Pancreatitis in the dog can be difficult to diagnose. The disease can be either acute or chronic and may be mild and transient, recurrent or severe with major systemic complications. The clinical and laboratory signs are, therefore, highly variable, and most findings such as vomiting and anorexia are also common to many other conditions involving the gastrointestinal tract. There are no pathognomic signs and, up until the recent introduction of the canine pancreatic lipase immunoreactivity (PLI) test (SNAP cPL test—IDEXX Laboratories), no reliable in-house diagnostic tests. Many—perhaps the majority—of cases are subclinical and never diagnosed.

Pancreatitis has been reported to be more prevalent in several breeds, such as Miniature Schnauzers and certain Terrier breeds. Other identified risk factors include age (the disease is more prevalent in middle age to older dogs), obesity, concurrent endocrine disease, high-fat diets, trauma and use of certain pharmaceuticals. In this article, DataSavant looks at the Banfield population to determine the overall prevalence of the disease as well as whether these known risk factors hold true for dogs seen in our hospitals. Knowing the risk factors that are associated with pancreatitis can help veterinarians have an appropriate index of suspicion for the disease in high-risk patients.

**Methods of analysis**

For our case series, we selected canine inpatients seen at Banfield hospitals during 2006, identified by both a diagnosis of pancreatitis and supporting clinical and laboratory signs. Parametric tests are those used to analyze populations that are "normally" distributed (i.e., like a bell-shaped curve). However, samples for certain variables in a study may be distributed less like a bell and more like, for example, a pair of bookends (i.e., distribution skewed toward extremes, as with diseases that target both the very young and the very old) or a ski ramp. Samples such as these require different statistical methods called nonparametric tests.

**Under-reporting**: A term often used to describe results from systems for disease surveillance. Under-reporting refers to the decreased (as compared to actual) prevalence of a disease or condition reported from study. Reasons for under-reporting are important to understand in the interpretation of results for potential bias.

DataSavant’s mission is to:

- Explore the health and well-being of Pet populations
- Evaluate new clinical treatments
- Monitor Pets as sentinels of zoonotic disease in family environments
- Transform Pet medical data into knowledge, i.e., open new windows into Pet health care using the Banfield medical caseload and database.
laboratory evidence. Dogs with a tentative diagnosis of pancreatitis, but without supporting laboratory data, were excluded from the case series. This case population data was then compared with two control sets of canine in-patients also seen at Banfield hospitals in 2006. One control group consisted of 5,000 healthy dogs selected at random (Control I); the other consisted of 5,000 dogs that had one or more other diagnoses, excluding pancreatitis (Control II). The data collected from each record included:

- Age and body condition (obese, overweight, normal) at diagnosis, breed and gender
- Any laboratory test results (e.g., serum amylase, lipase and creatinine; blood urea nitrogen [BUN]; creatinine; white blood cell [WBC] and neutrophil counts)
- Concurrent or subsequent diagnoses of renal disease, diabetes mellitus, Cushing’s disease or hypothyroidism seen during 2006.

Prevalence of pancreatitis in the Banfield dog population was determined in the analysis. Also, using our case and control populations, we compared the proportion of Pets evaluated with the most common clinical and laboratory signs at the time of diagnosis. Risk factors such as age group, breed, gender and obesity were evaluated using the chi-square test. The prevalence of concurrent diseases, both endocrine and renal, was also compared.

Wilcoxon two-sample test scores, a non-parametric method, were used to assess the significance of the differences between the groups’ laboratory tests as the population samples were not normally distributed (Evidence-Based Medicine Toolkit, page 17). Statistical significance was established at \( P<0.05 \).

**Results**

There were 1,189,844 dogs seen as in-patients at Banfield hospitals during 2006. Of these, 169,936 (14.3 percent) exhibited signs of gastrointestinal disease. Pancreatitis was diagnosed in a small subset of these, 2,738 dogs, for a prevalence of 23 per 10,000 patients.

