Heartworm in Dogs in Canada in 1986

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Abstract

In late December 1986, 1224 institutional veterinarians and small and mixed animal clinics across Canada were sent a questionnaire in order to assess the status of *Dirofilaria immitis* in Canada in 1986; 46% of them responded. Veterinarians reported that 150,989 dogs were blood-tested for microfilariae and 869 dogs were found with heartworm. Another 65 dogs were amicrofilaremic but diagnosed with heartworm disease and one was found with heartworm at necropsy to give the total number diagnosed in 1986 as 935 (0.62%).

Heartworm was reported from Manitoba, New Brunswick, Ontario and Quebec, but most (810) of the cases were from Ontario. Southwestern Ontario continued to be the primary focus of the infection in Canada. There were 103 cases reported from Quebec, mostly from and around Montreal, and 21 cases from Manitoba, from Winnipeg and surrounding areas. Heartworm was found most frequently in companion dogs over three years of age maintained mainly outdoors in rural areas. About 33% of the cases were observed with clinical signs of heartworm disease and 81% had a history of not having left Canada.

Key words: *Dirofilaria immitis*, heartworm, dogs, prevalence, Canada.

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Résumé

Dirofilariose canine au Canada en 1986

Vers la fin de décembre 1986, les auteurs adressèrent un questionnaire à 1224 vétérinaires des diverses provinces du Canada, qui oeuvrent dans des laboratoires, des cliniques de petits animaux ou des pratiques mixtes. Ils voulaient ainsi connaître la situation de la dirofilariose au pays, pour l'année 1986; 46% des vétérinaires visés répondirent au questionnaire. Le relevé démontra que 150,989 chiens avaient subi l'épreuve sanguine destinée à détecter la dirofilariose et que 869 étaient parasités par *Dirofilaria immitis*. On considéra aussi 65 autres chiens comme atteints de la maladie, même si leur sang ne recelait pas de microfilaires. La nécropsie permit d'en diagnostiquer un cas. Ceci donna un résultat global de 935 cas de dirofilariose, impliquant 0,62% des chiens impliqués dans le relevé.

La maladie sévit au Manitoba, au Nouveau-Brunswick, en Ontario et au Québec, mais la plupart des cas, c'est-à-dire 810, provenaient de l'Ontario et le sud-ouest de cette province représente toujours le principal foyer d'infection. Les 103 cas diagnositiqués au Québec intéressaient surtout Montréal et ses environs. Quant au 21 cas du Manitoba, ils survinrent à Winnipeg et ses environs.

La maladie affectait principalement des chiens âgés de plus de trois ans et vivant surtout à l'extérieur, dans les campagnes. Environ 33% des chiens parasités manifestaient des signes cliniques de la maladie et l'anamnèse de 81% des chiens atteints de dirofilariose révéla qu'ils n'avaient jamais quitté le Canada.

Mots clés: *Dirofilaria immitis*, dirofilariose, chiens, prévalence, Canada.

In late December 1986, 1224 questionnaires were sent to institutional veterinarians and small and mixed animal clinics in Canada to assess heartworm disease (HWD) primarily in dogs in 1986 as has been done previously (1-10). The questionnaire was not sent to veterinarians in Saskatchewan and Alberta. The number of questionnaires returned was 568 (46% response). The findings are presented in two figures and three tables and a few brief comments about these should be made.

1. The percentage response for 1986 was higher than 1985 (44% response). Of those clinics that responded, 87% indicated an interest in information on HWD and 97% stated that they would complete a questionnaire if it was offered again.

2. In 1986, 13,689 more dogs were checked for microfilariae than in 1985. The increase in testing was primarily in Quebec and Ontario. Eleven practices reported that they used the smear as the only blood test procedure. We have commented previously that this procedure is very inefficient for recovering microfilariae. We encourage practices to use a concentration technique as part of the laboratory examination.

3. In 1986, 869 dogs tested (0.58%) were found with HWD compared with 1247 (0.91%) in 1985. There were 65 amicrofilaremic dogs that were diagnosed with HWD. Heartworm disease was diagnosed in Manitoba, Ontario, Quebec and New Brunswick, but, as seen previously, nearly all of the cases were in Ontario. Heartworm disease was found most frequently in companion dogs over three years of age maintained mainly outdoors in rural areas. Clinical signs of HWD were observed in 33% of the cases.

