Summary of IWG Questionnaire Responses, 2023

Clubs Reporting

Club	Country	Contact	Members
BMDCV	Australia	Felicity Broome	40
BMDCNSW	Australia	Lyn Brand	30
VSSÖ	Austria	Karoline Gsell, Gerhard Kunz	214 (BMD members)
BMDCC	Canada	John Simons	268
KSSP	Czech Republic	Martina Kopecká	951
DBSK	Denmark	Inge Bibby	500
NBMDC	England	Helen Davenport-Willis	100, or a few more
BMDCGB	England	Steve Green	1023
SSFS	Finland	Heli Herranen	1091
AFBS	France	Grégory Leblanc	675
DCBS	Germany	Christian Schmid	553
MBE	Hungary	Dr. Kira Martin	60
BMDCI	Ireland	Valerie Hughes	202
CIABS	Italy	Isabella Tosti	134/107/175/200
ŠZMK	Lithuania	Jovita Piskunovienė	50
VBSH	Netherlands	Wendy van Dijk	801
NBSK	Norway	Bjørg Andreassen	953
KSPP	Poland	Teresa Deik	
ACCCE	Romania	Gabriela Manu	16
SKSSP	Slovakia	Terézia Gargušová	156
SShK	Sweden	Toril Melangen	1045
KBS	Switzerland	Martha Cehrs	895
BMDCA	United States	Julie Jackson	1263

Registration Numbers

Club	Year	Litters	Puppies	Dogs	Kennels	Notes
BMDCV, Australia	2022		171			Victoria
BMDCNSW, Australia	2022		55			New South Wales
	2022		85			Queensland
	2022		50			South Australia
	2022		36			Western Australia
VSSÖ, Austria	2019	31	126			♂: 56, ♀: 79
	2020	22	117			♂: 65, ♀: 52
	2021	29	110			♂: 53, ♀: 57
	2022	27	123			♂: 54, ♀: 69
BMDCC, Canada	2020	214	1328			
	2021	213	1336			
	2022	178	984			
KSSP, Czech republic	2020	90	582			
	2021	114	699			
	2022	84	574			
DBSK, Denmark			325			
NBMDC, England	2021		591			
	2022		569			
BMDCGB, England	2019	88	466			& 52 imports
	2020	88	517			& 40 imports
	2021	88	528			& 63 imports
	2022	93	470			& 88 imports
SSFS, Finland	2019	61	316			
	2020	55	279			
	2021	54	275			
	2022	38	192			
AFBS, France	2022		2866			Down 15%
DCBS, Germany	2019		197			
	2020		222			

	2021		240			
	2022		272			
MBE, Hungary	2019	28	176		17	
	2020	32	216		20	
	2021	41	254		25	
	2022	30	148		20	
	2023	30	142		20	So far!
BMDCI, Ireland	2018		448			All of these are Jan
	2019		418			through the following
	2020		345			June, 18 months
	2021		868			
	2022		839			
CIABS, Italy	2019		1736			
	2020		1826			
	2021		2004			
	2022		1589			
ŠZMK, Lithuania	2019	14	68			
	2020	10	58			
	2021	7	39			
	2022	12	76			
VBSH, Netherlands	2022		1160			With pedigree
	2022	20	113			Club members
NBSK, Norway	2019		157			
	2020		277			
	2021		185			
	2022		207			
KSPP, Poland	2019	198	1522			
	2020	204	1519			
	2021	181	1384			
	2022	168	1621			
ACCCE, Romania	2019		50			
	2020		116			
	2021		95			
	2022		80			

SKSSP, Slovakia	2019	10	63			
	2020	10	57			
	2021	18	108			
	2022	12	61			
SShK, Sweden	2022	64	318			
SShK, reported by members	2022	58	244			98 matings, 40 litters resorbed, 29 C-sections, 63 stillborn, 244 living
KBS, Switzerland	2022	43	202			252 born
BMDCA, USA	2019	2030	5511			
	2020	2324	6740			
	2021	2917	8755			
	2022	3283				

Information on Health Projects/Health Initiatives during the years 2019- till now

