



**THE KENNEL CLUB**  
*Making a difference for dogs*

## Information Guide

# Breeding for Health



[www.thekennelclub.org.uk](http://www.thekennelclub.org.uk)

## Breeding for Health

Dog breeders today have a number of different considerations to make when choosing which dogs to use for breeding, these include:

- Temperament
- Breed type and characteristics
- Health test results
- Genetic diversity
- General health of the sire and dam

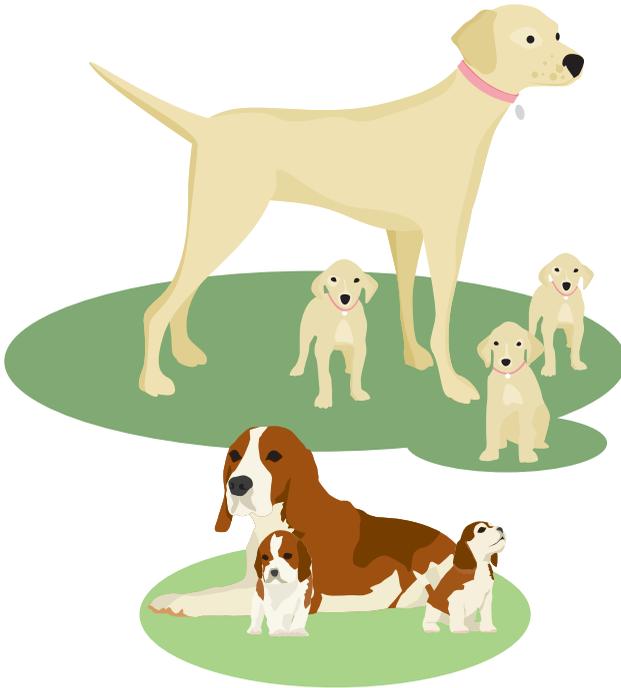
Responsible breeders will consider the health of their puppies to be a priority, increasing the probability that healthy puppies will go on to live long and happy lives.

This guide is made up of a number of different sections on factors to consider when breeding dogs for health.

For more information on general breeding practice, please see the Breeding from Your Dogs information guide, which includes information on breeding from your bitch and using your dog at stud.

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## 1. Discovering health information on Mate Select

The Kennel Club website has an array of free online health information and resources which help dog breeders to make informed breeding decisions. One resource of particular relevance is Mate Select, which provides breeders, puppy buyers and owners with an opportunity to look up the health information that is available for each Kennel Club Breed registered dog. Mate Select has been developed in conjunction with the Animal Health Trust and enables breeders to easily and accurately investigate the health of a potential sire or dam that they are thinking of using and integrate health screening and genetic diversity information into their breeding plans.

The services that are available online via Mate Select include:

- **The Health Test Result Finder**

This resource allows you to search for health test results for any dog registered on the Kennel Club's Breed Register.



Searching the database is easy and only requires the dog's registered name, registration number or stud book number. It will display any health screening test results received and recorded by the Kennel Club from any of the British Veterinary Association/Kennel Club (BVA/KC) health schemes (hip scheme, elbow scheme, eye scheme and syringomyelia/chiari like malformation scheme) or results from official Kennel Club DNA testing schemes.

- **Estimated Breeding Values (EBVs)**

This service produces a measure of an individual's genetic risk for specific complex conditions, such as hip and elbow dysplasia. EBVs are used to calculate the genetic risk of the individual by utilising the dog's BVA/KC score and those of its relatives. EBVs are initially available for 15 breeds.

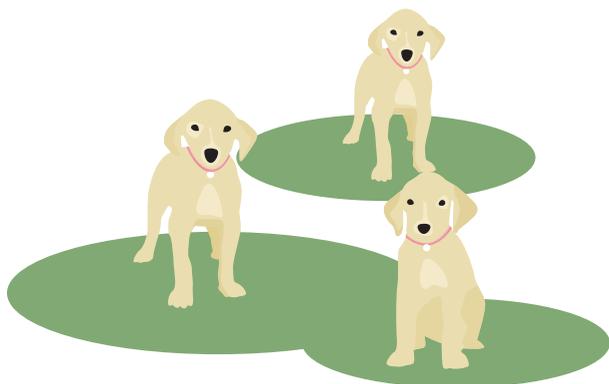
- **The Inbreeding Coefficient Calculators**

High levels of inbreeding can impact the health of individual dogs and the breed as a whole and this facility enables breeders and puppy finders to calculate the likelihood that two copies of the same gene have been inherited from a common ancestor (otherwise known as the inbreeding coefficient). This can be calculated for an individual breed, an individual dog, or for potential puppies produced from a hypothetical mating. These resources use pedigree information stored on the Kennel Club's database to calculate the degree of inbreeding, or Coefficient of Inbreeding (COI). The lower the COI, the lower the degree of inbreeding.

