New York City Department of Environmental Protection
Bureau of Water Supply

Waterborne Disease Risk Assessment Program

2002 Annual Report

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The New York City Waterborne Disease Risk Assessment Program was developed and implemented to: (a) obtain data on the rates of giardiasis and cryptosporidiosis, along with demographic and risk factor information on case-patients; (b) provide a system to track diarrheal illness to assure rapid detection of any outbreaks; and (c) determine the contribution (if any) of tap water consumption to gastrointestinal disease. The 2002 program achievements and results are presented.

Prepared by: The Waterborne Disease Risk Assessment Program Team

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ACTIVE DISEASE SURVEILLANCE

Active disease surveillance for giardiasis and cryptosporidiosis began in July 1993 and November 1994, respectively. Between 2001 and 2002, the number of giardiasis cases decreased from 1,529 to 1,419 while the number of cases of cryptosporidiosis increased from 123 to 148. With respect to immune status, the number of cases of cryptosporidiosis among persons with HIV/AIDS increased from 66 in 2001 to 94 in 2002. Demographic information for cases of giardiasis and cryptosporidiosis was gathered and is summarized in this report. Telephone interviews of cryptosporidiosis case-patients to gather potential risk exposure information continued, and selected results are presented. Changes were made in 2001 and 2002, to the questionnaire administered to patients diagnosed with cryptosporidiosis. These included eliminating questions that did not yield enough data for analysis and adding questions that ask case-patients to quantify the types of water they consumed.

SYNDROMIC SURVEILLANCE/OUTBREAK DETECTION

Gastrointestinal (GI) disease incidence in the general population can be monitored via tracking of sentinel populations or surrogate indicators of disease. Such tracking programs can play a significant role in limiting the extent of an outbreak of gastrointestinal illnesses by providing an early indication of a problem. Over the past several years, the City has established and maintained three distinct and complementary outbreak detection systems. One system monitors the volume of sales of anti-diarrheal medication. The second monitors the number of stool specimens submitted to clinical laboratories for microbiological testing. The third system monitored reports of GI disease observed in sentinel nursing homes. In 2001, a fourth outbreak detection system was added utilizing hospital Emergency Department illness reports. Also in 2001, an evaluation of the three original outbreak detection programs was completed. Improvements to the system were made in 2002 in response to this evaluation including progress towards an enhanced anti-diarrheal medication tracking system. In addition, significant changes were made to the nursing home surveillance program

INFORMATION SHARING AND PUBLIC EDUCATION

Information on *Cryptosporidium* and *Giardia* continues to be available on New York City Department of Environmental Protection's and New York City Department of Health and Mental Hygiene's websites, including annual reports on program activities, fact sheets on giardiasis and cryptosporidiosis, and results from the Department of Environmental Protection's source water protozoa monitoring program. Additional outreach was done to the HIV/AIDS community this year following the detection in February 2002, in a limited number of source water samples, of *Cryptosporidium* and *Giardia* concentrations that were slightly higher than previous values. This outreach effort is summarized in this report.

INTRODUCTION

New York City's Waterborne Disease Risk Assessment Program was developed and implemented to:

- obtain data on the rates of giardiasis and cryptosporidiosis, along with demographic and risk factor information on case-patients;
- provide a system to track diarrheal illness to assure rapid detection of any outbreaks; and
- determine the contribution (if any) of tap water consumption to gastrointestinal disease.

Two City agencies are involved in this effort: the Department of Environmental Protection (DEP) and the Department of Health and Mental Hygiene (NYCDOHMH). In addition to participation by staff from both agencies, a special interagency unit, the Parasitic Disease Surveillance Unit, was established to implement major components of this program. In the year 2001, the staff of the Parasitic Disease Surveillance Unit was merged with staff from the NYCDOHMH Bureau of Communicable Disease. Staff members employed by DEP and NYCDOHMH now jointly work on Parasitic Disease Surveillance Program (PDSP) activities as well as on other communicable disease activities. This merger increases the efficiency of the office but does not affect the Parasitic Disease Surveillance Program operations.

Following below is a summary of program highlights and data for the year 2002. Variations in data between this report and previous reports may be due to several factors, including disease reporting delays, correction of errors, and refinements in data processing (for example, the removal of duplicate disease reports). Year 2000 U.S. Census data were used in this report. In addition, case rates from prior years have been adjusted in this report to reflect 2000 U.S. Census data, utilizing intercensal population estimates for years 1994-1999. All rates are annual case rates. Caution must be exercised when interpreting rates based on very small case numbers.

In this annual report, for the geographic breakdown of data, United Hospital Fund (UHF) neighborhood of case-patient residence was used. New York City is divided on the basis of zip code into UHF neighborhoods; the 42 UHF neighborhoods are comprised of 1 to 9 zip codes. Maps illustrating annual rates by UHF neighborhood are included in this report.