4. The percentage of dogs with HWD with a history of not having left Canada was about 81% and this was similar to that for previous years. For about 13% of dogs with HWD the movement in and out of the province or Canada was unknown. Southwestern Ontario continued to be the primary focus of the infection in Can-

ada. Other foci of infection appeared to lie in and around Montreal, Quebec (103 cases), and in and around Winnipeg, Manitoba (21 cases).

5. In Ontario, the number of dogs with HWD in 1986 was 810 (1126 in 1985). There were 114 clinics (115 in 1985) and 81 towns (76 in 1985) reporting a diagnosis of HWD in 1986. There were 131,804 dogs tested (129,076 in 1985) to give a prevalence of 0.61% (0.92% in 1985).

In Charing Cross, Chatham, Essex, Fort Malden, Kingsville, Leamington, Oldcastle, Tecumseh, Wheatley and Windsor, there were 264 cases (444 in the general area in 1985). There were 16,220 dogs tested (15,088 in 1985) to give a prevalence of 1.63% (2.94% in 1985).

In Dresden, Forest, Glencoe, Petrolia, Sarnia, Strathroy, Wallaceburg and Watford there were 50 cases (65 in the general area in 1985). There were 6129 dogs tested (5296 in 1985) to give a prevalence of 0.82% (1.23% in 1985).

Along Lake Erie and including Aylmer, Dunnville, Fonthill, Fort Erie, Fisherville, Hagersville, Morpeth, Mt. Hope, Niagara Falls, Norwick, Port Colborne, Port Dover, Simcoe, Smithville, St. Thomas, Thorold, Tillsonburg and Welland, there were 333 cases (425 in the general area in 1985). As in previous years most of the cases were in Simcoe and Tillsonburg. There were 13,380 dogs tested (14,936 in 1985) to give a prevalence of 2.49% (2.85% in 1985).

In London and the surrounding areas of Arva, Dorchester, Embro, Lambeth, Mt. Brydges, Stratford and Woodstock, there were 25 cases (23 in that general area in 1985). There were 8433 dogs tested (10,507 in that general area in 1985) to give a prevalence of 0.30% (0.22% in 1985).

The number of cases reported from Arthur, Brantford, Cambridge, Elmira, Guelph, Kitchener, Mount Forest, New Dundee, New Hamburg, Paris and Waterloo was 42 (76 in the general area in 1985). There were 10,556 dogs tested (10,451 in 1985) to give a prevalence of 0.40% (0.73% in 1985).

In Ancaster, Burlington, Dundas, Grassie, Grimsby, Hamilton, Lynden, St. Catharines, Stoney Creek and West Flamborough, there were seven cases (18 in the general area in 1985). There were 10,735 dogs tested in that gen-

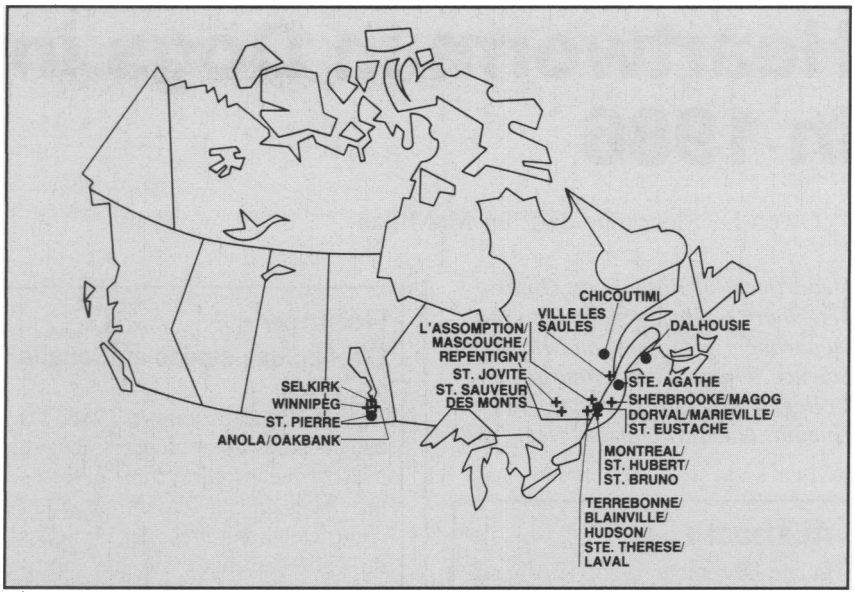

Figure 1. Areas in Canada (excluding Ontario) with diagnoses of heartworm disease in dogs in 1986.
● Areas with dogs which had been outside of Canada and presumed infected before returning or with dogs whose movements were unknown
+ Areas with dogs some of which had never left Canada

