



# CHOW CHOW BREED COUNCIL HEALTH SURVEY 2009

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## **Abstract**

This study looks at owner's perceptions of the overall health of the chow with a focus on the hereditary conditions identified by the Kennel Club to be associated with the Chow Chow. A structured questionnaire was used to gather data. The findings were subjective and qualitative rather than quantitative and provided an indication which areas gave more cause for concern and which areas owners had little or no awareness of.

The survey has been successful in its main aim to identify those areas that require further investigation by the Breed Council and has also identified some areas where owners may benefit by making more information about particular conditions.

## **Introduction**

Towards the end of 2008 the Kennel Club contacted all the Chow Chow Breed Clubs asking the clubs to "*review the health information contained in Annex B*" which relates to statistics collated from insurance claims which indicated that the most common claims are for "Cruciate ligaments, Skin Disorders, and Entropion". The second area where information relating to genetic conditions found in the Chow Chow was scientific literature where a further eighteen conditions were identified (see appendix 1& 2) but no indication was given as to how frequently any of these conditions occur in the breed.

In 2004 the Kennel Club carried out a general health survey where questionnaires were circulated to all breed clubs, unfortunately there were insufficient responses from Chow owners to enable the Kennel Club to produce detailed feedback for the breed. Sadly this means that there is no data on relating to health defects in the chow from this source and a golden opportunity was missed (appendix 2).

The Kennel Club advised the Breed Council that the identified conditions are believed to be hereditary although in many cases the mode of inheritance is not clear (Appendix 1). If this is the case it may be possible to reduce the incidence of some of the conditions either by testing or by selectively breeding to avoid using affected animals or careful breeding or selective use of known carriers where identifiable.

As there is no indication of numbers of affected dogs for any of the conditions it was decided to circulate a questionnaire to determine the Chow Chow owner's perception of the health status of the breed and which conditions (if any) they have had experience of.

Investigating the information sources for many of the listed conditions proved difficult because they were case study reports that have been published in scientific journals that can only be accessed through subscription. It was not possible to ascertain any idea of the frequency or numbers of occurrence of many of the

conditions or even where the cases occurred. A question and answer session at a Breed Council meeting suggested that many of the conditions were either not known by everyone or where people had knowledge of the condition they were unaware of any incidents of the condition in chow chows.

The aim of the survey was twofold, firstly to determine owner's perception of breed health issues and secondly to have a better understanding of how many of the conditions the owner's are familiar with. The main focus of the survey were the conditions identified through insurance claims and from scientific literature, to these conditions others identified by long-term breeders were added to give a more complete picture these conditions were: - Bloat: Torsion: Hypothyroidism: Epilepsy: and Infertility. Respondents were also invited to add other conditions that they were aware and these have been recorded separately for consideration at a later date. The additional conditions may or may not have a hereditary component.

It should also be noted that the term 'skin disorders/conditions' conditions covers a wide range of conditions some of which are likely to be symptomatic of other listed conditions e.g., Pemphigus, Alopecia X, hypothyroidism etc (see appendix 1).

Because the intention was to have a clearer perspective of which conditions owners had either experienced or had knowledge of there was no time limit placed on when the respondents experienced the problem as this may have obscured knowledge of conditions that may have been experienced some time in the past but that are not experienced today. The intention was not to discover how many dogs had suffered any of the conditions but to know if owners had some experience of them. The survey did not ask how many dogs the respondents have owned the sex, age or how many dogs the responses related to as this will be covered in future surveys that focus on specific health are

The main intention of the survey therefore was to establish ***"which health conditions are perceived by Chow Chow owner/breeder/exhibitors to occur most frequently in the breed and/or give most concern"***.

## **Method**

### **Design**

The research design was a structured survey where chow owners were invited to complete a three page questionnaire (Appendix 1) providing qualitative (subjective) data about their personal experience and personal perceptions of different health conditions.

### **Participants**

The Participants were 83 unidentified Chow breeders, exhibitors and owners located in the United Kingdom.

## **Materials**

A computer was used to build the database in Microsoft Excel. The internet was used to circulate questionnaires and receive responses. In addition paper copies were circulated to those without internet connection.

## **Procedure**

The questionnaire (appendix 1) was circulated via the internet and websites to breed club secretaries and breed council representatives with a request to forward on to club members. Where secretaries and owners had no internet access paper copies were sent by post on request. A copy of a glossary giving definitions of the various health conditions was made available online and also by post on request.

Questionnaires could be returned by post, internet or by handing the completed questionnaire to a club secretary to forward on. A small pilot study was conducted prior to full circulation of questionnaires.

The database was created using excel to generate pivot tables to count responses and generate bar charts.

Completed questionnaires required some manual manipulation to provide ordinal and nominal data e.g., marks indicating 'yes' were replaced with '1' and marks or blank spaces were replaced with '0'. This was necessary as empty spaces in the database lead to counting inaccuracies.

## **Results**

The survey approached the task from three angles, **Section A** looked at how many chow owners had any experience of the cited health conditions. The main purpose was to identify areas that require some action be taken either in the form of education or a more in-depth investigation into some conditions. The objective was not to identify how many times the responders had experienced the conditions but to see how many have had any experience of the conditions.

