

Extended Project Report

Is the breeding of pedigree dogs causing a health issue with the dog's welfare and is The Kennel Club doing enough to tackle this issue.



Candidate 5

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¹Nicole Martin, 2008 [Judges checking dogs at a dog show], [image online] Available at:
<<http://www.telegraph.co.uk/news/uknews/3153144/Kennel-Club-to-review-every-pedigree-dog-breed-in-Britain.html>>

This report aims to explain the different problems caused due to the breeding of pedigree dogs and the reason why these problems have come to exist. Also, the schemes launched by The Kennel Club (KC) will be explained and evaluated to determine whether they are successful enough. Finally, future recommendations will be given to show what more can be done by The KC to improve these schemes and ultimately, a conclusion will be stated to establish if The KC has done enough so far.

1. Introduction- background information on dogs

There is considerable evidence that dogs share a common ancestor with wolves and foxes and that the human race caused this to occur. However, there is considerable debate as to how the domestication of the wolves came about. One theory stated by Ray and Lorna Coppinger (2004) is that wolves scavenged around areas habited by humans and that wolves who were least afraid of coming into contact with humans would survive as they could get closer to the rubbish dumps. This theory works on the basis of natural selection and the fact that the food acted as a selection pressure.² An experiment conducted by Belyaev (1969) on the silver fox showed how rapidly foxes can be domesticated. Foxes that were the least fearful when touched by a gloved hand were artificially selected to breed. Within two generations the foxes were much more responsive and by the fourth generation a few cubs showed dog like behaviour by wagging their tails as a response. In the eighth to tenth generation “floppy ears” and “curly tails” began to appear as well as changes in the coat colour. Over many generations anatomical changes began to take place as the legs, tail and snout began to shorten and the skull became wider.²

Over the generations humans have become vastly dependent on dogs to fulfil many roles and purposes. Dogs that worked well with other animals were selected to herd sheep (sheep dog). Dogs that showed agility and speed were selected to become race dogs as greyhounds nowadays are commonly used for racing. Humans who lived in colder regions bred dogs for pulling sledges to allow them to travel more easily across the ice and snow, due to this sledge racing has now become a very well known sport. Recently, dogs are now being used to make the life's of the disabled and unfortunate more trouble-free by acting as guide dogs. Dogs are also used in the world of illegal fighting where a large amount of money is made of them. Furthermore, their exceptionally good sense of smell is used by the police to find drugs, catch criminals or look for explosives. These examples all show how the uses of dogs can be linked to specific breeds if traced far back enough. E.g. the Basset Hound can be traced back to be bred as a hunting dog or the Bulldog for bull baiting.²

² Patrick Baterson, 2010. *Independent Enquiry into Dog Breeding*. [pdf]: Patrick Baterson. Available at: <<http://breedinginquiry.files.wordpress.com/2010/01/final-dog-inquiry-120110.pdf>> [Accessed at 6 July 2013]

2. The Kennel Club

During the 19th century (Victorian era) dog breeding went through a shift from being based on the function of the breed to the physical appearance of the breed. Breeders began to believe that they could make “perfect specimens” of breeds and even started created new ones and perfecting them. Very quickly owning a dog became a status symbol and dog breeding, a sport.³ The first dog show was held in 1859 and was very successful; an organisation called The KC was set up in 1873 to run these dog shows. Today, The KC is widely seen as the guardian of pedigree dogs as even the Queen herself is part of the organisation and a well known breeder.³

The first main function of The KC is that it is registry that provides the lineage of its members via certificates that include the family tree of the dog down generations.³ 27% of potential pet owners who wish to purchase a dog look for pedigree registered dogs as they believe that these dogs have a good quality of life and will be healthier than cross-bred dogs.⁴ Therefore, The KC has a large effect on the trade of dogs as members who are part of the organisation are sold for a higher price and are more likely to be sold than dogs who are not members.