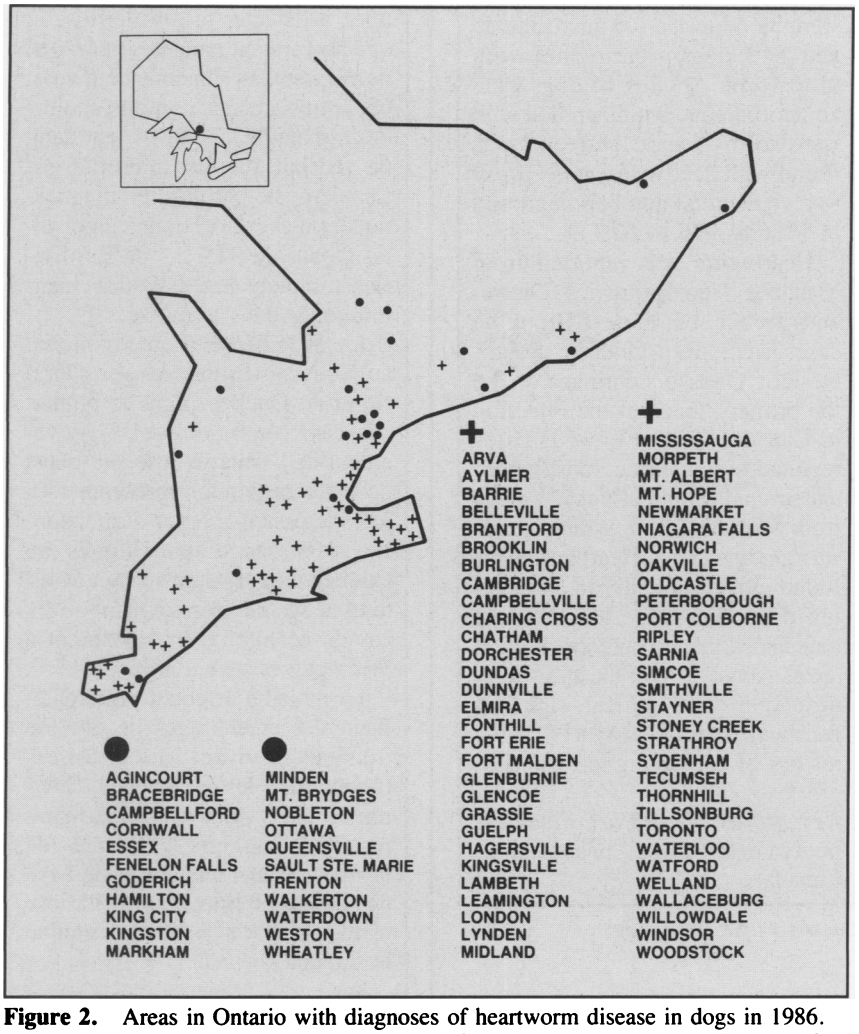

Figure 2. Areas in Ontario with diagnoses of heartworm disease in dogs in 1986.
● Areas with dogs which had been outside of Canada and presumed infected before returning or with dogs whose movements were unknown
+ Areas with dogs some of which had never left Ontario

TABLE I
Results of a Questionnaire Sent to 1224 Veterinarians or Clinics in Canada in December 1986 and Computed from 568 Replies

Heartworm in Canada 1986

Name: _____ Address: _____

1. Does your professional activity include examination of dogs, cats? YES 541 NO 27
   If YES go to question 2. If NO go to question 24
2. Which category would fit your activity best?
   Mixed 181 Small animal practice 360 Research 0 Diagnostic 0 Other 0
3. What technique(s) do you use for diagnosis of HWD? %
   Clinical signs 41 Radiography 30 Blood test 96 Necropsy 14
4. If blood tests, specify technique(s) used routinely %
   Knotts 29 Filter 55 Smear 14 Microcapillary 6 Immunodiagnosis 8 Submitted to diagnostic lab 22
5. If blood is routinely submitted to a lab for diagnosis, is this for:
   Microfilariae ID 53% Immunodiagnosis 24% Unknown 31%
6. What time of year do you test (blood) most dogs for HWD? %
   Spring 60 Summer 29 Fall 7 Winter 4
7. No. of dogs blood tested in 1986 150,989
8. No. of dogs diagnosed with HWD in 1986 and microfilaremic 869
9. No. of dogs diagnosed with HWD in 1986 and amicrofilaremic 65
10. Total no. of dogs diagnosed with HWD in 1986 935
11. No. of dogs diagnosed with HWD in 1986 and with clinical signs of HWD 305 (33%)
12. Circle month(s) you diagnosed most heartworm cases in 1986 %