Year 2000 U.S. Census data include two additional race/ethnicity categories that have not been used in the collection of City disease surveillance data for giardiasis and cryptosporidiosis. These race/ethnicity categories are: "Non-Hispanic of Single Race, other than White, Black/African American, Asian, Pacific Islander, American Indian and Alaskan Native" and "Non-Hispanic of Two or More Races." In this report, race/ethnicity-specific case rates are based upon year 2000 Census data for the proportion of New York City residents who were categorized into one of the remaining four racial/ethnic groups (7,724,354 of 8,008,278 total population, or 96.5%). Because disease surveillance data categorizes all case-patients into one of four race/ethnicity categories, only four of six U.S. census race/ethnicity denominator categories were used to calculate race/ethnicity-specific rates. Race/ethnicity-specific case rates presented may therefore be somewhat elevated above the true rates.

PART I: ACTIVE DISEASE SURVEILLANCE

Giardiasis

New York City implemented a program of active surveillance for giardiasis in July 1993. Active laboratory surveillance to ensure complete reporting of cases by laboratories continued in 2002. Also, telephone calls continued to be made to physicians, laboratories, and/or patients to obtain basic demographic information missing from case reports. Case rates and basic demographic findings were compiled and reported on a quarterly basis through July 2002. Beginning January 2003, rates and demographic findings have been compiled on a semi-annual basis.

During 2002, a total of 1,419 cases of giardiasis were reported to NYCDOHMH and the annual case rate was 17.7 per 100,000. The case rate decreased 47% from 1994 to 2002 (see Table 1 below, and Chart 1).

Table 1: Number of Cases and Case Rates* for Giardiasis, Active Disease Surveillance, New York City, 1994 - 2002.

Year	*Number of Cases*	*Case Rate per 100,000*
1994	2,514	33.1
1995	2,523	32.9
1996	2,288	29.6
1997	1,788	22.9
1998	1,961	24.9
1999	1,896	23.9
2000	1,771	22.1
2001	1,529	19.1
2002	1,419	17.7

* For 1994-1999, rates were calculated using intercensal population estimates. For 2000-2002, 2000 Census data were used.

The following provides some highlights from the active surveillance data for giardiasis among New York City residents from January 1 through December 31, 2002. Additional data is presented in the tables that appear later in this report.

Location of case-patient residence

Manhattan had the highest borough-specific annual case rate (41.8 cases per 100,000 population) (Table 2). The highest UHF neighborhood-specific case rate was found in the Chelsea-Clinton neighborhood in Manhattan (104.9 cases per 100,000) (Map 1 and Table 3).

Sex

Information regarding sex was available for all cases. The number and rate of giardiasis cases were higher in males than females, with 978 males (25.8 cases per 100,000) and 441 females (10.5 cases per 100,000) reported. The highest sex- and borough-specific case rate was observed in males in Manhattan (65.4 cases per 100,000) (Table 2).

Age

Information regarding age was available for 1418 of 1419 cases (99.9%). The highest age group-specific annual case rates were among children under age 5 (32.0 cases per 100,000), and children 5-9 years old (29.6 cases per 100,000) (Table 4). The highest age group- and sex-specific case rates were among males under age 5 (38.7 cases per 100,000), males 20-44 years old (32.2 cases per 100,000), and males 5-9 years old (30.4 cases per 100,000). The highest age group- and borough-specific case rates were among children less than 5 years old in Manhattan (60.5 cases per 100,000), persons 20-44 years old in Manhattan (50.5 cases per 100,000), and children 5-9 years old in the Bronx (49.3 cases per 100,000) (Table 5).

Race/Ethnicity

Information regarding race/ethnicity was available for 1,371 of 1419 cases (96.6%). The racial/ethnic group-specific case rate was highest among white non-Hispanics (26.4 cases per 100,000) (Table 6). The highest borough- and racial/ethnic group-specific case rate occurred among whites in Manhattan (63.2 cases per 100,000). The highest age group- and race/ethnicity-specific case rates were among children 5-9 years old in the grouping that includes Asian/Pacific Islanders and American Indian/Alaskan Natives (52.3 cases per 100,000) and children less than 5 in this racial/ethnic grouping (49.8 cases per 100,000) (Table 7).

Cryptosporidiosis

Cryptosporidiosis was added to the list of reportable diseases in the New York City Health Code, effective January 1994. Active disease surveillance for cryptosporidiosis (including regular visits or telephone contact with laboratories) began in November 1994 and continued during 2002. Case interviews for demographic and risk factor data were initiated in January 1995 and are ongoing. Case rates and basic demographic findings were compiled and reported on a quarterly basis through July 2002. Beginning January 2003, rates and demographic findings have been compiled on a semi-annual basis.

During 2002, a total of 148 cases of cryptosporidiosis were reported to NYCDOHMH and the annual case rate was 1.8 per 100,000. Although the case rate increased in 2002 as compared to 2001, the case rate has declined 71% from 1995 to 2002 (See Table 8 below, and Chart 2). The most substantial decline occurred in the first two years, coinciding with the introduction of highly active antiretroviral therapy (HAART) for patients with HIV.

Table 8: Number of Cases and Case Rates* for Cryptosporidiosis, Active Disease Surveillance, New York City, 1994 - 2002.

