TUFTS UNIVERSITY

School of Veterinary Medicine

Department of Clinical Sciences

August 17, 1998

TUFTS 1997-1998 CHINOOK BREED HEALTH SURVEY

Jerold S. Bell, D.V.M.
Clinical Assistant Professor of Genetics

This cover report accompanies the data report on the Chinook Breed Health Survey. There was a good response rate to the survey, with 49.04% returning surveys. The majority of dogs still reside in Maine and the other New England states, although Chinook populations are growing in other areas of the country. The vast majority of respondents felt that canine hip dysplasia is the most important health problem facing the breed. A limited gene pool was also a concern, and will be addressed in the **Chinook Genetic Diversity Study**. Epilepsy and retained testicles (cryptorchidism) were also singled out as problems, and the concern for these three mentioned hereditary disorders is supported by the data.

Any survey such as this cannot attempt to identify the true frequency of disease or health in the breed. While the response rate is good based on registration figures, healthy dogs are under reported in most surveys. While this tends to overestimate the frequency of disorders in the breed, repeated diagnoses suggest problem areas. The relative frequency of diagnoses can be compared with each other to rank the prevalence or importance of disorders in the breed. The inclusion of Chinook cross data allows comparison, and provides important information on the frequency of diagnoses.

There is a large population of purebred Chinooks, with a large population of possible breeding (sexually intact) dogs. Chinooks appear to live a normal lifespan, and based on the age distribution, there is an increasing population. There is more variation in height and weight than found in many other breeds. This may relate to the fact that the breed was created from diverse origins based on working ability, and not a conformational standard. The colors, eye color, and ear set are similarly varied.

A smaller population of Chinook crosses is similarly long lived, with a young breeding population. The population represents the influence of several different breeds. The population shows averages similar to the purebred population, with variation in height, weight, color, eye color, and ear set.

Litters of purebred Chinooks do not show a decrease in litter size that might be expected with an inbred population. There was no significant difference in litter size between purebred and crossbred Chinooks. Stillborn puppies, not due to dystocia or uterine infection occurred at a frequency of 3.8%. This corresponds to one puppy per every four litters, which is slightly higher than the average canine population. There was a significant occurrence of hydrops or hydrocephalus puppies, with one occurring in four different litters between 1982 and 1996. Reports of birth defects were higher than canine averages, but included 9.7% of males with cryptorchidism. This was not considered a birth defect on the litter form, and will instead be addressed in the breed diagnoses. Without these dogs, an 8.6% frequency of birth defects remains high. Hydrops/hydrocephalus and umbilical hernia top the list with frequencies of 2.2% each. Color of puppies listed showed a

200 Westboro Road
North Grafton, Massachusetts 01536
(508)839-7950 Academic Offices
(508) 839-5395 Hospitals
(508) 839-7922 Fax

significantly higher percentage of silver/gray dogs than that recorded in the adult population. From the Chinook cross litters, there was again a varied population, with only one stillborn puppy, and no birth defects recorded.

In the survey data of individual dog diagnoses, 41.8% of purebred Chinooks, and 59.2% of Chinook crosses had no disease listed. The frequency of diagnoses by category mirrored the frequently diagnosed individual disorders contained within them. In compiling the list of specific disorders, three were added as combinations of separate diagnoses, based on our knowledge of the inheritance of these disorders. Cryptorchidism-Unilateral (11) and Cryptorchidism-Bilateral (7) were combined to Total Cryptorchidism. Hip Dysplasia-Subluxation (12), Hip Dysplasia-Other (4), and Hip Laxity (1) were combined to Total Hip Dysplasia, while ensuring that individual dogs were not listed in more than one category. Epilepsy or Hereditary Seizures (10) and Non-Epileptic Seizures (10) were combined to All Seizure Disorders, as these two diagnoses cannot be differentiated clinically.

DISCUSSION OF TOP TEN DIAGNOSES

Total Cryptorchidism topped the list of Chinook diagnoses with a startlingly high 14.63% of all male dogs affected. **Cryptorchidism-Unilateral** had 11 diagnoses to be the second most frequent (8.94%) diagnosis for the breed, and **Cryptorchidism-Bilateral** had 7 diagnoses to be the ninth most frequent (5.69%) diagnosis for the breed. Litter survey forms had 9.7% of male puppies with retained testicles, including some where all males in the litter were affected. Cryptorchidism is defined as the failure of one or both testicles to descend into the scrotum by eight weeks of age. The reported incidence of retained testicles in the general canine population is approximately 0.8%. Unilateral and bilateral retained testicles are caused by the same genetic process, as is delayed descent of the testicles into the scrotal sac (which was not surveyed for). It is known that this is a sex limited disorder (females cannot express the trait). Females, including dams and littermates of affected dogs, can be genetically affected and pass on the trait at the same frequency as affected males. The mode of inheritance of cryptorchidism has not been established. The fact that Chinook crosses also had a significantly high percentage of diagnoses may suggest a major dominant influence. Conversely, many experts feel that this may be a polygenic trait, where a threshold of genes must combine to produce the disorder. With the high prevalence of the disorder in purebred Chinooks, they may pass on enough defective genes to cause crossbred dogs (not necessarily first generation) to express the trait. A genetic study of the relationship of these dogs should be investigated, and more data should be collected on dogs with cryptorchidism, and those with late descending testicles. Even if these frequencies are overestimated, this is an alarmingly high number of diagnoses for a rare breed.