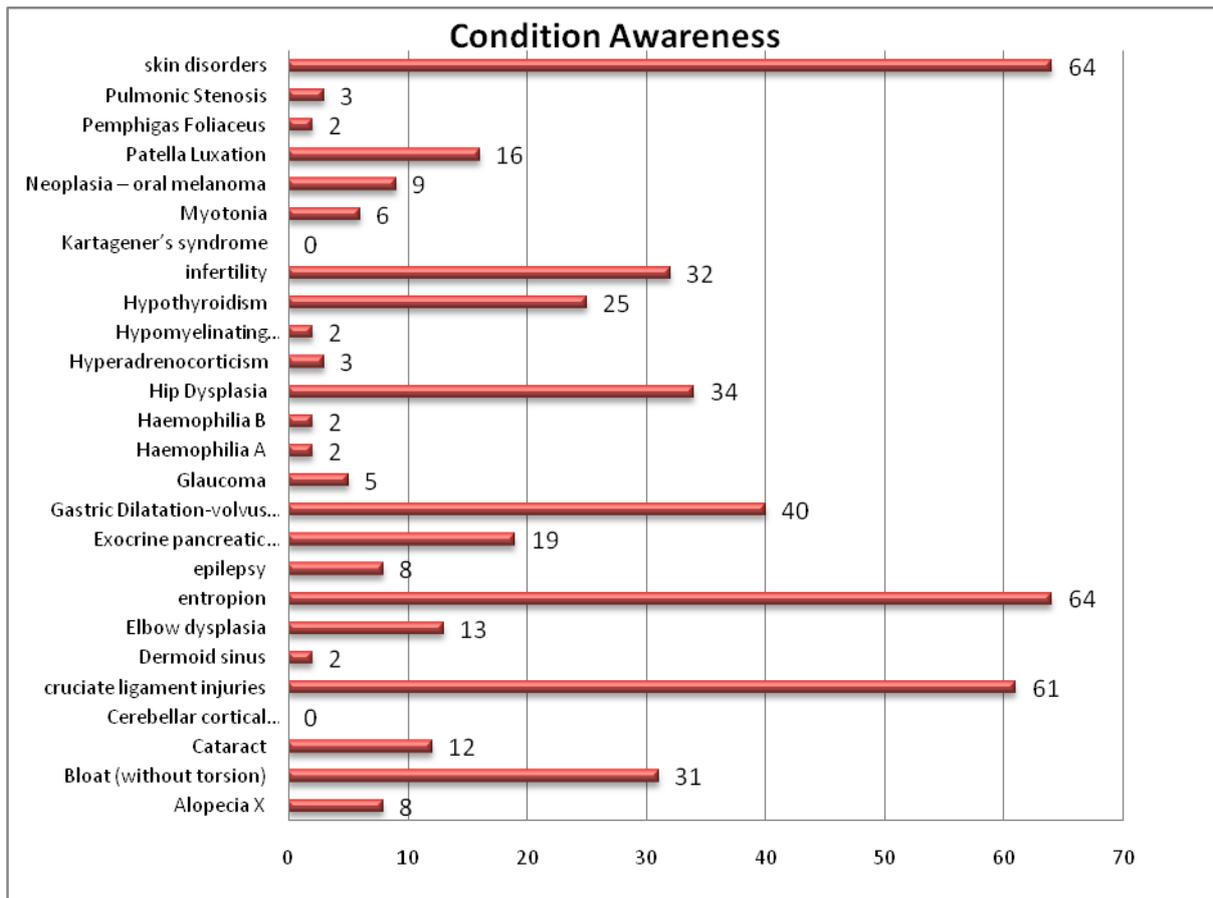
In **section B** responders were asked about their impression of the frequency of occurrence in the breed. This information is important to the Breed Councils understanding of perceptions of health issues and how those perceptions may impact on working towards reducing the incidence of specific conditions.

**Section C** asked responders to put the different conditions in order based on how problematic they felt they were whether that was seen in terms of how serious an

issue the condition was for the breed on the whole or in terms of the impact on the individual animal's health.

These are based on 83 responses that have been received from all over the UK, including Ireland and the Channel Islands.

**Section A** (see fig 1) suggests that the majority of respondents have had some experience of the three conditions Entropion 64 (77%): Skin Disorders 64 (77%) and Cruciate Ligament injuries 61 (73%) which supports the information provided by the Kennel Club relating to these conditions being highly represented in insurance claims.



*Fig 1. Owner's reported experience of various conditions associated with the Chow Chow*

Of the 18 additional conditions listed by the Kennel Club only Hip Dysplasia was experienced more than 40% of the respondents (34), 5 conditions had been experienced by less than 25% of respondents, 9 conditions were found to be experienced by less than 9% of the responders, and none recorded experience of cerebellar Cortical abiotrophies and Kartagener's syndrome.

There was however a significant amount of owner's that had experience of the additional conditions added in consultation with the breed council as areas of concern (although it is not known if there is a hereditary component to the

conditions). 40 respondents have reported experience of Bloat with torsion (48%) and 31 without torsion (37%), 25 respondents reported experience of hypothyroidism (30%) and 32 experienced infertility issues (38%). These results suggest some areas for further investigation.

**Section B** (fig 2) even where owners have had some experience of particular conditions the results suggest that the majority of Chow owners did not see these conditions occurring frequently. The most highly represented condition in this section was skin disorders, fewer than half the respondents 43% (36) felt that it was relatively common and 44% (37) felt it occurred occasionally even though skin disorders are often symptomatic of other underlying conditions including behavioural issues and thus is more likely to occur.

