

# **ABSTRACTS**

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## **Breed variations in the occurrence of pyometra and mammary tumours in Swedish dogs**

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**BACKGROUND:** In Sweden only 7% (all ages) of the dog population is neutered (1). As a consequence, a large number of dogs are susceptible for diseases of the genital tract or that are associated with production of reproductive hormones. Neutering/spaying dogs is performed to avoid reproduction but also for therapy or prevention of diseases. In female dogs, possible health benefits of spaying include prevention of the common uterine diseases cystic endometrial hyperplasia and pyometra. The risk for developing malignant mammary tumours is also considerably lower if spaying is performed at an early age compared with in intact animals (2). In average 25% of all intact female dogs in Sweden are diagnosed with pyometra by 10 years of age, with a corresponding proportion of 13% reported for diagnosis of at least one mammary tumour (3, 4). The risk of other diseases induced by reproductive hormone production such as neoplasia of the genital tract, progesterone-induced diabetes type 2 and growth hormone excess is also reduced in neutered animals (5, 6). The objective of the present study was to evaluate the occurrence of the two most important diseases in female dogs that may be prevented by neutering. Due to large differences in the diseases occurrence between breeds, another aim was to evaluate the disease risk for individual breeds.

**MATERIALS AND METHODS:** The Swedish dog-population was studied in relation to breed and age, using data on dogs insured by the animal insurance company Agria (Agria Pet Insurance, Stockholm, Sweden; www.agria.se) in 1995-2006. The current database contains data from over 260 000 female dogs, and has data on dogs with both life insurance and veterinary care insurance. Every year that a dog was insured it contributed one dog-years at risk (DYAR), resulting in just over 1 000 000 DYAR were calculated for dogs up to 10 years of age. Breeds were classified according to the Swedish Kennel Club breed classification system. The crude and breed-specific mean ages at development of pyometra and mammary tumours were determined. There were 110 breeds with over 1000 DYAR in the database, and they constitute the basis for the analyses. Overall and by breed, Cox proportional hazards regression without covariates was used to develop the baseline hazard and survival to different ages (interpreted as the proportion of bitches that developed eg. pyometra at a certain age and presented for 10 years of age).

**RESULTS:** In total data from 20 423 bitches with the diagnosis pyometra and 11 758 with the diagnosis mammary tumours and 30 131 with either of the two diseases were obtained from the database. The incidence rate (IR) for pyometra was 199 (CI 196-202) dogs per 10 000 DYAR, for mammary tumours 112 (CI 110-114) dogs per 10 000 DYAR and for either of the two diseases 297 (CI 294-301) dogs per 10 000 DYAR. The mean age of diagnosis pyometra was 7.0 years, mammary tumours 8.0 years and either pyometra or mammary tumour 7.4 years. The proportion of bitches diagnosed with either of the diseases ranged from 3-73% in different breeds. In all breeds, the overall proportion of the bitches that had developed these diseases at 10 years of age was for pyometra 19%, mammary tumour 13%, and either pyometra or mammary tumour 30%. The top 10 breeds with the largest proportion (%) of female dogs that had developed either pyometra or mammary tumours before 10 years of age were Leonberger (73%), Irish Wolfhound (69%), Bernese Mountain Dog (69%), Great Dane (68%), Rottweiler (65%), Staffordshire Bull Terrier (66%), Bullterrier (62%), Bouvier des Flandres (60%), Keeshond (57%) and Basset Hound (56%). However, there were 20 dog breeds with a proportion of at least 50% affected by either pyometra or mammary tumour within the same age interval. The proportion of dogs affected by pyometra was largest in the following 10 breeds: Bernese Mountain Dog (66%), Great Dane (62%), Leonberger (61%), Rottweiler (58%), Irish Wolfhound (58%), Staffordshire Bullterrier (54%), Bullterrier (52%), Newfoundland (50%), Collie (smooth haired) (44%), and Old English Sheepdog (42%). The proportion of dogs affected by mammary tumour was largest in the following 10 breeds: Leonberger (46%), Doberman Pinscher (42%), Irish Wolfhound (41%), Welsh Terrier (37%), English Springer Spaniel (36%), Boxer (35%), American Cocker Spaniel (35%), Bedlington Terrier (33%), Airedale Terrier (28%).

**DISCUSSION:** In the present study, the proportion of bitches that has developed the reproductive disorders pyometra and mammary tumours by 10 years of age in female dogs of 110 different breeds is shown. For the first time the combined risk of contracting either of the two diseases was studied. The occurrence of either pyometra or mammary tumours in dogs up to 10 years of age was high, >50% for over 20 breeds in the studied dog population. The results regarding to age- and breed differences in the incidence of both diseases were on the whole in accordance with previous reports (3, 4). Though elective neutering/spaying may have health benefits, breed-associated negative side-effects of the procedure should be considered when making the optimal decision for each dog.

**CONCLUSION:** The present study demonstrates the occurrence of pyometra and mammary tumours, and also either of the two diseases in female dogs of 110 different breeds. These data may be valuable when deciding whether or not to perform elective spaying for individual dog of different breeds.

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