The second main function of The KC is that it conducts a number of activities such as agility competitions, funding research via its charitable trust, dog training and most famously hosting a number of dog shows in the UK including Crufts which is the largest in the world.³

3. Why is the issue important?

a) The scale of dogs that are affected is very large as there are around five million purebred dogs situated in the UK and they represent 75% of the dog population.⁵ The KC itself registers more than 270,000 dogs a year. Therefore, the action taken by the dog showing community has a large impact on the majority of the dog population and their owners.⁴

b) Additionally, the problems that are caused are passed down the generations so more dogs are affected each year and in some cases the effects get worse due to inbreeding and line breeding. And so if the issue is not dealt with the problems will carry on and dogs will continue to be at a risk of developing problems.⁴

c) The problems are commonly long lasting and sometimes can last for the dog's entire lifetime causing the dog pain, discomfort and suffering. This severely limits the quality of life for the animal.⁴

d) Most of the problems that pedigree breeds suffer through can be avoided through very simple changes. Selective breeding via humans has encouraged these problems to develop and as a result we have a duty to solve it.⁴

³ *Pedigree Dogs Exposed*, 2008. BBC, Passionate Productions. (documentary)

⁴ Dr Nicola Rooney and Dr David Sargan, 2009. *Pedigree dog breeding in the UK: a major welfare concern?* [pdf].

Available at :

<http://content.www.rspca.org.uk/cmsprd/Satellite?blobcol=urlldata&blobheader=application%2Fpdf&blobkey=id&blobno_cache=false&blobtable=MungoBlobs&blobwhere=1232998477181&ssbinary=true>

⁵ The Associate Parliamentary Group for Animal Welfare, 2009. *A healthier future for pedigree dogs*. [pdf]: The Associate Parliamentary Group for Animal Welfare. Available at: <<http://www.apgaw.org/images/stories/PDFs/a-healthier-future-for-pedigree-dogs.pdf>>

4. **Problems caused due to selective breeding: morphologies and inherited disorders**

Over the last 130 years breeders who have bred pedigree dogs for showing them have not taken the dog's temperament, welfare and health into sufficient consideration. Therefore, only physical attributes have been kept in mind which has caused many breeds to suffer from pain, suffering and discomfort. This has been encouraged by The KC which has produced a Breed Standards that clearly states the physical characteristics of specific breeds. Judges in dog shows hosted by The KC such as Crufts use the Breed Standards as criteria. Dogs are compared to the description and participants who are the closest to it are given more marks. Thus breeders commonly conduct line breeding and inbreeding to "fix" certain traits that are specified in the Breed Standards.⁴

The two problems that have developed due to selective breeding are:

- Morphologies- exaggerated anatomical features
- Inherited disorders

Morphologies

These are physical abnormalities that have been caused due to breeders trying to exaggerate certain bodily traits. They can be split into different dog types such as dwarf breeds and toy breeds.

a) Larger breeds:⁴

1. Overly rapid growth of bones and distortion stress on bones that are far too big for their biomechanical design. Osteochondrosis is caused by the death of bone tissue growing too rapidly for its blood supply to keep up, cartilage can also be ruptured which causes further damage to the joint. Results in painful swellings that limit the mobility of the joint.
2. Elbow and hip dysplasia- The bone and joint do not fit properly and the soft tissue around the joint are too weak to hold the joint together, as a result, the joint is prone to partial or complete dislocation. Due to the tissues being stretched beyond their natural capacity the dog suffers serious pain and can also develop arthritis and lameness.
3. Vertebral degeneration- the discs in the spinal cord are stretched beyond their capacity which causes tissue damage. The dog's mobility is extremely limited from a young age and the pressure formed on the spinal cord leads to Wobbler disease (weakness of the limbs)
4. Gastric problems- due to their deep chest cavities cause the stomach to be stretched past its limit by the build up of gas. The pain caused by this is not the problem as the stomach can become twisted which traps the gas in the stomach. Up to 60% animals affected by this die and even animals that are treated surgically can still die afterwards.

b) Long backed breeds- Also suffer from vertebral degeneration where the compression from prolapsed discs on the spinal cord leads to pain, weakness of the hind limbs and finally paralysis.⁴

c) Dwarf breeds- short limbs may mean that the bones can be deformed and cause the leg to curve. Can have difficulty in mobility and the stress caused on the joint and spine can cause lameness and degeneration of the joints from a young age, this is very painful. These dogs less able to play-bow (a signal that invites other dogs to interact with them), therefore the dogs will not be able to interact with other dogs and are more prone to be socially deprived. This will have a mental affect on the welfare of the dog.⁴