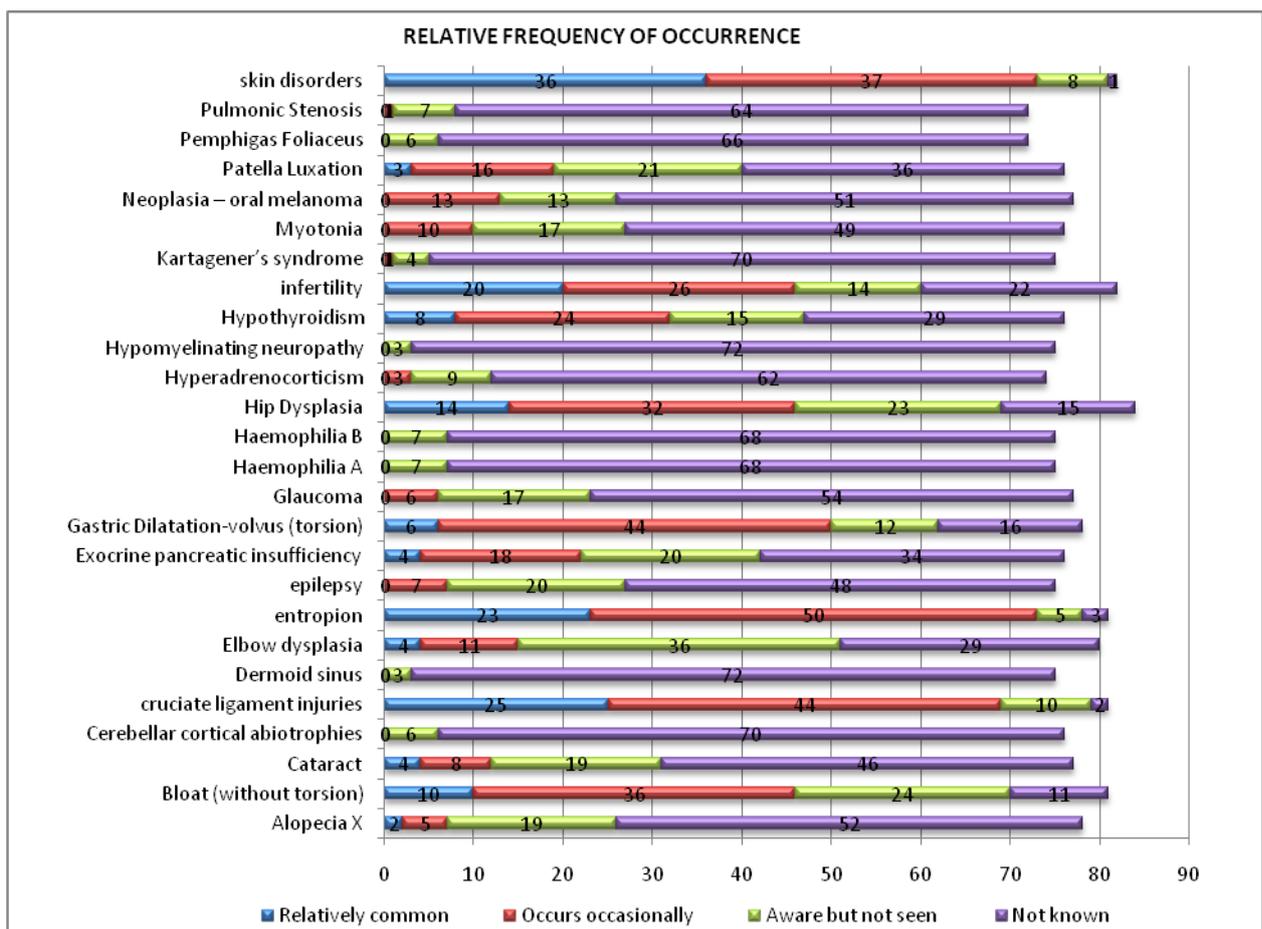


Fig 2. Indicates owner’s perception of relative frequencies of occurrence of various conditions associated with the Chow Chow

Entropion was seen to occur relatively frequently by 23 respondents (27%) and infrequently by 50 respondents (60%), Cruciate Ligament injuries were seen to occur relatively frequently by 25 respondents (30%) and infrequently 44 respondents (53%). Other conditions that were perceived as either occurring relatively frequently or infrequently most often were bloat 55%, torsion 60%, hip

dysplasia 55% and infertility 55% and may suggest areas that require further investigation.

There were a number of conditions that significant numbers of owners were aware of but had never seen such as elbow dysplasia 36 reports (43%), patella luxation 21 reports (25%) and exocrine pancreatic insufficiency (EPI) 18 (21%) reported that they felt the condition occurred infrequently and 20 reported that they were aware of the condition but had never seen it (24%). It should be noted that 40% of respondents were unaware of EPI, 43% of respondents were unaware of Patella luxation and 34% respondents were unaware of elbow dysplasia, this may indicate areas where more information about these conditions should be made available to Chow owners.

**Section C.** This section required owners to rank conditions in the order that they felt reflected the seriousness of the condition. As many of the conditions were either unknown or not experienced by the respondents many ranked less than 10 conditions. Similarly some respondents rated conditions with higher numbers to indicate that whilst they recognised them as being of some concern the level of concern was not particularly high. As two conditions received the same number of responses overall the table lists the top 6 conditions rather than the top 5.