All Seizure Disorders was tied for the third most frequent (8.37%) diagnosis with 20 dogs recorded. Ten dogs were listed with **Epilepsy** (tied for 12=4.18%) and ten dogs were listed with **Non-Epileptic Seizures** (tied for 12=4.18%). The clinical descriptions of the seizure disorders in these two groups overlap, and could not be differentiated. The onset of seizures ranged from 9 weeks, to six years of age, with most between 9 months and four years of age. Six dogs had their first seizure at less than one year of age, seven dogs between one and three years of age, five dogs between three and five years of age, one at six years of age, and one with no age recorded. Most dogs had multiple seizures, but four of the twenty have had only one seizure recorded to date. Three of the twenty had multiple seizures over at least a one year period, but have not observed any since then. Chinook crosses had three dogs with seizures (4.23%); one that was eventually euthanized due

to seizures, and two that had recurrent seizures, for one and four years duration, but none since then. The high frequency of Chinooks and Chinook crosses with seizures of any kind is significant. While it is not infrequent to see dogs with single seizures who never seize again, these are occurrences across all breed lines; not clustered within the same breed. Some genetic mechanism is causing Chinooks and Chinook crosses to have seizures at a much higher rate than the general canine population. Epilepsy is known to be a group of different genetic disorders, which must be separated based on their phenotype of; age of onset, type of seizures, and frequency of seizures. The data warrants a genetic study to be conducted on epilepsy and seizures in the breed. This should include a study of pedigrees, as well as inclusion in some of the molecular genetic studies on epilepsy presently being conducted in other breeds of dogs.

Hot Spots was tied for the third most frequent (8.37%) diagnosis, with 20 dogs recorded. Related diagnoses were **Lick Sores** (14, tied for 7=5.86%), **Allergies** (9, ranked 14=3.77%), and **Flea Allergy** (8, ranked 15=3.35%). These diagnoses were spread across all age groups. Some dogs were listed in more than one of these categories. All these categories relate to reactive or allergic skin disease, which is a frequent diagnosis in the general canine population. While this is a frequent occurrence, and there are many breeds with higher frequencies of these diagnoses, they are still considered a group of hereditary conditions that should be selected against. It is interesting that Chinook crosses had no diagnoses of hot spots, only one with lick sores, 2 with allergies, and 1 with flea allergies. It is possible that in some dogs, lick sores to their owners could actually be lick granulomas, which are considered a behavioral problem triggered by anxiety. If this is the case, it could be expected to find more diagnoses of lick sores in Chinook crosses, especially since their percentage of shyness diagnoses is greater than that in purebred Chinooks. There is no established mode of inheritance for these conditions. Chinook breeders should select against these disorders as polygenic traits.

Shyness was the fifth most frequent (7.95%) diagnosis with 19 dogs recorded. This is one of the few diagnoses where the frequency in Chinook crosses significantly exceeded that in purebred Chinooks. This behavior is uniformly recorded as occurring from birth, and includes notations of; "shy with strangers," "timid of men," "afraid of visitors," "panics at loud noises," "terrified of strangers," "timid with strangers," "hates strange places," "hides," "frightens easily," and "hides with strangers." In addition, the category of **Temperament-Other** contained one diagnosis of "Cautious," which could have been included in the shyness category. The Chinook was not originally bred to be a social dog, but a working dog. If the breed wishes to establish the Chinook as a family dog, and can breed away from this temperament without losing its working ability, then it should recommend this to its breeders. Owners felt that this was enough of a problem to write these additional comments on the survey forms. The mode of inheritance of behavioral disorders has not been established.

