

Pedigree dog breeding has been reported to be associated with health and welfare issues for purebred dogs (1). However, a critical data gap on disorder prevalence information in dogs has constrained effective reforms (2). Systematised collection of electronic patient record (EPR) data from primary-care veterinary practices has been proposed for generation of reliable prevalence data relating to the overall dog population (3)

Background



This study aimed to report the prevalence of common disorders in dogs attending veterinary practices in England. Associations between purebred/crossbred status and between popular breeds in the occurrence of common disorders would be investigated.

It was hypothesised that purebred dogs have a higher prevalence of common disorders compared with crossbred dogs.

Aims & Objectives

M&M

VetCompass collects de-identified EPR data from primary-care veterinary practices in the UK for companion animal health surveillance (4). Practitioners recorded summary diagnosis terms from an embedded standard nomenclature, the VeNom codes (5). This study included all dogs with data uploaded to VetCompass from September 01, 2009 to March 31, 2013. Data collected included demographic (species, breed, date of birth, sex, neuter status, insurance status, weight and deceased status) and clinical information (free-form text clinical notes, summary diagnosis terms, treatment and deceased status with relevant dates). A random sample of dogs was selected for detailed examination and data on all disorders diagnosed were extracted. Ethical approval was granted by the RVC Ethics and Welfare Committee (URN 2010 1076).

Analysis: All analysis used Stata 11. The demography of the sampled dogs was described. Prevalence values were estimated for the most common disorders recorded. Prevalence for individual disorders was compared between purebred and crossbred dogs and between popular breeds using the chi-squared test with Holm-adjusted P-values to account for multiple testing effects (6). The level of significance was set at $P < 0.05$.

Results

Demography of study dogs

The study included 148,741 dogs attending 93 practices in central and south-east England. Prevalence extraction used a sample of 3,884 dogs of which 79.4% were purebred, 47.0% were female, 44.7% were neutered and 31.6% were insured. The median weight was 17.3 kg (interquartile range [IQR]: 9.1-28.4, range: 1.3-100.6) and the median age was 4.8 years (IQR: 1.8-9.1, range: 0.0-21.24).

Summary results

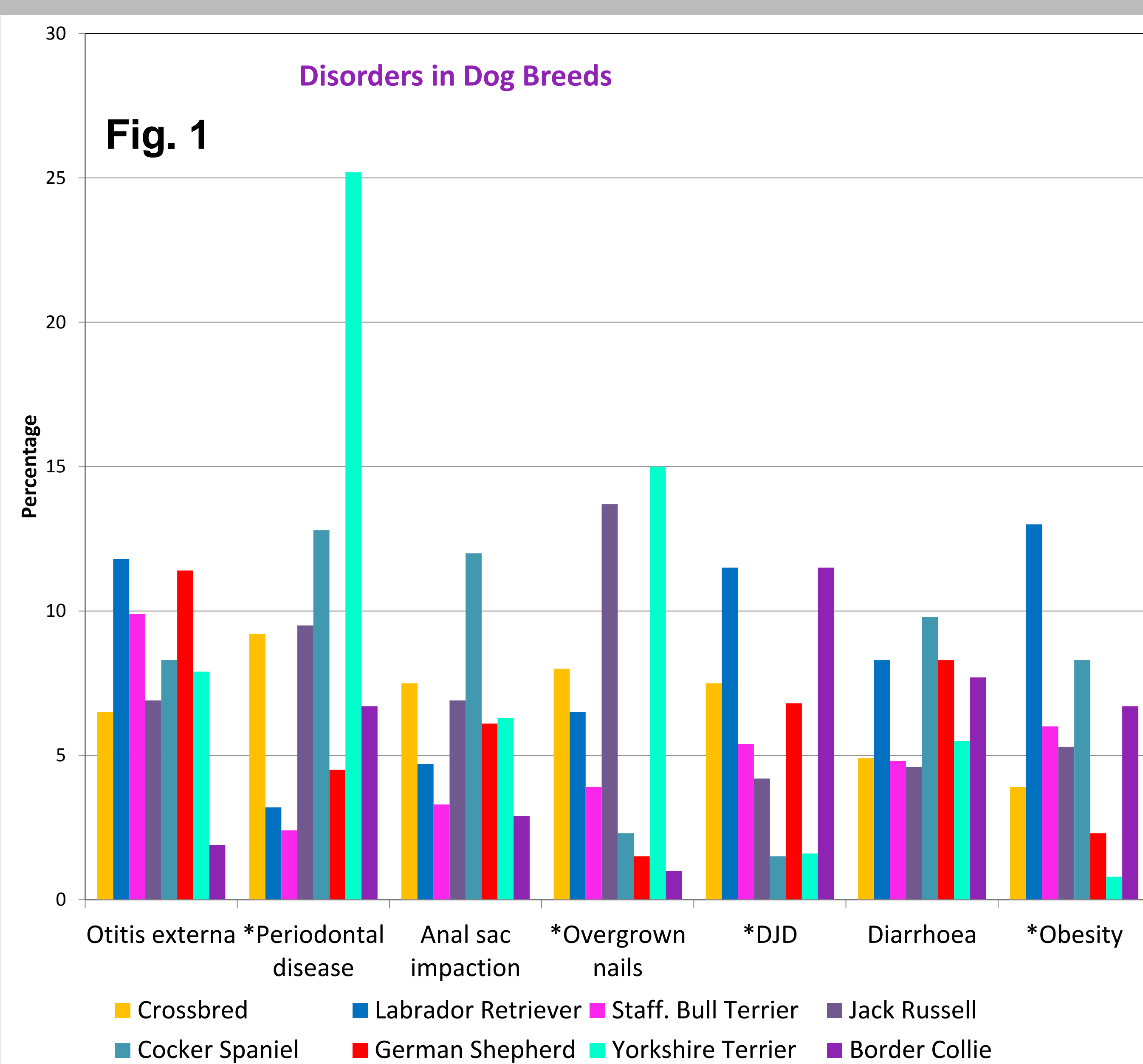
Overall, 2,945 (75.8%) of the sampled dogs had at least one disorder diagnosed during the study period. The median (IQR, range) number of disorders diagnosed per dog was 1.0 (1.0-3.0, 0.0-21.0). The median (IQR, range) time contributed to the study per dog was 0.7 years (0.0-3.5, 0.0-1.9). There were 8,025 unique disorder events diagnosed that encompassed 430 distinct diagnosis-level disorder terms.

