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Stephen A. Harriman, Commissioner

Cryptosporidiosis 1994-1997

Cryptosporidium, an intestinal protozoan, was first identified in 1907. It has been known to cause illness in animals since the 1950s, but was not recognized as a human pathogen until 1976. Large waterborne outbreaks due to *Cryptosporidium parvum* along with the identification of *C. parvum* as a cause of severe gastrointestinal illness in persons with acquired immunodeficiency syndrome (AIDS) resulted in recognition of its public health importance (1).

Infectious oocysts of *C. parvum* are shed in feces of people and animals. They are resistant to most chemical disinfectants including chlorine and, due to their small size (5 microns), are not filtered by most home or public utility water filters. Transmission occurs by ingestion of oocysts in contaminated food or water (2). Some infected persons remain asymptomatic. Ingestion of just a few oocysts can result in illness (3), with onset of symptoms in 2-10 (median=7) days. Illness lasting from several days to several weeks is commonly characterized by watery diarrhea, cramps, and abdominal pain. In immunocompromised persons, illness can be long lasting and debilitating (4,5).

In Connecticut, cryptosporidiosis has been a physician and laboratory reportable disease since January 1994. To better define the epidemiology of cryptosporidiosis in Connecticut and identify risk factors for its acquisition, cryptosporidiosis was included for study in Connecticut's Emerging Infections Program (EIP). Active laboratory surveillance and case interviews began in 1995. This report summarizes the results of surveillance during 1994 - 1997, and the results of physician and laboratory surveys conducted to determine the extent of testing stool specimens for *Cryptosporidium*.

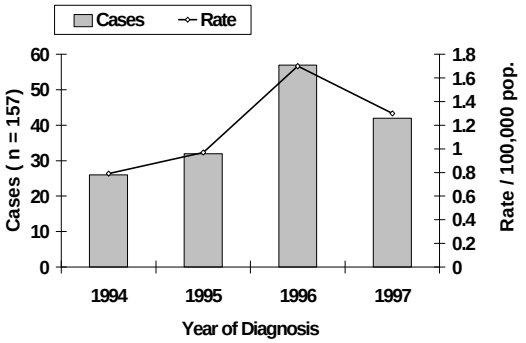
In This Issue

Active Laboratory Surveillance

From January 1994 through December 1997, 157 cases of cryptosporidiosis were reported to the Department of Public Health (DPH): 26 cases in 1994, 32 in 1995, 57 in 1996, and 42 in 1997 (Figure 1).

Figure 1

Cases and Incidence by Year
Cryptosporidiosis - Connecticut, 1994 - 1997



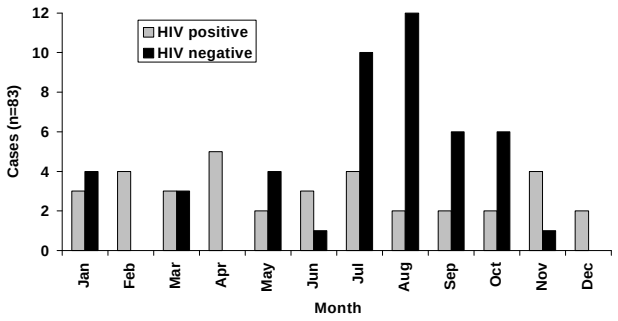
The cases ranged in age from 1 to 82 (median=35) years. Sixty-five percent (102) were male and 68% (95/140) were non-Hispanic whites. Of the 131 cases for whom a medical history was obtained, 60% were infected with human immunodeficiency virus (HIV). The proportion of cases involving HIV-positive persons decreased from 72% in 1994-1996 (range 67-100%) to 32% in 1997. The HIV-negative cases were more likely to be children aged ≤ 12 years and non-Hispanic whites (Table 1, p. 16).

Cases included residents of all eight Connecticut counties with an average annual county rate ranging from 0.9 to 3.5 cases per 100,000 population. New London County had the highest incidence (3.1 - 3.5 cases per 100,000 population) each year. HIV-positive cases had no seasonality to onset of illness, most HIV-negative cases occured from July through October (Figure 2).

Figure 2

Cases by Month of Onset of Symptoms and HIV Status

Cryptosporidiosis - Connecticut, 1995-1997



To identify potential risk factors, telephone interviews of cases were conducted. The HIV-negative cases more frequently ate at restaurants in the 14 days prior to onset of illness, had contact with cats or dogs, traveled out of Connecticut, or went swimming (Table 2, p. 16). Twenty percent of the HIV-positive cases aged ≥18 years reported male homosexual contact.

Physician Survey

In 1995, to assess physician awareness of cryptosporidiosis and laboratory testing for this parasite, a questionnaire was mailed to a random sample of Connecticut physicians in specialties most likely to see patients with possible cryptosporidiosis. Specialties included family practitioners, pediatricians, internists, infectious disease specialists, and gastroenterologists. Responses were received from 511 (70%) of 730 physicians contacted (6).