Total Hip Dysplasia was the sixth most frequent (7.11%) diagnosis with 17 dogs recorded. **Hip Dysplasia-Subluxation** ranked 11, with 12 diagnoses (5.02%), and **Hip Dysplasia-Other** ranked 20, with 4 diagnoses (1.67%). There was one dog listed only with **Hip Laxity**. This is a category where it is possible the recorded frequency may be lower than the actual frequency. Unless all owners screened their dogs for hip dysplasia, many dogs may not show signs of the disorder until their later years. Some may never show signs, although their hip x-rays may show laxity, malformation or degeneration, and would pass on genes for these traits to their offspring. The

frequency of Total Hip Dysplasia for Chinook crosses (8.45%) exceeds that of purebred Chinooks. This is unfortunate, as one objective of the cross program was to correct this problem. Hip dysplasia is not an uncommon diagnosis in large breeds of dogs, especially in those that share the Chinook body type. The crosses used, all have measurable frequencies of hip dysplasia in their purebred populations. This is a polygenic disorder, and is considered a threshold trait, although there may be major recessive or dominant genes influencing the disorder in some families. It is interesting that a breed such as the Chinook, which was selected almost exclusively for its working ability, would have a high frequency of hip dysplasia. Breeders should use breadth of pedigree when selecting against hip dysplasia.

Arthritis was tied as the seventh most frequent (5.86%) diagnosis with 14 dogs recorded. This is a symptom of degenerative skeletal disease, and probably reflects hip dysplasia, as well as other conditions causing secondary arthritis. Each has its own hereditary basis.

Difficulty Whelping is the tenth most frequent (5.36%) diagnosis, with 6 of 112 females recorded. Comments included; "uterine inertia," "dystocia," "hydrops puppy," "fetal oversize and stillbirth," "hydrops/C-section," and "C-section." As found with the litter analysis, the appearance of any **hydrops** pups in a breed is a confirmed genetic problem. As affected dogs cannot survive and reproduce, it must be considered that there are one or more major recessive genes at work. The heredity should be investigated, and breeders should select against carriers of the disorder.

CONCLUSIONS

The Chinook breed appears to be vigorous, and healthy. There does not appear to be any prenatal lethal recessives present in the breed, although there is a low frequency problem with hydrops/hydrocephalus. The major genetic disorders; Cryptorchidism, Hot Spots (allergic skin disease), Epilepsy (seizures), Shyness, and Hip Dysplasia are seen in many breeds, but are being seen at higher frequencies in purebred Chinooks. With the identification of these disorders as hereditary problems in the breed, owners can concentrate on selecting against them, while working to maintain form and function of the breed.

The breed must decide whether it wants to develop a conformational standard to create more uniformity in the breed. In doing so, breeders must recognize that dogs with superior conformation, function, and temperament should be selected from **all** family lines, to not limit existing genetic diversity. The breed also needs to determine the status of cross breeding programs. Many mushers crossbreed to produce their sled dogs, but do not consider them to be purebred, or seek to reintroduce offspring back into a purebred population. The breed needs to come to a decision on the advantages and disadvantages of introducing genes from other breeds into the Chinook gene pool. Based on the results of this study, and the Chinook Genetic Diversity Study, the breed has a large enough population to sustain itself, and does not exhibit symptoms of a lack of genetic diversity. The number and frequency of genetic disorders are not different from other rare breeds, who with breeder education and research, have achieved genetic improvement.

TUFTS UNIVERSITY
School of Veterinary Medicine

Department of Clinical Sciences

August 17, 1998

TUFTS 1997-1998 CHINOOK BREED HEALTH SURVEY

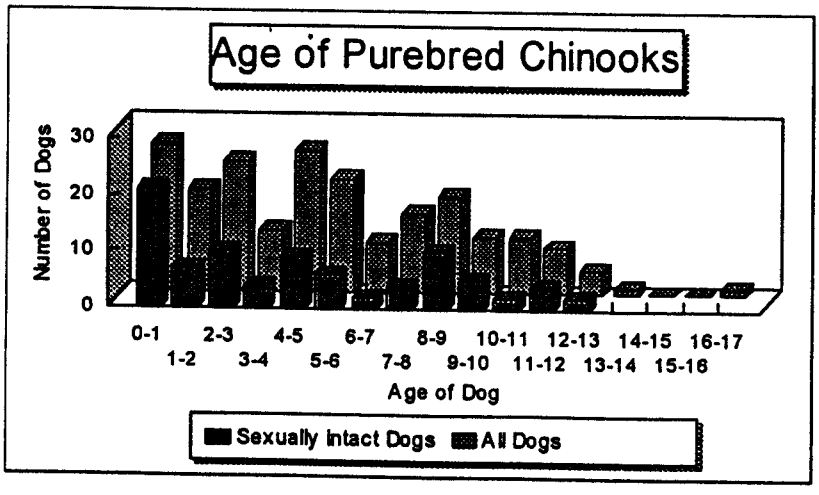
Jerold S. Bell, D.V.M.
Clinical Assistant Professor of Genetics

