

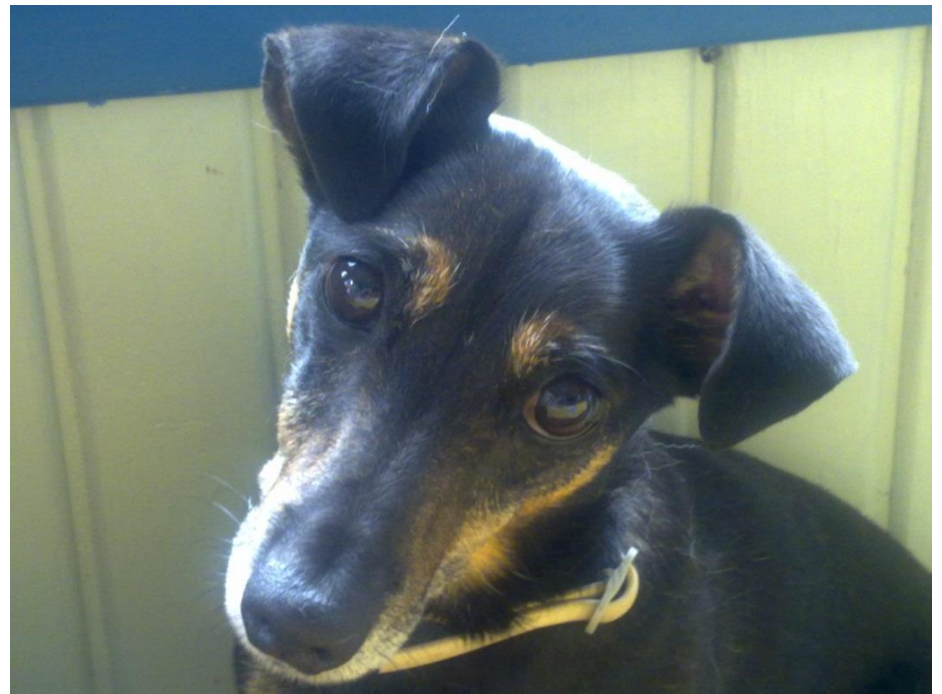
Promoting health of dogs through breeding: The Finnish Kennel Club's tools

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What does the Finnish Kennel Club do?

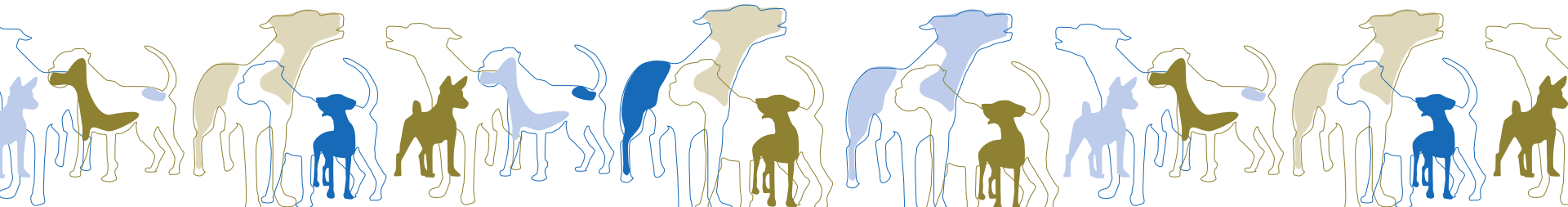
- General breeding strategy
- Breed-specific breeding strategies
 - Programme to combat hereditary diseases and defects (PEVISA)
 - Breeding database
 - Instructions to avoid exaggerated features
- Dog registry guideline
- Education for breeders and breeding councillors
- Co-operation
 - National and international
- Canine Health Research Fund



Photo: T. Eerola

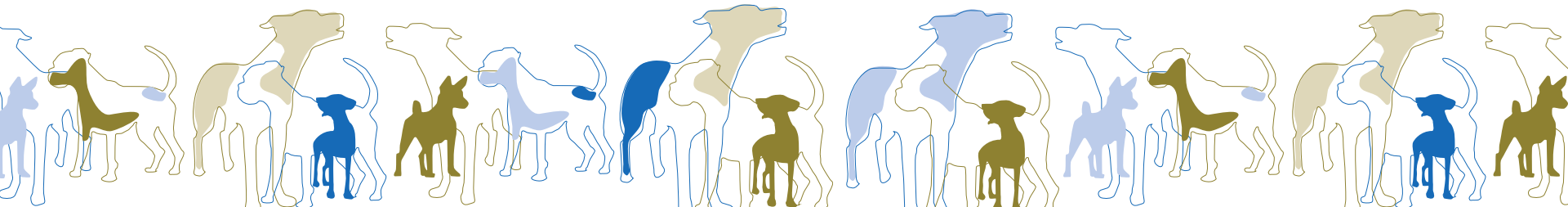
Finnish Kennel Club's rules and regulations

- Developed with the health and wellbeing of dogs as primary concern
- In harmony with the Animal Welfare Act and the Animal Welfare Decree as well as other official regulations that apply to the breeding of animals
- Finnish Kennel Club's (FKC) rules and regulations oblige all members, as well as people attending organized dog activities
- By becoming a member one accepts also the rules



Dog breeding in the Finnish Kennel Club

- **Breed associations** and their subordinate clubs are **responsible for directing the breeding in their respective breeds**
 - Breeding goals and strategies
- The FKC for example
 - Registers the dogs, making sure that the parents meet all the conditions
 - Maintains the Breeding database
 - Gives general breeding guidance and education



Are we proceeding? How can you tell?