These resources are designed to allow dog breeders and owners to make informed choices when deciding on a potential mate for their dog, or when considering a new pet.



For further information visit [www.mateselect.org.uk](http://www.mateselect.org.uk)



## 2.1 Why Health Test your dog

All dogs are at risk of inheriting diseases, regardless of whether they are purebred or crossbred dogs. A substantial amount of research has been carried out to analyse these diseases by investigating important factors such as what causes them, which breeds may be affected and how the disease is inherited. Funding into this type of research has enabled the development of DNA tests and health screening schemes, which allow breeders to help reduce the number of affected dogs and eventually eradicate these conditions.

### **Making informed health decisions for breeding**

Where DNA tests and screening schemes are available, breeders are able to test their breeding stock for these inherited diseases before the dogs are bred from. Testing all potential breeding stock allows breeders to better understand the kind of genes a dog may pass on to its offspring, giving them the information required to avoid producing clinically affected puppies. Making informed decisions from health test results enables breeders to adapt their breeding programmes and reduce the risk of the diseases appearing in future generations.

### **Reassuring puppy buyers**

Puppy buyers should ensure that any puppies they consider buying are from parents that have been appropriately health tested. By health testing potential breeding stock and by using those results responsibly, puppy buyers will be reassured that there is a lower risk of the puppy developing the specific inherited disease that was tested for. The Kennel Club encourages puppy buyers to only buy puppies from responsible breeders, such as a Kennel Club Assured Breeder, who are required to undertake specific health tests of dogs used for breeding, in addition to other requirements, such as welfare standards that makes the health of their dogs a priority.



A list of recommended breed specific health tests is available from [www.breedinformationcentre.org.uk](http://www.breedinformationcentre.org.uk)

## **Diagnosis of genetic disorders**

Regardless of whether you use your dog for breeding, if you think it is at risk of developing, or may be suffering from an inherited disorder, it is important to test your dog in order to know their health status.

Not all inherited conditions are congenital, i.e. present at birth. Sometimes an inherited disease does not develop until later in its life. These late onset diseases present real challenges to the dog breeder because a dog could be well past its reproductive phase, and have been bred from, before it shows signs of the condition. By knowing the health status of your dog, it may enable you to seek essential early treatment.

## **Furthering research**

Health test results provide data which allow researchers to help develop a picture of how each breed is affected by particular diseases, how best to improve the health of affected breeds and to develop cheaper and faster testing methods. The data from these results can be monitored to show how the number of affected dogs has changed over time, whether it has improved or worsened and if a specific disease is no longer a risk for the population.

## **Types of health tests available**

There are two general types of health tests that are available:

- DNA testing schemes for simple inherited disease.
- Clinical screening programmes for complex inherited diseases.

For further information on health testing for simple or complex inherited diseases, please see the appropriate sections overleaf.

## 2.2 Simple inherited disorders

### What is a simple inherited disorder?

Simple inherited disorders occur from a mutation of a single gene and represent around 70-75% of the **known** inherited diseases in the dog. Dogs are usually tested for these conditions through a simple DNA test, either from a blood sample, or more commonly from a cheek (buccal) swab. The inheritance of these diseases is predictable, provided that the test results for both parents are known. Often individual breeds, or related breeds, will have a predisposition to these simple, single gene disorders, although even in predisposed breeds, the percentage of dogs affected by the disease is usually, but not always, very low. These diseases are most commonly tested for in purebred dogs by responsible breeders, but also occur in crossbred and mixed breeds.

### How is DNA testing carried out?

Some tests require a small blood sample, which needs to be drawn by a qualified person, but increasingly these DNA tests are based on a simple mouth swab that is totally non-invasive and can be performed by the dog's owner. A small brush is used to gently rub the inside of the dog's cheek. The loose cheek cells that this removes stick to the bristles of the brush, which is then dried and returned to the laboratory. The cheek cells are broken open to liberate their DNA, which is produced in sufficient amounts to allow the genetic status of any dog to be determined.

### DNA Testing Schemes and publishing of results

The Kennel Club Charitable Trust has provided substantial research funds to facilitate the development of further DNA tests and has worked with relevant breed



clubs and councils to develop DNA testing schemes for diseases that are known to affect their breed. These official DNA Testing Schemes involve collaboration between the Kennel Club, the breed clubs and the DNA testing facility. Under any one of these schemes,

the breeder/owner agrees for the result of their tested dog to be sent independently to the Kennel Club by the testing laboratory. The Kennel Club then notes the result on the dog's record in the registration database, and is published on the open access online health resource Mate Select.