BMDCV (BMD Club of Victoria, Australia)

- Held a seminar by Dr Nicole Rouse on canine first aid
- Held a grooming presentation by Emily Durrant

BMDCNSW (BMD Club of New South Wales, Australia)

- Hold a Championship Specialty Show annually
- General analysis of breeders in New South Wales shows over 55% of deaths under the age of 10 are due to cancer, the main one being HS
- The general consensus is that ED is less prevalent, so the main points mentioned are:
    - Cancer
    - Forelimb structural deformity in some puppies ○ Crutiate ligament rupture ○ Bloat ○ Early age of death ○ Early infertility in males ○ Low litter size

VSSÖ (Verein für Schweizer Sennenhunde in Österreich, Austria) all 4 Swiss breeds

- See section on breeding requirements below
- Kidney failure/ renal insufficiency questionnaire; 177 mailed, 15 responses with reports of 4 cases of renal failure. Still trying to collect more information.

BMDCC (Bernese Mountain Dog Club of Canada)

- Raise awareness of histio risk and the HSIMS tool
- Membership outreach, comprehensive questionnaire to all members on how to best include them, engage them, and get volunteers. Happy to share details if desired. KSSP (Klub švýcarských salašnických psů, Czech Republic)
- 99,5% of breeders are members of the club
- 153 (or 17%) of males are used for breeding
- 235 females are used for breeding (until the age of 8 years)
- HS testing - 94 Czech dogs have been tested, 27% A, 44% B, 30% C, same as world averages.
- AOD and cause of survival is being monitored, a specialized IT system will be used to manage breeding and membership.
- **Fertility problems** ○ A questionnaire requested information about number of bitches that failed to become pregnant, the cause if known, if puppies were absorbed, if progesterone levels were used for mating timing, what lab tests of medical exams were done to bitches and dogs prior to matings
    - Numbers of non-pregnant bitches: 2020 – 22%, 2021 – 19%, 2022 – 19% ○ Mid year 2023, 28% of females were covered on the basis of progesterone levels, and 41% of females were tested/examined for things such as streptococcus, mycoplasma, ureaplasma or also herpes virus
    - Root causes of failed pregnancies (when level of progesterone is used):
        - High number of bitches with irregular heats
        - Increasing number of males losing libido
        - Infections (detected after the matings) ○ One CZ reproductive expert says that exams of females for mycoplasma and ureaplasma do not affect the possibility of pregnancy, another states that re-treating a bitch leads to successful pregnancies. We also see false positive mycoplasma PCR tests for a long time after treatment, so we recommend a laboratory culture test in CZ.
    - Testing a small sample of sperm quality from 17 matings, 10/17 resulted in pregnancies. Of the other 7 matings, 6 were confirmed positive for mycoplasma, ureaplasma or streptococcus. After retreatment and repeated mating, 5 bitches

became pregnant. ○ The effect on reproductive abilities was also detected on males (sperm quality decreased sharply in positive dogs), after retreatment it recovered after about 3 months.

DBSK (Dansk Berner Sennen Klu, Denmark)

- No new projects

NBMDC (Northern Bernese Mountain Dog Club, north England)

- Encourage members to participate in health surveys done by BMDCGB

BMDCGB (Bernese Mountain Dog Club of Great Britain, England)

- GDV Study, a survey done by the University of Nottingham Veterinary School is underway and they are pleased by the response. They hope to observe and investigate differences between breeds which could obviously suggest genetic influences. Steve was able to get BMDs included.
- UK Hip and Elbow Scoring, The Kennel Club is investigating the validity of hip and elbow scores in the UK, and it should be assumed that they are limited in their validity currently.