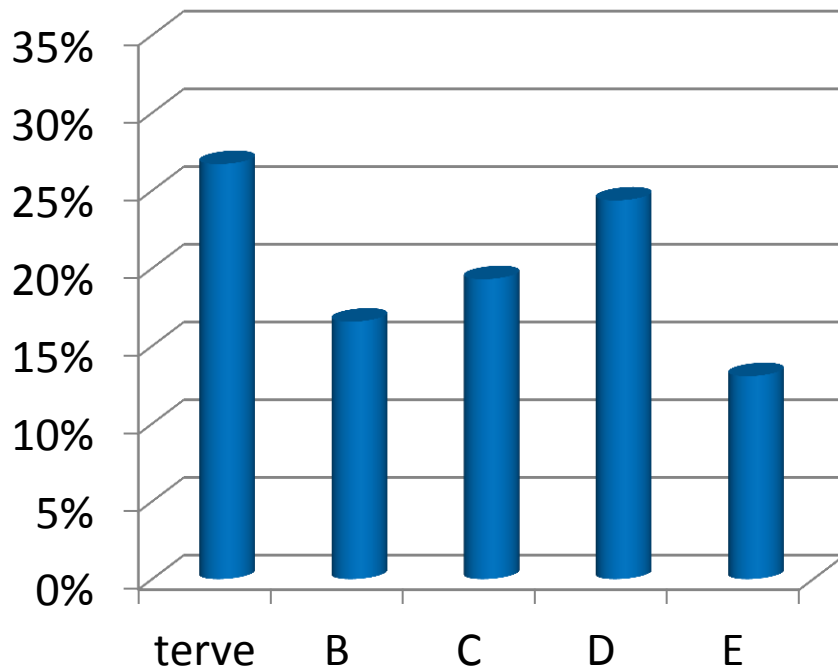
If important traits of a breed are improving generation by generation as a result of selection and breeding, *genetic improvement* is taking place



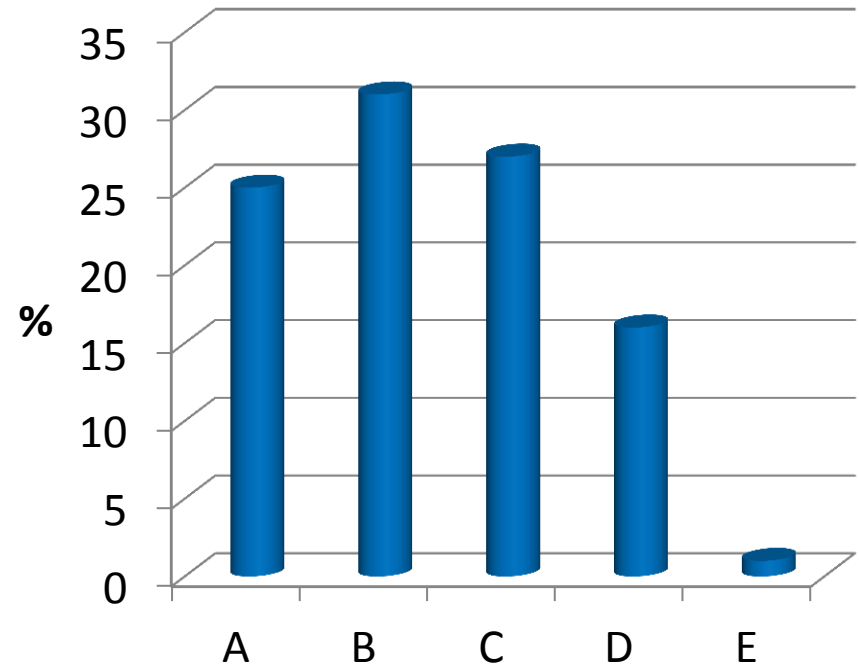
Photo: T. Eerola

Hip dysplasia

Bernese Mountain Dogs
born 1980-1989
(mean 1,8 = almost C)