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1	2	3	18	23	19	16	8	4	2	2	1

13. How many cases of HWD had the following histories in 1986?
    Six months or more prior to diagnosis was outside of Canada 54 (5.8%)
    Six months or more prior to diagnosis was in another province 3 (0.3%)
    Never left the province 756 (80.9%)
    Movement unknown 122 (13.0%)
14. For dog(s) with HWD that never left Ontario identify
    No. of cases that never left your area 569 (87.6%)
    No. of cases that in the summer visited endemic areas in Ontario (e.g. Windsor, Lake Erie, etc.) 47 (7.2%)
    Unknown 34 (5.2%)

    For questions 15 through 18 give the number (or percentage) of those dogs with HWD in 1986 according to the following classifications. (The numbers were converted to frequencies where most frequent = 1)

15. Domicile of dogs City — 2 Suburb — 3 Rural — 1 Unknown — 4
16. Location in domicile Primarily indoors — 2 Primarily outdoors — 1 Unknown — 3
17. Age of dogs Less than 1 year — 4 1-3 years — 2
    Greater than 3 years — 1 Age unknown — 3
18. Principle activity of dogs Companion dog — 1 Show dog — 5 Hunting dog — 3
    Farm dog — 2 Unknown — 4
19. Do you recommend a preventive program for your area? YES 354 (65%)
20. No. of cases diagnosed with *Dipetalonema reconditum* in 1986? 37
21. No. of cases of *D. immitis* in cats diagnosed in 1986? 6
22. No. of cases of *D. immitis* in other animals 0
23. For which of the above questions (Q) was the information supplied based on your medical records (expressed as a % of respondents to those questions)

Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21
55	58	57	53	49	61	66	58	59	60	57	64	57	45	44	44

24. Would you be interested in the results of this questionnaire? % YES 97 NO 3
25. Would you be interested in information on HWD? % YES 87 NO 10
26. Would news releases on HWD be helpful to the public? % YES 86 NO 10
27. Did you respond to the 1985 heartworm questionnaire? % YES 81 NO 19
28. Did you see the results of the 1985 questionnaire? % YES 79 NO 19
29. Would you respond to the questionnaire if it was offered again? % YES 97 NO 2
30. Any other comments: 133 respondents made comments

eral area (9333 in 1985) to give a prevalence of 0.07% (0.19% in 1985).

In Bramalea, Brampton, Campbellville, Georgetown, Mississauga, Oakville and Orangeville, there were three cases (18 in the general area in 1985). There were 11,938 dogs tested (9896 in 1985), to give a prevalence of 0.03% (0.18% in 1985).

In Metropolitan Toronto including Agincourt, Downsview, Etobicoke, North York, Rexdale, Scarborough, Weston and Willowdale, there were 14 cases (11 in the general area in 1985). There were 14,351 dogs tested (13,655 in 1985) to give a prevalence of 0.10% (0.8% in 1985).

In the area between Metropolitan Toronto and Lake Simcoe and up to Beaverton on the east and Barrie on the west, there were 11 cases (18 in 1985). In that area there were reports also from Aurora, Beaverton, Beeton, Bradford, Keswick, King City, Markham, Mt. Albert, Newmarket, Nobleton, Queensville, Richmond Hill, Stayner, Stouffville, Thornhill, Unionville, Uxbridge and Woodbridge. There were 9176 dogs tested (9528 in the general area in 1985) to give a prevalence of 0.12% (0.19% in 1985).

In Atwood, Blyth, Chesley, Drayton, Exeter, Goderich, Harriston, Kincardine, Markdale, Port Elgin, Ripley, Seaforth, Walkerton, Wiarton and Zurich, there were four cases (five in the general area in 1985). There were 1119 dogs tested (801 in 1985) to give a prevalence of 0.36% (0.62% in 1985).

6. There were 37 cases of *Dipetalonema reconditum* reported in 1986 (48 in 1985). Most of the cases (28) were in Ontario. There were six cases of HWD reported in cats in Ontario.

7. This report identifies a decrease in the number of cases and prevalence of HWD in Canada in 1986 over 1985. We believe that the decrease is due to the effectiveness of the preventive program in the population of dogs that routinely visit clinics. However, it is likely that infection with heartworm continues to increase in the population of dogs at large and we believe that continued surveillance for HWD is needed.