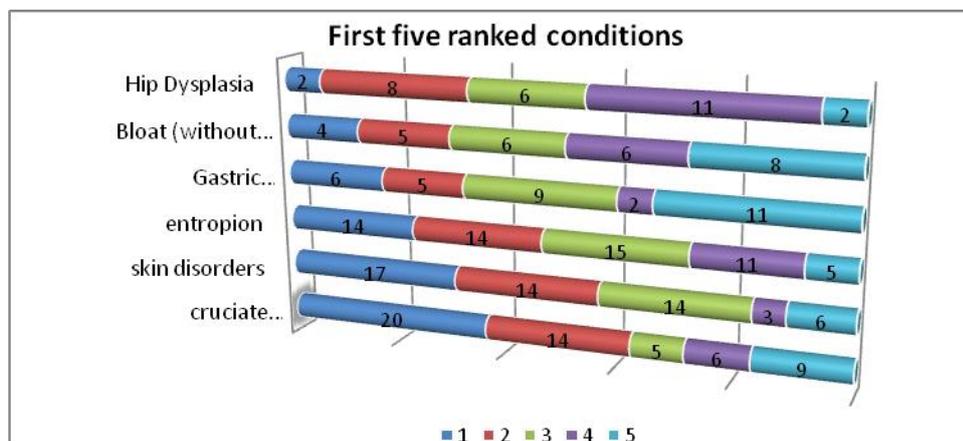
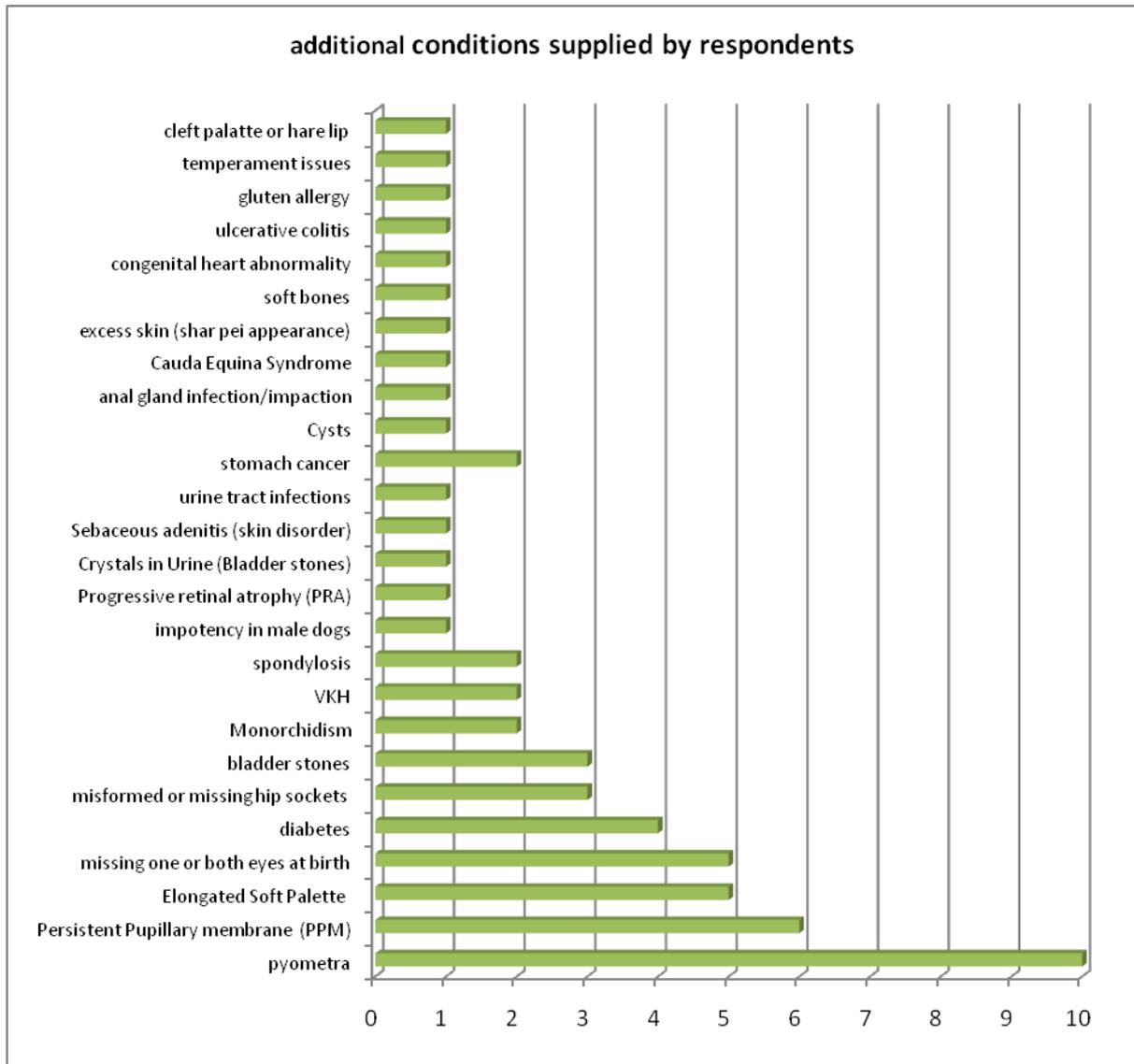


fig 3. Shows the conditions that were rated as the top 6 conditions that the respondents felt were those that they were most concerned about either because of the effect it had upon the overall well-being of the dog or because it occurred relatively frequently.

Again the three conditions indicated by the Kennel Club as most commonly occurring based on insurance claims are also the conditions that owners rate most highly Cruciate Ligament injuries was ranked first most often (20) followed by skin disorders (17) and Entropion (14) however hip dysplasia and entropion were both ranked most often in the top five. This result was not unexpected as these were the conditions that more respondents reported some experience of even if that experience was that they occurred infrequently but still are of most concern to owners overall.

The results pertaining to additional conditions (fig 4) that were noted by respondents that were not included in the survey, whilst not necessarily genetic or congenital in origin, may indicate areas for further investigation. This list is not exhaustive.



*Fig 4 indicates numbers of respondents that have had experience of the above conditions that were not included in the original study.*

As these conditions were not included on the original questionnaire the results do not reflect the experiences of all of those that responded to the standard questionnaire. With this in mind it is noteworthy that a significant number of respondents listed conditions such as Pyometra 12%, persistent papillary membrane (PPM) 7% and birth defects such as missing eyes or elongated soft palates were listed by 6% of respondents. The relatively high level of respondents citing these conditions indicates that these may be conditions and issues that require further investigation by the Breed Council some time in the future.

## **Discussion**

The survey was compiled and circulated in a relatively short time to enable the Breed Council to make a more informed response to the Kennel Clubs request for comments to be made regarding the listed health conditions.

The response to this survey has been very encouraging, the respondents have come from all over the UK including Ireland and the Channel Islands ranging from those that have been in the breed for many years, sharing their lives with large numbers of dogs to those who have had one or two dogs over a long period and those newly in the breed.

A number of issues were raised by respondents with who had concerns that while they were aware of some of the conditions their experience of them was many years ago and to the best of their knowledge they are no longer seen in the breed. It was pointed out that one outcome of the survey was to have a better understanding of how many of the conditions are known and understood by Chow Chow owners and where it the Breed Council may need to look at where more information may need to be made available to Chow Owners about specific conditions.

At present there are no health checks or requirements (voluntary or mandatory) to carry out health checks for the Chow Chow. Without certification and health checks there is means of determining the prevalence of the conditions included in the Kennel Club lists.

It cannot be ignored that the Kennel Club has indicated that some of the conditions that breeders felt are no longer occurring in the breed such as myotonia are still apparent. Only 6 respondents (7%) had reported experience of this condition and anecdotally a number of those had said that this was many years ago. In Section B (fig 2) 59% of respondents recorded no knowledge of the condition which may indicate an area where more knowledge should be made available to Chow owners.

Another area of concern was that there was no way of determining if the conditions that owners did have experience of had lessened over time but this was not something that could be covered in this rather general survey particularly as there were so many conditions listed. These issues would be much better served by surveys concentrating in depth on one condition.

The three conditions listed by the Kennel Club that had the highest number of insurance claims, Skin disorders, Entropion, Cruciate Ligament injuries were also the ones that were most experienced by Chow owners, and were also recorded as relatively commonly occurring by the highest number of respondents although the majority response was that these conditions occurred occasionally.

