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Demographic Data of a Population of Insured Swedish Dogs Measured in a Questionnaire Study

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Sallander M, Hedhammar Å, Rundgren M, Lindberg JE: Demographic data of a population of insured Swedish dogs measured in a questionnaire study. Acta vet. scand. 2001, 42, 71-80. – Dogs, in the age range 1-3 years old, were randomly selected from the largest animal insurance database in Sweden for inclusion in the study. The study was performed in 1997, and a total of 680 dog owners were selected for the study. A total of 461 dog owners completed the survey, at an overall response rate of 68%. Data was compared to a recent Gallup performed on a sample of all dogs in Sweden. The demographic statistics of the insured dog population were in many aspects similar to the total dog population of Sweden. Typical for both insured dogs and the total population of dogs were a low proportion of neutered dogs, that many dogs were bought at an early age, that many dogs were in contact with a "breeder" when sold, and a similar profile of health status. However, "dog breeders" seemed to have their dogs insured to a higher extent than the general dog owner. It was concluded that as the populations were alike in many respects, it is reasonable to use the insurance database for epidemiological studies on diet and exercise in Swedish dogs.

canine; telephone; survey; Sweden.

Introduction

A well-managed and controlled data base is needed in order to perform reliable epidemiological studies in a population. In Sweden, there have been efforts to register certain health parameters of pure-breed dogs for more than 20 years. Moreover, two thirds of all Swedish dogs are enrolled in health insurances, providing data suitable for epidemiological investigations of the Swedish dog population. The largest animal insurance database (Agria Insurance, Stockholm) includes slightly over 60% of the insured dogs. This database has recently been validated against veterinary practice records (Egenvall *et al.* 1998). In addition, the Swedish Kennel Club (SKC) registers two thirds of all the dogs in Sweden (Egenvall *et al.* 1999). To be able to draw conclusions about dogs in gen-

eral from an insurance database, it is necessary to know more about possible differences between insured dogs and the total dog population. Recently, Egenvall *et al.* (1999) presented a survey of the demographic data of all Swedish dogs. Therefore, it was considered important to study dogs from the Agria Insurance database for demographic variables, and to compare these data to the survey of all dogs in Sweden. The demographic data presented in this article was a part of a survey study on dietary intake and exercise in insured dogs.

The aim of this work would be to examine the demographic data of dogs between 1 and 3 years old and their owners using data collected in the insured dog population. Further, the objective was to examine whether there were differences between the insured dog population

selected and the total dog population with regard to dogs and owners, and to compare dog owners with the Swedish human population in general.

Materials and methods

Frame and sample design

The individuals sampled were a simple random sample of 680 pure-breed dogs between 1 and 3 years of age, in the register of the insurance company Agria, which registered 240 000 dogs in 1997 totally. The sample size was based on an assumed dietary intake being the main objective of the questionnaire study. Sample size was calculated according to *Schaeffer et al.* (1993). The only data that, for legal reasons, could be made available for sampling of individuals for this study was the name and address of the dog owner, and the name and date of birth of the dog.

Method of measurement

The method to obtain information about demographic data was a combined mail and telephone survey. The owners of the randomly selected dogs were initially contacted by mail by Agria with an inquiry about their willingness to participate in the study. The letter from Agria contained information on why and how the interviews would be done. The participants had to respond in a pre-stamped envelope whether they were willing to participate, and when would be the most convenient time for an interview. Two follow-up letters were sent to non-respondents. A third reminder was made in the form of a telephone inquiry from Agria to the dog owner. After the respondent had agreed to participate, a mailed questionnaire was sent out together with information that a telephone interview would be performed within a week. The respondent was asked to fill in the mailed survey prior to the interview in order to make the telephone interview as effective as possible.

Pretesting and training of interviewer

A preliminary questionnaire was tested on 21 dog owners prior to being used in this survey study, and necessary modifications were made. Telephone interviews were performed by the main author and a graduate student at the Department of Animal Nutrition and Management at the Swedish University of Agricultural Sciences in 1997. They had both undergone training in interviewing techniques. The interviews took about 30 min to perform for each dog owner.

Questions

Questions asked in this study were part of a large survey about diet and exercise in dogs. All questions were of multiple-choice type or were formulated in order to register continuous data with possibilities to add specific information. The questions asked for demographic data related to the owners and the specified dog (Table 1). Based on the collected data the objects were grouped into specific categories such as breed, sex and age.