Year	*Number of Cases*	*Case Rate per 100,000*
1994	297**	3.9**
1995	472	6.2
1996	334	4.3
1997	172	2.2
1998	208	2.6
1999	261	3.3
2000	172	2.1
2001	123	1.5
2002	148	1.8

* For 1994-1999, rates were calculated using intercensal population estimates. For 2000-2002, 2000 Census data were used.
** Active disease surveillance began in November 1994.

The following provides some highlights from the active surveillance data for cryptosporidiosis among New York City residents from January 1 through December 31, 2002. Additional data is presented in the tables that appear later in this report.

Location of case-patient residence

Manhattan had the highest borough-specific annual case rate (4.6 cases per 100,000) (Table 9). The highest UHF neighborhood-specific case rate was found in the Chelsea-Clinton neighborhood in Manhattan (13.8 cases per 100,000) (Map 2 and Table 10).

Sex

Information regarding sex was available for all cases. The number and rate of cryptosporidiosis cases were higher in males than females, with 116 males (3.1 cases per 100,000) and 32 females (0.8 cases per 100,000) reported. The borough- and sex-specific case rate was highest for males in Manhattan (8.5 cases per 100,000) (Table 9).

Age

Information regarding age was available for all cases. The highest age group-specific case rates were observed in children less than 5 years old (3.0 cases per 100,000) and persons 20-44 years old (2.8 cases per 100,000) (Table 11). The highest age group- and sex-specific case rates occurred among 20-44 year old males (4.8 cases per 100,000) and males less than 5 years old (4.3 cases per 100,000). The highest age group and borough-specific case rates were among persons 20-44 years old in Manhattan (7.1 cases per 100,000) and children less than 5 years old in Manhattan (6.6 cases per 100,000) (Table 12).

Race/Ethnicity

Race/ethnicity information was recorded for all cases. The racial/ethnic group-specific case rate was highest among black non-Hispanics (2.7 cases per 100,000) (Table 13). Non-Hispanic blacks in Manhattan and non-Hispanic whites in Manhattan had the highest race/ethnicity- and borough-specific case rates (7.2 cases per 100,000 and 5.3 cases per 100,000, respectively). The highest age group- and race/ethnicity-specific case rate was in 20-44 year old non-Hispanic blacks (4.8 cases per 100,000) (Table 14).

Cryptosporidiosis and Immune Status

Trends observed over the years in reported number of cryptosporidiosis cases have differed between those persons with HIV/AIDS and those who are immunocompetent. Reported cryptosporidiosis cases among persons with HIV/AIDS decreased considerably, from 392 in 1995 to 80 in 1997, thus causing a decline in the overall number of cryptosporidiosis cases in New York City (see Table 15 below, and Charts 2 and 3). This decrease coincides with the introduction of HAART, as noted previously. In 2002, the number of cases reported among persons with HIV/AIDS was 94. Reported cases among immunocompetent persons increased from 1995 to 1999, and decreased from 1999 to 2002 (Table 15 below, and Chart 4).

Table 15: **Number of Cases of Cryptosporidiosis by Year and Immune Status, New York City, 1995-2002**.

Immune Status	YEAR							
	1995	1996	1997	1998	1999	2000	2001	2002
Persons with HIV/AIDS	392	244	80	79	118	91	66	94
Immunocompetent	71	83	83	122	139	79	54	47
Immunocompromised Other Than HIV/AIDS	4	3	7	2	3	2	2	7
Unknown Immune Status	5	4	2	5	1	0	1	0
Total	472	334	172	208	261	172	123	148

Cryptosporidiosis and Potential Risk Exposures

Summary data for 1995 through 2002 on commonly reported potential risk exposures are presented in Table 16. Information has also been collected and presented regarding tap water consumption (Table 17). It must be noted that the significance of risk exposures reported by cryptosporidiosis case-patients cannot be determined without reference to a suitable control population (i.e., non-*Cryptosporidium*-infected controls). Also, a limitation of the questionnaires that were used from 1995 through May 2001 to collect information regarding tap water consumption is that they did not collect quantitative information concerning the volume of tap water consumed for each water consumption category (i.e., unfiltered/unboiled tap water, filtered tap water and boiled tap water). In addition, many individuals consume water from more than

one water consumption category. Beginning May, 2001, patients diagnosed with cryptosporidiosis were asked to quantify the total number of eight ounce cups of New York City tap water they consumed on average per day. Case-patients were then asked to specify how many of the total daily cups were directly from the tap without being first boiled or filtered, how many were boiled, and how many were filtered. Findings for interviewed case-patients diagnosed in 2002 are presented in Table 18.

In August 2002, additional changes were made to case-patient questionnaires. Questions that did not yield enough data for analysis, such as those pertaining to possible exposures that occurred more than a month before onset, were eliminated. Some questions were resequenced so that they were grouped with related questions. Race/ethnicity categories included in the year 2000 Census, but not previously included in City surveillance data, were added to the questionnaire.