d) Toy breeds:⁴

1. Fine limbs are very prone to stress fractures. They can suffer fractures from very small activities such as jumping and it is also common for these types of dogs to suffer dislocations of the patella (the knee cap) which causes lameness and pain.
 2. Incomplete formation of cartilage rings in the trachea increases the chances of the trachea collapsing during inspiration and expiration. They are also prone to respiratory issues that limit their ability to exercise and run.
 3. Toy breeds are known for their facial features by retaining their puppy look into adulthood, for this to occur the skull's development must be interfered with to form an skull that is not completely closed off. This causes Syringomyelia as the skull slows the down the flow of cerebrospinal fluid, causes a build up of the fluid in the form of a cyst in the cervical spinal cord. Eventually the cyst will be large enough to put pressure on the spinal cord and cause damage to it. Results in headaches, weakness, stiffness of the back and limbs and in some case paralysis. The animal must normally be euthanized if the pain caused by the illness is too great.
- e) Brachycephalic breeds- the length of the skull from the front to the back has been deliberately shortened to give an impression of the face as being flat ⁴
1. The size of the nose, cheek and mouth has been greatly reduced which causes stenotic nares (narrowing of the nostrils); limits the amount of air that can be breathed in through the nose. They also are prone to having a large palate of soft tissue at the back of the throat which interferes with the flow of air to the trachea.
 2. The dog's rate of breathing is much greater than other dogs as they must force air through their nose, causes considerable damage to the voice box which will inevitably result in the whole voice box collapsing.
 3. The tissue damage that occurs due to forced breathing causes swellings to occur in small cavities within the nasal.
 4. Breathing difficulties will eventually lead to right side heart failure. Due to these reasons dogs with respiratory diseases cannot live an active life without causing respiratory distress (tongue starts to turn blue when excited or when stressed).Soft Palate resection has to occur which is when the nostrils are opened up via surgery
 5. Reduced size of the nasal and buccal features means that the surface area of the cavities in these areas has been reduced; it is more difficult for evaporation to occur via panting for thermoregulation to occur. This means that these types of dogs are prone to heat strokes.
 6. Normally the size of the eye for a dog correlates to the size of their skull, so small dogs should theoretically have small eyes. However the Brachycephalic are known to have large eyes and this means that their eyes are very poorly protected. Can be seen as a Proptosis (eye dislocation from the socket) can easily occur if the head suffers a trauma.
 7. Cannot use their facial expressions properly so it is harder for these dogs to interact with others.
- f) Breeds with short or screw tails ⁴
1. The tail may lie to close to the body or can be so tightly twisted that it is common to have infection.
 2. In extreme cases the tail may have to be amputated and can also affect other parts of the spine by causing scoliosis which is sharp bends in the spine or narrowing of the spine itself
 3. may cause hind limb weakness, paralysis and spinal pain
 4. Studies via Leaver and Rimchen in 2008 show that dogs are more likely to approach dogs whose tails are longer rather than shorter and is wagging rather than still as that shows affection for other dogs.

A breed that is classified as a Brachycephalic is the Pug and this breed is said to be so inbred that scientists at Imperial College of London discovered that even though there the population of pugs consists of 10,000 individuals the genetic diversity is only equivalent to 50 individuals.³ Therefore, the breed suffers from many abnormalities as shown above and the only way for these abnormalities to be avoided is via out-crossing (breeding two different breeds) which is currently banned by The KC to maintain its “very unsullied aristocratic breeds”. Furthermore, Amanda Ellis who is a champion pug breeder states the pug hasn’t really got those many problems and that it only looks exaggerated.³ The pug is also known for its screw tail as the Breed Standards states “tail curled as tightly as possible. Double curl highly desirable.” Hence, the breed suffers from spinal problems as well which is known to cause pain.

g) Dorsal ridge- Rhodesian Ridgeback

1. The ridge is treated as the defining feature in the breed
2. Ridge is caused by a recessive mutation that also increases the chances of the dog suffering from Dermoid Sinus. These are narrow tube like structures which penetrate the skin with varying depths and can reach all the way to the brain or the spinal cord. There is no evidence of ridgeless dogs suffering from Dermoid Sinus.⁴
3. One in twenty ridgebacks doesn’t have a ridge so breeders such as Ann Woodrow put them to sleep as The KC will not accept them as show dogs.³
4. “The problem of Dermoid Sinus could be virtually eliminated by allowing unridged dogs in breeding and by avoiding matings between ridged dogs” Even so the Rhodesian Ridgeback club refuses to do this and still excludes ridgeless dogs from their breed Standards.⁴
5. Until 2008 the Rhodesian Ridgeback club stated on it’s code of ethics that “ridgeless puppies shall be culled”³
6. Mark Evans who is the chief veterinary advisor of the RSPCA describes this as “disgraceful” due to the fact that breeders breed them for the ridge which is a “deformity” whilst the healthy ridgeless dogs are killed.³