For further information visit [www.mateselect.org.uk](http://www.mateselect.org.uk)

### **DNA Control Schemes to eradicate genetic diseases**

Some of these official DNA Testing Schemes have evolved into DNA Control Schemes, usually after several years of operation. A DNA Control Scheme links DNA testing to registration, limiting registration to those dogs that meet the requirements of the breed-specific DNA Control Scheme.

In 2000 a DNA test was provided to Irish Setter breeders in the UK which allowed them to assess the genetic status of their dogs with regard to an inherited disease known as Canine Leucocyte Adhesion Deficiency (CLAD). Following consultation with the Irish Setter breed clubs, an official DNA testing scheme was established. During the next five years over a thousand Irish Setters were DNA tested and breeder selections based on these results were so successful that a DNA Control Scheme was introduced in 2005, meaning that the Kennel Club would only register Irish Setter litters from parents that were either DNA tested normal or were hereditarily clear. As a result of the DNA control scheme and the hard work of the breeders and breed clubs, CLAD has now been eradicated from the UK Irish Setter population.



## 2.3 Breeding from your DNA tested dog

DNA health testing is one of many resources that can help dog breeders make good breeding decisions.

Knowing the health status of your dog allows you to make breeding plans to avoid producing puppies with a specific genetic condition.

### Which tests are relevant to my breed?

Before breeding, check whether any simple inherited disorders affect your breed. Information on the tests that are available can be found on the Breed Information Centre on the Kennel Club website, or by contacting your veterinary surgeon, breed club, and/or your dog's breeder.



For further information visit [www.breedinformationcentre.org.uk](http://www.breedinformationcentre.org.uk)

The results from dogs tested under any of the official Kennel Club DNA testing schemes are published on the Kennel Club's online health resource Mate Select.



This resource is freely searchable and assists breeders wishing to check on the health status of a potential mate for their dog.



To view the health test results of any Kennel Club registered dog visit [www.mateselect.org.uk](http://www.mateselect.org.uk)

Most DNA tested dogs can be used responsibly in a breeding programme, but the decisions you make when choosing which dogs to mate must be informed and carefully planned.

DNA tests can currently be divided into two main categories, those that test for autosomal-recessive conditions and those that test for autosomal-dominant conditions.

## Autosomal-recessive conditions

An autosomal-recessive condition means that a dog must inherit **two copies** of an abnormal gene before its health is affected.

Each dog inherits one copy of a gene from its mother and one from its father.

If the health status of both sire and dam are known, the likely health status of any puppies produced can be predicted. This means that any dog can be used responsibly in a breeding programme without the risk of producing clinically affected puppies, provided that the right mate is selected.

Dogs that have been tested for an autosomal-recessive condition can be described as either: clear, carrier or affected, but what do these terms mean?

### Clear

The dog does not have any copies of the abnormal genes associated with the condition you have tested for. The dog **will not** be clinically affected by the disorder and will only pass on a normal copy of the gene to any offspring.

### Carrier

The dog has **one copy** of the normal gene and **one copy** of the abnormal gene associated with the condition you have tested for. The dog **will not** be clinically affected by the disorder, but **may** pass one copy of the normal gene, or one copy of the abnormal gene on to its offspring.

### Affected

The dog has **two copies** of the abnormal gene associated with the condition you have tested for. The dog **will** be clinically affected by the disorder and **will** pass one copy of the abnormal gene on to any potential offspring.

## 2.3 Breeding from your DNA tested dog

	<b>Clear Male</b>	
<b>Clear female</b>	All puppies will be clear	50% chance puppy being
	See section 1 for breeding advice	See
<b>Carrier female</b>	50% chance of each puppy being clear	25% chance puppy being
	50% chance of each puppy being a carrier	50% cha
	See section 2 for breeding advice	See
<b>Affected female</b>	All puppies will be carriers	50% chance o puppy being a
	See section 3 for breeding advice	See

### Producing all clear puppies

#### Breeding Advice Section 1

All puppies from this mating will be clear from the specific condition you have tested for and have none of the abnormal genes associated with the condition. If you wish to use these

puppies for future matings, then clear puppies can be mated to carrier and affected dogs without risk of producing affected puppies.

### Producing carrier puppies

#### Breeding Advice Section 3

This mating will produce carrier puppies that will not be affected by the condition you have tested for. Carrier puppies will carry a single copy of the abnormal gene and could pass this on if they themselves are bred from. When used responsibly, carriers can be an important part of any breeding plan and

should not be overlooked when making breeding plans. By using carriers, you can keep good, healthy dogs in the breeding population. Just be sure that if you mate a carrier dog, you know the health status of the other dog. Carriers should never be used to produce affected dogs.

