Heartworm Disease Management in North American Animal Shelters

Results from a survey conducted by the American Heartworm Society and the Association of Shelter Veterinarians

October 2014

Keep them safe. Love them always.
**Background**

The management of canine and feline heartworm disease is a challenge to animal shelters with a variety of sheltering models, admission policies, and resource limitations across North America.

In January 2014, the American Heartworm Society and the Association of Shelter Veterinarians (ASV) formed a working group to better understand current practices of animal shelters with regards to management of heartworm disease and to develop resources to support shelter veterinarians in their efforts. A survey of the ASV membership was undertaken in February 2014, the results of which are contained in this report.

A total of 105 shelter veterinarians completed the survey, representing the following regions of North America: Northeast (15%), Southeast (32%), Midwest (12%), West (20%), Canada (2%).
I. Respondent Demographics

Q. What type of sheltering organization do you represent? (Select all that apply.)

Q. How would you describe your organization? (Select all that apply.)
Q. How many veterinarians does your shelter employ?

<table>
<thead>
<tr>
<th>Number of Veterinarians</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
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<td>3</td>
<td>4</td>
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<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>&gt;5</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>68</strong></td>
</tr>
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<table>
<thead>
<tr>
<th>Type</th>
<th>Full time</th>
<th>Part time</th>
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<td>3</td>
</tr>
<tr>
<td>Count</td>
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<td>0</td>
</tr>
<tr>
<td>Response</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Count</td>
<td>68</td>
<td>60</td>
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</tbody>
</table>

Q. Please estimate your shelter's annual medical budget. (Include the budget for preventive care products, medications, treatment of medical conditions and not that for salaries.)

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Response Percent</th>
<th>Response Count</th>
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</thead>
<tbody>
<tr>
<td>I don't know.</td>
<td>72.8%</td>
<td>59</td>
</tr>
<tr>
<td>Estimated budget</td>
<td>27.2%</td>
<td>22</td>
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<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Response Percent</th>
<th>Response Count</th>
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<tbody>
<tr>
<td>≤$50,000</td>
<td>18.2%</td>
<td>4</td>
</tr>
<tr>
<td>$50,001-100,000</td>
<td>13.6%</td>
<td>3</td>
</tr>
<tr>
<td>$100,001-200,000</td>
<td>27.3%</td>
<td>6</td>
</tr>
<tr>
<td>&gt;$200,000</td>
<td>40.9%</td>
<td>9</td>
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</tbody>
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| Answered Question     | 81               |
| Skipped Question      | 24               |
Q. How many dogs did your shelter admit in 2013?

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1,000</td>
<td>14.8%</td>
<td>12</td>
</tr>
<tr>
<td>1,001-2,500</td>
<td>29.6%</td>
<td>24</td>
</tr>
<tr>
<td>2,501-5,000</td>
<td>32.1%</td>
<td>26</td>
</tr>
<tr>
<td>5,001-10,000</td>
<td>17.3%</td>
<td>14</td>
</tr>
<tr>
<td>&gt;10,000</td>
<td>6.2%</td>
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answered question 81
skipped question 24

Q. What percentage of these dogs was heartworm positive?

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Response Percent</th>
<th>Response Count</th>
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</thead>
<tbody>
<tr>
<td>We do not admit dogs.</td>
<td>2.5%</td>
<td>2</td>
</tr>
<tr>
<td>I don't know.</td>
<td>44.4%</td>
<td>36</td>
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<tr>
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<td>53.1%</td>
<td>43</td>
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</table>

answered question 81
skipped question 24

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤5%</td>
<td>62.8%</td>
<td>27</td>
</tr>
<tr>
<td>5-10%</td>
<td>20.9%</td>
<td>9</td>
</tr>
<tr>
<td>11-25%</td>
<td>9.3%</td>
<td>4</td>
</tr>
<tr>
<td>&gt;25%</td>
<td>7.0%</td>
<td>3</td>
</tr>
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</table>

answered question 43
skipped question 0
Q. How many cats did your shelter admit in 2013?

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1,000</td>
<td>14.8%</td>
<td>12</td>
</tr>
<tr>
<td>1,001-2,500</td>
<td>28.4%</td>
<td>23</td>
</tr>
<tr>
<td>2,501-5,000</td>
<td>33.3%</td>
<td>27</td>
</tr>
<tr>
<td>5,001-10,000</td>
<td>22.2%</td>
<td>18</td>
</tr>
<tr>
<td>&gt;10,000</td>
<td>1.2%</td>
<td>1</td>
</tr>
</tbody>
</table>

answered question 81
skipped question 24

Q. What percentage of these cats was heartworm positive?

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>We do not admit cats.</td>
<td>1.2%</td>
<td>1</td>
</tr>
<tr>
<td>I don't know.</td>
<td>93.8%</td>
<td>76</td>
</tr>
<tr>
<td>Enter percentage</td>
<td>4.9%</td>
<td>4</td>
</tr>
</tbody>
</table>

answered question 81
skipped question 24
II. Canine Heartworm Prevention

Q. Do dogs receive monthly heartworm preventive?

Yes 66%
No, 33.7%

Q. What preventive agent(s) is/are used? (Select all that apply.)

Oral ivermectin (per label) 60%
Oral ivermectin (extra-label) 30%
Oral milbemycin 10%
Topical moxidectin 10%
Topical selamectin 10%
Parenteral moxidectin 0%
Other (please specify) 0%
III. Canine Heartworm Diagnostic Testing

Q. Are dogs tested for heartworm infection?

*Dogs tested include those:

- Originating from endemic areas
- With clinical signs of cardiac or respiratory disease
- Selected for adoption or transfer
- With evidence of previous ownership (e.g., identification tags or microchip)
- Over 4 months of age; over 6 months of age; over 1 year of age; over 7 years of age
- That are neutered
- Being transported to states or organizations requiring testing
- For which an adopter has elected testing for a fee
Q. When are dogs tested? (Select all that apply.)