Inherited disorders

This is the indirect effect of selective breeding as over generation’s genetic diversity of the dog species is decreasing. Breeders have not put enough selection pressure on the health and welfare of the dogs which has lead to a whole range of genetic disorders that are painful and “chronically debilitating”.⁴ Furthermore, many modern breeds have come from a small number of founder dogs, these dogs were bred with other dogs that showed desired characteristics and the sires were then extensively used as studs. If a stud suffers from a genetic disorder then the disease can spread very rapidly down the line. For a dog to suffer from a monogenic disease both the alleles received from the parents must be defective and cause the disease. If both the parents are closely related then they both may be carriers which would mean that the offspring is much more likely to develop the disease.

Since the last 50 years or so The KC has maintained a closed gene pool within breeds as the dam and sire must both be already pedigree registered to allow for the offspring to be registered. Even though the reason for this was to preserve the characteristics of the breeds that distinguished them from each other, the outcome is that breeders are less likely to find a mate that is not genetically related to some degree. Thus, the offspring is more prone to suffer from genetic disorders.⁴ In addition, studies by the Imperial College of London showed that in ten common breeds in the UK, 90% of the genes from predecessors have been lost.³ Nowadays, many breeders understand that inbreeding (breeding closely related animals) causes many problems and avoid it but fail to

understand that all dogs from the same breed are related to some degree due to the common founder dogs in the family line. The only possible solution to completely avert the chances of the pup developing disorders is via out-crossing which The KC currently bans. However, some breeders still continue inbreed to make sure that the dog's pups have the specific features as laid out by the Breed Standards.

The link between inbreeding and diseases can be seen by the three examples given below: ⁴

- a) Cardigan Welsh Corgis whom suffer from progressive retinal atrophy can be traced back to a single ancestor. This disease causes the retina to degenerate over time which causes vision to decrease and eventually leads to blindness.
- b) Epilepsy which is found as a monogenic disease in Keeshond and as a more complicated disease in Labrador Retrievers can be found in significantly inbred populations within the breed.
- c) Also Labradors who suffer from polygenic diseases such as hip dysplasia are found to be highly inbred.

Other examples of genetic disorders include: ⁴

- a) In Cavaliers the prevalence of Chiari Malformation (when the cerebellum and brain stem get pushed downwards) is high. There is also a high chance of the dog having abnormalities at the craniocervical junction (where the head meets the spine). These conditions increase the chance of Syringomyelia occurring. In a study 64 dogs were tested out of which 49 showed no clinical signs of disease. 42% of these dogs were found to suffer from Syringomyelia.
- b) Also the breed suffers highly from cardiac problems as 25% of all conditions in the breed are heart related the prevalence (percentage of the population with the breed) is 17%
- c) 13.7% of the Lancashire Heeler breed is affected by a genetic disease known as the Collie Eye Anomaly. This is a disease that causes abnormalities in the retina of the eye and can cause the retina to detach or for the blood vessels near the retina to bleed profoundly. This will result in blindness of the eye. As the disease is a recessive disease an offspring must have two alleles that cause the disease two be directly affected by it. Therefore, it can be estimated that 60% of the dogs in the breed carry the mutation.
- d) The KC health survey stated that 39% of Boxers died of cancer when compared to 27% across all other breeds.

The diseases caused in Cavaliers are of particular concern as they are sixth most common breed in the UK. Dr Clare Rusbridge states that humans there is condition similar to Syringomyelia and it is seen as one of the most painful conditions where patients suffer from a "burning pain and a piston type headache." ³ These descriptions can be used to explain the suffering Cavaliers experience due to their conditions. Some dogs have to be put to sleep due to the amount of pain that they constantly have to go through.