PART II: SYNDROMIC SURVEILLANCE/OUTBREAK DETECTION

Introduction

Gastrointestinal (GI) disease incidence in the general population can be monitored via tracking of sentinel populations or surrogate indicators of disease. Such tracking programs can play a significant role in limiting the extent of an outbreak of gastrointestinal illnesses by providing an early indication of a problem. Over the past several years, the City has established and maintained a number of distinct and complementary outbreak detection systems. One system monitors GI disease observed in sentinel nursing homes. Another monitors the number of stool specimens submitted to clinical laboratories for microbiological testing, and a third system monitors the volume of sales of non-prescription anti-diarrheal medication. In 2001, a fourth outbreak detection system was added utilizing hospital Emergency Department illness reports. All systems rely upon the voluntary participation of the institutions providing the syndromic data.

In 2002, NYC reviewed and implemented recommendations of the program evaluation that was completed under contract with the New York Academy of Medicine (NYAM). Progress was made towards an enhanced anti-diarrheal medication tracking system, and significant changes were made to the nursing home surveillance program. Further details are provided below.

Nursing Home Sentinel Surveillance

The nursing home surveillance system began in March of 1997 and was modified significantly in 2002. Under the initial program, infection control practitioners were asked to receive reports of new diarrheal illness on each ward, ensure that each case met the case definition (three or more episodes of vomiting and/or loose stools within 24 hours), ascertain the census for the nursing home, and fax the surveillance forms on a daily basis to the Parasitic Disease Surveillance Program. At the time of the NYAM evaluation there were nine nursing homes in the system: three in Manhattan, two in the Bronx, two in Brooklyn, two in Queens; seven provided services predominantly to persons without AIDS, one was an AIDS nursing

home and one serviced a mixed population. Sources of drinking water for each of the nine nursing homes included untreated tap water (used in eight homes) and filtered tap water and bottled water (used in one home). Seven nursing homes received water from the Catskill and Delaware distribution system; one received water from the Croton System; and one received water from ground water wells in Jamaica, Queens.

In response to recommendations in the NYAM evaluation, NYCDOHMH conducted a survey to determine whether Nursing Home Sentinel Surveillance could be made more acceptable to facility participants, and whether data quality could be improved. Based on survey responses, the decision was made to modify the nursing home system. Under the new system initiated in August 2002, the daily reporting requirement has been eliminated, and emphasis has now been placed on specimen collection as part of outbreak investigation, with the goal of determining etiologic agent. When a given nursing home notes an outbreak of gastrointestinal illness that is legally reportable to the New York State Department of Health, the nursing home also notifies NYCDOHMH. Such an outbreak is defined as onset of diarrhea and/or vomiting involving three or more patients on a single ward/unit within a seven-day period, or more than the expected (baseline) number of cases within a single facility. All participating nursing homes have been provided with stool collection kits in advance. When such an outbreak is noted, specimens are to be collected for culture and sensitivity, ova and parasites, *Cryptosporidium* and viruses. The Bureau of Communicable Disease will facilitate transportation of the specimens to the City's Public Health Laboratories. Testing for culture and sensitivity, ova and parasites, and *Cryptosporidium* will occur at the Public Health Laboratories. If preliminary tests for bacteria and parasites are negative, specimens will be sent to the New York State Department of Health laboratories for viral testing. All nine nursing homes have switched to the new system. With regard to providing feedback to all of our data sources, all nursing homes will continue to be provided with copies of our semi-annual and annual reports.

From January through July 2002, there were three instances in which nursing homes reported three or more cases of diarrhea or vomiting on a single unit within a seven-day period. In two of the three, the illnesses were of short duration (24-48 hours) and no stool specimens were collected. In the third, stool specimens tested for ova and parasites and *Cryptosporidium* were negative. From the time the new system was established in August 2002 through the end of the surveillance period in December 2002, no outbreaks have been reported.

Clinical Laboratory Monitoring

The number of stool specimens submitted to clinical laboratories for bacterial and parasitic testing also provides information on the incidence of gastrointestinal illness in the population. Participation of three clinical laboratories (including the largest laboratory in the metropolitan area) continued during 2002. Data is transmitted by fax (by two labs) and by telephone report (by one lab) to NYCDOHMH's Bureau of Communicable Disease reporting the number of stool specimens examined for: (a) bacterial culture and sensitivity, (b) ova and parasites, and (c) *Cryptosporidium parvum.*

The results of the Clinical Laboratory Monitoring are reviewed daily. Although we will be evaluating whether we can establish statistical cut-offs to define a significant increase in clinical submissions (a.k.a. a "signal"), the current method is for the reviewer to compare the

results for the day to previous data, and use his experience to assess when the number of submissions is elevated. During 2002, for all days in which there was an increase in stool specimen submissions above normal variation, increases were not sustained on subsequent days. As part of the investigation of specimen submission increases, calls were made to participating laboratories. In one instance, the laboratory manager stated that the increase was caused by additional specimens received from an affiliated parasitology laboratory experiencing a temporary staff shortage. In all other instances there were no changes in internal laboratory practices that would account for the submission increases. As the increases were not sustained, no additional actions were taken.

