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## The Relationship of Park Maintenance and Accessibility to Dogs to the Presence of *Toxocara* spp. Ova in the Soil

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**Abstract:** Three parks in St. Joseph/Benton Harbor, Michigan were examined for the presence of *Toxocara* spp. ova in the soil. Nineteen per cent (22/114) of the samples contained ova, and mean density (eggs/5 g soil) was 0.73. The density of two samples, collected at the base of playground equipment in one park, was >2.1, which is considered sufficient for human infection. Subjective assessments of park maintenance and accessibility to dogs were not good indicators of the presence of *Toxocara* spp. ova. (*Am J Public Health* 1989; 79:633-634.)

### Introduction

Visceral larva migrans (VLM) is a disease caused by the migration of the larval nematodes, normally parasitic in animals other than humans, through the extraintestinal tissues of humans.<sup>1</sup> *Toxocara canis*, the common roundworm of dogs, is regarded as the primary agent of this disease. Risk of human infection is greatest in young children, and most likely to occur via ingestion of embryonated eggs in the soil rather than through direct contact with an infected animal.<sup>1</sup>

The purpose of this study was to survey three parks in the St. Joseph/Benton Harbor area of southwestern Michigan for the presence of *Toxocara* spp. ova in the soil. Selection was based on subjectively determined differences in accessibility and levels of maintenance.

### Methods

#### Study Sites

Milton Park, a well-kept neighborhood park used by children and adults, is located in an older neighborhood with some commercial development. It is approximately 70 m × 75 m, and is regularly maintained. There are conspicuous "No Dogs Allowed" signs posted around the park border.

Napier Park, a small triangular play area, approximately 45 m on a side, is located in a middle-class suburban neighborhood, frequently used by neighborhood children. Regular maintenance appears minimal, and there are no signs restricting access by dogs.

Corronde Park, the largest of the three, is bordered on one side by the St. Joseph River and regularly maintained. Facil-

ities include: tennis courts, a baseball field, and picnic pavilions. It is isolated from surrounding housing and is typically used for picnics and family gatherings. Dogs are permitted but must be on a leash or chained. Soil samples were collected in a large play area (100 m × 55 m) adjacent to the river.

#### Soil Collection

Samples were collected at 9 m intervals, along transect lines approximately 9 m apart. Composite soil samples, totaling 40 g, were taken to a depth of 1-2 cm. Five to six plugs of soil were taken with a soil corer within a one square foot area at each grid point. Additional samples were collected at the bottoms of slides, bases of teeter-totters, and underneath swings. Samples were not collected when grid points fell on sidewalks or other obstructions.

#### Laboratory Procedures

Collection of eggs followed Method 6 of Kazacos<sup>2</sup> with minor variations, using 20 gram subsamples from each site. The specific gravity of the NaNO<sub>3</sub> used in the final flotation was 1.30 (Kazacos, personal communication). No attempt was made to differentiate between eggs of *Toxocara canis* and *T. cati*.

### Results

Nineteen per cent (22/114) of the samples examined were positive for *Toxocara* spp. ova (Table 1). No ova were found in Milton Park, while Napier and Corronde Parks had similar prevalences of approximately 30 per cent. Mean density (ova/5g of soil) is higher in Corronde, but mean density for Napier falls within the 95% confidence limits of the differences between the two parks.

The five transects at Corronde Park fell into two distinct groups (Table 2). Two transects nearest the river (A & B) had only one positive sample between them. The remaining transects (C, D, and E) passed through the general play area, with prevalences between 50 and 60 per cent.

TABLE 1—Results of the Examination of Soil Samples for *Toxocara* spp. Ova from Parks in St. Joseph/Benton Harbor, Michigan

Parks	No. Samples	No. Positive	% Prevalence	Mean Density (range)
Milton	48	0	0	0
Napier	13	4	31	0.25
Corronde	53	18	34	0.83*
Total	114	22	19	(0.25,5.5) 0.73 (0.25,5.5)

\*Approximate 95% confidence interval for Corronde-Napier Parks is 0.08, 1.08.

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TABLE 2—Presence of *Toxocara* spp. Ova from five Transects\* in Corronde Park

Transect	A	B	C	D	E
Ova present	0	1	6	5	5**
Ova absent	10	9	4	5	5

\*Ten samples collected from each transect.

\*\*Approximate 95% confidence interval for Transect<sub>C,D,E</sub>—Transect<sub>A,B</sub> (48 per cent) is 28–68 per cent.

### Discussion

Overall prevalence of *Toxocara* spp. ova from soil samples in this study (19 per cent) falls in the mid-range of other studies of public parks and playgrounds in North America.<sup>3–6</sup> Reasons for variation include, but are not restricted to, environmental conditions, choice of sampling sites, the utilization of the area by dogs and cats, and the prevalence of infection of *Toxocara* spp. in animals in the area.<sup>7</sup>

Subjective assessment of maintenance and access was of little value as a predictor of contamination. No ova were found in Milton Park, which is well maintained and has conspicuous signs prohibiting dogs. Napier and Corronde Parks differ markedly in appearance, maintenance, and accessibility, therefore, the similarity in prevalence (Table 1) must be based on the type of utilization. The majority of dogs in Corronde Park are brought by their owners, but must be leashed or chained. Visits are likely to be prolonged, resulting in a high probability that the animal will defecate on the premises. Napier Park, on the other hand, is more likely to be visited for shorter durations, e.g., by strays or pet owners taking animals there specifically for the purpose of defecation, rather than allowing the animal to defecate on private property and risk confrontation with the owner or resident.

Prevalence of *Toxocara* spp. ova is unquestionably a factor of how a park is actually used by pet owners rather than simply the accessibility of the area to animals. The primary factor is human behavior and not the behavior of the dog: strays would hardly be deterred by the presence of signs. Despite the fact that Napier Park appeared to have a lower

level of maintenance and is more accessible to strays than Corronde Park, the mean density of ova was higher in Corronde.

The prevalence of eggs was higher in the three transects which pass through the general play area in Corronde Park than in the two transects immediately adjacent to the river. Two positive samples from Transect C (at the base of a large, jungle gym complex) had densities of 3.4 and 5.5/5 g of soil. These densities are above the level (2.1 ova/5g) considered sufficient to result in human infection,<sup>8</sup> although justification for this threshold value is obscure.

The numbers of eggs found in the present study were generally low, but this does not mean there is no cause for concern. If eggs are concentrated in areas where children play, the probability of infection is real even if the average for the park falls below the values considered necessary for human infection.

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## American Indian Youth and Drugs, 1976–87: A Continuing Problem

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**Abstract:** Continuing surveillance of drug use among American Indian adolescents living on reservations shows them to have rates of use higher than those of their non-Indian counterparts. Marijuana use is particularly high among Indian students. By the 7th grade a significant number of Indian youth have tried drugs, particularly marijuana and alcohol, and there are few significant differences by gender. Based on observed patterns of use, intervention strategies need to begin in the elementary school years and target both males and females equally. (*Am J Public Health* 1989;79:634–636.)

### Introduction

We have been collecting data on drug use rates among American Indian youth since 1975.<sup>1–3</sup> In addition to moni-

toring levels of use, we have conducted a series of studies examining the etiology of drug and alcohol use in this population.<sup>4,5</sup> In general, findings to date have shown that Indian youth have higher rates of drug use than non-Indian youth for nearly all drugs, and the interactions within small groups of peers (what we refer to as “peer clusters”) have the strongest influence on a youth’s decision to use or not use drugs. The latter finding is consistent with what we have

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