Data analysis

The data was analysed using Microsoft Excel (*Microsoft Software* 1997) and Minitab Statistical Package (*Minitab* 2000). Descriptive information about the questions was given as proportions and confidence intervals on each alternative. Having access to original data from a recently published national Gallup (*Egenvall et al.* 1999), dogs between 1 and 3 years of age in that study were compared to the dogs in the present questionnaire study. For continuous data, the standard deviations from the 2 data sets were pooled, and t-values were calculated. For categorical data, the 2-proportions test and the chi-square test were used (*Minitab* 2000). For proportions 95% confidence intervals were calculated using the formula $\pm 1.96[(\text{proportion}(1-\text{proportion})) / (n-1)]^{0.5}$.

Table 1. Demographic data included in the telephone questionnaire

Questions about the owner	Questions about the dog
Name	Name and registration number
Address	Breed
County	Sex
Number of adults in the household (≥ 18 years)	Date of birth
Age of each adult	Neuter status - Neutered or intact, age at neutering if neutered
Number of adults in the household	Age when owner got possession of the dog
Age of each child	Type of place where the dog was bought - Breeder, owner is also the breeder, friend, other
Employment/Retired/Other type	Price paid for the dog
Purpose of dog ownership - Company, dog exhibitions, breeding, hunting, obedience, tracking, searching on humans, guarding, herding, other	Weight of the dog
Number of dogs in the household	Subjective judgement of body condition by dog owner - normal, thinner or heavier than normal
Other animals in the household - Dogs, cats, other animals and numbers	Size of pure-bred dog compared to standard - small, normal, large
	Present disease of the dog - Yes/no, and diseases as open questions
	Previous disease of the dog - Yes/no, and diseases as open questions

Results

General

In total, 461 owners completed the questionnaire, which gave a response rate of 76% (461/608) for the owners possible to contact, and an overall response rate of 68% (461/680). The main reason for non-completion of the questionnaire was that dog owners did not wish to participate, and other causes of a negative response were that the dog had died, and that the persons were not reachable during the period of study. The dogs belonging to the non-respondents were similar to those owned by respondents with respect to age distribution.

Demographic data of the dog owners

The percentage of the dog owners that lived in single households was 10.2% (CI 7.4-13.0). An additional 3.5% (CI 1.8-5.2) of dog owners lived as single adults (persons ≥ 18 years) with one child or more. Couples with no children represented 35.1% (CI 30.7-39.5) of the households, and a further 35.3% (CI 30.9-39.7) of families lived with 2 adults and 1 child or more. In 15.0% (CI 11.7-18.3) of the households, there were 3 adults or more. The average number of adults in dog owning families was 2.0 (SD 0.6), and the families having children had 2.1 adults (SD 0.6). The majority (79.4%), CI 75.7-83.1) of dog owners was between 30 and

Table 2. Proportion of households that own dogs including adults and children within different age groups (n=461)

Average age groups	Proportion (%)	
	Mean (%)	95 % C.I.
<i>Adults, years</i>		
18≤x<30	12.6	9.6-15.6
30≤x<40	32.5	28.2-36.8
40≤x<50	23.0	19.1-26.8
50≤x<65	23.9	20.0-27.8
>65	7.4	5.0-9.8
Refused to give this information	0.6	
<i>Children, years</i>		
No children	53.6	49.0-58.1
0≤x<5	8.5	5.9-11.0
5≤x<10	9.5	6.8-12.2
10≤x<15	17.8	14.3-21.3
15≤x<18	10.2	7.4-13.0
Refused to give this information	0.4	

65 years of age, and the average age for the adults was 43.2 years (SD 12.3). Only 7.4% (CI 5.0-9.8) of the adults that possessed a dog were older than 65 years of age (Table 2).

More than half of the families that owned a dog did not have any children (persons below 18 years of age). One fifth of the families had one child, while another fifth had 2 children. The number of children in the dog owning families was on average 1.85 (SD 0.84). The largest age group of children was between 10 and 15 years (Table 2), and the average age for children was 10.4 years (SD 4.9).

The geographical distribution of dog owners shows that there was a higher total number of dog owners in the counties of Gävleborg, Skåne and Stockholm, than in any other single county. One quarter of the dog owners lived in the 3 biggest cities of Sweden (Stockholm, Gothenburg and Malmö). Approximately 38.4% (CI 34.0-42.8) of the insured dogs lived in the south (Götaland), 35.4% (CI 31.0-39.8) in the middle

(Svealand), and 26.2% (CI 22.1-30.2) in the north (Norrland) of Sweden.