Carrier Male		Affected Male	
of each clear	50% chance of each puppy being a carrier	All puppies will be carriers	
See section 2 for breeding advice		See section 3 for breeding advice	
of each clear	25% chance of each puppy being affected	50% chance of each puppy being a carrier	
50% chance of each puppy being a carrier		50% chance of each puppy being affected	
See section 4 for breeding advice		See section 4 for breeding advice	
of each carrier	50% chance of each puppy being affected	All puppies will be affected	
See section 4 for breeding advice		See section 4 for breeding advice	

### Producing clear and carrier puppies

#### Breeding Advice Section 2

This mating may produce both clear and carrier puppies. Once the puppies are born, it is important to test **all** of the puppies before they themselves are bred from or are passed on to new homes.

Clear puppies will have none of the abnormal genes associated with the condition you have tested for. If you wish to use these puppies for future matings, then clear puppies can be mated to carrier or affected dogs without risk of producing affected puppies.

Carrier puppies will carry a single copy of the abnormal gene and could pass this on if they themselves are bred from. When used responsibly, carriers are an important part of any breeding plan and should not be overlooked when making mating choices. By using carriers, you can keep good, healthy dogs in the breeding population. Just be sure that if you breed a carrier dog, you know the health status of the other dog.

### Producing affected puppies

#### Breeding Advice Section 4

Producing affected puppies that will develop the condition you tested for is taking a risk on canine health and welfare. A mating which may produce affected puppies should never knowingly be carried out. If this mating

accidentally occurs, it is important to test **all** of the puppies before they are bred from or are passed on to new homes. Veterinary advice should be sought as to the clinical management of any affected puppies.

## 2.3 Breeding from your DNA tested dog

### Autosomal-dominant conditions

An autosomal-dominant condition means that a dog need only inherit **one copy** of an abnormal gene before its health is affected.

Each dog inherits one copy of a gene from its mother and one from its father.

If the health status of both sire and dam are known, the likely health status of any potential puppies produced can be predicted.

Dogs that have been tested for an autosomal-dominant condition can be described as either: clear, heterozygous affected or homozygous affected, but what do these terms mean?

#### Clear

The dog does not have any copies of the abnormal genes associated with the condition you have tested for. The dog **will not** be clinically affected by the disorder.

#### Heterozygous affected

The dog has **one copy** of the normal gene and **one copy** of the abnormal gene associated with the condition you have tested for. The dog **will** be clinically affected by the disorder and may pass one copy of the abnormal gene and the associated condition on to its offspring.

#### Homozygous affected

The dog has **two copies** of the abnormal gene associated with the condition you have tested for. The dog **will** be clinically affected by the disorder and **will** pass one copy of the abnormal gene and the associated condition on to its offspring.

If you know the health status of your dog and its potential mate, you can use the table overleaf to predict the likely health status of any puppies produced.



To find out if a particular dog has had a DNA test, why not visit the Health Test Results Finder at [www.mateselect.org.uk](http://www.mateselect.org.uk)

	Clear Male	Heterozygous affected Male		Homozygous affected Male
Clear Female	All puppies will be clear	50% chance of each puppy being clear	50% chance of each puppy being heterozygous affected	All puppies will be heterozygous affected
	See section 1 for breeding advice	See section 2 for breeding advice		See section 2 for breeding advice
Heterozygous affected Female	50% chance of each puppy being clear	25% chance of each puppy being clear	25% chance of each puppy being homozygous affected	50% chance of each puppy being heterozygous affected
	50% chance of each puppy being heterozygous affected	50% chance of each puppy being heterozygous affected		50% chance of each puppy being homozygous affected
	See section 2 for breeding advice	See section 2 for breeding advice		See section 2 for breeding advice
Homozygous affected Female	All puppies will be heterozygous affected	50% chance of each puppy being heterozygous affected	50% chance of each puppy being homozygous affected	All puppies will be homozygous affected
	See section 2 for breeding advice	See section 2 for breeding advice		See section 2 for breeding advice

### Potentially producing all clear puppies

#### Breeding Advice Section 1

All puppies from these matings will be clear from the specific condition you have tested for and have none of the abnormal genes associated with the condition.

### Potentially producing affected puppies

#### Breeding Advice Section 2

Potentially producing affected puppies that may develop the condition you have tested for is taking a risk on canine health and welfare. Matings which could produce affected puppies should never knowingly be carried out. If this mating accidentally occurs, it is important to test **all** of the puppies before they are bred from or are passed on to new homes. Veterinary advice should be sought as to the clinical management of any affected puppies.

## 2.4 Complex inherited disorders

### **What are complex inherited disorders?**

Complex inherited disorders are often caused by a number of different genes and are also influenced by environmental factors. Dogs are usually tested for these conditions through grading systems which rate to what degree the dog is affected by the condition. Complex diseases can cause clinical conditions that worry breeders the most, such as hip and elbow dysplasia, epilepsy and heart disease. These complex diseases are usually seen across many different breeds and are described in both cross breeds and mixed breeds.