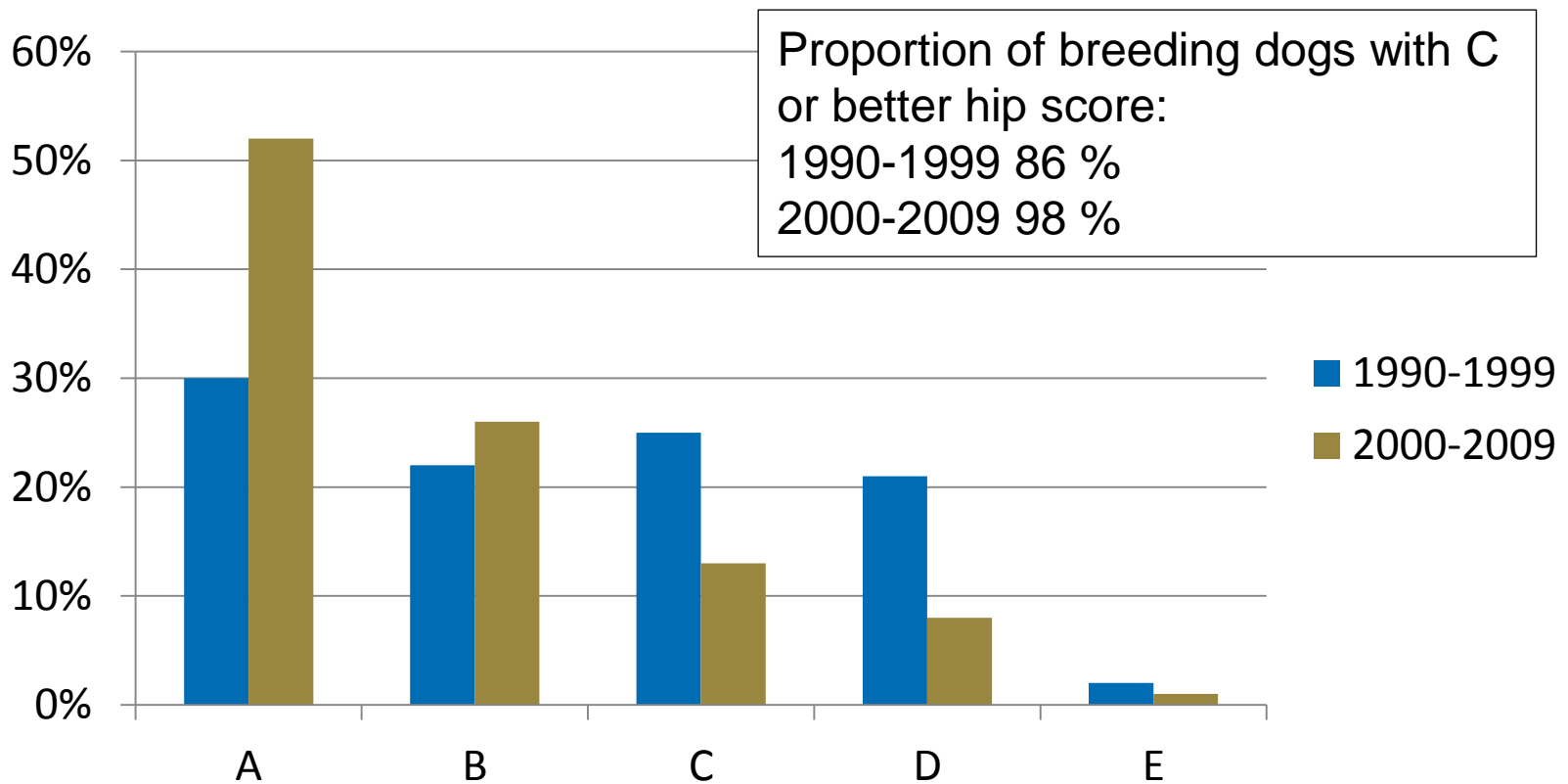


Bernese Mountain Dogs
born 2000-2009
(mean 1,3 = n. B)



Source: FKC Breeding database

Hip dysplasia in the Beauceron



Source: FKC Breeding database

Hip dysplasia, St. Bernard and Leonberger

Dogs have been grouped according to the year of birth

	St. Bernard (long haired)	Leonberger
Dysplastic (D-E) dogs in breeding 1990-1999	155/298 = 52 %	7/284 = 2 %
% healthy (A-B) 1990-1999	18 % (proportion screened 22 %)	69 % (proportion screened 41 %)
Dysplastic (D-E) dogs in breeding 2000-2009	13/124 = 10 %	4/388 = 1 %
% healthy (A-B) 2000-2009	38 % (proportion screened 32 %)	73 % (porportion screened 40 %)

Other examples of genetic improvement

- Newfoundland:
 - Dogs born in the 1990s, proportion of healthy hips: 31 %
 - Dogs born in the 2000s, proportion of healthy hips 42 %
- Labrador Retriever
 - Dogs born in the 1990s, proportion of healthy hips: 68 %
 - Dogs born in the 2000s, proportion of healthy hips: 77 %
- Unfortunately not every breed is improving

Source: FKC Breeding database

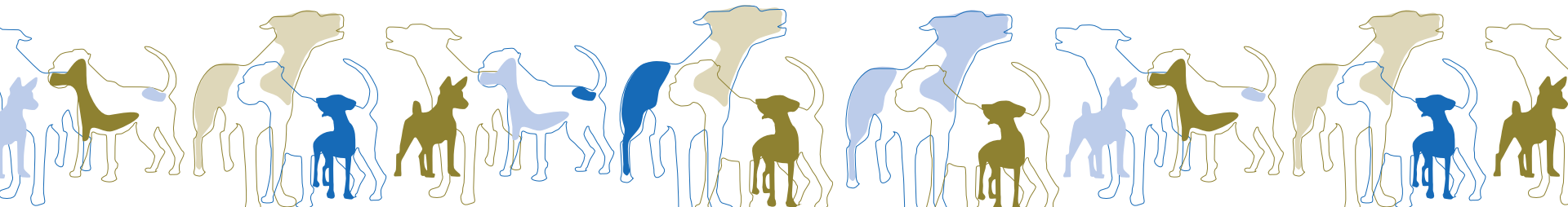
Genetic improvement

Genetic improvement = proportion of "good" genes increases in a population

-> Frequency of desirable traits increases

-> Proportion of affected dogs decreases

- Hip dysplasia as an example: E becomes rare, then D, and after a while, also C



Improvement is possible in all breeds, but it requires

- **Work of the breeders:** selection of breeding dogs, openness, interest in learning about breeding and heredity
- **Tools:** have to know which dogs to choose for breeding in order to maximise the probability for healthy offspring
- **Patience:** proceed bit by bit, every generation will be healthier than the earlier ones
 - Take care of the genetic diversity
 - So far selection for health has not reduced diversity – but other breeding goals have