Approximately one quarter (24.3%, CI 20.4-28.2) of the dog owners stated that they did not work at all. The most common reasons for not working were that they were retired, unemployed, or on parents leave.

General data on dogs

The dogs in this investigation were of 124 different breeds and were by design selected from individuals born in the years 1993-1995. Male dogs were slightly more numerous in the study group than bitches, and the proportions were 53.8% (CI 49.2-58.3) and 46.2% (CI 41.6-50.8), respectively. The most common breeds were dachshund, golden retriever, German shepherd dog, labrador retriever, English cocker spaniel and Swedish elkhound (Table 3). The vast majority (98.9%, CI 97.9-99.8) of the dogs was not neutered. The average age for neutering for the few that were not intact was 31.0 (SD 8.5) months, indicating that castration was usually done after puberty.

The average age when dog owners had bought their dog was 3.8 months (SD 4.9, median 2.0, range 1-32 months). As much as 13.7% (CI 10.6-16.8) of the participants in the survey claimed that they were breeders of the chosen dog, thus indicating that they had become owners of their dog when the dog was born. It can

Table 3. The most common breeds and the proportion in the survey (n=461)

Breed	Proportion (%)	
	Mean (%)	95% C.I.
Dachshund	7.4 (n=34)	5.0-9.8
Golden retriever	6.9 (n=32)	4.6-9.2
German shepherd	6.3 (n=29)	4.1-8.5
Labrador retriever	4.6 (n=21)	2.7-6.5
English cocker spaniel	3.5 (n=16)	1.8-5.2
Swedish elkhound	2.8 (n=13)	1.3-4.3

Table 4. Age of the dog (months) when the present owners got it in possession (n=461)

Age	Proportion (%)	
	Mean (%)	95% C.I.
0	13.2	10.1-16.3
0<x≤2	47.1	42.5-51.7
2<x≤6	30.4	26.2-34.6
6<x≤12	5.0	3.0-7.0
>12	3.5	1.8-5.2
Not specified	0.9	

be noted that 90.7% (CI 88.0-93.3) of the dogs actually were with their current owners before they had reached 6 months of age (Table 4).

The majority of the dogs (78.3%, CI 74.5-82.1) was bought from breeders, in addition to the 13.7% (CI 10.6-16.8) already listed as breeders themselves. Thus, more than 92.0% (CI 89.5-94.5) of the dogs originated from "a breeder". The remaining dogs were bought from relatives, friends or through contacts or advertisements.

The average price for a dog that was sold was approximately 5,400 SEK (SD 1,600) and varied from 0 up to 20,000 SEK (Fig 1). Some of the individuals that were interviewed did not remember or did not want to reveal the price. Ap-

proximately 1.5% (CI 0.4-2.6) of the dogs were sold from a breeder to a private person for a reduced cost, and with a breeding contract on the dog. However, there was no consistency in the price paid and the conditions applied with regard to the breeding-rights.

The stated main purpose of owning a dog was as a companion animal (69.0%, CI 64.8-73.2), whilst 16.7% (CI 13.3-20.1) had the dog primarily for hunting. Other important reasons were to have the animal for breeding (3.9%, CI 2.1-5.7) or as a working dog in obedience, search- and tracking work on humans (3.7%, CI 2.0-5.4).

More than half of the dogs lived as solitary canines within a household (Table 5). Almost 1 quarter of the dogs were housed together with 1 other dog, while another quarter lived in households with more than 2 dogs. The household that had the highest number of dogs had another 17 dogs beside the dog sampled.

It is notable that 30.4% (CI 26.2-34.6) of the dog owners had at least 1 cat. Dog owners also tended to have other animals; every sixth and tenth owned other small animals or horses, respectively. Farm animals such as cattle, pigs and poultry were owned by every fifteenth dog owner.

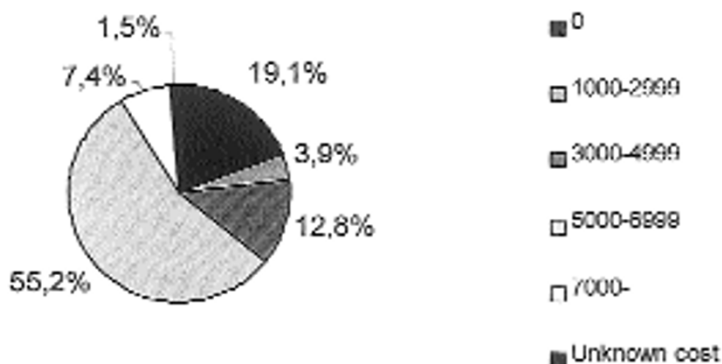


Figure 1. Proportion (%) of the cost at acquisition (Swedish Crowns, SEK).

