestine	2 each
	Accidental, hind leg paralysis (cause not known), intrabdominal mass near kidney invading vena	1 each

	cava and entire root of mesentery (source of mass unknown), respiratory failure (cause unknown), systemic lupus erythematosus, great difficulty managing with visual problem	
	Unknown (1 with heart murmur – otherwise normal physical)	7
9 through 12 (n=44)	Addison's	2
	Cancer *	17
	Cognitive dysfunction (1 also had exocrine pancreatic insufficiency), (1 also had autoimmune disease, idiopathic thrombocytopenia)	3
	Heart failure	4
	Accident, autoimmune hemolytic anemia, cardiac arrest during seizure, megacolon and complications of hernia, severe shoulder pain (cause searched for but not identified), Cushing's and embolism (also had autoimmune hemolytic anemia and hypothyroidism), idiopathic epilepsy, incontinence, chronic pancreatitis, MRSA breakdown of neck wounds, necrotizing granulitis, ruptured aneurysm or intestine, rear leg paralysis from lower back nerve deterioration	1 each
	Unknown cause	7
Age 13 and older (n=47)	Old age	18
	Unknown	8
	Cancer**	6
	Stroke	5
	Heart failure (1 also had Cushing's)	3
	Arthritis	2
	Addison's, abdominal mass, fits, heart attack suspected, multiple causes	1 each

- * Cancer types for 9-12 age group: brain 1, bladder 1, fibrosarcoma (facial) 1, lung 3 (1 with Marie's disease), liver and spleen 1, metastatic (origin unknown) 1, throat 1, nasal 4 (1 was suspect only, not confirmed), liver 1, not specified 3.
- * Cancer types for 13 and older group: liver and pancreatic 2 each, insulinoma and bile duct 1 each

Coefficients of Inbreeding (COI)

674 dogs had COIs calculated. As noted in the introduction, the pedigree software from Kennel Club Breed System was used for these calculations.

Average	13.63%
Standard Deviation	6.63%
Minimum	1.07%
Maximum	37.6%