For dogs that are very seriously affected the only other option is brain surgery where the back of the skull is removed to allow the brain to function normally. In spite of this the surgery is very risky and unfortunately the dog does not always survive. Simon Swift, a cardiologist from the University of Liverpool confirms that half of all Cavaliers suffer from a murmur by the age of five and that he is frustrated by the lack of progress in this issue. ³ The KC had denied that Syringomyelia was a concerning issue by assuring that it was nothing more than a "pet over reaction." Also the former chairman of the Cavalier Club claimed that the scratching caused due to the condition is too common as all dogs scratch. ³

5. Limitations in data ⁴

There are two different ways in which the spread of a disease can be identified: prevalence and incidence. Prevalence is the percentage of the breed population that has the disease whilst incidence is the number of new cases per year. Hence, it is the better of the two to use as the risk of contracting the disease is clearly stated. And yet researchers may not be able to use incidence as they do not have enough time and can only afford to investigate data at one point in time (to study incidence the number of new cases in a time period must be studied). Moreover, the breeds, disorders and populations may not have been systematically selected thus by the time the data from the study are split into the different breeds the results will be too miniscule to effectively compare.

In addition, many conditions are tended to by private veterinary services so are unlikely to be reported in open registries. This indicates that the data stated in reports will not be accurate enough to represent the true prevalence and incidence. As a result, the spread of the disease may be much higher than it is expected to be, in which case the issue is even more pressing than it was believed to be. What is more, insurance databases are commonly used to compare the spread of a disease in pedigree dogs and crossbred dogs although these companies tend to be biased towards pedigree dogs as they are more likely to come from a wealthy family, they are therefore, unreliable. Either way we do not know the true prevalence and incidence of diseases in dogs but we do know that it is much higher in some breeds such as the Cavaliers when compared to other breeds such as the Greyhound. Ultimately, the issue must be considered or else numerous dogs will suffer.

6. Ways in which The KC has tried to tackle the issue and has it worked

The KC and British Veterinary Association (BVA) have both launched a scheme to try and minimise the spread of Canine Hip Dysplasia (CHD) for more than 30 years. Local veterinary surgeons send radiographs of dog's hips which are then sent to the BVA where an expert panel of judges score each hip out of 53 (the higher the score, the more extensive the damage). The KC publishes the mean breed score (MBS) each year to indicate the prevalence of CHD. Breeders are then strongly recommended to select a mate that has a hip score lower than the average to try and decrease the spread of the disease. ⁵ So far, the MBS has been falling slightly each year. The KC uses this as proof to demonstrate that progress is being made. ⁴

In reality, owners ask their vets to look at the radiographs before sending them to the BVA. If the dog shows obvious signs of CHD then the radiograph will not be sent and as a result the extent of the damage will not be included in the MBS. Moreover, the scheme is voluntary, hence only a small number of owners are willing to screen their dogs. E.g. in 2006 13,000 hips of a particular breed were screened by the BVA whilst simultaneously The KC registered 75,000 dogs in the same breed. This means, that less than a fifth of the breeds' population who are at risk of developing CHD were screened. For a breeding scheme to be truly efficient it should apply to the whole breed or at least a large segment of the breed. Additionally, breeders must agree to follow the advice of the panel and only mate dogs with a hip score lower than the MBS. The fact that the scheme does not conform to either of these means that the true progress of minimising the spread of CHD cannot be determined. ⁴

Secondly, there is a mandatory DNA test for both breeds of Irish Setters for Canine Leucocyte Adhesion Deficiency (CLAD) if they wish to be registered with The KC. The test seems to be very efficient as dogs that are tested are seen as more valuable than dogs that aren't. Therefore, it provides an incentive for breeders to test their dogs whilst at the same time benefitting the welfare of the dogs. Since the scheme has been launched the incidence and prevalence of CLAD in Irish Setters have dropped dramatically, this provides enough evidence that DNA testing is a successful scheme and has the potential to work. ⁴

However, the scale of the test is too miniscule as there are many other breeds in the UK who suffer from genetic disorders. Therefore, these breeds can be registered with The KC and bred from without the need for any tests being conducted before. What is more, the Irish Setter is only tested for one disease whilst the breed can suffer from other diseases as well.⁴

Thirdly, in 2004 The KC launched the Accredited Breeder Scheme which includes tests that are recommended and required for specific breeds that are part of the scheme.³ The scheme includes tests for many breeds such as Cavaliers and Labradors. In Labradors hip and eye testing is compulsory which is efficient as the issue can be detected before individuals are selected for mating. Therefore, only dams and sires who do not suffer from the problem can be mated to reduce the chances of hip and eye problems from developing.⁴