SSFS (Suomen Sveitsinpaimenkoirat ry, Finland)

- Use questionnaires to collect data on birth and health
- Maintain lists of cause of death, and diseases
- Encourage breeders to use available genetic tests

AFBS (Association Francaise des Bouviers Suisses, France)

- The Breeding Commission is composed of committee members and breeders. It's under the responsibility of Agnès VANHEE. It reports on its work to the committee, which then decides on the choices to be made. This commission is the main contact with the CNRS and Antagene.
- AFBS encourages breeders to use the Antagene tests for SH and DM
- We also continue to take care about hip and elbow dysplasia

DCBS (Deutscher Club für Berner Sennenhunde, Germany)

Altersstrukturwert (age structure value)
Altersangaben (age of the dogs, death or alive) on pedigree
X-Ray OCD-shoulder, collecting Cancer-samples for research to Uni Gießen sending samples to Antagene
collecting data on our own database = dogbase

MBE (Magyar Bernipásztor Egyesület, or Hungarian BMD Association, Hungary)

- DM testing is not required, but breeders are well informed and are not depleting the gene pool by the use of this test. But most breeders are doing the test.
- HS test is not common practice – yet.

BMDCI (Bernese Mountain Dog Club of Ireland)

- The club held an IKC Accredited Breed Seminar in June, 2023, health topics discussed by Alan Aherne MVB, Senior Vet and partner at Southview Vet Hospital in Tipperary:
    - Hip and elbow scoring and what the x-rays indicate ○ Histiocytic sarcoma ○ Degenerative myelopathy
- The club has been doing outreach to be more inclusive of new breeders and owners
- There is a propensity to breed too many shy and nervous dogs

CIABS (Club Italiano Amatori Bovari Svizzeri, Italy)

- Promotion of the HS risk test (2017 – present)
- Promotion of the DM tests (2014 – present)
- Online questionnaire to collect data on health, behavior and nutrition of Swiss Cattle Dogs. Have 700 responses so far. Collaborating with Drs Palestrini and Cannas at Univ of Milan to process data relating to behavior

ŠZMK (Šveicarų Zenenhundų Mylėtojų Klubas, Lithuania)

In Lithuania there are no rules to register litters only through breed clubs, it is also possible to make registration through regional clubs. We do not know and do not have statistics on how many litters and puppies were born in Lithuania.

VBSH (Vereniging de Berner Sennenhond, Netherlands)

- Encouraging the use of Berner-Garde through a win action in the 2022 magazine
- Encouraging the use of the Antagene genetic tests (HS, DM, vWD), a € 100 refund to members

NBSK (Norsk Berner Sennenhund Klubb, Norway)

- HAK (the Health and Breeding Committee) has been given control of the health fund, and is using it in the following ways. (Breeders and stud owners are encouraged to pay NOK 25 per puppy to the Health Fund.) ○ Support for SH risk test for breeding animals
    - Support for submitting biopsies when SH or kidney disease is suspected ○ Support for necropsy when there is a suspicion of SH, other cancers, renal dysplasia, familial nephropathy, severe kidney disease
- SH risk test is recommended but not required for all breeding dogs. Clinics have been held at special shows, with cost of the blood draw and shipping covered by the health fund, and a subsidy of NOK 700 to assist with the cost of the test.
- Fictional Pedigrees is a project to avoid duplication of hereditary diseases and behaviors. HAK provides the information to the breeder with notes from the HAK about guidelines, health and expected average lifespan of the resulting puppies.
    - HD-Index was introduced in 2022 and is being assessed ○ 6 generation COI of < 2,5% is preferred, but up to 6,25% is accepted ○ Expected average lifespan of puppies must be at least 8 years
    - Male dogs over 8 years of age may be used even if they don't meet all of the breeding requirements
- Health Register – for many years the club has collected information about BS including age at death, cause of death, diseases, genetic problems, eye color and problem temperament. This information is available for all members of NBSK.
- Breedersaward – an award given to breeders who have a litter in which more than 50% of the offspring reach the age of 9 years. Breeder strive to achieve and encourages them to think about longevity.
- SGS (Still Going Strong) – A list is maintained of Norwegian Berners that reach the age of 8 years. They are removed from the list when they die, but moved to the 10+ list if they reach that age or more when they die.
- 10+ Project – A list to get a better overview of long lived lines. All dogs that live to 10 years or more are included in this list forever.
- Introduction/education of Berner-Garde – this tool is too little used by our breeders. We will be providing information at our upcoming breeder seminar this month.