In order to control for data variability and provide analytic guidelines for interpreting the data, we will be piloting the application of CUSUM (cumulative sum) analyses to the database in 2003. CUSUM is a quality control method that has been adapted for aberration-detection in public health surveillance.

Anti-Diarrheal Medication Monitoring

The monitoring of sales of anti-diarrheal medication (ADM) is a useful source of information about the level of diarrheal illness in the community. In New York City's current program, volume-of-sales information of non-prescription ADMs is obtained on a weekly basis from a major drug store chain. Information is also obtained on the chain's promotional sales. In the current ADM monitoring program, weekly sales volume data is graphed and visually compared to data collected since the program's inception in 1996. In interpreting the data, consideration is given to the weekly promotions on monitored products. During the surveillance period, no increases in weekly sales volume above the general noise of the data were observed.

Prior to September 11, 2001, the DOHMH started discussions with a second large pharmacy chain to set up a more comprehensive monitoring system for prescription and non-prescription drugstore sales. The goal was to develop a new system that would provide more timely and comprehensive data than the existing ADM tracking system. The new system was also intended to better serve bioterrorism surveillance. Following the events of September 11th pharmaceutical chains were more understanding of the importance of their data, and became more willing to share their proprietary information. In August 2002 daily electronic transmission began of approximately 6,000 prescription and 32,000 non-prescription medication sales that occur daily at this pharmacy chain. Daily data analysis began in mid-December. Drugs are categorized into key syndromes and trends are analyzed for citywide increases in sales of anti-diarrhea and cold medications. Electronic point-of-sale data is provided daily on loperamide and non-loperamide drugs. This system is currently in a pilot phase and future modifications and improvements are expected. Statistically significant increases in ADM sales ("signals") were detected on six days from December 19th-December 31, 2002; however, these results should be considered preliminary, as additional modeling is being pursued to better fit the data.

Hospital Emergency Department Monitoring

Two days after the 2001 September 11th attacks, the DOHMH and Centers for Disease Control and Prevention (CDC) deployed Epidemic Intelligence Officers to 15 New York City hospital emergency departments (ED) to conduct 24-hour surveillance for bioterrorism-related

illness. Patients were classified into syndrome categories (i.e., fever, respiratory, diarrhea and vomiting) and daily statistical analyses were conducted to detect any unusual patterns in ED chief complaint data. When CDC staff departed in early October, 2001 the DOHMH switched briefly to a fax-based system, and finally to an electronic system in which hospitals transmit electronic files each morning containing chief complaint and basic demographic information for patient visits during the previous 24 hours. NYCDOHMH currently receives data from 40 (59%) of New York City's 68 emergency departments, reporting 7000 visits per day, roughly 75% of emergency department visits citywide. Data is analyzed for both citywide trends and spatial clusters within the city seven days a week. Spatial analysis is based on home zip code and hospital address. Temporal ("citywide") analyses assess whether the frequency of ED visits for the syndrome (the two syndromes for gastrointestinal illness are vomiting and diarrhea) has increased in the last one, two or three days compared to the previous fourteen days. The spatial analyses scan the data for "clustering" of syndrome visits by two geographic variables, hospital and residential zip code. A single day of ED visit data is compared by syndrome and geographic variable to the previous fourteen days. Unusual clusters are denoted as "signals" and statistically this is determined by ranking the cluster in question alongside 999 simulated distributions of the data to produce a Monte Carlo estimate of the probability. Statistically significant signals are defined as a probability of the clustering occurring fewer than 10 times out of 1000. From Jan 1, 2002- December 31, 2002, there were 60 spatial (hospital or zip code) gastrointestinal signals. Thirty-one of these signals were for diarrhea and twenty-nine signals were for vomiting. There were 33 citywide signals, 14 for diarrhea and 19 for vomiting.

There were no spatial signals (hospital or zip code signals) that persisted for two or more consecutive days during the one year surveillance period. Beginning on November 7, 2002, a persistent citywide signal of increased diarrheal illness and vomiting was observed in the emergency department system. The increase was sustained through the end of the surveillance period. In response, twenty-nine stool specimens were collected from six institutions. Nineteen specimens (66%) tested positive for calicivirus. Reported symptoms included vomiting and diarrhea of 24-48 hour duration. The predominance of vomiting and the short duration of illness suggested a viral syndrome. Reports from elsewhere in the state and the nation confirmed that calicivirus was circulating widely. A review of other surveillance data, both the reportable disease database and other syndromic systems, did not suggest the presence of a community-wide increase in parasitic or bacterial illness.

In light of these findings, on November 13th, NYCDOHMH sent a broadcast alert to hospitals and physicians in the city that: (a) notified them of the increase in GI illness, (b) recommended that providers lower their threshold for ordering bacterial, parasitic and viral testing for patients presenting with diarrheal illness, (c) requested that all gastrointestinal outbreaks or illness clusters be reported to NYCDOHMH, and (d) offered basic prevention recommendations such as hand washing and exclusion of daycare, healthcare and food industry employees from work until they have recovered from their illness.