During 1997 and 1998, three separate mailings of the breed health survey were sent to Chinook owners, breeders, Chinook Owners Association and Chinooks World Wide members, and members of Chinook mailing lists. Not counting surveys that were returned undeliverable, 179 out of 365 surveys were returned, for a 49.04% response rate. Completed surveys were received from 36 states, plus Canada. The states with the highest number of Chinook surveys returned were Maine (96 dogs), Ohio (31), Connecticut (27), New York (18), California (15), and Massachusetts (13). Completed surveys were received for 310 individual dogs (239 purebred and 71 Chinook crosses), and 38 litters containing 253 puppies (28 purebred litters and 10 cross litters). For dogs with registration numbers listed, 112 had UKC registration numbers, and 57 had CWW registration numbers (including Chinook crosses). For those dogs with both types of registration numbers, the first number listed was counted in this statistic.

The survey form asked what the respondent felt is the most important health issue facing the Chinook today. The responses included: Canine Hip Dysplasia (43), Limited gene pool (20), Epilepsy (8), retained testicles (6), importing genetic diseases through cross-breeding (3), need for carefully planned breeding (3), decreasing size (3), shyness (3), weak structure (3), need for breeder education (2), cancer (2), and orthopedic disease (2). The following had one response each: allergies, breeding unsound dogs for profit, don't cross-breed, genetic disease, good record keeping, cataracts, immune disease, knee problems, lack of breeder communication, poor appetite, reproductive problems, need for a standard conformation, and back problems.

DATA ON PUREBRED CHINOOKS

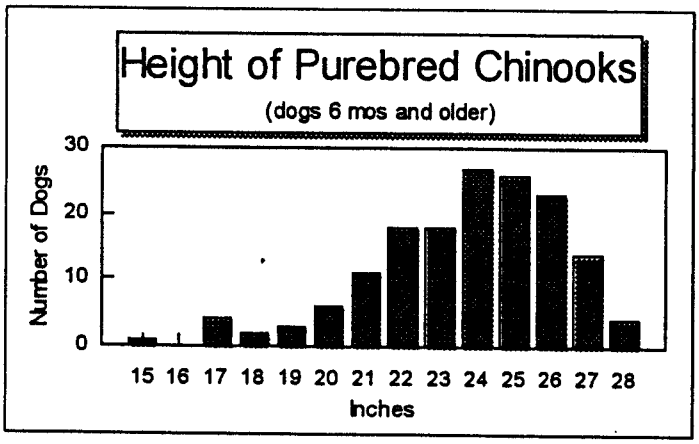
For the purebred Chinooks where the information was indicated, there were surveys for 112 females, and 123 males. The mean age of live dogs was 4.95 years (SD=3.48, median=4.0). This was broken down into the following ages: 0-1 years=26, 1-2=18, 2-3=23, 3-4=11, 4-5=25, 5-6=20, 6-7=9, 7-8=14, 8-9=17, 9-10=10, 10-11=10, 11-12=8, 12-13=4, 13-14=1, and 16-17=1. For sexually intact dogs, there were 43 females, and 63 males. The mean age of these dogs was 4.11 years (SD=3.49,



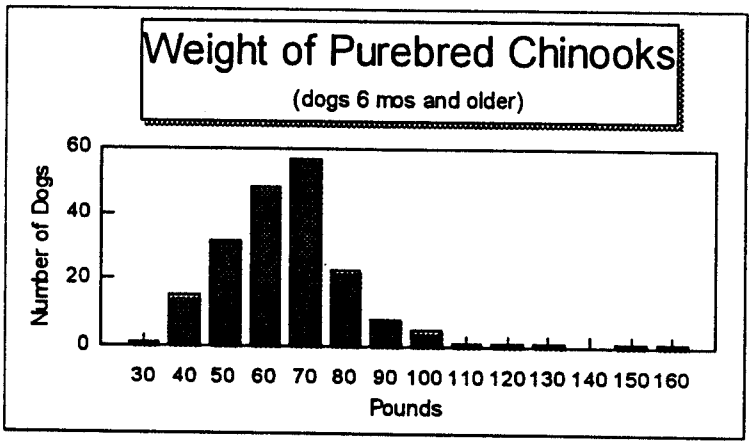
200 Westboro Road
North Grafton, Massachusetts 01536
Academic offices:
Section of Medicine (508) 839-7950
Section of Surgery (508) 839-7960

Hospitals: (508) 839-5395
Fax: (508) 839-7922

median=3.5). This was broken down into the following ages: 0-1 years=21, 1-2=7, 2-3=10, 3-4=4, 4-5=9, 5-6=6, 6-7=2, 7-8=4, 8-9=10, 9-10=5, 10-11=2, 11-12=4, and 12-13=2.