KSPP (Klub Szwajcarskich Psów Pasterskich, Poland)

- The Club was established in 2021 in Poland, and is a Commission Club appointed by the Main Board of the Kennel Club in Poland. It is not a club associating members and authorities elected by the members of the Club. All owners of Swiss Mountain Dogs registered in Poland (four breeds) are club members. The Club's chairman was also appointed by the Main Board.
- There are also clubs that are not affiliated with FCI. They also issue pedigrees that are not accepted by our association. We have no information how as to many puppies were born in those associations, but watching the announcements, you can estimate that there are more of them than our registered puppies. Unfortunately, it is done without any control and required research, bypassing any rules of breeding.

ACCCE (Asociatia Clubul Cainilor de Cireada Elvetieni, Romania)

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- No projects to report

SKSSP (Slovenský klub švajčiarskych salašníckych psov, or Slovak Club for Swiss Mountain Dogs, Slovakia)

- No new projects

SShK (Sennenhundklubbeb SShK, Sweden)

- No new projects, but results to be presented at the meeting by Bodil Ström KBS (Schweizerischer Klub für Berner Sennenhunde, Switzerland)
- Dr. Blättler was running a study to define how and to what degree of accuracy HD and ED diagnostics can be made based on testing the movement of dogs. This is a multi-breed study and the KBS provided twenty dogs to participate in it. The study has ended and we are awaiting the final conclusions/results.
- Dr. Urs Geissbühler of the Veterinary University in Bern was mentoring a student for a Master's Degree by running a study on the impact of accuracy of cause of death diagnostics and discovery of general state of health by running post-mortem medical imagery (x-rays, MRI, CT, etc.) tests. This study has ended and is now in documentation/conclusion phase.
- Development of DM in BMDs, study done by Prov. T. Leeb, Veterinary University Bern. The population tested was a minimum of one puppy out of each litter born in 2014 and 2019. The breeding guidelines recommended as of 2015 on which the 2019 results are based are: to mate carriers and affected dogs only with free dogs. Final results:

Year	**2014**	**2019**
Clear (N/N)	29%	49%
Carrier (N/dm)	54%	48%
At Risk (dm/dm)	17%	4%

- Prevalence of c-sections in Swiss BMDs, 2001 – 2020, study by Dr. Magdalena Schrank at the Veterinary University Padua. See: https://actavetscand.biomedcentral.com/articles/10.1186/s13028-2022-00664-9

BMDCA (Bernese Mountain Dog Club of America, United States)

- Antagene HS genetic risk test – subsidized test offered at the National Specialty, 1,000 tests total
- BG is working to provide DNA samples to Dr. Hédan for confirmed cases of HS, lymphoma, mast cell, and for dogs 10 years or older without cancer
- BMDCA is reimbursing some of the cost of collection, pathology, and shipping of tumor samples (HS, lymphoma, mast cell) to Dr. Hédan
- BG is working to provide an ongoing list of dogs that have taken the Antagene HS genetic risk test and are deceased, providing cause of death if available
- BMDCA is funding research being done by Dr. Hédan to identify markers in blood plasma to help diagnose HS sooner
- BMDCA is funding research by Dr. Vilma Yuzbasiyan-Gurkan at Michigan State University through the Morris Animal Foundation for a clinical trial to treat HS
- BG is funding research by Dr. Vilma Yuzbasiyan-Gurkan for a liquid biopsy as an early detection tool for HS
- Carol Lynn Fox has been tracking 59 dogs being treated with prophylactic doxycycline to reduce risk of HS. Out of 34 that are now deceased, only 2 died of histio (6%, versus breed average 16%)
    - Dr. Coates at University of Missouri has announced a clinical trial funded by the AKC

Canine Health Foundation to use Riluzole (a drug used to slow ALS progression) as a possible treatment to slow DM progression

- BMDCA identified essential health testing, the dogs meeting that criteria are shown with a gold star in BG (https://www.bmdca.org/recommended-testing)

Histiocytic Sarcoma, ongoing project. Breeding regulation to test all breeding stock before first mating is still in effect. Breeding recommendation to not mate two partners with C is still in effect. Between 2012 and 2020 there were 4400 dogs tested:

Result	**%**	**avg AOD**
A	24,6%	8,3 years
B	44,3%	
C	31,1%	6,7 years

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Information on planned future Health Projects/Health Initiatives

BMDCV (Australia, Victoria) - No plans for future projects.