8. We have attempted in this report to provide you with information which would be useful for discussion and making decisions with your clients on whether or not to blood test dogs for HWD and to use preventive medication. We cannot define a precise

TABLE II
Areas in Canada with Two or More Dogs Diagnosed with Heartworm Disease in 1986

Area	Number of Cases	
	Had Been Outside Canada or Movement Unknown	Never Left Canada
Anola, Manitoba	0	2
Oakbank, Manitoba	0	6
Selkirk, Manitoba	1	8
Winnipeg, Manitoba	0	3
Agincourt, Ontario	2	0
Aylmer, Ontario	5	20
Belleville, Ontario	0	3
Brantford, Ontario	1	29
Brooklin, Ontario	0	2
Cambridge, Ontario	0	2
Charing Cross, Ontario	1	8
Chatham, Ontario	0	24
Dundas, Ontario	0	2
Dunnville, Ontario	0	8
Essex, Ontario	23	0
Fonthill, Ontario	0	3
Fort Erie, Ontario	1	4
Fort Malden, Ontario	0	9
Glenburnie, Ontario	1	1
Glencoe, Ontario	0	5
Hagersville, Ontario	0	6
Kingsville, Ontario	0	16
Leamington, Ontario	0	13
London, Ontario	1	6
Morpeth, Ontario	0	4
Mt. Albert, Ontario	1	1
Mt. Brydges, Ontario	4	0
Mt. Hope, Ontario	0	2
Newmarket, Ontario	0	2
Niagara Falls, Ontario	1	2
Norwich, Ontario	4	7
Oldcastle, Ontario	0	43
Ottawa, Ontario	3	0
Peterborough, Ontario	0	5
Port Colborne, Ontario	0	5
Ripley, Ontario	1	1
Sarnia, Ontario	10	1
Simcoe, Ontario	1	117
Smithville, Ontario	0	6
Stayner, Ontario	1	2
Tecumseh, Ontario	0	2
Thornhill, Ontario	2	1
Tillsonburg, Ontario	3	142
Toronto, Ontario	5	3
Trenton, Ontario	15	0
Wallaceburg, Ontario	0	25
Waterloo, Ontario	5	3
Watford, Ontario	4	4
Welland, Ontario	1	4
Wheatley, Ontario	22	0
Willowdale, Ontario	0	3
Windsor, Ontario	23	80
Woodstock, Ontario	1	10
Blainville, Quebec	0	6
Hudson, Quebec	0	16
Laval, Quebec	0	6
Magog, Quebec	0	6
Mascouche, Quebec	1	19
Montreal, Quebec	4	4
Sherbrooke, Quebec	0	3
St-Bruno, Quebec	0	2
St-Jovite, Quebec	1	1
St-Sauveur des Monts, Quebec	1	1
St-Therese, Quebec	2	18
Terrebonne, Quebec	1	2

TABLE III
Number of Clinics or Laboratories Reporting that they had Blood-tested (BT) Dogs and the Number of Dogs Diagnosed with Heartworm Disease (HWD) in 1986 in the Provinces

	No. of Practitioners	No. of Dogs	
		BT	HWD
British Columbia	44	285	0
Manitoba	26	4,119	21
Ontario	313	131,804	810
Quebec	85	14,348	103
Nova Scotia	11	134	0
New Brunswick	7	227	1
Prince Edward Island	4	56	0
Newfoundland	1	6	0
Total	492	150,979	935

level of infection at which it becomes necessary to blood test all dogs or to put all dogs on a preventive program. However, in order to gain the best estimate of the prevalence of HWD, we encourage blood testing. This is especially important in Ontario for practices south of a line drawn from the southern end of Lake Simcoe to Grand Bend, in Quebec around Montreal, and in Manitoba around Winnipeg. We encourage blood testing of all dogs once a year in the spring not earlier than mid-April and preferably in May and regardless of whether the dogs were given preventive medication previously.

We have also encouraged the use of preventive medication where it seems most important. One area is in southwestern Ontario in the region of Forest-Sarnia-Chatham-Windsor, along the Lake Erie shoreline and in the triangular area bounded by Niagara Falls, Brantford and Aylmer. It would appear also that preventive medication may be useful in Ontario in the area between Toronto and Lake Simcoe and in the area bounded by the western end of Lake Ontario to the east and the Niagara escarpment to the west. Other areas in Canada where preventive medication appears useful are Quebec, in and around Montreal, and Manitoba, in and around Winnipeg. Preventive medication should be given also to all dogs entering those defined areas from June through September.

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