The height of dogs six months of age and over averaged 23.6 inches (SD=3.02, median=24.0). Heights were reported in the following inches (15=15 and up to 16 inches): 15=1, 17=4, 18=2, 19=3, 20=6, 21=11, 22=18, 23=18, 24=27, 25=26, 26=23, 27=14, 28=4. The weight of dogs six months of age and older averaged 69.6 lbs (SD=17.6, median=70.0). Weights were reported in the following ranges (30=30 lbs and up to 40 lbs): 30=1, 40=15, 50=32, 60=48, 70=57, 80=23, 90=8, 100=5, 110=1, 120=1, 130=1, 150=1, and 160=1.



Color of purebred Chinooks was reported as the following: tawny 107=45%, tawny w/black muzzle 39=16.5%, tawny w/black muzzle & ears 27=11.5%, buff 17=7.2%, silver/gray 10=4.2%, bicolor 10=4.2%, buff w/black muzzle 7=3%, white 6=2.5%, white & buff 4=1.7%, other 3=1.3%, tawny w/gray muzzle 2=0.8%, tawny w/white chest 2=0.8%, red 1=0.4%, and buff w/gray muzzle 1=0.4%. Chinook eye colors were reported as: dark brown 145=69%, amber 62=29.5%, gray 2=1%, and bi-eyed 1=0.5%. Ear set of purebred Chinooks was reported as: pricked 87=38%, dropped 64=28%, helicoptered 37=16.3%, one of each 31=13.7%, and flying 8=3.5%.

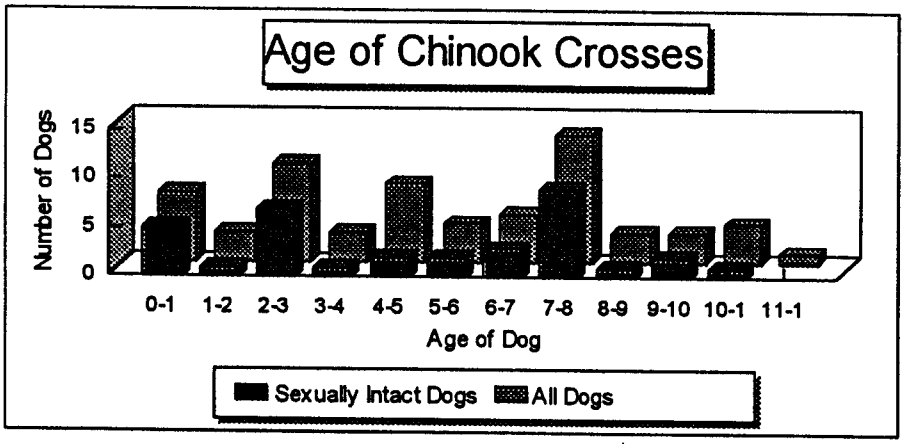
Chinooks that were exercised regularly numbered 190 (79.5%) of 239. Chinooks with no disease present numbered 100 (41.8%) of 239. Thirty-three purebred Chinooks were deceased, with five of them due to non-health reasons (hit by car, or euthanized for other reasons). The average age of death due to health reasons was 10.3 years. The causes were: cancer 5=17.9% (3 bone, 1 spleen, 1 lung), heart disease 3=10.7%, not listed/unknown cause 3=10.7%, and the following with one dog each=3.6%; neurological disease, bloat, muscle disease, prolapsed anus, and acute fibrinopurulent bronchopneumonia.

DATA ON CHINOOK CROSSES

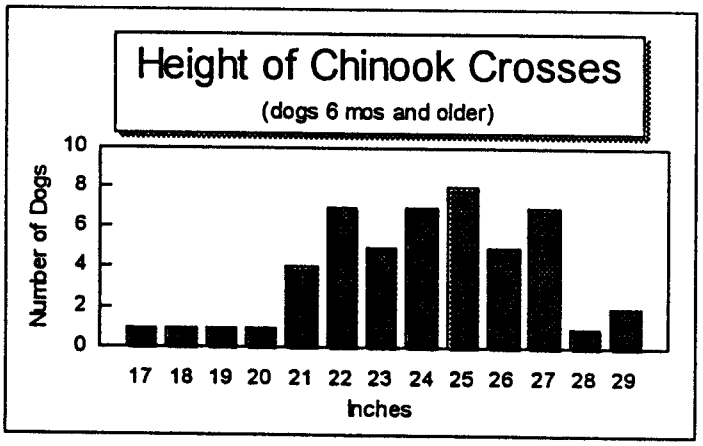
For the Chinook crosses where the information was indicated, there were surveys for 40 females, and 29 males. Crosses included the following breeds: Siberian/Alaskan Husky 21=29.6%, unknown/unlisted 19=27%, Alaskan Malamute 13=18.3%, German Shepherd Dog 11=15.5%, German Shepherd Dog and Malamute 3=4.2%, Saint Bernard 2=2.8%, and Saint Bernard and