As indicated in section B there were a number of the disorders listed by the Kennel Club that were recorded as known about but not seen or as unknown. Some of these conditions are in general uncommon e.g., the skin condition pemphigus which may not always be correctly diagnosed or even considered by a veterinary surgeon unfamiliar with the condition. Initially the symptoms may be mistaken for other those associated with other conditions such as hypothyroidism or Cushing's disease. The term skin conditions is also problematic as skin conditions are associated with allergies, parasites, malfunction of the endocrine system and even behaviour issues which may not be correctly identified or treated correctly. This area would be an interesting area to investigate further but would be a very complex area to work on because of the numerous possible causes and frequent misidentification and consequent mistreatment of condition. It is however an area where more information may help to provide owners with more knowledge about conditions that more commonly are associated with skin problems in the chow e.g., hypothyroidism.

In section C entropion, skin disorders and cruciate ligament injuries were the top three conditions followed closely by bloat, torsion and hip dysplasia.

Future studies will be more focused on a specific health condition and will be able to look at owners experience over time and to get a better idea of proportion by establishing how many dogs the responses refer to. We may also be able to look at gender differences and also look to see if there is a familial pattern which can be done without identifying dogs or owners.

Carrying out this study has shown that responses can be made completely anonymously as many respondents downloaded the questionnaire and when completed returned it in the post.

To ensure the anonymity of those respondents that emailed their responses, on receipt their questionnaires were saved to hard-drive by allotting them a number and the emails were erased. This method of circulation and collection saved a great deal of expense in paper and postage and also saved a good deal of time when entering the data into the database.

The electronic responses have been downloaded to a CD and stored along with those responses received by post for reference if needed.

Future studies may give a better indication of which health checks should be included in the requirement for inclusion on the Kennel Club's Accredited Breeder Scheme. It is appreciated that any tests that become a requirement for accreditation it would not be a mandatory requirement for registration of puppies however it would provide guidelines towards better breeding practices in general.

## **Conclusion**

Hereditary conditions in pedigree dogs has recently come into the spotlight, and the Kennel Club is clearly putting the responsibility for the continued health and welfare of the breed into the hands of the breed clubs and breeders themselves which is where it should be. It is hoped that following the interest shown in this survey that owners and the Breed Council will continue to work together to preserve the health and well-being of the Chow.

The three conditions that attract the most insurance claims, entropion, skin disorders and cruciate ligament injuries are also the conditions that are identified in this survey as those most experienced by chow owners and also the ones giving most cause for concern.

Many comments have been received in response to this survey asking that the Breed Council conduct more surveys looking in more depth at specific conditions with the intention of establishing, for instance, if the efforts of the breeders are having any effect on the breed as a whole. The Kennel Club have not provided any data to date relating to the changes in the eye clause that was intended to reduce the incidence of entropion. There is no data available on which to make comparisons as is the case with all three of the cases most reported by insurance companies.

The survey suggests that these three areas are the first that should be investigated by the Breed Council health sub committee, with this in mind it is hoped that Chow owners, breeders and exhibitors will continue to support the Breed Council in this endeavour both by participating in surveys and by encouraging their chow friends and puppy owners to do the same. The results will have more relevance with a high response rate especially where the survey population is more representative of chow owners in general.

## Appendix 1

### **List and brief definition of conditions identified in scientific literature the have been diagnosed in the Chow Chow**

1 **Cruciate ligaments** : Cranial cruciate ligament rupture (CCL) is the tearing of an important ligament in the stifle joint (knee), resulting in partial or complete joint instability, pain, and lameness. Torn ligaments retract, do not heal, and cannot be repaired completely. If the injury is not treated, damage to connective tissues and degenerative joint disease often results.

(<http://www.animalhealthchannel.com/ccl/index.shtml>). The breed council have produced a booklet giving a fuller explanation of the condition

2. **Skin Disorders**: The Kennel Club has not specified any particular skin disorder. This is the most commonly reported problem in dogs in general and has a wide range of causes and vary from acute, self-limiting problems to chronic or long-lasting problems needing life-time treatment.

3. **Entropion**: describes the rolling-in of the eyelid. This causes the hair on the surface of the eyelid to rub on the eyeball, which is both painful and often causes corneal ulcers or erosions. The corneal damage can also result in corneal scarring, which can interfere with vision. Usually the dog will squint and tear excessively. However, many flat-faced dogs with medial entropion (involving the inside corner of the eyes) show no obvious signs of discomfort. Requires surgery to correct the condition. <http://www.animaleyecare.net/diseases/canine.htm>

4. **Alopecia X**: is the name many veterinary dermatologists have given to the hair cycle abnormality that affects primarily Nordic breeds and Toy or Miniature Poodles. Other names for this condition in the veterinary literature have included Adult Onset Growth Hormone Deficiency, Growth Hormone-Responsive Alopecia, Castration-Responsive Alopecia, and, more recently, Adrenal Hyperplasia-Like Syndrome. You may be more familiar with the breeders' terminology of Coat Funk of Malamutes or Black Skin Disease of Pomeranians. It is also known as Hair Cycle Arrest. Alopecia X affects dogs of both sexes regardless of neuter status. The hair loss can first occur as early as 1 year of age or as late as 10 years of age. The primary clinical presentation is the symmetrical gradual loss of hair over the trunk and caudal thighs, sparing the head and front limbs. Sometimes the guard hairs are lost first leaving a soft "puppy" coat. The skin may become intensely hyperpigmented. There are no systemic signs associated with this condition. If your dog is not eating or drinking or eating and drinking excessively, is depressed, or has elevated liver or kidney values, then it is important to look for another cause of the hair loss. The cause of the hair cycle arrest is unknown at this time. It is our hope through research and clinical trials that we will gain a better understanding of the cause of the hair loss and perhaps develop a truly effective treatment.