### **What tests are available for complex inherited disorders?**

The Kennel Club, in conjunction with the British Veterinary Association (BVA), run four clinical screening schemes:

The **BVA/KC Hip Scoring Scheme** has been designed to address the problem of hip dysplasia. The scheme evaluates radiographs that have been taken of an individual dog's hips. Each hip is evaluated by two experts who score nine anatomical features of the hip and score each hip out of a total of 53. The two hip scores are then added together to give an overall total hip score. So, a dog's hip score can range from 0 to 106, and the lower the hip scores the better the anatomy of the dog's hips. In breeds where significant numbers of dogs have been through the hip scheme, it is possible to calculate a breed mean hip score, which gives a feel for the average score within that breed.

The **BVA/KC Elbow Grading Scheme** has been designed to address elbow dysplasia. Each dog is assessed from radiographs that are taken of the dog's elbows. Each elbow is graded on a scale of 0 to 3, by two specialists. The lower the grade, the better the anatomy of the elbow. In this scheme, if the dog has two different elbow grades, the higher of the two is used as the dog's elbow grade.

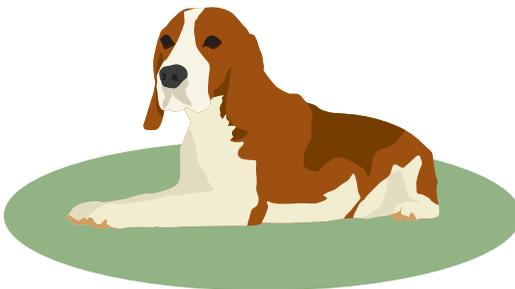
The **BVA/KC/ISDS (International Sheep Dog Society) Eye Scheme**. This scheme has two lists, Schedule A and Schedule B. Schedule A contains all of the known inherited eye diseases and the breeds that are currently known to be affected by these conditions. Schedule B, lists breeds and conditions where further investigation is urged. Specialist panellists, appointed by the BVA, can examine any individual dog for clinical signs of these diseases. Some of these inherited eye diseases are not present from birth and breeders are advised to have their breeding stock examined each year throughout their dog's life.

The **BVA/KC Chiari Malformation/Syringomyelia (CM/SM)** scheme (Launched January 2012). MRI scans, scanned under BVA procedures, are reviewed by a panel of BVA appointed neurologists and radiologists and graded by two scrutinisers. Grading is assigned according to the severity of the CM and SM changes. As CM/SM is a progressive condition, scans throughout the dog's lifetime are recommended, generally at years 1, 3-5, and over 5.

Procedure Notes, submission details and breeding advice are available for all these schemes from the BVA Canine Health Schemes (CHS) office.



For more information, visit [www.bva.co.uk/chs](http://www.bva.co.uk/chs)



## 2.4 Complex inherited disorders

### **Breed Clubs health screening schemes**

Besides the BVA/KC Health Screening Schemes, many Breed Clubs support dog health and good breeding practices through their own health improvement strategies and health screening programmes. These programmes are organised by the breed club using specialist veterinarians that they have identified. The results of these screening programmes are collated and disseminated by the breed clubs.

### **Which tests are relevant to your breed?**

Before breeding, check whether any of the conditions mentioned previously may affect your breed. Information on the tests that are available can be found on the Breed Information Centre of the Kennel Club websites, or by contacting your veterinary surgeon, breed club, and/or your dog's breeder.



To view the health test results of any Kennel Club registered dog visit [www.mateselect.org.uk](http://www.mateselect.org.uk)

The results of dogs tested under any of the BVA/KC health schemes are published on the Kennel Club's online health resource Mate Select. This resource is freely searchable and assists breeders wishing to check on the health status of a potential mate for their dog.

### **Breeding advice for complex inherited disorders**

Where health testing is recommended for your breed, it is important that any potential breeding stock are tested prior to mating. The results of these tests should be carefully considered and used responsibly to produce healthy puppies. If any of the BVA/KC health schemes are recommended in your breed, then once you know the results for both the potential sire and dam, you may wish to visit [www.bva.co.uk/chs](http://www.bva.co.uk/chs) for specific breeding advice on dogs tested against specific BVA/KC health schemes.