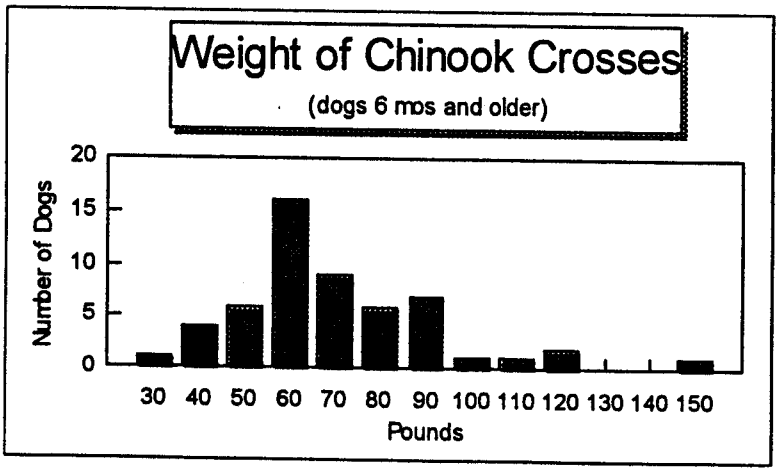
Labrador Retriever 2=2.8%.

The mean age of live crosses was 4.9 years (SD=3.00, median=5.0). This was broken down into the following ages: 0-1 years=7, 1-2=3, 2-3=10, 3-4=3, 4-5=8, 5-6=4, 6-7=5 7-8=13, 8-9=3, 9-10=3, 10-11=4, and 11-12=1. For sexually intact dogs, there were 18 females, and 18 males. The mean age of these dogs was 4.68 years (SD=2.99, median=5.9). This was broken down into the following ages: 0-1 years=5, 1-2=1, 2-3=7, 3-4=1, 4-5=2, 5-6=2, 6-7=3, 7-8=9, 8-9=1, 9-10=2, and 10-11=1.



The height of crosses six months of age and over averaged 23.8 inches (SD=2.89, median=24). Heights were reported in the following inches (17=17 and up to 18 inches): 17=1, 18=1, 19=1, 20=1, 21=4, 22=7, 23=5, 24=7, 25=8, 26=5, 27=7, 28=1, 29=2. The weight of crosses six months of age and older averaged 70.0 lbs (SD=25.0, median=65). Weights were reported in the following ranges (30=30 lbs and up to 40 lbs): 30=1, 40=4, 50=6, 60=16, 70=9, 80=6, 90=7, 100=1, 110=1, 120=2, and 150=1.





Color of Chinook crosses was reported as the following: tawny w/black muzzle & ears 18=26%, tawny 16=23%, tawny w/black muzzle 14=20%, bi-color 9=13%, other 3=4.3%, buff w/black muzzle 2=3%, buff w/black muzzle & ears 2=3%, and the following with one each (1.5%); buff, gray/tan, silver/gray, tan w/white ruff, tri-colored, and white. Eye color of Chinook crosses were reported as: dark brown 52=84%, amber 8=13%, bi-eyed 1=1.6%, and blue 1=1.6%. Ear set of Chinook crosses was reported as: dropped 28=40.6%, pricked 27=39%, helicoptered 9=13%, and one of each 5=7.2%.

Chinooks crosses that were exercised regularly numbered 60 (84.5%) of 71. Chinooks with no disease present numbered 42 (59.2%) of 71. Three Chinook crosses were deceased. Two were hit by car, and one was euthanized at 3.5 years of age due to frequent epileptic seizures.

DATA ON LITTERS

Surveys were completed on 28 litters of **purebred Chinooks**, containing 186 puppies. This averaged out to 6.64 puppies born per litter (median=7.5, SD=2.23). There were 93 males, and 90 females born. Where the year of birth was reported, the litters were born in the following years: 1982=2, 1983=1, 1984=1, 1985=2, 1986=1, 1987=2, 1989=2, 1990=1, 1991=1, 1992=2, 1993=2, 1994=2, 1995=2, 1996=1, 1997=4, 1998=1.

Color of purebred puppies was reported as: tawny w/black muzzle 61=36.8%, tawny 50=30.1%, silver/gray 28=16.9%, buff 11=6.6%, tawny w/black muzzle & ears 9=5.4%, bicolor 4=2.4%, and white 3=1.8%.

There were thirteen puppies reported stillborn out of 186=6.7%. Six of these were stillborn due to dystocia or uterine infection, leaving 7 out of 186 stillborn not due to traumatic birth=3.8%. Four of the seven were hydrops, or hydrocephalus puppies.

