IDEXX SNAP 4Dx Plus Test provides sensitive and specific detection of heartworm and tick-borne diseases

Introduction
Since 2001, IDEXX has been a world leader in tick-borne disease testing by offering generations of high-quality, multiplexed diagnostic products (SNAP® 3Dx Test, SNAP® 4Dx Test, and SNAP® 4Dx Plus Test). The latest version, the SNAP 4Dx Plus Test, detects, in addition to heartworm antigen, antibodies to five pathogens, which include *A. phagocytophilum*, *A. platys*, *B. burgdorferi* (Lyme), *E. canis*, and *E. ewingii*. Its accurate performance has been documented in large-population studies around the globe.1–3 Recently, Abaxis introduced the VetScan® FLEX4 Rapid Test with product claims similar to the SNAP 4Dx Plus Test. IDEXX conducted a study to compare the performance of this new test with the SNAP 4Dx Plus Test for the detection of heartworm and tick-borne diseases, using a scientifically rigorous methodology in a broad population of field samples.

Study design
Canine samples were sourced from worldwide commercial reference laboratories (IDEXX Reference Laboratories) and veterinary clinics. They were positive by reference methods (see table 1) that included immunofluorescence assay (IFA), Western blot, PetChek® Heartworm PF Antigen Test (ELISA), and necropsy. These samples were further characterized based on geographic distribution of tick-borne diseases and species-specific ELISA.4,5 Species-specific ELISA was necessary, particularly to differentiate *Ehrlichia* species that overlap in geographic distributions. To further enhance monospecific identification of *E. canis* samples, clinical submissions were used from dogs in Germany and southern Europe where *E. ewingii* and its competent tick vectors have not been reported.

<table>
<thead>
<tr>
<th>Disease</th>
<th># Samples</th>
<th>Reference method</th>
<th>Further characterization method</th>
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<tbody>
<tr>
<td>Heartworm</td>
<td>105</td>
<td>Positive = Necropsy</td>
<td>N/A</td>
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<tr>
<td></td>
<td></td>
<td>Negative = PetChek Heartworm PF Antigen Test</td>
<td></td>
</tr>
<tr>
<td>Lyme</td>
<td>105</td>
<td>Western blot</td>
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<td><em>Anaplasma</em></td>
<td>275</td>
<td>IFA, ELISA</td>
<td>Geography, species-specific ELISA</td>
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<tr>
<td><em>Ehrlichia</em></td>
<td>359</td>
<td>IFA, ELISA</td>
<td>Species-specific ELISA</td>
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Table 1. Sample set and reference methods.

Samples were tested, in a blinded and randomized manner, on the VetScan FLEX4 Rapid Test and the SNAP 4Dx Plus Test following manufacturers’ instructions. The test results were compared to reference method results for calculation of sensitivity and specificity.
**Conclusion**

For all vector-borne infections evaluated in this study, the IDEXX SNAP® 4Dx® Plus Test was meaningfully more accurate than the Abaxis VetScan® FLEX4 Rapid Test.

Because the consequences of missing a heartworm infection are substantial, of particular note is the relatively low sensitivity of 88.2% on heartworm for the VetScan FLEX4 Rapid Test (see figure 1).

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**Figure 1.** Sensitivity vs. gold-standard reference methods.

This study revealed the sensitivity limitations of the VetScan FLEX4 Rapid Test and showed its performance to be similar to or worse than that of Abaxis VetScan® single-strip tests as documented in peer-reviewed studies. Specificities were similar between the VetScan FLEX4 Rapid Test and the IDEXX SNAP 4Dx Plus Test, ranging 98%–100%.

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**References**