However, the scheme does not seem to work very well as it is voluntary and so it is the breeder's choice as to whether they wish to participate or not. Furthermore, Labrador breeders are only recommended to have their elbows graded even though 27% of the conditions they suffer from are musculoskeletal and the elbow is one of the most common areas where the disorder occurs. In addition, Cavalier breeders are recommended to be tested for Mitral Valve Dysplasia (MVD) even though the disease is the second most cardiac problem in the breed. Also there is no mention of Syringomyelia despite the fact that the illness can easily be detected by a MRI scan.⁴

Likewise, from January 2012 The KC has banned the registration of puppies from a dam that has had two caesarean sections or who's had more than four litters. Thus, bulldogs that cannot give birth without assistance will not be able to be bred from more than once if the breeder wishes to register the puppies. This will reduce the spread of the genetic and physical abnormalities that bull dogs suffer from. However sires that have these abnormalities can still be bred from and can, as a result, spread then abnormalities.⁶

Ultimately, since 2009 The KC has prohibited mother-son, father-daughter and grandfather-granddaughter mating. This is efficient as the chances of the offspring suffering from genetic disorders are greatly reduced if the dogs are not very closely related.⁴

7. Changes that still need to be introduced

The CHD scheme can be improved by making it compulsory for breeders to screen their dogs. This would mean that 100% of dogs who are registered with The KC should be screened. If this is unrealistic then at least all dams and sires in the organisation should be screened to control the spread of the disorder. Also a scoring system should be introduced where animals with no disease should be grouped so that it is possible to compare the spread of the disease within breeds internationally. Hence, progress will be able to be easily determined. Furthermore, breeders should be encouraged to consider welfare and health in the same way with which physical appearance is seen so that the problems caused due to selective breeding can be "bred out." However, the high cost to owners and breeders may discourage them from conforming to the scheme.⁴

Additionally, DNA tests for Irish Setters has been very successful so must be developed for other breeds so allow more diseases to be accurately detected to reduce the spread of disorders. On the other hand, this is difficult to implement as there is limited knowledge regarding mutations and the funds provided for research are limited. Moreover, in some disorders, the only allele remaining is

⁶ The Associate Parliamentary Group for Animal Welfare, 2012. *A healthier future for pedigree dogs Update report [pdf]*: The Associate Parliamentary Group for Animal Welfare. Available at: < <http://www.apgaw.org/images/stories/PDFs/Dog-Breeding-Report-2012.pdf>>

the mutated version. Therefore, there is no way to test for the allele in dogs as there is no genetic variation to compare it to. Also, blood samples will be taken collected in a large scale so legal barriers such as the Home Office Scientific Procedures Act will come into effect. As a result staff members will need to be hired to collect the blood samples as local vets will be unlikely to give up their time to conduct blood tests. This includes a large cost disadvantage that may act as a disincentive for The KC.⁴

Finally sires with genetic disorders should be limited to the amount of litters they can produce in the same way that dams currently are.⁶ This is essential as sires are extensively used as studs and therefore the amount of litters that a stud can produce in a lifetime is much higher than that of a dam.

8. Conclusion

Pedigree dog breeding has caused major problems regarding the welfare and health of dogs. Not only the dogs, but owners too are affected as it is estimated that pedigree dogs cost their owners ten million pounds a week.³ The health effects can be distinguished as being physical with regards to morphologies and genetic disorders and mental as dogs such as pugs that cannot wag their tail are seen as unsociable in the eyes of other dogs. As a result, these dogs are prone to be mentally affected which may have a large influence on the temperament and the behaviour of the dog.⁴

Finally, The KC has recognised that selective breeding has caused a concerning issue that must be dealt with. Keeping this mind the organisation has taken the first step by launching schemes such as the Accredited Breeder Scheme. These schemes aim to reduce the spread of the disorders via different methods that have been evaluated. However, the scale of these schemes is far too small for it to affect the whole breed. Ultimately, The KC must allow the out-crossing of breeds to truly reduce the incidence and prevalence of diseases. This has already been done with the Dalmatian to try and get rid of the genetic disorders linked to the breed. A Dalmatian was out-crossed with a Pointer and the offspring was back-crossed with a Dalmatian. The result is that the offspring's do not have the genetic disorders anymore. However The KC refuses to register the dog until the fifth generation has passed. This is a disincentive for breeders as they will have to wait for a long time before they can show their healthy dog.⁴ To conclude, The KC has not done enough to tackle the issue caused by selective breeding as the schemes themselves are not enough to reduce the spread of diseases in the dog population.