<http://www.vet.utk.edu/hairloss/alopecia.html>

5. **Cataract:** Like a camera, eyes have a clear lens inside them that is used for focusing. A cataract is any opacity within a lens. The opacity can be very small (incipient cataract) and not interfere with vision. It can involve more of the lens (immature cataract) and cause blurred vision. Eventually, the entire lens can become cloudy, and all functional vision lost. This is called a mature cataract. *Most cataracts in dogs are inherited.* <http://www.animaleyecare.net/diseases/cataract.htm>  
The cataract may develop rapidly over weeks, or slowly over years, in one or both eyes  
Like humans, dogs also develop cataracts with age (often after 8 years of life). Cataracts can also develop in dogs with diabetes mellitus or in orphan puppies on an artificial milk replacer diet.

6. **Cerebellar Cortical Abiotrophies:** This is a *genetic neurological condition*. Symptoms include [ataxia](#) or lack of balance, an awkward wide-legged stance, a head tremor, body tremors, hyperreactivity, lack of menace reflex, stiff or high-stepping [gait](#), coarse or jerky head bob when in motion (or in very young animals, when attempting to nurse), apparent lack of awareness of where the feet are (sometimes standing or trying to walk with a foot knuckled over), poor depth perception, and a general inability to determine space and distance. The symptoms are, when taken as a group, fairly unique and not easily mimicked by other illnesses, though certain types of neurological injury and infection do need to be ruled out. Verifying the diagnosis in a laboratory setting is only possible by examining the [brain post-mortem](#) to determine if there has been a loss of Purkinje cells.  
[http://en.wikipedia.org/wiki/Cerebellar\\_abiotrophy](http://en.wikipedia.org/wiki/Cerebellar_abiotrophy)

7. **Dermoid sinus:** A case of multiple dermoid sinuses in the dorsal cervical and craniothoracic regions (spine) in an adult chow chow dog is described. One sinus did not open on the skin surface. This is the first reported case of the condition in this breed and the first time absence of the sinus opening on the skin is described. The use of the term pilonidal sinus to describe this condition is challenged. (Department of Surgery, Faculty of Veterinary Science, University of Pretoria, Onderstepoort, South Africa). <http://www.ncbi.nlm.nih.gov/pubmed/9850515?dopt=Abstract>

8. **Elbow dysplasia:** Canine elbow dysplasia is a syndrome characterized by development of secondary degenerative arthritis following several distinct primary diseases of the elbow. Asynchronous (unequal) growth between the radius and ulna during growth of the dog is the likely linking etiology between the individual diseases leading to elbow dysplasia. Normal elbow joint congruency is based on uniform growth of the humeral, radial, and ulnar joint components, and unequal growth of any of these bones leads to elbow incongruency and later degenerative joint disease (osteoarthritis). The individual diseases are Ununited Anconeal Process (UAP), Fragmented Coronoid Process (FCP) and Osteochondrosis (OC) of the distal medial humeral condyle. Cases of elbow dysplasia with severe secondary osteoarthritis but without the specific surgically-approached diseases listed above should be treated as arthritic patients.  
<http://www.vet.ksu.edu/DEPTS/vmth/sa.surgery/ElbowDysplasia.htm>

9. **Exocrine pancreatic insufficiency:** This is an acquired condition, although there is *likely to be a genetic predisposition in most cases*; *heritability* has already been demonstrated in German shepherd dogs and Rough collies. Unknown factors trigger atrophy (decrease in size/wasting away) of the pancreatic acinar tissue: the endocrine tissue is largely spared, but there can be complete loss of acini and, consequently, enzyme secretion. Recent work has suggested that acinar atrophy is preceded by a lymphocytic pancreatitis. Curiously, sequential biopsy studies of lymphocytic pancreatitis have shown that some dogs progress to Pancreatic acinar atrophy (PAA), some resolve spontaneously, and others remain in a state of subclinical EPI. As stated above, PAA is the most common cause of EPI in dogs; it is very rare in cats. The condition usually manifests between 6 months and 6 years of age, and there is no sex predisposition. It can affect any breed of dog and even mixbreeds, but is most commonly seen in German shepherds. In several studies German shepherds comprise two-thirds of the cases identified, and affected mix-breed dogs are often of shepherd origin. Other breeds reportedly over-represented are collies, especially Rough collies, terrier breeds, Cavalier King Charles spaniels, and Chow Chows.

<http://www.vin.com/proceedings/Proceedings.plx?CID=WSAVA2003&PID=pr06553&O=Generic>

10. **Glaucoma** **Primary Glaucoma** is an *inherited condition*. it occurs in many breeds, especially American Cocker Spaniels, Basset Hounds, Chow Chows, Shar Peis, Labrador Retrievers, and Arctic Circle breed dogs (Huskies, Elkhounds, etc). **Secondary Glaucoma** occurs when other eye diseases cause decreased fluid drainage. Common causes of secondary glaucoma are inflammation inside the eye (uveitis), advanced cataracts, cancer in the eye, lens subluxation or luxation, and chronic retinal detachment. Glaucoma is increased pressure within the eye. Cells inside the eye produce a clear fluid ("aqueous humor") that maintains the shape of the eye and nourishes the tissues inside the eye. The balance of fluid production and drainage is responsible for maintaining normal pressure within the eye. In glaucoma, the drain becomes clogged but the eye keeps producing fluid. Therefore, the pressure in the eye increases. The increased pressure in the eye actually can cause the eye to stretch and enlarge, in addition to blinding the eye.

<http://www.animaleyecare.net/diseases/glaucoma.htm>

11. **Haemophilia A** The disease *is genetic* and is caused because the body's cells cannot make a molecule called Factor VIII. In order for the body to form a clot in response to an injury a chain reaction of molecules must happen. If only one link in this chain reaction can't happen then a clot cannot form. In the case of hemophilia there is no Factor VIII and the reaction stops there. Factor VIII is not present because of an inherited inability for the cells to make it. Most of the affected dogs are males because the instructions for making Factor VIII in cell DNA is on the female "X" sex-determining chromosome from the mother. Females get two X chromosomes and can be carriers but will not express the disease, unless both X chromosomes are affected. Hemophilia in females is much rarer than in males. [www.mydogfluffy.com/faq.htm](http://www.mydogfluffy.com/faq.htm)

Where the condition is severe, sufferers experience spontaneous haemorrhage and rarely reach adulthood. Onset usually occurs before 2yrs of age, symptoms include

intermittent lameness with swollen painful joints due to haemorrhage into the joint preceding chronic lameness. Bleeding and bruising episodes are usually associated with trauma. Major injury, surgery, fighting are life threatening and often fatal. It is almost impossible to control major bleeds because the quantities of whole blood or plasma required to bring the FV111 levels to the necessary 40-50% to stop the bleed would cause circulatory overload. *This is a genetic problem*, affected males and carrier females should be removed from the breeding programme.