BMDCNSW (Australia, New South Wales) - No plans for future projects.

VSSÖ (Austria)

- Fertility is an issue, possible reason is limited genetic diversity; Study by Anna Letko and Benoît Hédan et al analyzed runs of homozygosity and found an average COI of 39.5%. (See link and abstract below)
- Matings that did not result in pregnancy ○ 2021 40/17 = 43% ○ 2022 40/15 = 38% BMDCC (Canada)
- New code of ethics approved, working to get all members to sign and become compliant

KSSP (Czech Republic)

- HS Testing: We would like to increase the numbers of dogs tested, which we could do by offering tests at the breeding test, and if Antagene would discount the cost, that would help

DBSK (Denmark)

- No plans at the moment

NBMDC (England)

- No current plans

BMDCGB (England)

- Nothing new at this moment.

SSFS (Finland)

- Beginning to keep a list of autoimmune diseases and add to it yearly
- In 2024 we are planning to develop and update lifespan index information
- In 2025 we are planning to update the Ideal Temperament Profile with new behavioral measurements.
- In 2025 we are planning to check and update the program to combat hereditary diseases and defects and its targets AFBS (France)
- AFBS has followed closely, and with great interest, the research carried out by Dr Catherine André and Dr Benoit Hedan of the canine genetics team from the Centre National de Recherche Scientifiques (CNRS) in Rennes. From the very beginning, our club has been involved in the research conducted by the CNRS. Many of our breeders worked alongside the research team, enabling the CNRS to collect data and samples. This is part of an important process allowing both, the research team, and the breeders to keep being aware of the histocytic sarcoma and prevent it.
- Even though this research has been of great importance for our breeders, it is still vital that it is pursued if this disease is to be completely eradicated from our breed. Detecting this pathology earlier is the key. Earlier detection of this pathology is a prerequisite for better treatment. We are grateful to the researchers who are continuing their efforts into the detection of tumors and blood markers involved in histiocytic sarcoma and lymphoma. We would like to emphasize the vital importance of rapid detection and diagnosis in eradicating these pathologies. We will continue to back this research and hope that all clubs concerned about the health and longevity of Bernese Mountain Dogs will join us in this endeavor.

DCBS (Germany)

- Artificial insemination, sperm bank

MBE (Hungary)

- Want to work on getting data about lifespan

Working to make the HS test more widespread

BMDCI (Ireland)

- Similar seminars are planned for the future for topics such as auto-immune disease and gastric torsion CIABS (Italy)
- DM study using the genetic tests to determine the prevalence of the mutations
- DM study to evaluate the accuracy of new diagnostic techniques besides clinical investigations and imaging methods for Dm. Study of SSEPs , MEPs, proteomic analysis of canine neuro specific enolase and S100B binding protein.
- Biometric measurements to determine the deviation from the standard and the impact on working ability and health. Develop a picture of the morphological status of the breed. A database will be developed. ŠZMK (Lithuania)
- No plans for future projects.

VBSH (Netherlands)

- Using a Body Score Index for Berners to educate owners on events for young dogs, club shows, etc. Working with Dr. Ronald Corbee
- Concerned about breed genetic diversity and the resulting fertility issues we're seeing. Would like to get Antagene to include a COI result in their testing package.

NBSK (Norway)

- Breeding assessment – the club will be arranging breeding tests in addition to our current clearance at dog shows. This is to best provide for genetic variation in the breed by getting as many dogs as possible approved for breeding.
- We will be introduction a "Breeding Regulation" to take steps to improve reproduction in the breed. There are too many empty bitches, dogs that cannot mate that requires insemination, birth problems, stillbirths, caesarean sections, etc.
- Breeding seminar – we will be doing this in September 2023, introducing Berner-Garde, and the new breeding regulations from the government. It will also include discussions and group work on certain topics. KSPP (Poland)
- We promote dogs that have additional tests, not only those required by the Kennel Club in Poland for all breeds. We promote dogs that have DM, SH tests as well.