**Clinical signs**

The results for the most common clinical signs observed are displayed in Table 1. Vomiting and diarrhea were the most common signs, reported in approximately 75 percent of dogs in the pancreatitis group. Surprisingly, abdominal pain was not as common; only 15 percent of dogs with pancreatitis were reported to have this sign.

There are significant differences in some laboratory results (Table 2, page 20) between case and control groups. Our results are consistent with the observations of oth-
Risk factors for pancreatitis

As Table 3 shows, the prevalence of pancreatitis clearly increases with age in the Banfield canine population. Dogs older than 3 years are three to five times more likely to be diagnosed with pancreatitis than dogs less than 3 years old. As reflected by the range in breed-specific prevalence, Miniature and Standard Schnauzers and Yorkshire and West Highland White Terriers are more susceptible to pancreatitis than other breeds.

The 20 breeds in which pancreatitis is most common can be seen in Table 4 (page 21).

Table 5 (page 21) depicts prevalence of pancreatitis by gender and neuter status. There is a decidedly increased prevalence of pancreatitis in spayed and neutered dogs. However, the latter may to some extent reflect confounding by age because most unspayed and unneutered dogs seen at Banfield are in the juvenile age range. This age group has a much lower prevalence of pancreatitis than the older groups.

Obesity. Table 6 (page 21) depicts the recorded prevalence of obesity in dogs with pancreatitis compared with our control groups. We do not see a marked difference between the case group and Control II in terms of the proportion evaluated as obese. There is a 10-fold difference between the pancreatitis group and Control I. This may be confounded by age and other factors.
that are different between the two groups, such as neuter status.

**Concurrent disease.** The pancreatitis group was compared with Control II for evidence of concurrent disease during 2006 (Table 7). Control I contained only
As noted above, there is a difference in average age for the pancreatitis group (5.3 years) vs. the Control II group (3.4 years), so some of these differences may be expected since all of these conditions are more frequently seen in middle-aged to older dogs. An age-matched control group would have provided a better basis for comparison.

Summary
A review of the Banfield database for 2006 identified 2,738 diagnoses of pancreatitis that were supported by adequate diagnostic data. This was from a population of 1,189,844 and reflected a prevalence of 23 per 10,000 dogs seen. The dominant clinical findings were vomiting, diarrhea and anorexia. Abdominal pain was variable in occurrence. Elevations in several laboratory tests (e.g., serum amylase, lipase and creatinine; BUN; WBC and neutrophil counts) were common, but none were specific for differentiating pancreatitis from other conditions (apart from very high levels of serum lipase and amylase).

Our results confirm that increasing age is a risk factor for canine pancreatitis diagnosed in Banfield hospitals and that the disease has a higher prevalence in some breeds, notably Miniature Schnauzers and Yorkshire Terriers. We also found a relationship with gender that corroborates reports that middle-aged female dogs are more likely to develop acute pancreatitis than are other populations. And while our analysis did not find an association of obesity with the diagnosis of pancreatitis, we may have been limited in our assessment of that risk factor because obesity is often under-reported and not consistently captured in medical records. We also found that there were other diseases likely to be co-associated with pancreatitis, such as hypothyroidism, diabetes mellitus and renal failure. Our large Banfield population has provided an opportunity to confirm what has been previously reported on canine pancreatitis, as well as to generate evidence to help veterinarians identify and diagnose Pets at high risk for the disease.

Table 7: Prevalence of Concurrent Disease in Dogs with Pancreatitis Vs. Other Sick Canine Patients*

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>Cushing’s disease</th>
<th>Hypothyroidism</th>
<th>Diabetes mellitus</th>
<th>Renal disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pancreatitis</td>
<td>2,738</td>
<td>6</td>
<td>44**</td>
<td>43**</td>
<td>50**</td>
</tr>
<tr>
<td>Control II</td>
<td>5,000</td>
<td>3</td>
<td>18</td>
<td>6</td>
<td>11</td>
</tr>
</tbody>
</table>

*Pets seen at Banfield hospitals during 2006
**Chi-square statistical analysis indicated significant differences for hypothyroidism, diabetes mellitus and renal disease. The numbers were too low for analysis of Cushing’s disease.

References

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