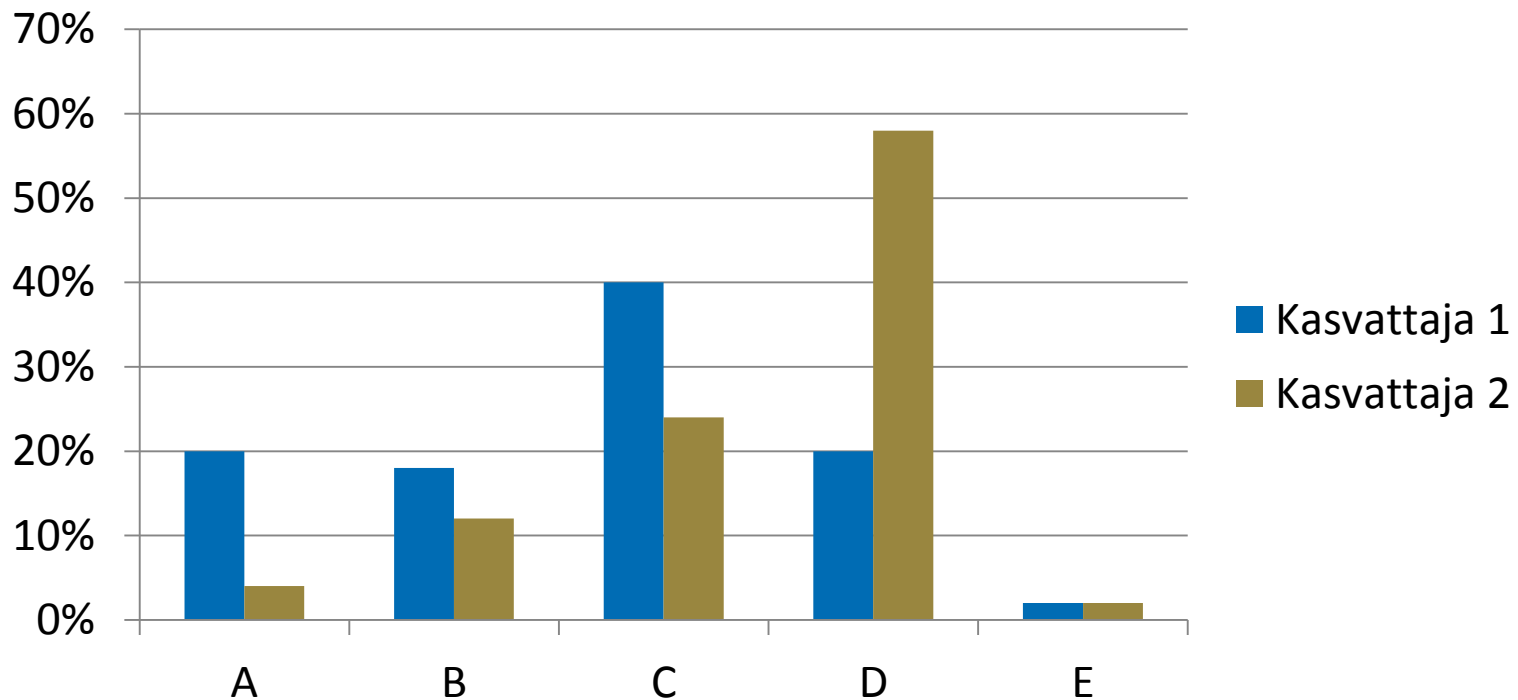


Photo: T. Eerola

Two breeders, large breed, hip dysplasia

Breeder No 1 (blue): 60
% of the dogs screened

Breeder No 2 (brown): 28
% of the dogs screened

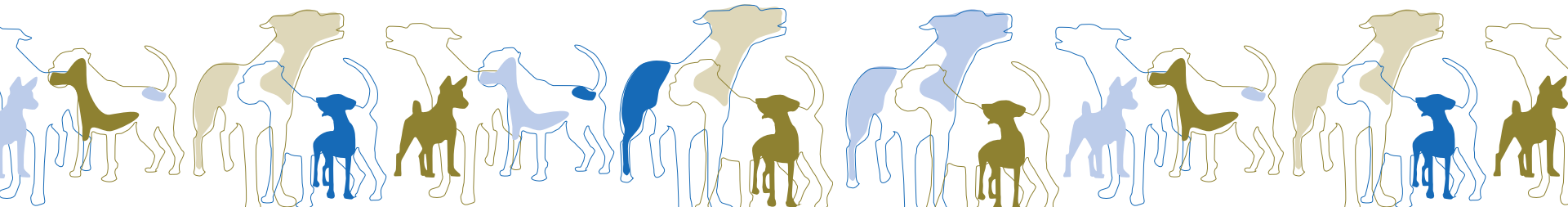


Source: FKC Breeding database

How do you get genetic improvement?

- Polygenic, quantitative trait:
use dogs from the better half of the population (dogs whose scores are above the breed average)

-> the breed average moves to the desired direction and the frequency of healthy dogs increases generation by generation
- To define the breed average:
Health information and/or screening results for as many dogs as possible





General breeding strategy of the Finnish Kennel Club

started in 2012

Approved by the Finnish Kennel Club Council
Breed associations and clubs have been committed to the strategy

Aims of the general breeding strategy

Finnish Kennel Club Council 2006

- Maintain a conformation that enables wellbeing and normal reproduction
- Maintain and increase genetic diversity
- Maintain a balanced behaviour
- Maintain and improve the working abilities that form the basis of breed-typical behaviour and temperament

Furthermore, the breeding strategy:

- Pays special attention to measures that promote the health of dogs
- Strives to safeguard the status of Finland's national breeds

Breeding strategy, objective 1:

Dogs that are used for breeding shall be above the breed average in desired characteristics in order to achieve genetic improvement.

- Breeding strategy recommends to focus on the most important traits/problems of the breed
 - What are these?
 - Need **information** on the dogs
 - Breed-specific breeding strategies in an important role
- Which dogs are above the average?
 - Need **information** on the dogs
- One of the main tasks of the breeding strategy is to ease collection of information
 - Behaviour and health surveys
 - Breeding inspections

Breeding strategy, objective 2:

A dog that is suitable for breeding is typical of its breed both in appearance and temperament, and it is free of ailments or characteristics that would make everyday life difficult.

- Balanced behaviour and temperament
- Mentally and physically suitable for the use for which the breed was created
- Healthy: no signs of disease or breathing and/or moving difficulties
- No exaggerated features
- Able to mate normally
- From a bloodline with good longevity
- Typical for the breed in both conformation and appearance
- At least two years of age
- Recommendation: an approved result from either a breeding inspection, a dog show, or some other authorised review

Breeding strategy, objective 3:

Dogs that are used for breeding have sound temperaments because this helps minimize the probability of their progeny inheriting mental traits, such as timidity, that make everyday life difficult and are detrimental to wellbeing.

- Do not breed a dog with a poor nerve stability or a dog that is timid or angry
- Characteristics of companion dogs can also be seen as working traits: a companion dog that is used for breeding must be social and have adequate nerve stability.
- Recommendation: the dog has a result from one of these
 - Finnish Kennel Club's mental test
 - Mental description (MH)
 - Companion dog test (Begleithundprüfung, BH)
 - Breeding inspection or a review arranged by the breed association, if it includes a behavioural analysis

Breeding strategy, objective 4:

The spread of defects and diseases that have a severe impact on the wellbeing of dogs (cause pain or discomfort or otherwise restrict the dog's ability to lead a normal life that is typical for the species) will be prevented. Only clinically healthy dogs can be used for breeding if such diseases are a concern.

- **Wellbeing of a breeding dog**
 - Free of diseases and defects that reduce its wellbeing or prevent it from leading a normal, physically active life as well as of a disease that requires constant medical treatment or a special diet
- **Genes of a breeding dog**
 - Not be known to pass down defects and diseases similar to those mentioned above
 - Exception if a DNA test exists!