There were twenty-five puppies reported with birth defects out of the 186=13.4%. Defects reported were: unilateral or bilaterally retained testicles 9=9.7% of all males, hydrops/hydrocephalus 4=2.2%, umbilical hernia 4=2.2%, prolapsed rectum 3=1.6%, unknown 2=1.1%, incomplete abdominal closure 1=0.5%, swimmer 1=0.5%, and subaortic stenosis 1=0.5%.

Surveys were completed on 10 litters of **Chinook crosses**, containing 67 puppies. This averaged out to 6.7 puppies born per litter (median=7, SD=1.62). There were 35 males, and 32 females born. Where the year of birth was reported, the litters were born in the following years: 1992=2, 1993=1, 1994=1, 1995=1, 1996=1, 1997=2, 1998=1. Breeds used in crosses were: German Shepherd Dog=3, Alaskan Malamute=3, Siberian Husky=2, German Shepherd Dog/Siberian Husky=1, and not listed=1.

Color of Chinook cross puppies was reported as: tawny w/black muzzle & ears 21=32.3%, silver/gray 14=21.5%, tawny 12=18.5%, bicolor 8=12.3%, tawny w/black muzzle 7=10.8%, buff 1=1.5%, liver 1=1.5%, and white 1=1.5%.

There was one puppy reported stillborn out of 67=1.5%. No birth defects were reported.

SURVEY DATA

There were 100 out of 239 purebred Chinooks with no disease listed=41.8%. There were 42 out of 71 Chinook crosses with no disease listed=59.2%. For all diseases listed, the following are the percent of diagnoses with a disease from each catagory for purebred and crossbred Chinooks. (Listed in descending order of purebred Chinook diagnoses):

Category	Purebred	Cross
Orthopedic	23.80%	22.50%
Dermatology	23.40%	8.50%
Reproduction	15.90%	7.00%
Neurology	10.90%	5.60%
Temperament	9.20%	12.70%
Gastrointestinal	5.40%	2.80%
Urinary/Kidney	4.20%	0.00%

Cardiovascular	2.50%	0.00%
Immune Mediated	2.50%	0.00%
Cancer	2.50%	1.40%
Endocrinology	2.10%	1.40%
Ophthalmology	2.10%	0.00%
Metabolic Disease	0.00%	0.00%
Hematology	0.00%	0.00%

For all disorders, based on frequency, the following were those with more than 2% of either purebred or cross Chinook diagnoses listed (in descending order of purebred Chinook diagnoses). Percentages are based on number of diagnoses divided by the total number of dogs with completed surveys. Sex limited diagnosis percentages are based on the number of surveys from dogs of the same sex:

	PUREBRED		CROSS	
	#	%	#	%
Total Cryptorchidism	18	14.63%	3	10.34%
Cryptorchidism-Unilateral	11	8.94%	2	6.90%
All Seizure Disorders	20	8.37%	3	4.23%
Hot Spots	20	8.37%	0	0.00%
Shyness	19	7.95%	9	12.68%
Total Hip Dysplasia	17	7.11%	6	8.45%
Arthritis	14	5.86%	3	4.23%
Lick Sores	14	5.86%	1	1.41%
Cryptorchidism-Bilateral	7	5.69%	1	3.45%
Difficulty Whelping	6	5.36%	0	0.00%
Hip Dysplasia-Subluxation	12	5.02%	2	2.82%
Epilepsy	10	4.18%	2	2.82%
Non-Epileptic Seizures	10	4.18%	1	1.41%
Allergies	9	3.77%	2	2.82%
Flea Allergy	8	3.35%	1	1.41%
Chronic Diarrhea	6	2.51%	0	0.00%
Bow-legged	5	2.09%	0	0.00%
Urinary Incontinence	5	2.09%	0	0.00%
Urinary Tract Infection	5	2.09%	0	0.00%
Hip Dysplasia-Other	4	1.67%	4	5.63%
Failure to Conceive	1	0.89%	1	2.50%
Pyometra	1	0.89%	1	2.50%
Gastritis	1	0.42%	2	2.82%

The following is the complete data on the specific disorders listed for purebred Chinook and Chinook crosses, by category:

	PUREBRED		CROSS	
	#	%	#	%
CANCER				
Mammary Tumor	0	0.00%	1	1.41%
Osteosarcoma	3	1.26%	0	0.00%
Mouth Cancer	1	0.42%	0	0.00%
Splenic Cancer	1	0.42%	0	0.00%
Lung Cancer	1	0.42%	0	0.00%
CARDIOVASCULAR				
Cardiomyopathy	1	0.42%	0	0.00%
Congestive Heart Failure	2	0.84%	0	0.00%
Heart Murmer	2	0.84%	0	0.00%
Lymphocytic Myocarditis	1	0.42%	0	0.00%
DERMATOLOGY				
Allergies	9	3.77%	2	2.82%
Autoimmune skin disease	1	0.42%	0	0.00%
Flea Allergy	8	3.35%	1	1.41%
Food Allergy	3	1.26%	0	0.00%
Hot Spots	20	8.37%	0	0.00%
Lick Sores	14	5.86%	1	1.41%
Pyoderma	1	0.42%	0	0.00%
Juvenile Acne	0	0.00%	1	1.41%
ENDOCRINOLOGY				
Hypothyroidism	4	1.67%	1	1.41%
Pancreatic Insufficiency	1	0.42%	0	0.00%
GASTROINTESTINAL				
Bloat	1	0.42%	0	0.00%
Acute Diarrhea	2	0.84%	0	0.00%
Chronic Diarrhea	6	2.51%	0	0.00%
Gastritis	1	0.42%	2	2.82%
Prolapsed anus	1	0.42%	0	0.00%
Inflammatory Bowel Disease	1	0.42%	0	0.00%
Anal Gland Disease	1	0.42%	0	0.00%
IMMUNE MEDIATED DISEASE				
Vaccine Allergy	2	0.84%	0	0.00%
Autoimmune Thyrombocytopenia	1	0.42%	0	0.00%
Lyme Disease	3	1.26%	0	0.00%
URINARY/KIDNEY				
Urinary Incontinence	5	2.09%	0	0.00%
Urinary Tract Infection	5	2.09%	0	0.00%
NEUROLOGY				
Knuckling	2	0.84%	1	1.41%
Nerve Degeneration	2	0.84%	0	0.00%

Paralysis	1	0.42%	0	0.00%
Epilepsy	10	4.18%	2	2.82%
Non-Epileptic Seizures	10	4.18%	1	1.41%
All Seizure Disorders	20	8.37%	3	4.23%
Tremors	1	0.42%	0	0.00%
OPHTHALMOLOGY				
Cataracts	3	1.26%	0	0.00%
Late Onset Blindness	2	0.84%	0	0.00%
ORTHOPEDIC				
Arthritis	14	5.86%	3	4.23%
Bow-legged	5	2.09%	0	0.00%
Cruciate Disease	1	0.42%	0	0.00%
Carrying a hind leg	0	0.00%	1	1.41%
Hip Dysplasia-Subluxation	12	5.02%	2	2.82%
Hip Dysplasia-Other	4	1.67%	4	5.63%
Hip Laxity	1	0.42%	0	0.00%
Total Hip Dysplasia	17	7.11%	6	8.45%
Intermittant Lameness-Fore	2	0.84%	0	0.00%
Intermittant Lameness-Hind	3	1.26%	1	1.41%
Overshot jaw	1	0.42%	0	0.00%
Undershot jaw	4	1.67%	1	1.41%
Knock-kneed	0	0.00%	1	1.41%
Panosteitis	1	0.42%	1	1.41%
Patella Luxation	2	0.84%	1	1.41%
Spondylosis	0	0.00%	1	1.41%
Toeing out	3	1.26%	0	0.00%
Kinked Tail	1	0.42%	0	0.00%
Dwarfism	2	0.84%	0	0.00%
Narrow Chested	1	0.42%	0	0.00%
Splayed Feet	1	0.42%	0	0.00%
REPRODUCTION				
Difficulty Whelping	6	5.36%	0	0.00%
Failure to Carry to Term	1	0.89%	0	0.00%
Failure to Conceive	1	0.89%	1	2.50%
False Pregnancy	2	1.79%	0	0.00%
Irregular Heats	1	0.89%	0	0.00%
Poor Mothering Instinct	1	0.89%	0	0.00%
Pyometra	1	0.89%	1	2.50%
Reabsorption of Fetus	2	1.79%	0	0.00%
Small Litters	1	0.89%	0	0.00%
Small Birth Canal	1	0.89%	0	0.00%
Undeveloped Female Repro Tract	1	0.89%	0	0.00%
Cryptorchidism-Bilateral	7	5.69%	1	3.45%

Cryptorchidism-Unilateral	11	8.94%	2	6.90%
Total Cryptorchidism	18	14.63%	3	10.34%
Male Infertility	1	0.81%	0	0.00%
Testicular Tumor	1	0.81%	0	0.00%
TEMPERAMENT				
Aggression	1	0.42%	0	0.00%
Shyness	19	7.95%	9	12.68%
Unexplained Behavioral Change	1	0.42%	0	0.00%
Cautious	1	0.42%	0	0.00%