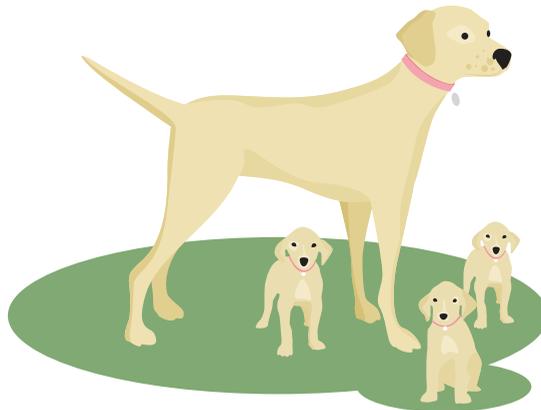
It is important to ensure that you also take into consideration all health test results, the general health of each parent, the inbreeding coefficient of the potential puppies that could be produced, the temperament of the dogs and the look of the dogs. How complex inherited disorders are passed on to any progeny is not straight forward and so you may wish to also consider the results of any breeding dog's parents, grandparents, siblings and previous offspring.

### **Estimated Breeding Values**

Available for breeds with a large number and proportion of tested dogs. Estimated Breeding Values (EBVs) evaluate the genetic value of an individual dog, in relation to the whole of the dog's breed. These EBVs are intended to help breeders reduce the prevalence of hip and/or elbow dysplasia by more accurately evaluating genetic risk. A dog's EBV allows it to be placed on a scale of liability, identifying those individuals at highest risk of passing on the condition and those at lowest risk.

### **Will there ever be a DNA test for complex hereditary diseases?**

Presently, all of the available DNA tests relate to diseases that are the result of simple inherited disorders. Many research scientists are working to develop increasingly sophisticated resources to better understand the genetics behind complex diseases that may mean there are DNA tests in the future. However, the nature of the complexity of these diseases means this will probably be some time in coming.



### 3. Inbreeding and its impact on health

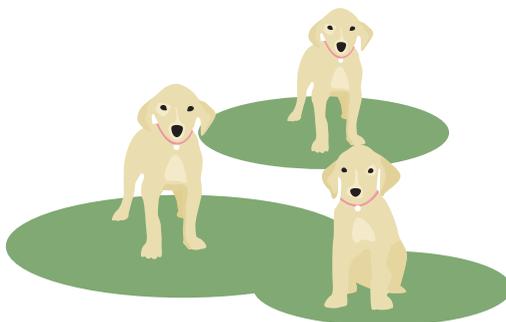
#### **What are the effects of inbreeding?**

Inbreeding is the mating of related individuals, either close or distant. The more inbred a dog is, the higher the chance that the same version of a gene has been inherited from both dam and sire – both for desirable and undesirable traits. This could increase the chances of a dog being at risk for both known and unknown inherited disorders and can lead to inbreeding depression.

Inbreeding depression is an overall decrease in general fitness, or general health, and may reduce, across the breed, things like litter sizes and fertility. It is impossible to make precise predictions about the exact impact that inbreeding has on an individual breed or dog, but we do know that, as the degree of inbreeding increases, the risk of having a serious and harmful impact on the breed as a whole will also increase.

#### **How can you measure the degree of inbreeding?**

The degree of inbreeding can be measured by using an inbreeding coefficient. This is the probability that two copies of the same gene have been inherited from an ancestor common to both the sire and dam. The lower the degree of inbreeding, the lower the inbreeding coefficient. Breeders should be aware that the inbreeding coefficient is a measurement of risk and does not guarantee that puppies produced will or will not have any inherited health conditions.



## View your dog's inbreeding coefficients on Mate Select

The Kennel Club's online health resource, Mate Select, provides breeders with inbreeding coefficient calculators. These calculators use pedigree records stored on The Kennel Club's database to calculate the degree of inbreeding, or coefficient of Inbreeding (COI), for:



- potential puppies that could be produced from hypothetical matings
- each individual Kennel Club registered dog
- each breed as a whole

These resources provide information about how a specific inbreeding coefficient for a mating is calculated, which includes how many generations the pedigree data extends back to in order to calculate a particular result.



For further information visit [www.mateselect.org.uk](http://www.mateselect.org.uk)

## Putting your dog's inbreeding coefficient in perspective

The lower the degree of inbreeding, the lower the inbreeding coefficient. An inbreeding coefficient of 0% indicates a dog that comes from two unrelated parents. An inbreeding coefficient of 12.5% would equate to the genetic equivalent of a dog produced from a grandfather to granddaughter mating. An inbreeding coefficient of 25% would equate to the genetic equivalent of a dog produced from a father to daughter mating. Inbreeding can be accumulative and so if it has occurred to a significant degree over several generations, the inbreeding coefficient may exceed 25%.

## Breeding advice

When choosing a potential mate for your dog, the Kennel Club recommend that breeders use Mate Select to calculate the inbreeding coefficient of the puppies that could be produced from a hypothetical mating. By using this resource it helps breeders decide whether to mate a particular pair of dogs together. The current Kennel Club breeding guidelines are that, where possible, breeders should produce puppies with an inbreeding coefficient which is at, or below, the breed average. The breed average is recalculated annually and is presented each time you

### 3. Inbreeding and its impact on health

use the Kennel Club's inbreeding coefficient calculators. Although the Kennel Club recommends breeding at lower inbreeding coefficients, there are similarly other important factors to also consider when deciding whether two dogs should be mated together, such as temperament, available health test results etc. Your decision should be well balanced between the inbreeding coefficient and the good qualities of the sire/dam that you are considering.