Breeding strategy, objective 5:

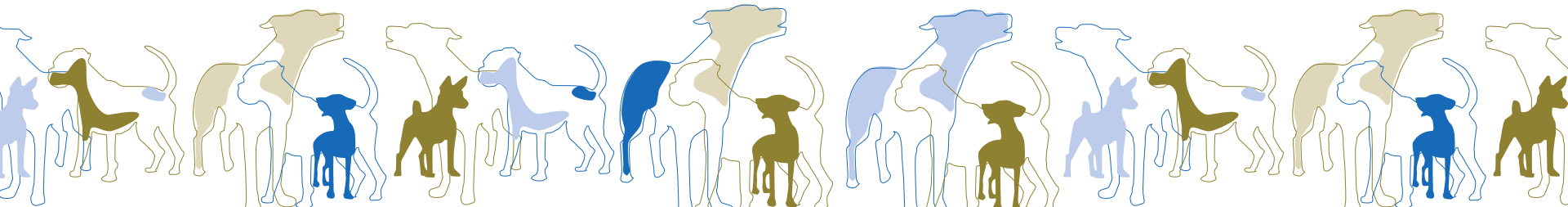
Only dogs that can mate naturally and care for their puppies will be used for breeding.

- Both the bitch and the dog must be willing to mate naturally.
- Bitches, which were unable to give birth naturally or care for their progeny in a normal manner (without a good reason), should not be used in breeding again
- Males, which have been unable to mate normally or display a deficient libido, should not be used in breeding
- Only bitches whose wellbeing is not expected to be impaired by mating, pregnancy or whelping because of the anatomical features of the bitch or the puppies should be used for breeding.
- Puppies that required resuscitation and special support to ensure their survival especially during their first week should not be used for breeding

Breeding strategy, objective 6:

Dogs from bloodlines with maximal longevity will be used for breeding. The life length of a dog shall not be unduly prolonged at the expense of its health and wellbeing.

- Development of the average longevity and most common causes of death within a breed is monitored in the breed-specific breeding strategy
- Finnish Kennel Club collects this information for the Breeding database via webservice Omakoira or via signed notification from the owner
- Longevity of the relatives should be taken into account when choosing dogs for breeding



Breeding strategy, objective 7:

The genetic diversity of all breeds will be safeguarded. It must always be ensured that at least 50% of the breed's gene pool, all criteria considered, remains in breeding use.

Compromises have to be done, but not in wellbeing and behaviour

Tools to maintain or increase diversity:

- Restricting the number of progeny per individual
 - Maximal no of progeny 5% of the number registered in a 4-year period
- Restricting inbreeding
 - Four generation ancestor loss coefficient min. 90 %
 - Meaning that in the 4 generation pedigree, only one individual may appear twice
- Unregistered landrace dogs for breeding (lancashire heeler, jackrussell, Finnish breeds, etc.)
- Breed crosses

A few breed crosses made in Finland

Barbet x Spanish
Waterdog



1st generation
Kromfohländer x
Standard Poodle



Danish-Swedish Farm
Dog x Brazilian Terrier

Kromfohländer x
3 different breeds

3rd generation Pinscher-Schnauzer:
FI, NO, SE, LT champion
FI W-2009, 2011, LT W-2010
HD A/A, ED 0/0, no hereditary eye
diseases
FKC Mental test 115 points



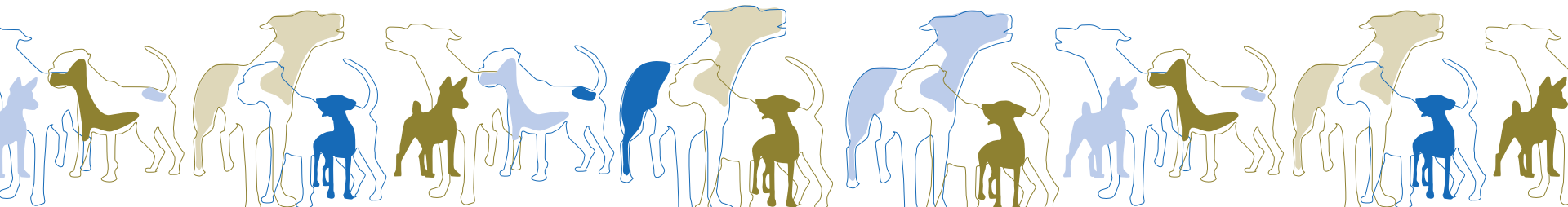
1st generation

Pinscher -
Schnauzer

Breeding strategy, objective 8:

The Finnish Kennel Club supports and produces activities that aim to increase knowledge of the heredity, health and diseases of dogs.

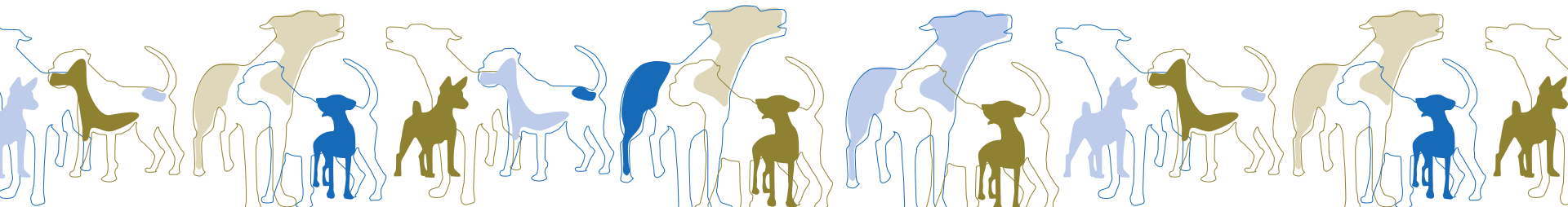
- Regular education for breeders, breeding counsellors of breed associations, districtal trainers and kennel advisers
- Education material on dog breeding, heredity and the raising of dogs
- Advising puppy buyers, owners and breeders to seek information from the breed associations
- Keeping in contact with researchers and veterinarians to maintain knowledge and competence in matters related to dog breeding
- Publishing significant new research findings in the Koiramme magazine