New York City DOHMH Public Health Laboratories - Stool Testing

In previous years, as part of efforts to assess cryptosporidiosis incidence in the general population, NYCDOHMH has performed Cryptosporidium testing on all stool specimens

submitted by the Child Health Clinics and the School Health Program. The analyses were conducted by the Health Department's Public Health Laboratories (PHL) and results have been provided in previous WDRAP annual reports. Methodological problems with compiling these data have now been identified through a recent quality assurance review. However, the incidence of cryptosporidiosis in this population was reported to be low, and these methodological problems are not expected to have affected the overall low positivity rates seen since this system was first implemented in 1996.

As reported in earlier WDRAP reports, due to organizational changes at the Child Health Clinics and the School Health Program, the PHL is no longer receiving stool specimens from the School Health Program, and the number of Child Health Clinics submitting specimens has declined significantly. As a result, the number of specimens available for testing has been significantly reduced and thus the findings are not considered to be of much value for WDRAP purposes; therefore these data will no longer be reported.

PART III: INFORMATION SHARING AND PUBLIC EDUCATION

Information sharing and education efforts continued during 2002. Over the year, program staff participated in meetings to discuss New York City's Waterborne Disease Risk Assessment Program and related issues. In addition, information continues to be available on both the NYCDEP and NYCDOHMH websites, including results from the City's source water protozoa monitoring program. Documents on the website include:

NYCDOH Webpages:

- *Giardiasis fact sheet*
  http://www.nyc.gov/html/doh/html/cd/cdgia.html

- *Cryptosporidiosis fact sheet*
  http://www.nyc.gov/html/doh/html/cd/cdcry.html

DEP Webpages:

- *DEP Water Supply Testing Results for Giardia and Cryptosporidium (Data is collected and entered on the website each week. Historical data is also included)*
  http://www.nyc.gov/html/dep/html/pathogen.html

- *1997, 1998, 1999, 2000 and 2001 Waterborne Disease Risk Assessment Annual Report*
  http://www.nyc.gov/html/dep/html/wdrap.html

- *1997, 1998, 1999, 2000 and 2001 New York City Drinking Water Supply and Quality Statement*
  http://www.nyc.gov/html/dep/html/wsstate.html

Special Communications with the HIV/AIDS Community

In early February 2002, DEP reported the detection of a *Cryptosporidium* oocyst concentration at the Croton supply source water keypoint that was judged by DEP and the oversight agencies to be slightly higher (5 oocysts/50 L) than the "typical" concentrations reported previously. At the same time, DEP reported *Cryptosporidium* values in the Catskill and Delaware source water keypoints of 2 oocysts/50 L sample. *Giardia* samples were also judged to be slightly above "typical" values. At the time, DEP did not have a long period of record using a newly adopted analytic method (EPA Method 1623 HV, 50 L) with which to help assess the significance of the reported values. In response to these results, NYCDOHMH, DEP and USEPA held a conference call to review available data from the City's environmental and disease/syndromic monitoring programs. No increases in gastrointestinal disease or associated syndromes were seen in the nursing home, pharmacy, clinical lab, or active disease surveillance programs. A citywide signal noting an increase in emergency department visits for diarrhea was seen at that time. The signal occurred predominantly in children under two years of age, suggesting that the etiology was unlikely to be related to water consumption. In addition, seasonal increases of rotavirus have been seen at that time of year, and in fact, laboratory reports at that time documented an increase in rotavirus activity. Other water quality parameters, such as turbidity and fecal coliforms, were determined to be within normal ranges.

In the interest of conservative public health practice, a broadcast medical alert was issued by fax and e-mail to hospitals, HIV/AIDS providers, and HIV/AIDS organizations recommending that immunocompromised populations consider boiling or filtering their water. In addition, active surveillance visits and calls to parasitology laboratories, as well as sampling for *Cryptosporidium* in the water supply, were increased. Results from increased monitoring and surveillance efforts showed no increases in cases of cryptosporidiosis or giardiasis, and environmental testing results showed that *Cryptosporidium* and *Giardia* counts in the water supply returned to normal levels. Following these investigations, a follow-up alert was issued rescinding the special recommendations for the HIV/AIDS community.

Chart 1: Giardiasis by Month of Diagnosis, New York City, July 1993-December 2002