Several important findings of the survey indicated that cases of cryptosporidiosis may go underdiagnosed. Thirty-four percent of general/family practitioners and 26% of pediatricians were unaware that watery diarrhea is a predominant symptom of cryptosporidiosis. Nearly all respondents recognized that persons with AIDS were at increased risk. However, other reported risk groups including persons with overseas travel or contact with farm animals, and children in daycare were often not recognized. Among gastroenterologists, family practitioners, internists and pediatricians, over 75% rarely ordered testing even when patients had symptoms consistent with cryptosporidiosis. Approximately 40% of respondents believed that examination for *Cryptosporidium* is part of a standard ova and parasites (O&P).

Laboratory Survey

In May 1997, the DPH conducted a survey of clinical laboratories to assess laboratory testing practices for *Cryptosporidium*. Laboratories licensed in Connecticut to test for bacterial stool pathogens and fecal parasites were asked to participate in the survey. Surveys were completed for all 42 laboratories. Of the

42 laboratories, 38 performed onsite testing for the presence of O&P: 31 based in hospitals, 6 private clinical laboratories, and the DPH State Laboratory. In 1996, 34,494 specimens were tested for O&P at the 33 laboratories with available data.

Of the 38 laboratories that tested onsite for O&P, 31 performed specific examination for *Cryptosporidium*. Data obtained from 23 of the 31 laboratories indicated that 17% of specimens were tested for *Cryptosporidium.* Based on data from 18 laboratories, 1% (30/2904) were positive.

All laboratories performing onsite testing did so when specifically requested by a physician. Only two laboratories tested all O&P specimens for *Cryptosporidium.* The majority of laboratories using selective testing criteria performed specific tests for this organism when structures suggestive of oocysts were detected on a routine O&P. Liquid stool specimens submitted for O&P were tested for *Cryptosporidium* by six laboratories. All specimens from known HIV-positive patients were tested by four laboratories.

For *Cryptosporidium* testing, 22 (71%) laboratories used acid fast stains, 9 (29%) used direct IFA, and 3 (10%) used an ELISA. Several laboratories used more than one technique including initial examination of wet mounts with temporary stain. Over 80% of laboratories concentrated the samples before staining, using formalin ethyl acetate most often.

The positivity rate in specimens tested for *Cryptosporidium* at laboratories that test all specimens for O&P was 0.2 % (1/581), compared to 0.9% (5/566) of specimens tested only when requested by a physician. At laboratories with additional selection criteria, 1.4% (24/1727) of tested specimens were positive. Laboratories routinely using an acid fast stain reported a 0.7% (5/704) positivity rate compared to 0.6% (6/1037) of specimens tested by direct IFA and 14.5% (8/55) tested by an ELISA technique on a limited number of specimens. The positivity rate for specimens after concentration was 1.3% (28/2203) compared to 0.3% (2/701) for specimens not concentrated.

Editorial Note: Overall, cryptosporidiosis is infrequently but increasingly diagnosed in Connecticut among HIV-negative persons. Persons with HIV-infection have accounted for more than half of diagnosed cases but this percentage is decreasing. Nearly all cases among black or Hispanic persons are among HIV-infected persons. When adjusted for AIDS in the racial and ethnic groups, rates for cryptosporidiosis are highest among whites. Risk profiles for cryptosporidiosis are different among HIV-positive and HIV-negative cases. The HIV-negative cases are more likely to have traveled outside of Connecticut, gone swimming, or had onset during the summer and fall than HIV-positive cases.

Due to current testing practices in Connecticut, identification of cryptosporidiosis may go underdiagnosed among people who are HIV-negative. Most laboratories do not routinely test for *Cryptosporidium* and physicians do not frequently request this testing. To better define the incidence of cryptosporidiosis, detect outbreaks, and prevent transmission, a more standardized approach to testing for cryptosporidiosis is necessary.

Laboratories should advise physicians of the criteria they use for *Cryptosporidium* testing and should consider routinely examining all watery stools specifically for *Cryptosporidium*. Physicians and managed care plans should know whether the laboratories they use routinely examine stool specimens submitted for O&P for cryptosporidiosis, and should take appropriate action to assure that they are.

A cryptosporidiosis fact sheet is available at the DPH website (http://www.state.ct.us/dph).

References

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Table 1

Demographic Characteristics by HIV Status*
Cryptosporidiosis - Connecticut, 1994 - 1997

	HIV negative n=52 (40%)	HIV positive n=79 (60%)
Sex:		
female	46%	30%
male	54%	70%
Age:		
range	1-82 years	7-67 years
median	35 years	35 years
≤ 12 years	29%	4%
≥ 65 years	13%	-
Race/Ethnicity		
White	96%	47%
Black	2%	36%
Hispanic	-	17%

* 17/26 cases of unknown status from 1994

Table 2

Potential Exposures* by HIV Status
Acute Cryptosporidiosis - Connecticut, 1994 - 1997

	HIV status	
	negative	positive
Ate in resturant^	88%	49%
Swimming^	47%	5%
Travel out of CT^	64%	26%
Foreign travel	16%	7%
Contact - farm animals^	17%	4%
Contact - cats or dogs	65%	62%
Contact - person with diarrhea	33%	26%
Male homosexual contact (>17y)^	-	20%
Home water supply		
public system^	70%	91%
private well^	30%	9%

^ p<.05
*Within 14 days of onset of symptoms

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