Breeding strategy, objective 9:

*Cooperation with veterinarians and researchers in this field will be intensified.
The actions undertaken by veterinarians also support the principles and objectives of the breeding strategy.*

- Joint Finnish Kennel Club and Faculty of Veterinary Medicine Dog Health Research Fund
 - Improving the diagnosing of hereditary diseases and defects



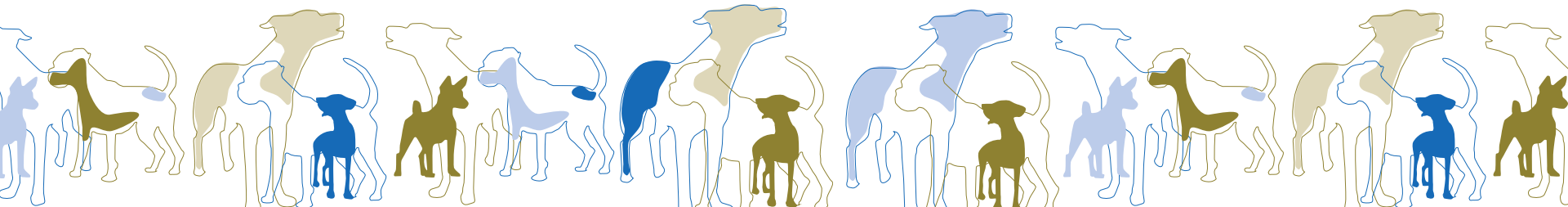
Breeding strategy, objective 10:

The Finnish Kennel Club influences the international community through the Nordic Kennel Union and the FCI with the aim of promoting greater knowledge of and competence in dog breeding. Our actions within the international community always set the health and wellbeing of dogs as the most important goals.

- FCI and the Nordic Kennel Union (NKU)
 - Promoting Nordic knowhow in dog breeding
- Breed standards should not permit characteristics that endanger the wellbeing of dogs
- Breeds, which share common origin and are separated by national borders, geographical obstacles or just minor conformational details or colour, should be defined as breed variants that can be cross-bred after careful deliberation
- An alternative is to ease the granting of approval of inter-breed crosses between such breeds

Dog registry guideline

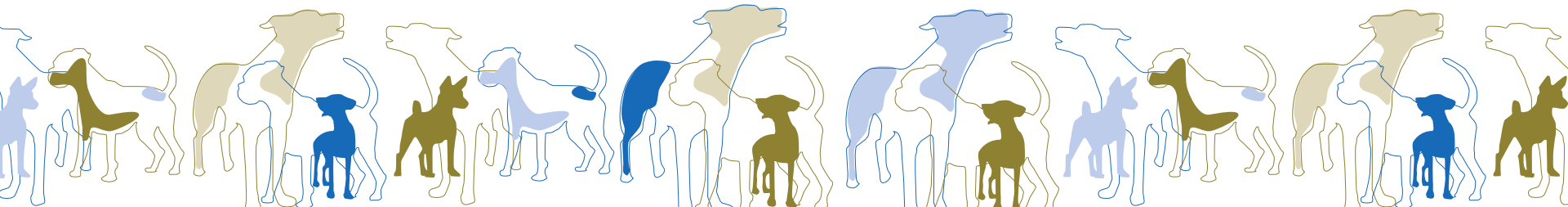
- Defines the grounds on which dogs can be included in the FKC's registers
- Imposes requirements on breeding dogs that apply to all breeds with the aim of promoting the welfare of dogs



Dog registry guideline

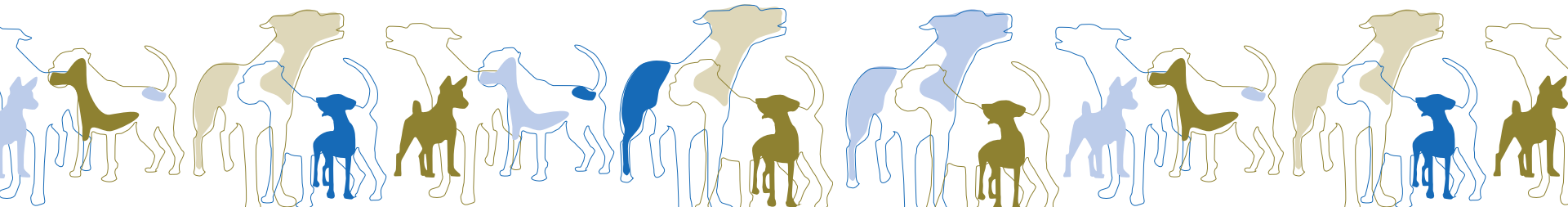
On a welfare ground, examples:

- Maximum of 5 litters per bitch
- Minimum of 10 months between two subsequent litters of a bitch
- Close inbreeding litters go to No breeding –register
- Litters where one or both parents have received the worst score in official health testing (HD, ED, patellar luxation, spondylosis) go to No breeding –register
- Combinations of two Merles are not allowed
- Combinations of two T-box bobtails are not allowed



Merle and T-box -bobtail

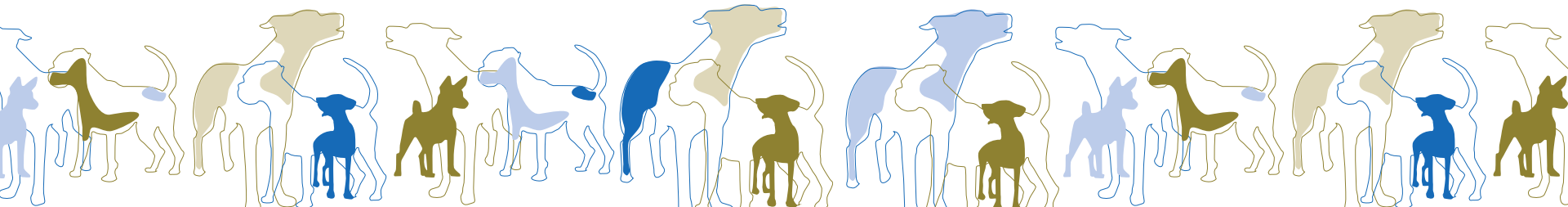
- Merle-merle –combinations: homozygous dogs have congenital disorders of eyes and inner ear
- Dominant T-Box –mutation is lethal in a homozygous state
 - lead to fetal death
 - sometimes very deformed, non-viable puppies are born