ACCCE (Romania)

- No plans for future projects.

SKSSP (Slovakia)

- DM testing not required, but reputable breeders do it
- HS testing rare, but we're working to increase the testing

KBS (Switzerland)

- No firm plans, still no president of the Health Committee

BMDCA (United States)

- Looking for studies on gastrointestinal problems (irritable bowel, protein losing enteropathy, lymphagiectasia, etc)
- Looking at research into genetic markers for SAS. Dr. Yuzbasiyan-Gurkan is working with the Newfoundland Club of America, and we're in discussions to see what would be involved in having her work with Berners.
- Cleft palatates have 88 cases in BG. DNA from 3 litters has been provided to VetGen for research in collaboration with Dr. Leeb at University of Bern for gene sequencing. A marker was found for cleft palates in Nova Scotia Duck Tollers. See https://www.akcchf.org/educationalresources/library/articles/articles/cleft-palate-in-the-nova.html

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Information on major health concerns in your club/country

Cancer
- HS/SH – DCBS, VSSÖ, BMDCA, MBE, KBS, ŠZMK, KSSP, SSFS, AFBS, BMDCNSW, BMDCI
- Lymphoma – SSFS, BMDCI
- Osteosarcoma – BMDCI
- TCC (urinary tract) – SSFS
- Lung - SSFS

Reproductive issues – SShK
- Fertility - DCBS, VSSÖ, DBSK, BMDCA, SShK, NBMDC, ŠZMK, KSSP (mostly males), BMDCNSW (young males in particular)
- High rate of C-sections – DMSK, NBSK (59% of births in 2022)
- Pyometra – BMDCA
- Low litter size – BMDCNSW

Health Data
- Lack of system for data collection, and low use of diagnostic tests – CIABS
- Need more information on cause of death - CIABS

DNA testing
- Need more use of genetic tests – CIABS

Longevity
- VSSÖ, BMDCA, MBE, KBS, KSSP, SSFS (avg 7,93, med 8,27), AFBS, BMDCNSW, BMDCI

Genetic Diversity
- VSSÖ, VBSH

Veterinary care
- Shortage of vets – BMDCC

SMRA (Steroid responsive meningitis arteritis)
- Bigger problem than has been reported? – BMDCC

SAS (Sub aortic stenosis)
- BMDCA, BMDCC

GI Tract
- IBD/IBS, PLE – BMDCA, BMDCC
- Bloat – BMDCNSW, BMDCI

Skin/Allergy problems
- NBMDC

Temperament/Behavior
- NBMDC, SSFS

Puppy Mills
- NBMDC

Cross Breeding
- NBMDC

Torn ligaments
- KBS, BMDCNSW

Breeding Requirements

VSSÖ (Austria)

- Breeders must follow breeding rules to get Austrian FCI pedigrees
- All breeding dogs must pass a breeding approval test
- HD, ED, HS, DM (Exon 1 & 2). Breeding has to be approved by a breed warden, and longevity, health, structure, and temperament are all considered
- About 25 BMDs approved for breeding each year
- Must have HD-A or B, and ED-0 or 1; one parent must be ED-0
- Each litter requires hip and elbow x-rays from random puppy, results reports for statistical analysis
- X-ray results from 2022:
    - 56 HD results (47 A's, 4 B's, 4 C's, 1 E) ○ 56 ED results (49 0's, 6 1's, 1 3) ○ 16 OCD results (15 free, 1 OCD)
- COI must be under 3.6% in first 5 generations, the ancestral loss coefficient must not be under 80% in first 5 generations
- Popular sires: a dog may only sire 4 litters in a year, a bitch may only have 2 litters by the same sire
- HS – starting in 2019 all approved dogs must be tested for HS ant the HSIMS tool activated
- DM – both exon tests are required, and only matings that will not produce at-risk puppies are allowed
- Epilepsy – dogs with epilepsy or other inheritable diseases are not allowed to be bred
- Breed wardens have to be informed of any major diseases or operations of breeding dogs
- Longevity – club requests death notices of all BMDs in the club. All breeding dogs that die before the age of 8 must have cause of death notice from a vet provided to the breeding wardens.