Table 1. Disorder prevalence in dogs

Disorder	Overall			Purebred		Crossbred		P-value
	No.	Prev ^a %	95% CI ^b	Prev ^a %	95% CI ^b	Prev ^a %	95% CI ^b	
Otitis externa	396	10.2	9.1-11.3	11.2	10.0-12.4	6.5	4.7-8.3	0.001
Periodontal disease	361	9.3	8.3-10.3	9.4	8.2-10.5	9.2	7.4-11.0	1.000
Anal sac impaction	277	7.1	6.1-8.1	7.1	6.0-8.1	7.5	5.7-9.4	1.000
Overgrown nails	276	7.1	6.1-8.2	6.9	5.8-8.0	8.0	6.1-9.9	1.000
Degenerative joint disease	256	6.6	5.7-7.5	6.4	5.3-7.4	7.5	5.7-9.4	1.000
Diarrhoea	249	6.4	5.5-7.4	6.8	5.6-8.0	4.9	3.4-6.4	0.255
Obesity	238	6.1	5.2-7.1	6.7	5.6-7.9	3.9	2.3-5.5	0.006
Traumatic injury	214	5.5	4.7-6.4	5.5	4.4-6.5	5.7	3.6-7.7	1.000
Conjunctivitis	192	4.9	4.1-5.8	5.2	4.2-6.2	4.1	2.8-5.5	1.000
Vomiting	159	4.1	3.3-4.9	4.0	3.1-4.9	4.5	3.0-6.0	1.000
Heart murmur	153	3.9	3.3-4.5	4.1	3.5-4.7	3.4	2.1-4.7	1.000
Lipoma	137	3.5	2.8-4.2	3.5	2.7-4.2	3.8	2.7-4.9	1.000
Dermatitis	134	3.5	2.8-4.1	3.5	2.8-4.3	3.1	1.9-4.4	1.000
Skin hypersensitivity	113	2.9	2.3-3.5	3.2	2.5-3.9	1.8	0.9-2.6	0.116
Skin mass	110	2.8	2.3-3.4	3.2	2.6-3.8	1.5	0.6-2.4	0.033
Claw injury	103	2.7	2.1-3.2	2.6	2.0-3.2	2.6	1.5-3.8	1.000
Behavioural	99	2.6	2.1-3.0	2.6	2.1-3.1	2.4	1.4-3.4	1.000
Gastroenteritis	99	2.6	2.0-3.1	2.4	1.9-2.9	3.1	2.0-4.3	1.000
Dog bite injury	97	2.5	1.9-3.1	2.4	1.7-3.1	2.9	1.8-4.0	1.000
Laceration	92	2.4	1.8-2.9	2.5	1.8-3.1	2.0	1.1-2.9	0.446

The most prevalent diagnosis-level disorders recorded were otitis externa (10.2%), periodontal disease (9.3%), anal sac impaction (7.1%) and overgrown nails (7.1%). Purebred dogs had a higher prevalence than crossbreds for three of the twenty most-prevalent disorders: otitis externa ($P = 0.001$), obesity ($P = 0.006$) and skin mass lesion ($P = 0.033$) (Table 1).

Prevalence differed between popular breeds in four of the seven most common disorders: periodontal disease ($P = 0.002$), overgrown nails ($P = 0.004$), degenerative joint disease ($P = 0.005$), obesity ($P = 0.001$) and lipoma ($P = 0.003$) (Fig. 1).



References

- Bateson, P., *Independent inquiry into dog breeding*. 2010, University of Cambridge.
- Collins, L.M., et al., *Getting priorities straight: risk assessment and decision-making in the improvement of inherited disorders in pedigree dogs*. *The Veterinary Journal*, 2011. **189**(2): p. 147-154.
- McGreevy, P.D., *Breeding for quality of life*. *Animal Welfare*, 2007. **16**: p. 125-128.
- VetCompass. *VetCompass: Health surveillance for UK companion animals*. <http://www.rvc.ac.uk/VetCompass> 2013 [cited 2013 August 21]
- The VeNom Coding Group. *VeNom Veterinary Nomenclature*. <http://www.venomcoding.org> 2013 [cited 2013 May 13]
- Aickin, M. and H. Gensler, *Adjusting for multiple testing when reporting research results: the Bonferroni vs Holm methods*. *American Journal of Public Health*, 1996. **86**(5): p. 726-728.

Discussion

This study highlights the most frequently recorded disorders in dogs in England to provide a prevalence baseline against which to assess breeds and to evaluate progress in canine health. The substantial prevalence variation identified between breeds suggests that breeding reforms should target commonly diagnosed complex disorders that are amenable to genetic improvement on a breed-by-breed basis for the greatest population impact.