Breed-specific requirements for registration

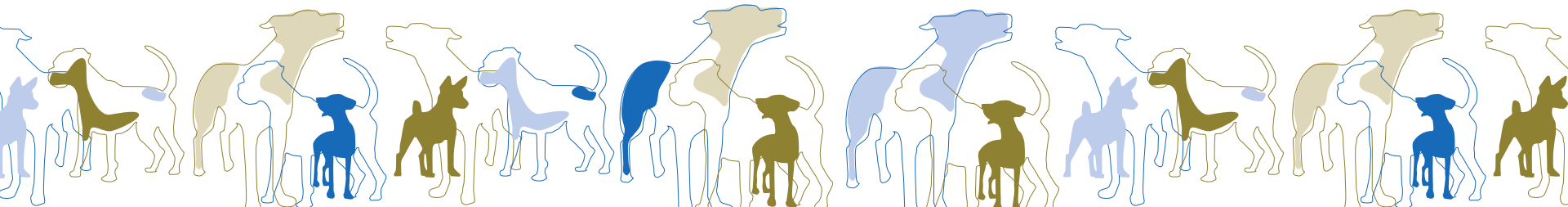
Programme to combat hereditary diseases and defects (PEVISA)

- Started in 1984 in the Golden retriever and the Labrador retriever (hip dysplasia)
 - Exists in >100 breeds
- A breed can be joined in PEVISA by a decision by the breed association's general assembly



PEVISA - Rottweiler

- **Hip dysplasia screening result:** no worse than C (mild dysplasia)
- **Elbow dysplasia screening result:** no worse than 1 (mild dysplasia)
- **Eye screening result** (valid for 24 mo):
 - If certain diseases are found, the offspring of the dog will not be registered in the normal register
 - If mRD is found, the dog can be bred only with an individual that is free of mRD
- **Age** at the time of mating: minimum of 24 mo
- **Mental** test or Mental description done
- Maximum of **60 offspring**



PEVISA – official health tests

At the moment we have an official testing protocol for

- Hip dysplasia (HD)
- Elbow dysplasia (ED)
- Patellar luxation
- Congenital spinal changes: spondylosis, intervertebral disc degeneration (IDD), lumbosacral transitional vertebra (LTV), vertebral deformity
- Eye diseases
- Heart diseases
- Syringomyelia
- Liver diseases in the Bedlington terrier and the Dobermann
- Normal hearing (BAER test)

Breeding database (jalostus.kennelliitto.fi)

- Public information
- Contains dogs registered in Finland:
 - Pedigrees
 - Official health screening results (60,000 – 80,000 new ones annually)
 - Estimated breeding values (EBVs) for HD and ED
 - Inbreeding coefficients, ancestor loss coefficients
 - Date and cause of death
 - Trial results
 - Mental test and Mental description results
 - Show results
 - Offspring, and statistics of their official health screenings



Breeding database (jalostus.kennelliitto.fi)

Breed-specific listings and annual statistics:

- Number of annual registrations
- Most popular sires and dams with offspring amounts and offspring statistics
- Breeding statistics: annual litter sizes, numbers and average ages of sires and dams, proportion of dogs used for breeding, average inbreeding coefficients, etc.
- Health screening statistics
- Cause of death statistics
- Trial statistics



Breed-specific breeding strategy - genetic infopackage of the breed

- Compulsory for every breed with at least 50 registered dogs during the last 5 years
- Have to be approved by the general meeting of the breed association
 - Final approver Finnish Kennel Club scientific committee
- Have to be in harmony with the Animal Welfare Act and the Animal Welfare Decree
 - Have to steer dog breeding in that direction
- Build with the help of the Breeding database – statistics in health, behaviour, trial and cause of death - as well as instructions regarding exaggerated features
- Model and instructions available for the breed associations to use

Contents of the breed-specific breeding strategy

1. Summary
2. Background of the breed
3. Information on the breed association
4. Current situation of the breed
 - 4.1 Population structure and gene pool
 - 4.2 Behaviour and working traits
 - 4.3 Health and reproduction
 - 4.4 Conformation and appearance
5. Fulfilment of the previous breeding strategy
6. Breeding goals and strategy



Contents of the breed-specific breeding strategy

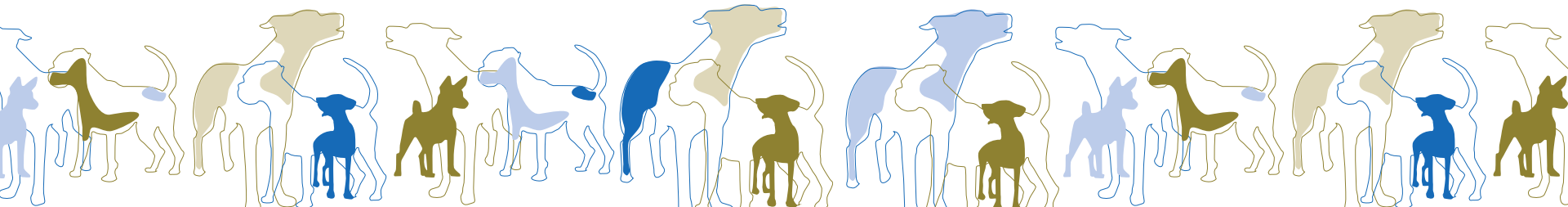
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4.1 Population structure and gene pool

- Statistics from the Breeding database: annual registrations, effective population sizes, average inbreeding coefficients, proportion of dogs used for breeding, average age of the breeding dogs, etc.
- List of the most popular breeding dogs
 - What proportion do the progeny make of all dogs registered in certain period, for example one generation?
 - Are the most popular dogs related to each other?