<http://www.workingdogs.com/doc0155.htm>.

Haemophilia *is the most common inherited coagulation* factor deficiency.

**Haemophilia A** is a result of a deficiency of factor VIII, and **haemophilia B** of factor IX. Haemophilia A is more common than haemophilia B, and varies in severity depending on the level of factor VIII activity. Haemophilia B is often a severe bleeding disorder.

<http://www.upei.ca/cidd/Diseases/clinical%20pathology/hemophilia.htm>

12. **Haemophilia B** Is the X- linked bleeding disorder caused by a deficiency of functional coagulation factor IX (F.IX). Treatment consists of infusion of clotting factor protein in response to bleeding and maintaining F.IX levels above 1% of normal (>50 ng/ml) to reduce the frequency of spontaneous bleeding into joints and soft tissue and reducing the risk of fatal intracranial bleeding. The treatment is ongoing and expensive and more recently there has been an interest in gene therapy and the introduction of a functional F.IX gene by gene transfer to provide a continuous supply of F.IX. The study is ongoing and to date has not been particularly successful in large-animals, the invasive procedures also make the approach unappealing for human trials

[http://www.nature.com/nm/journal/v5/n1/full/nm0199\\_56.html](http://www.nature.com/nm/journal/v5/n1/full/nm0199_56.html) .

13. **Hip Dysplasia** Hip dysplasia is an abnormality in the development of the hip joint characterized by a shallow acetabulum (the "cup" of the hip joint) and changes in the shape of the femoral head (the "ball" of the hip joint). These changes may occur due to excessive laxity in the hip joint. Hip dysplasia can exist with or without clinical signs. When dogs exhibit clinical signs of this problem they usually are lame on one or both rear limbs. Severe arthritis can develop as a result of the malformation of the hip joint and results in pain as the disease progresses. Many young dogs exhibit pain during or shortly after the growth period, often before arthritic changes appear to be present. It is not unusual for this pain to appear to disappear for several years and then to return when arthritic changes become obvious.

Dogs with hip dysplasia appear to be born with normal hips and then to develop the disease later. This has led to a lot of speculation as to the contributing factors which may be involved with this disease. *This is an inherited condition*, but not all dogs with the genetic tendency will develop clinical signs and the degree of hip dysplasia which develops does not always seem to correlate well with expectations based on the parent's condition. *Multiple genetic factors* are involved *and environmental factors* also play a role in determining the degree of hip dysplasia. Dogs with no genetic predisposition do not develop hip dysplasia. At present, the strongest link to contributing factors other than genetic predisposition appears to be to rapid growth and weight gain. In a recent study done in Labrador retrievers a significant reduction in the development of clinical hip dysplasia occurred in a group of puppies

fed 25% less than a control group which was allowed to eat free choice. It is likely that the laxity in the hip joints is aggravated by the rapid weight gain.

<http://www.vetinfo4dogs.com/ddyspla.html#Hip%20Dysplasia>.

14. **Hyperadrenocorticism** Cushing's syndrome and Cushing's disease, more accurately known as *hyperadrenocorticism* is the condition which occurs when the body produces too much hormone, particularly corticosteroids or cortisol. In 80 to 85 percent of dogs with hyperadrenocorticism the most common cause is a small tumour in the pituitary gland (located at the base of the brain). This type of Cushing's syndrome is called pituitary-dependent hyperadrenocorticism because it originates from the pituitary gland. In the remaining 15 to 20 percent of dogs with Cushing's syndrome, the cause is a tumor of the adrenal gland.

<http://www.petplace.com/dogs/hyperadrenocorticism-cushing-s-syndrome-in-dogs/page1.aspx>.

15. **Hypomyelinating neuropathy** in humans CMT is an *inherited neurological disease* characterized by the gradual degeneration of nerves which starts in the hands and feet and results in progressive numbness, muscle weakness and loss of function. Type 4B2 has an autosomal recessive inheritance and involves a defect in the EGR2 gene on chromosome 10.

[http://www.wrongdiagnosis.com/medical/congenital\\_hypomyelinating\\_neuropathy\\_c hn .htm](http://www.wrongdiagnosis.com/medical/congenital_hypomyelinating_neuropathy_c hn .htm) In the Chow Chow the symptoms are generalised tremors from birth.

Caused by severe myelin deficiency in the central nervous system. (myelin is the fatty substance that forms a sheath around nerve fibres and enables electrical impulses to be transmitted efficiently along the nerve fibres). Mode of inheritance described as familial (characteristic of a family)

<http://server.vet.cam.ac.uk/index.html>

16. **Kartagener's Syndrome** Symptoms described in the human condition are reduced or inability to clear mucus from lungs, a susceptibility to chronic recurrent respiratory infections. There may also be hearing loss, 'glue ear' reduced sense of smell, and high mucus production in the sinuses. Infertility in females because of defective ciliary action in the fallopian tubes and diminished sperm motility in affected males. Chronic headaches, and in rare cases hydrocephalus (spinal fluid build up in the brain) in severe cases lung transplantation is required. Ciliary dysfunction is described as immotility or dyskinetic beating of the cilia (tail-like *projections* extending approximately 5–10 [micrometers](#) from the cell body). Mode of inheritance - *Autosomal recessive* (passed down through families, two copies of an abnormal [gene](#) must be present in order for the disease or trait to develop).

[http://en.wikipedia.org/wiki/Kartagener%27s\\_syndrome](http://en.wikipedia.org/wiki/Kartagener%27s_syndrome)

<http://www.jaaha.org/cgi/content/abstract/38/1/45>

17. **Myotonia (Canine Myotonia Congenita)** affects muscles usually in the legs but can be any muscles – muscles are slow to relax after voluntary contraction. Dog may begin to move but then slow up and come to a stop until the muscles relax again. Muscles may hypertrophy (enlarge). Symptoms may worsen when cold or

after period of inactivity. Mode of inheritance - *Autosomal recessive* mode – requires two copies of the defective gene, one from each parent. Dog with one copy of the defective gene may not show any symptoms but they are carriers and should not be bred from. **DNA TESTING** – none known at this time (there is a test available but only for Miniature Schnauzers). Diagnosis confirmed by analysing muscle response to electrical stimulation (electromyography) and by evaluation of muscle biopsies.