SSFS (Finland)

- Required ○ HD A, B, or C, and a C must be bred to an A or B ○ ED 0, or 1, and a 1 must be bred to a 0 ○ Dog must be 18 months old for official HD/ED screening ○ A BMD can only produce a maximum of 60 puppies
- Recommended by Finnish KC ○ COI should be under 6,25% in 4-5 generation pedigree
- Recommended by SSFS
    - Use EBV for HD/ED (EBV established in 2003) and for longevity (est 2012) ○ Do not use if it is sick, timid, aggressive, surgically operated due to genetic defect (such as OCD, HD, ED, cruciate rupture, eye disease), or if it has bite defect, blue eyes, or has entropion or ectropion
    - Only dogs and bitches that are able to mate naturally should be bred. Bitches should be able to whelp naturally.
    - Breeders should research ages and causes of death at least four generations back in the breeding dogs.
    - If a bitch has had a litter before it is highly recommended to evaluate the litter before bitch is mated again. Also stud dog's previous offspring should be evaluated when making new breeding decisions
    - On a voluntary basis breeders and dog owners test their dogs for eye diseases, patellas, shoulders, heart and back and also various genetic tests (e.g. DM, vWD, HS pre-test and MyDogDNA Pass)
    - Breeding tests and character tests are voluntary

MBE (Hungary)

- Must pass the breeding test for exterior and temperament
- Must have a hip evaluation of A, B, or C ○ If they have an HD C, they must be bred with an A or B
- Must have an elbow evaluation of 0 or 1 ○ If they have an ED 1, they must be bred with a 0

ŠZMK (Lithuania)

- Must have a hip evaluation of A, B, or C
- Must have an elbow evaluation of 0, 1, or 2
- For elbows, male and female combined should not exceed 2
- DM and HS testing is not mandatory

NBSK (Norway)

- HAK is the Health and Breeding Committee, 6 experienced breeders and 1 small animal veterinarian. HAK manages breeding guidelines, available litters, list of breeders, and the list of stud dogs. They can assist with puppy placement, provide guidance, and collect and publish health information.

SKSSP (Slovakia)

- Must pass the breeding test for exterior and temperament
- Must have a hip evaluation of A, B, or C
- Must have an elbow evaluation of 0 or 1

BMDCA (United States)

- Anyone with a bitch and access to a male can be a breeder.
- The club recommends that the following requirements be met:
    - AKC DNA registration (which confirms parentage) ○ Evaluations for Hips and Elbows
    - Eye examinations (for PRA and cataracts specifically) ○ Heart examination (for SAS specifically) ○ DM genetic test for both SOD1-A (exon 2) and SOD1-B (exon 1) ○ At least one of the following:
        - vWD Type 1
        - Antagene's HS Genetic Risk Test
        - Thyroid testing, FT4, cTSH, TgAA

Paper from Dr. Hédan's lab shared by CIABS:
https://www.researchgate.net/publication/369057843_Genomic_Diversity_and_Runs_of_Homozygosity_in_Bernese_Mountain_Dogs Abstract:

Bernese mountain dogs are a large dog breed formed in the early 1900s in Switzerland. While originally farm dogs that were used for pulling carts, guarding, and driving cattle, today they are considered multipurpose companion and family dogs. The breed is predisposed to several complex diseases, such as histiocytic sarcoma, degenerative myelopathy, or hip dysplasia. Using whole-genome sequencing (WGS) data, we assessed the genomic architecture of 33 unrelated dogs from four countries: France, Sweden, Switzerland, and the United States. Analysis of runs of homozygosity (ROH) identified 12,643 ROH with an average length of 2.29 Mb and an average inbreeding coefficient of 0.395. Multidimensional scaling analysis of the genetic relatedness revealed limited clustering of European versus USA dogs, suggesting exchanges of breeding stock between continents. Furthermore, only two mtDNA haplotypes were detected in the 33 studied dogs, both of which are widespread throughout multiple dog breeds. WGSbased ROH analyses revealed several fixed or nearly fixed regions harboring discreet morphological traitassociated as well as disease-associated genetic variants. Several genes involved in the regulation of immune cells were found in the ROH shared by all dogs, which is notable in the context of the breed's strong predisposition to hematopoietic cancers. High levels of inbreeding and relatedness, strongly exaggerated in the last 30 years, have likely led to the high prevalence of specific genetic disorders in this breed.