Table 5. Number of dogs in dog owning households (n=461)

Number of dogs	Proportion (%)	
	Mean (%)	95 % C.I.
1	53.7	49.1-58.3
2	22.6	18.8-26.4
3	8.5	5.9-11.0
4	5.9	3.7-8.0
5 or more	9.3	6.6-11.9

The average weight for dogs was 22.1 kg (SD 13.5, median 21.0, range 1.2-75.0). When dog owners judged the body condition of their dog, 65.2% (CI 60.8-69.6) of dogs were considered to have a normal weight, while 19.0% (CI 15.4-22.6) thought their dog to be lighter than normal, and 15.8% (CI 12.5-19.1) regarded the dog as heavier than normal. More than half (56.6%, CI 52.1-61.1) of the dogs was considered of normal size for the breed by the dog owner, while 25.4 (CI 21.4-29.4) and 18.0% (CI 14.5-

21.5) were considered smaller and larger, respectively.

The majority of dogs (92.4%, CI 90.0-94.8) was considered healthy at the time of the interview. For the dogs that were not reported to be healthy, more than one quarter had skeletal disorders (29.4%, CI 25.2-33.6), and approximately every sixth (17.6%, CI 14.1-21.1) dog had skin problems.

One third (33.8%, CI 29.5-38.1) of the dogs had, according to the owner, had some previous disease. Approximately 1 out of 7 dogs was reported to have suffered from infections (5.9%, CI 3.7-8.0), ear diseases (5.6%, CI 3.5-7.7) or skeletal disease (5.0%, CI 3.0-7.0). Skin disorders, gastric- and intestinal disorders, and trauma were also mentioned repeatedly as previous disorders for the dogs covered by the survey.

There was no significant difference between the dogs in the present study and the dogs between 1 and 3 years in the national gallup as for the

Table 6. Comparison of data for the dogs in the present study (n=461) to dogs 1 to 3 years in a national gallup (n=513)

Variable		Dogs 1-3 yrs in the present study		Dogs 1-3 yrs from a national gallup		P-value
		Proportion		Proportion		
		Mean (%)	95% C.I.	Mean (%)	95% C.I.	
Sex						0.624 ¹
	Male	53.8	49.2-58.4	55.3	50.9-59.6	
	Female	46.2	41.6-50.8	44.6	40.3-48.9	
Breed						0.075 ²
	Dachshund	7.4	5.0-9.8	7.3	5.0-9.6	
	German shepherd	6.3	4.1-8.5	6.8	4.6-9.0	
	Golden retriever	6.9	4.6-9.2	3.5	1.9-5.1	
	Labrador retriever	4.6	2.7-6.5	3.7	2.1-5.3	
Neuter status	Intact dogs	98.9	97.9-99.8	97.0	95.5-98.5	0.043 ¹
No of dogs in the household	Mean	2.29		1.67		0.0013
	SD	2.95		1.07		

¹Analysed with 2-proportion statistics²Analysed with chi-square³Analysed with t-test

proportion of sex, the 4 most common breeds (dachshund, German shepherd, golden and Labrador retriever), and the proportion of breeders. Data of the present study for neuter status and for the number of dogs in the household was significantly different to the dogs between 1 and 3 years in the national Gallup (Table 6).

Discussion

This survey has given estimates of demographic data on a random sample of dogs between 1 and 3 years in the insured dog population. Whilst this has a value within itself, it is also interesting in comparison to data for the dog population as a whole in Sweden.

Dog owners

It was only possible to control whether the non-respondents were different from the respondents with respect to age of the dogs, as all other data from the insurance register was confidential.

The average number of adults (persons ≥ 18 years) in dog owning families without children was higher (2.0) in the present study than for an average family (1.6) in Sweden (SCB 1997). The average number of adults in dog owning families with children in the present study was also higher (2.1) than for an average family (1.8) in Sweden (SCB 1999a). The percentage of dog owners that lived in single households was 10%, which was considerably lower than reported in a recent Gallup of dog owners (35%; Egenvall *et al.* 1999). However, the figure given by Egenvall *et al.* (1999) only counted persons of 15 years of age or older as household members, thus excluding the majority of children (Egenvall *personal communication* 2000). In the present study, both adults and children in the household were counted, as defined by the Statistics Sweden (SCB 1992). It has been reported that households with a lower total income than 175 000 SEK/year and single-person

households have dogs to a lesser extent than do other households (Egenvall *et al.* 1999). It is also possible that single person households that do have a dog cannot afford having their dogs insured to the same extent as families with more than 1 adult in the family.