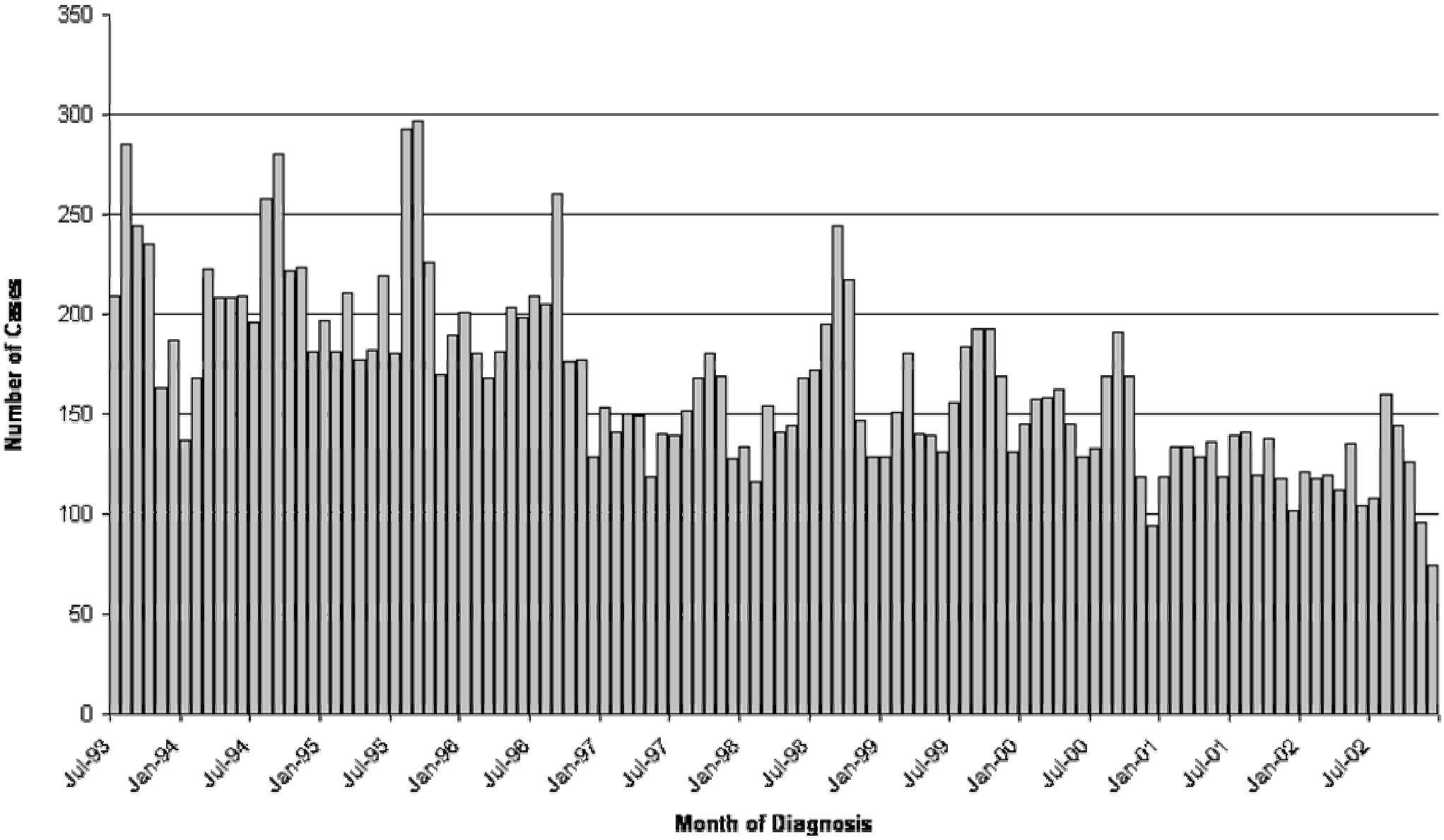


TABLE 2: Number of cases and annual case rate per 100,000 population by sex and borough of residence - Active surveillance for **giardiasis** in New York City (2002)

	Borough of residence					
Sex	Citywide number (rate)	Manhattan number (rate)	Bronx number (rate)	Brooklyn number (rate)	Queens number (rate)	Stat Is number (rate)
Male	978 (25.8)	477 (65.4)	129 (20.8)	189 (16.3)	161 (15.0)	22 (10.3)
Female	441 (10.5)	165 (20.4)	94 (13.2)	97 (7.4)	78 (6.7)	7.0 (3.1)
Total	1419 (17.7)	642 (41.8)	223 (16.7)	286 (11.6)	239 (10.7)	29 (6.5)

Map 1

Giardiasis annual case rate per 100,000 population by UHF neighborhood - Active surveillance data for New York City (2002)