Notes from SAS Breeder Symposium, 4/4/23 from the BMDCA
Presentation by Dr. Vilma Yuzbasiyan-Gurkan
By Julie Jackson

- Mode of inheritance could be dominant, but may be abnormal inheritance, like Huntington's Disease. May be caused by an instable repeat--this has greater chance of recombining repeats. When new sperm or ova is produced, is new opportunity for genetic instability.
- Dr. Vilma proposes a hypothesis using GWAS (genome wide association study). She emphasized:
- We must be looking for it!
- The GWAS provides long reach sequencing, and show repeats more accurately. Where before researchers only had short sections by genome.
- Huge advances in genetic research! Just last month the NIH has 2 complete genomes for BMD's!
- Use 'trio analysis' of affected offspring from unaffected parents
- Will be important to understand the phenotype for the range of symptoms. From mild symptoms to early death.
- We need to know how many versions of SAS are in the gene pool.
- Molecularly, there's new information on incomplete penetrance on dominant inheritance disease.
    - SAS is a complex disease.

What can we do now?

- Collect blood samples from affected dogs, their littermates and parents. - - For dogs lost to sudden death, do necropsy and collect blood or tissue sample
- Puppies from parents that are suspected carriers (no symptoms), should be echo tested at no sooner than 10 wks. old, by cardiologist

And the MOST important take away from this Symposium, we need to do OFA heart exams, by a cardiologist, and share the results. OFA reports that dogs with abnormal heart results are the most under reported test of all!
Statistics from the BMDCA:

Additional information from the SSFS (Finland)

Breeding and health screenings – other health screenings and tests -

Other health screenings than HD & ED are voluntary.

- On a voluntary basis breeders and dog owners test their dogs for eye diseases, patellas, shoulders, heart and back and also various genetic tests (e.g. DM, vWD, HS pre-test and MyDogDNA Pass) - Breeding tests and character tests are voluntary.
- Breed club keeps records of breeding tests.
- All character test results are published in Finnish Kennel Club database Koiranet.
- The breed club has supported breeders financially in tests

Genetic tests

- The DM test is voluntary. First dogs were tested in 2008. Breed club keeps a public database of tested dogs (currently over 250 dogs in the database).
- DM tests are kept voluntary and slowly more people are testing their dogs. We have not seen that the test results would have too high of an importance for the breeders. On the contrary for many breeders or stud dog owners DM result has no importance.
- HS test is not yet widely used, only a few dogs have been tested.
- Many people do not want to spend money for any voluntary testing, only mandatory testing is done. Some are afraid that the possible bad test results would limit their choices or harm their reputation.

Data collection

- All registration data, pedigrees, official health screening data (HD, ED, shoulders patella, eyes, heart, back), EBV's for hips and elbows, titles, results of shows and trials are publicly available in Koiranet which is Finnish Kennel Club's public database http://jalostus.kennelliitto.fi
- Members of the Finnish Kennel Club can add the day of death and cause of death of their dogs in the database.
- Breed club has been collecting age and cause of death data since the 90's. (Over 3640 public age records, 990 public COD records (10/2022))
- Breed club is also keeping records of veteran dogs alive, various genetic test results, cases of epilepsy, autoimmune and renal diseases
- Health survey will be launched during autumn 2015
- Breed club encourages breeders and owners to find out the cause of death of their dogs. Breed club and its health fund reimburses the cost of the autopsy for membership in exchange for the autopsy report of the dog.

Statistics of interest from the BMDCA (United States)

year	Litters by BMDCA members	Litters by nonclub members
2016	291	1349
2017	301	1586
2018	290	1618
2019	231	1798
2020	289	2035
2021	292	2628
2022	232	3051