The average age for the dog owners in the present study was 43.2 years, which was comparable with the average age (40.2 years) of Swedish adults (SCB 1999b). The present figure was also within the age range (40-65 years) where it was most common with dog ownership reported in the national survey study about dogs (Hedhammar *et al.* 1999). The proportion of persons above 65 years of age owning a dog was shown to be low both in the present study and in the national Gallup (Egenvall *et al.* 1999).

Almost half of the dog-owning households in the present study did have children and the average number of children in the dog owning families was 1.85. This was comparable with the figures reported for the average Swedish family (1.82; SCB 1999a). Dog owners in this study seem to have children to the same extent as Swedish people do in general.

In the present survey approximately 36% of the insured dog owners lived in the south of Sweden (Götaland), whereas 35% lived in the middle (Svealand), and 29% in the north (Norrland). These figures were not in accordance with those reported by Egenvall *et al.* (1999); they reported that 42.2% of dogs lived in the south, 47.4% in the middle, and 10.5% in the north of Sweden. The main reason for the differing results is the different criteria that have been used to define what should be considered as south, middle and north. One quarter of the dogs in this survey was reported to be living in or in the surroundings of 1 of the 3 largest cities (Stockholm, Gothenburg and Malmö), which was in accordance with the figure (24%) reported by Egenvall *et al.* (1999). According to available human population statistics 49% of

the Swedish people live in the 3 largest cities (SCB 1999b). The Manimalisreport (*Anonymous* 2000) stated that the ownership of dogs was higher in small and middle-sized cities than in large cities.

The 2 main purposes of dog-ownership found in our study were to have the dog as a companion animal, and as a hunting dog, which was in agreement with *Egenvall et al.* (1999).

A little over half of the insured dogs lived as solitary canines within a household. In contrast, *Egenvall et al.* (1999) reported that 78% of all dogs lived as solitary canines within households. There were significant differences between the 2 studies in the number of dogs in households (Table 6). Insured dogs do live together with other dogs more often than dogs from the total dog population. This can be explained by the fact that a higher proportion of breeders seems to have their dogs insured than is normal for the general population, and that breeders most commonly have at least 2 dogs.

In the present study, 31% of the owners of insured dogs had at least 1 cat, which was in accordance with *Hedhammar et al.* (1999). The present data also indicated that dog owners tended to have other animals.

One quarter of the dog owners in the present study stated that they did not work, which was in agreement with figures reported by the National Food Administration (*Becker* 1999). This indicates that owners of insured dogs work to the same extent as the Swedes in general.

Dogs in the survey

The dogs in this investigation were by design born in the years 1993-1995. Male dogs were slightly more numerous than the bitches (54% and 46%, respectively). The reason for this is that for 2 of the large breeds (golden retriever and German shepherd dog), the males were more numerous than the females. There was no significant difference as for sex distribution

between dogs in the present study and dogs between 1 and 3 years old in the recent national gallup. The most common breeds in this survey (dachshund, golden retriever, German shepherd dog, labrador retriever, English cocker spaniel and Swedish elkhound) were ranked more or less in the same order as in the national gallup made in 1998 (*Egenvall et al.* 1999). *Egenvall et al.* (1999) also examined whether the breed distribution was similar for insured and non-insured dogs, and found the same breeds being most numerous as in this survey. There was no significant difference between the proportion of the 4 most common breeds between dogs in the present study and dogs between 1 and 3 years old in the recent national gallup. As a comparison, the registration figures in the Swedish Kennel Club rank the German shepherd dog as the number 1 breed in Sweden, and the dachshund follows as number 2. However, if we regard dachshunds as a single breed, summing all sizes and hair types, the dachshund is the most common breed in Sweden, which was in accordance with this study.