9. Bibliography

Author	Description	URL	Usefulness	Reliability
Jemima Harrison	BBC documentary known as "Pedigree Dogs Exposed"	http://www.youtube.com/watch?v=TMyqH_Q_iPY	Very useful as the documentary explains the different viewpoints of organisations such as the RSPCA, Kennel Club, breeders, cardiologists' etc regarding breeding dogs for their appearance. It also gave facts and figures that have been found out by Imperial College of London and other major organisations. Furthermore, the documentary gave me real life examples of dogs who suffer from genetic disorders; it also showed how Crufts champions also suffered from genetic disorders. However, the source was not as useful as the reports I read.	Due to the fact that the documentary shows both sides of the issue it could be seen as quite reliable. However, the producer seems to agree with the fact that the Kennel Club and that the current schemes have more disadvantages than advantages. Therefore, the documentary can be seen as slightly biased as it encourages the audience to agree with the RSPCA.
Dr Nicola Rooney and Dr David Sargan	Report called "Pedigree Dog Breeding in the UK: a major welfare concern?"	http://content.www.rspca.org.uk/cmsprd/Satellite?blobcol=urldata&blobheader=application%2Fpdf&blobkey=id&blobnocache=false&blobtable=MungoBlobs&blobwhere=1232998477181&ssbinary=true	The report was clearly structured so I could find out the information I needed relatively easily. Furthermore, the report described and explained various different diseases that different types of dogs suffer through and also provided some information about the schemes developed by the Kennel Club. Moreover, the data's reliability was evaluated which led me to make a whole new section called "limitations of data."	The report was very reliable as all facts and experiments were referenced and could be traced. Also, the conditions stated and explained were also included in the other reports so I could easily cross-reference the information. Furthermore, the data was evaluated by stating the limitations of the experiment.
Patrick Bateson	Report called "Independent Inquiry into Dog Breeding"	http://breedinginquiry.files.wordpress.com/2010/01/final-dog-inquiry-120110.pdf	The report mostly stated the same information as the RSPCA report so was not very useful except for the introduction as it stated relevant background information without the need for too much in-depth analysis. Therefore, I could use the historical information, experiments and theories	The report was reliable as the experiments were thoroughly referenced. When I checked the online the results from the experiments stated in the report turned out to be accurate. As a result, the

			stated to explain the domestication of foxes and wolves in my introduction.	reliability of the information I used in my report from this source is high.
APGAW	Report called "A healthier future for pedigree dogs."	http://www.apgaw.org/images/stories/PDFs/a-healthier-future-for-pedigree-dogs.pdf	The report was not very useful as most of the information stated was already in the other reports. The only information I found useful was the population of pedigree dogs in the UK. However, the report allowed me to cross reference the RSPCA report so was a bit useful.	The report was quite reliable as the information stated could be easily cross referenced with the other reports.
APGAW	Report called "A Healthier Future for Pedigree Dogs- updated report"	http://www.apgaw.org/images/stories/PDFs/Dog-Breeding-Report-2012.pdf	The report was more up to date than its predecessor and so had quite a lot of information regarding the actions taken by The KC. I discovered some contemporary schemes taken by The KC which were evaluated so could be used in two sections of my report.	The information stated was checked by me on The KC website and was accurate. Also, the data was well referenced and since the organisation is well known the report is reliable.
Nicole Martin	Online picture showing Judges checking dogs at a dog show	http://www.telegraph.co.uk/news/uknews/3153144/Kenel-Club-to-review-every-pedigree-dog-breed-in-Britain.html	The picture was used by me on the title page of my report to make it more aesthetically pleasing and for the reader to understand that the report will be regarding pedigree dogs and The KC. This can be seen clearly as the dogs are being judged on their physical traits rather than their temperament or health which is a vital part of my report.	The picture was shown The Guardian web page under a news article so can be seen as reliable as The Guardian is a well known and respected organisation.