18. **Neoplasia – oral melanoma** a brief general description of this condition is cancer growths in the mouth. "Malignant melanomas can form in many sites in the oral cavity (gingiva, buccal mucosa, hard and soft palate, and tongue) and are locally invasive and highly metastatic to the lungs and regional lymph nodes as well as bone. They may appear either darkly pigment. Pemed or nonpigmented. Clients may complain about halitosis or oral bleeding. Loose teeth may result from bone involvement. Surgical excision, electrocautery, cryotherapy, radiation, chemotherapy and immunotherapy have been used in treatment. Malignant melanomas carry a poor prognosis, as reoccurrence is common".

<http://www.vin.com/VINDBPub/SearchPB/Proceedings/PR05000/PR00045.htm>

In an extensive study of diagnostic records from 338 canine oral melanoma cases the **chow chow**, golden retriever and Pekingese/poodle mixes were *over-represented*. there was no apparent gender predisposition and the average age of presentation was 11.4 years. The average survival time from diagnosis was 173 days. It occurred most frequently in the gingival and labial mucosa. (*possibly a genetic predisposition*) <http://www.vetpathology.org/cqi/content/abstract/37/6/597>

#### 19. **Patellar Luxation** Incidence of Patellar Luxation

Patellar luxation is one of the most common *congenital anomalies* in dogs, diagnosed in 7% of puppies. The condition affects primarily small dogs, especially breeds such as Boston terrier, Chihuahua, Pomeranian, miniature poodle and Yorkshire terrier. The incidence in large breed dogs has been on the rise over the past ten years, and breeds such as Chinese shar pei, flat-coated retriever, Akita and Great Pyrenees are now considered *predisposed* to this disease. Patellar luxation affects both knees in 50% of all cases, resulting in discomfort and loss of function.

<http://www.acvs.org/AnimalOwners/HealthConditions/SmallAnimalTopics/MedialPatellarLuxations/>

Signs of patellar luxation in pets vary depending on how severe the problem is. Most pets tend to skip or hop when walking or especially when running, but some dogs and cats may hold the leg up completely. Damage caused by the kneecap slipping in and out of its track can eventually lead to [arthritis](#) in the knee.

<http://www.webvet.com/main/article?id=78&med=1>

20 **Pemphigus Foliaceus** is a severe skin disease that is characterized by pustules and blisters that rupture, causing damage to the skin of the face, ears, feet and eventually the entire skin. This disease results when the animal recognizes a specific component of his own skin (desmoglein I) as foreign and makes antibodies against that component. Desmoglein I is important in attaching skin cells to each other. Lack of this component causes the outer layer of the skin to split apart and fill with fluid and cells leading to a blister or pustule. *This abnormality of the immune system is an example of an autoimmune disorder.* Middle aged to older dogs are more prone to this disease. It is seen more commonly in akitas, Doberman pinschers, chows, dachshunds, Newfoundlands, bearded collies and schipperkes, but can be seen in

other breeds. This disease has a severe health impact on the animal and can be fatal if not treated aggressively <http://www.petplace.com/dogs/pemphigus-foliaceus-in-dogs/page1.aspx>

21 **Pulmonic Stenosis** This is described as a *congenital* heart disease, boxer, beagle, English bulldog, fox terriers, JR terriers and Chihuahuas are most susceptible. It is described as an abnormal narrowing of the right ventricular outflow tract or stricture of the pulmonary, or lung artery. The right ventricle becomes enlarged increasing the level of heart blood pressure. Symptoms include exercise intolerance, slow growth, laboured breathing, fluid accumulation in the abdomen, bluish or purplish skin discolouration (cyanosis), weakness, fainting and collapsing and sudden death. A heart murmur may be detected and blood tests may find an abnormal increase in circulating red blood cells (Polycythemia). Surgical correction is most common treatment. <http://www.gopetsamerica.com/dog-health/pulmonic-stenosis.aspx>

## **Appendix 2**

### **ANNEX B**

(Information provided by the Kennel Club)

(Please address any queries to Diana Brooks-Ward, The Kennel Club, 1-5 Clarges Street, London, W1J 8AB – [diana.brooks-ward@thekennelclub.org.uk](mailto:diana.brooks-ward@thekennelclub.org.uk).)

1. Breed specific information from the Kennel Club.

Breed: **Chow Chow**

A. Relative risks (using Health Survey data)

Diseases/conditions affecting health

There is a greater reported prevalence of diseases/conditions affecting the following: - **none recorded due to low response rate to health survey**

Diseases/conditions causing death:

There is a greater reported prevalence of death due to diseases/conditions affecting the following: **none recorded due to low response rate to health survey**

NB. The enclosed glossary provides information on each body system. Many breeds have their own breed specific conditions listed on the KC website under the breed health survey reports ([www.thekennelclub.org.uk/item/549](http://www.thekennelclub.org.uk/item/549))

B. Insurance Data

Statistics collated from insurance claims indicate that the most common claims are for conditions affecting the following;

- **cruciate ligaments**
- **skin disorders**
- **entropion**
- 

C. Conditions referred to in scientific literature

A review of scientific literature indicates that the following conditions are known to affect your breed;

**Alopecia X**  
**Cataract**  
**Cerebellar cortical abiotrophies**  
**Dermoid sinus**  
**Elbow dysplasia**  
**Exocrine pancreatic insufficiency**  
**Glaucoma**  
**Haemophilia A**  
**Haemophilia B**  
**Hip dysplasia**  
**Hyperadrenocorticism**  
**Hypomyelinating neuropathy**  
**Kartagener's syndrome**  
**Myotonia**  
**Neoplasia - oral melanoma**  
**Patellar luxation**  
**Pemphigus foliaceus**  
**Pulmonic stenosis**