The task is to *assess the size of the gene pool*



4.2 Behaviour and working traits

- Do the dogs behave like described in the breed standard?
- How do the dogs behave at home? Behaviour surveys
- Statistics from mental and working tests and mental description
 - Are there results showing *undesireable behaviour*? What is the *typical behaviour* in the different situations of the test? What is the *desireable behaviour*?

The task is to *assess possible behaviour problems and to define what kind of dogs are preferable in breeding*

4.3 Health and reproduction

- Diseases and defects included in the PEVISA health program
 - Short description, consequence regarding wellbeing and breeding, annual statistics of the breed
- Other significant hereditary diseases in the breed
- Causes of death, average age of death
- Reproduction traits – are there problems?
- Anatomical features that predispose dogs to diseases and obstetric difficulties

The task is to *list diseases which need to be observed in order to prevent their increase, as well as to work as a reference*
(knowledge of the existing diseases may help even in diagnostics)

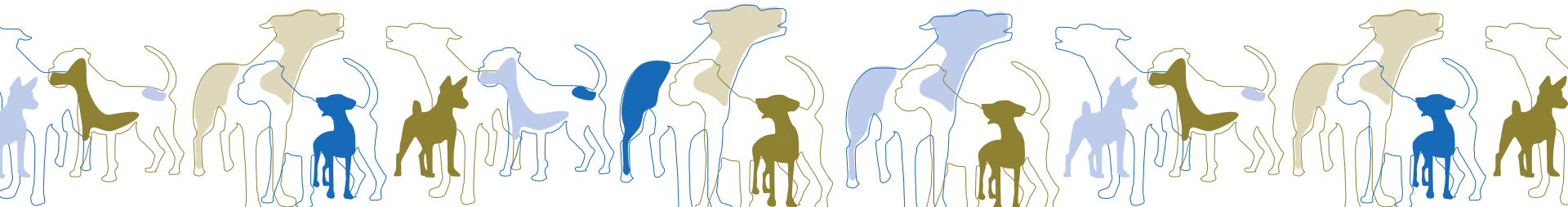
Exaggerated anatomical features

Do these exist in the breed?

<http://tinyurl.com/nxqxzxv>

Guidelines for show judges regarding unhealthy features in breeds
(new Nordic guidelines to replace these coming in the summer of 2015)

According to the FKC general breeding strategy, the structure and appearance of a breeding dog must not demonstrate welfare-compromising defects that are mentioned in this list



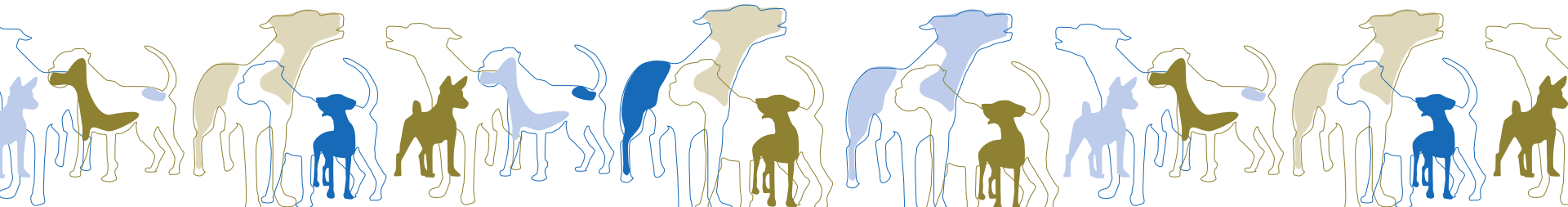
4.4 Conformation and appearance

- Are the current dogs equivalent to the breed standard?
- What do the breeding inspections and show results tell us about the current conformation and appearance of the dogs?
- The most important conformation traits regarding the work the breed was bred for? Does the current conformation allow original work?
- Are there features which compromise the wellbeing of dogs?

The task is to *draw attention to the correct conformation and to flaws which should be taken into account when choosing breeding dogs*

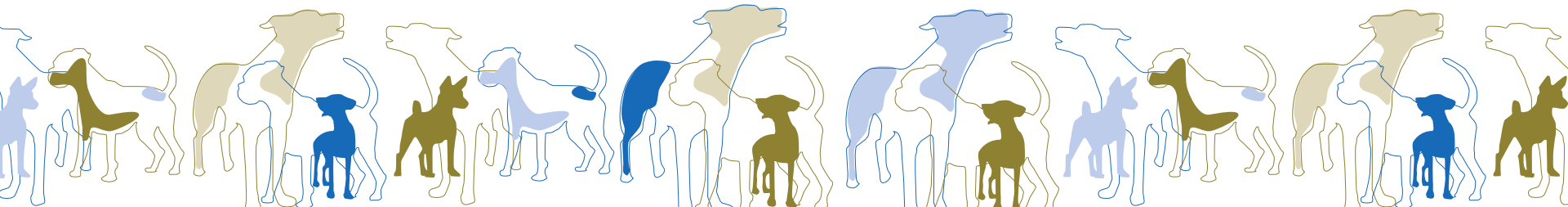
5. Fulfilment of the previous breeding strategy

- Previous measures: what have been done?
- Results: what have been accomplished?
 - If no improvement can be seen, what are the reasons for that?
- Records and offspring statistics of the most popular breeding dogs
 - Is it probable that the breeding goals will be achieved by using dogs with this kind of health and other results?



6. Breeding goals and strategy

- Summary of traits that should be maintained at the current state
- Summary of traits that need improvement
- Goals separately for
 - Gene pool
 - Behaviour and working traits
 - Health and reproduction
 - Conformation and appearance
- Goals should be clear, concrete and measureable



6. Breeding goals and **strategy**

- Gathering info on the breed and on the individual dogs
 - Health and behaviour surveys
 - PEVISA health programme
- Delivering info for the breeders and owners:
 - Health statistics of the breed: are we going to the right direction?
 - Offspring health statistics of the most popular breeding dogs
- Recommendations regarding the traits of the dogs and combinations used for breeding



Co-operation

Breeders

Breed
associations

Veterinarians

Finnish
Kennel Club



Researchers

Kennel
Clubs
abroad

Puppy
buyers

FCI

PKU



Thank you for your attention!
Any questions? ☺