- Prior to admission: 10%
- During intake examination: 50%
- Prior to transfer: 20%
- Prior to adoption: 30%
- Other (please specify): 0%

Q. What type of screening test(s) is/are used? (Select all that apply.)

- Direct microscopy (microfilaria): 10%
- Centrifugation microscopy (microfilaria): 10%
- Filtration testing (microfilaria): 10%
- Modified Knott’s test (microfilaria): 10%
- ELISA (antigen): 90%
- Lateral flow test (antigen): 20%
- Serum antibody: 10%
- Bajsia: 10%
- Other (please specify): 10%
Q. Are additional diagnostic tests pursued following a positive screening test?

![Pie chart showing 51.7% No, 48.3% Yes]

Q. What diagnostic tests are typically performed? (Select all that apply.)

![Bar chart showing various tests with percentages]

*Other tests include:
- Microfilarial testing (including direct smear, Knott’s test, modified Knott’s test)
- Alternate antigen screening test (including on-site and diagnostic laboratory testing)
IV. Canine Heartworm Treatment

Q. Are heartworm positive dogs treated by your organization?

*Dogs treated include those:

- That are otherwise physically and behaviorally healthy
- For which treatment is available (i.e., maximum limit per year due to resource restrictions)
- That are adopted
- Selected for adoption or transport and a foster home is available
- That have Class 1 or Class 2 disease
- For which a donor has provided melarsomine and/or funds to pay for treatment
- That would otherwise be selected for euthanasia
- Recommended for treatment by staff and volunteers
- That are of a particular size to maximize supply of melarsomine
- That are selected by a partnering organization
Q. How are heartworm positive dogs handled? (Select all that apply.)

- Treatment is performed off-site: 0%
- Dogs are transferred to another facility for treatment: 5%
- Dogs are placed for adoption without treatment: 5%
- Dogs are euthanized: 35%
- Other (please specify): 20%

Q. What is the adulticide treatment protocol? (Select all that apply.)

- Melarsomine dihydrochloride two-injection protocol (2 injections, 24 hours apart): 50%
- Melarsomine dihydrochloride three-dose alternate protocol (1 injection, followed at least 1 month later by 2 injections of the same dose 24 hours apart): 40%
- Monthly ivermectin administration alone: 10%
- Other (please specify): 10%
Q. Which adjunctive treatments are utilized? (Select all that apply.)

*Other adjunctive treatments include:

- Monthly selamectin
- Tramadol
- Diphenhydramine
- Dexamethasone
Q. How often is doxycycline (or equivalent antibiotic) utilized?

*Doxycycline is used:

- At doctor’s discretion
- For small dogs receiving 3 injections of melarsomine
- If there is a delay in adulticide treatment
- Dogs >8 years of age
- When there is concurrent upper respiratory infection
- If dogs are going to a foster home prior to adulticide treatment
- When melarsomine is unavailable
- When doxycycline is available
Q. How often is prednisone used?

*Prednisone is used:

- At doctor’s discretion
- If post-adulticide reactions are seen
- If clinical signs of heartworm disease are evident
- Depending on worm burden
- Depending on class of disease
- Microfilaria positive dogs
- Abnormal thoracic radiographs
- Severe pain
Q. How often are NSAIDs used?

*NSAIDs are used:

- At doctor’s discretion
- If prednisone is contraindicated
- At the time of injection
- If dogs are painful post injection
- Whenever prednisone is not utilized
- If radiographs are normal

Not used, 40.7%
Always, 21.0%
Sometimes*, 38.3%
Q. How often are macrocyclic lactones used?

- Not used, 50.6%
- Always, 45.7%
- Sometimes, 3.7%
V. Feline Heartworm Prevention

Q. Do cats receive monthly heartworm preventive?

![Pie chart showing 19.6% of cats receive monthly heartworm preventive and 80.4% do not.]

Q. What heartworm preventive agent(s) is/are used? (Select all that apply.)

![Bar chart showing the percentage of cats that receive each heartworm preventive agent.]
VI. Feline Heartworm Diagnostic Testing

Q. Are cats tested for heartworm infection?

*Some cats are tested.*, 6.2%

All cats are tested., 0.0%

No, 93.8%

*Cats tested include those:
  - With clinical suspicion of disease
  - That are dyspneic or vomiting
  - With respiratory disease
Q. When are cats tested for heartworm infection? (Select all that apply.)

* Cats are tested:
  
  - Whenever clinical signs consistent with disease are identified
Q. What type of test(s) is/are used? (Select all that apply.)

- Direct microscopy (microfilaria)
- Centrifugation microscopy (microfilaria)
- Filtration testing (microfilaria)
- Modified Knott's test (microfilaria)
- ELISA (antigen)
- Lateral flow test (antigen)
- Serum antibody testing
- Other (please specify)

Q. Are additional diagnostic tests pursued following a positive screening test?

- No, 50.0%
- Yes, 50.0%
Q. What diagnostic tests are typically performed? (Select all that apply.)

- Repeat screening test
- Complete blood count
- Blood chemistry analysis
- Ultrasound
- Thoracic radiographs
- Echocardiogram
- Other
VII. Feline Heartworm Disease Treatment

Q. Are heartworm positive cats treated by your organization?

Q. How are heartworm positive cats handled? (Select all that apply.)
Q. What treatment modalities are utilized? (Select all that apply.)

- Monthly ivermectin administration (per label)
- Monthly ivermectin administration (extra-label)
- Doxycycline (or equivalent antibiotic)
- Corticosteroids
- NSAIDs
- Other (please specify)