For more information, visit  
[www.mateselect.org.uk](http://www.mateselect.org.uk)

#### **Will the Kennel Club still register puppies with a higher than average inbreeding coefficient?**

The Kennel Club would still register the puppies of a mating which results in an inbreeding coefficient which is higher than the breed average, but it is recommended that you consider a different pairing, all other considerations being equal. If you do go ahead with the mating and plan to use any of the puppies for breeding in the future, it is strongly recommended that you take extra care to choose a highly unrelated mate that will result in puppies with an inbreeding coefficient well below the breed average.



## 4. Breeding from your non-pedigree dog

All dogs (like people too) are at risk of inheriting diseases. This section is designed to provide some general information on health testing and the schemes available for breeders of non-pedigree dogs. Due to the wide variation found in a litter of crossbred puppies, breeders of these dogs have an extra challenge, as it is more difficult to predict the temperament and physical characteristics than in purebred dogs.

If you are new to dog breeding then you should consider seeking out experienced breeders of your crossbred dog for advice on how to breed responsibly. With cross-bred and purebred dogs alike, the general health of a dog is paramount, especially prior to breeding e.g. ensuring no infections. This short guide however, can take you through the steps to gain a better understanding of how to choose appropriate healthy parents and how to breed healthy, happy puppies.



For further information visit  
[www.breedinformationcentre.org.uk](http://www.breedinformationcentre.org.uk)

### **Where to start?**

The Breed Information Centre, available on the Kennel Club website, provides health testing recommendations for each Kennel Club recognised breed. Breeders of crossbred dogs should look at the health information for each breed that makes up their dog. If you are thinking of breeding a cross between a Labrador Retriever and a Standard Poodle, for example, you should consider carrying out all of the tests for both breeds: BVA/KC Hip and Elbow Dysplasia Schemes, BVA/KC/ISDS Eye Scheme, DNA tests, and breed club recommendations.

### **How does inheritance work in crossbreeds?**

#### **If you are starting with two purebred dogs:**

It is important to test both of your dogs for the breed-specific health concerns that are relevant to them; this includes both DNA and health testing schemes.

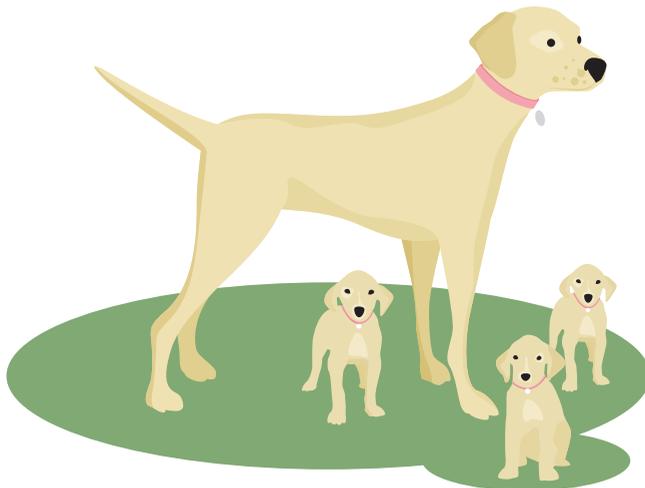
For some breed crosses, crossing two pedigree dogs once makes it less likely that certain inherited conditions will be passed on to that first litter of puppies. However, for many breeds, and especially for complex conditions like hip dysplasia, the same

## Breeding for Health

faulty genes are involved, which is why it is important to test. Health tests and schemes also give you important information about the health of your dogs.

### **If you are starting with one purebred dog and one crossbred dog OR two crossbreed dogs:**

It is important that if you use a crossbred dog for mating that you test each dog for the breed-specific health concerns that are relevant to them – both DNA tests and health screening schemes. For example, if you are breeding two Labrador-Poodle crossbreed dogs, then both dogs should be tested for all of the conditions that are relevant to both the Labrador Retriever and the Standard Poodle. Any puppies produced from this mating are at risk of inheriting both known (and unknown) diseases. It is especially important to health test any potential parents you are considering before they mate. This will help you to make an informed choice and allow you to reduce the risks of any potential puppies developing inherited diseases. If you breed untested dogs together, you could be putting your puppies at risk of being affected for both specific conditions (identifiable by DNA test), or complex conditions, like hip and elbow dysplasia (identifiable by health screening).