In Sweden, there are practically no stray dogs, and there is a long tradition not to neuter dogs. Until 1988 it was only allowed to neuter dogs for medical reasons. In the present study, the majority (99%) of the dogs was not neutered, which was even higher than the figures reported by *Egenvall* (1999), who found 96% of males and 93% of females to be intact. The slightly higher neutering figures given by *Egenvall et al.* (1999) might be explained by the fact that they sampled dogs from all ages, and that castration is often performed on older dogs for medical reasons in Sweden (*Hedhammar* unpublished data). Out of dogs between 1 and 3 years of age from the recently published study by *Egenvall et al.* (1999), 97% of the dogs were intact as compared to 99% in the present study. Although a statistically significant difference was noted (Table 6), both figures are much higher

than in countries where it is traditional to castrate most dogs that are not intended for breeding. These figures differ markedly from a survey made in Australia, where 8% and 43% of the females and males were intact, respectively (Blackshaw & Day 1994).

In this survey, we found that dogs in the insured dog population were purchased at an early age (8 weeks), and that most dogs arrived at their current owner before the age of 6 months (91%). This was in accordance with Hedhammar *et al.* (1999), who reported that 75% of the dogs had reached their owner at normal age of delivery (before 4 months), and that most of the dogs arrived to their present owner before the age of 12 months. This indicates that Swedish dogs to a large extent live most of their lives in the same household. This differs from experiences from other countries such as the U.S., where there are a many dogs that are taken care of by dog shelters (Moulton *et al.* 1991, Rowan 1991).

In the present study 13% of the owners of insured dogs were breeders, which is a slightly higher percentage than was found compared to the general dog population (10%; Hedhammar *et al.* 1999). Seventy-eight percent of the dogs in this survey were purchased from breeders, whereas another 13% were owned by their breeder. Thus, this indicates that more than 91% of the insured dogs were in contact with "a breeder" at the age of acquisition. This is higher than what was reported by Hedhammar *et al.* (1999), who showed that 78% of the dogs were in contact with a breeder at the age for acquisition.

In the present study, 9 out of 10 dogs were considered to be without health problems at the time of interview, and this is in agreement with the study by Hedhammar *et al.* (1999). In the present study the main reasons for disease were skeletal disorders (2.2%), and skin- and ear problems (1.5%), which corresponds to the

study by Hedhammar *et al.* (1999). Only one third of dogs that were in the ages 1-3 years were considered to have been ill previously.

The dog owners in this study were asked to estimate the body condition of their dog. Previous studies (Slater 1999) shows that dog owners often under-estimate the body condition of their dogs, and the figures given in the present study should only be considered as indicative.

Conclusions

The present mail and telephone survey performed during 1997 has given estimates of some demographic parameters for a random sample of dogs 1 to 3 years old insured by the insurance company Agria.

The demographic statistics of the insured dog population were in many aspects similar to the general dog population in Sweden. The age distribution of the dog owners seemed to be corresponding, and the distribution of households in the country was similar. Typical of both investigations were a low proportion of neutered dogs, a similar distribution of breeds, that dogs were bought at an early age, that many dogs were in contact with a "breeder" when sold, and similar reports of health status. The reasons for dog ownership were also similar for the 2 populations. Also, the percentage of cat owners among the dog owners was similar. However, "dog breeders" seemed to have their dogs insured to a higher extent than the general dog owner.

It was concluded that as the populations were alike in many respects, it appears reasonable to use the insurance database for future epidemiological studies.

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Sammanfattning

Demografiska data från en försäkrad svensk hundpopulation undersökt i en enkätstudie.

Sluppmässigt utvalda hundar mellan 1 och 3 år gamla från den största djurförsäkringsdatabasen för hundar i Sverige (Agria) inkluderades i studien. Undersökningen utfördes under år 1997 och 680 hundägare utvaldes till studien. Sammanlagt 461 hundägare besvarade enkäten så den totala svarsfrekvensen var 68%. Data jämfördes med en nyligen genomförd Gallup-undersökning på ett urval av samtliga svenska hundar. Demografiska data från den försäkrade hundpopulationen var i flera avseenden lika motsvarande data i den totala svenska hundpopulationen. Något som var typiskt i båda grupperna av hundar var att en hög andel var okastrerade, de hade en liknande fördelning av raser, att hundar inköptes vid en tidig ålder, att många hundar såldes av en "uppfödare" och en liknande rapportering av hälsostatus. Hunduppfödare verkade dock ha sina hundar försäkrade i högre utsträckning än den genomsnittlige hundägaren. Eftersom den försäkrade hundpopulationen i så hög utsträckning liknade den totala hundpopulationen, drogs slutsatsen att man i epidemiologiska studier kan använda Agrias databas för att få information om svenska hundar.

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