## What about inbreeding?

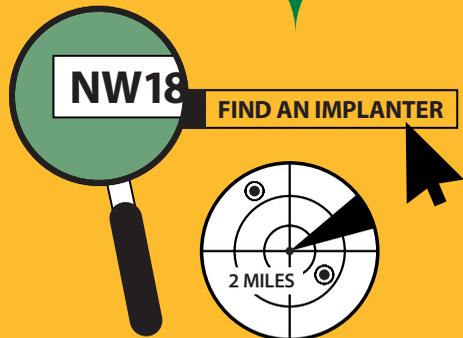
It is important to consider inbreeding when breeding any kind of dog. Pedigree dog breeders continue to work hard to increase the genetic diversity of the breeds, because they know this is important to reduce the risks associated with inbreeding and to conserve the breeds for the future. If you are breeding crossbreed dogs, it is just as important to work hard to not breed dogs that are closely related. Inbreeding may not be an issue when breeding dogs from two different breeds together, such as a Labrador and a Poodle, but will be an important consideration if mating two Labrador-Poodle crossbred dogs together. You may wish to keep your own mating records which can help you to avoid using close relatives of your dogs.



The UK's largest lost and found database for microchipped pets

## Petlog and the Kennel Club make it easy to find your local Petlog implanter

Did you know that new legislation is being introduced in England in April 2016 that requires all dogs to be microchipped? This includes puppies at eight weeks, before they go to their new homes.



To make sure your puppies are registered on Petlog, the UK's largest database for microchipped pets visit:

[www.petlog.org.uk/findanimplanter](http://www.petlog.org.uk/findanimplanter)

Managed by



## Mate Select

Mate Select is a useful online health-focused resource, which has been developed in conjunction with the Animal Health Trust.



It provides invaluable information to help breeders ensure that their breeding programmes continue to have a positive impact on the health and genetic diversity of their breed.

Mate Select currently includes:

- Inbreeding Coefficient Calculator (which can be used for individual dogs or for hypothetical matings)
- Health Test Results Finder
- Information about the health schemes available for each breed
- Estimated Breeding Values (EBVs)
- And more to come!



For further information visit [www.mateselect.org.uk](http://www.mateselect.org.uk)

Or why not visit the Kennel Club's Breed Information Centre for details on:

- Recommended Health Screening and DNA tests
- Assured Breeder requirements and recommendations
- Breed Club contacts
- Breed standards and breed characteristics
- Rescue organisations



For further information visit [www.breedinformationcentre.org.uk](http://www.breedinformationcentre.org.uk)

Breeding a litter of puppies can be very rewarding, but you need to remember that it can also be a costly and time consuming experience. The Kennel Club is committed to supporting responsible breeders to help ensure that all dogs - now and in the future - are fit, healthy and cared for.



## THE KENNEL CLUB

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Telephone 01296 318540 Email [mateselect@thekennelclub.org.uk](mailto:mateselect@thekennelclub.org.uk)

[www.thekennelclub.org.uk](http://www.thekennelclub.org.uk)

Join the conversation:

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**THE KENNEL CLUB**

*Making a difference for dogs*

The Kennel Club works to protect and promote the health and welfare of all dogs in the UK. We want happy, healthy dogs living long lives with responsible owners. All profits from the organisation go straight into funding the many programmes run in the best interest of dogs and dog owners and to support the Kennel Club Charitable Trust to re-invest into a wide variety of welfare and health programmes.

Anyone can register their dog with the Kennel Club. By registering you will demonstrate your commitment to your dog's well-being and to the health and welfare of all dogs. You can register online today at

**[www.thekennelclub.org.uk/dogregistration](http://www.thekennelclub.org.uk/dogregistration)**.

Whatever your dog's needs, the Kennel Club is here to help and support you.

Find out more by contacting us on **01296 318540**, or visit our website at **[www.thekennelclub.org.uk](http://www.thekennelclub.org.uk)** to find out more about the wonderful world of dogs.

**Additional guides on a wide range of subjects are also available to download from our website at [www.thekennelclub.org.uk](http://www.thekennelclub.org.uk):**

- Asthma and your dog
- Breeding from your dogs
- Choosing and bringing home the right dog for you
- Common canine poisons in the house and garden
- DNA profiling and parentage analysis services
- Do you know dog law?
- Do you know how to look after your dog in its senior years?
- How to get involved in fun activities and competitions with your dog
- How to get started with dog training
- How to register your dog with the Kennel Club
- Introducing dogs to children or babies
- Kennel Club endorsements
- Managing your dog's weight
- Moving house with your dog
- Pet Insurance Guide for dog owners
- Puppy Socialisation
- Road travel with your dog
- So you are thinking of working with dogs?
- Thinking of showing your dog in the UK?
- Travelling abroad with your dog
- Why should I Microchip my pet?