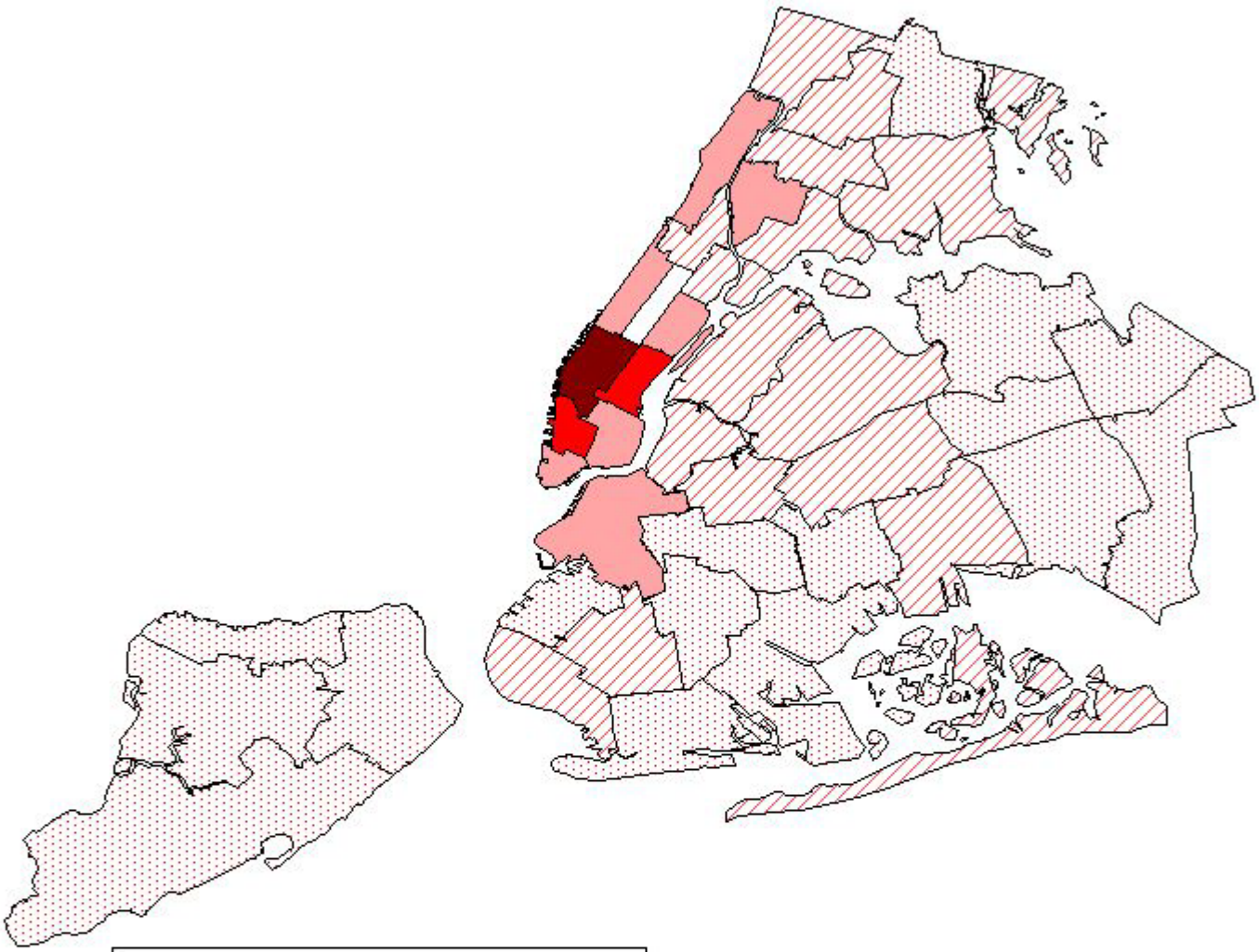


Table 3: Number of cases and annual case rate per 100,000 by UHF neighborhood of residence - Active surveillance for **giardiasis** in New York City (2002)*

UHF Neighborhood	Borough	Number	Population	Rate
Chelsea-Clinton	Manhattan	129	122998	104.9
Greenwich Village-Soho	Manhattan	48	83709	57.3
Gramercy Park-Murray Hill	Manhattan	68	124468	54.6
Upper West Side	Manhattan	105	220706	47.6
Lower Manhattan	Manhattan	12	29266	41.0
Union Sq-Lower East Side	Manhattan	78	197138	39.6
Upper East Side	Manhattan	82	216441	37.9
Downtown-Heights-Slope	Brooklyn	68	214696	31.7
High Bridge-Morrisania	Bronx	59	189755	31.1
Washington Heights-Inwood	Manhattan	76	270677	28.1
Long Island City-Astoria	Queens	48	220960	21.7
East Harlem	Manhattan	21	108092	19.4
Greenpoint	Brooklyn	24	124449	19.3
Fordham-Bronx Park	Bronx	45	250491	18.0
Kingsbridge-Riverdale	Bronx	15	88989	16.9
Williamsburg-Bushwick	Brooklyn	32	194305	16.5
Hunts Point-Mott Haven	Bronx	19	122875	15.5
Crotona-Tremont	Bronx	30	199530	15.0
C Harlem-Morningside Hgts	Manhattan	21	151113	13.9
Pelham-Throgs Neck	Bronx	40	290052	13.8
Ridgewood-Forest Hills	Queens	32	240901	13.3
West Queens	Queens	60	477516	12.6
Bensonhurst-Bay Ridge	Brooklyn	24	194558	12.3
Borough Park	Brooklyn	37	324411	11.4
Southwest Queens	Queens	29	269952	10.7
Rockaway	Queens	11	106738	10.3
Fresh Meadows	Queens	9	93148	9.7
Port Richmond	Stat Is	6	62788	9.6
Sunset Park	Brooklyn	11	120441	9.1
East Flatbush-Flatbush	Brooklyn	27	316734	8.5
Northeast Bronx	Bronx	15	185998	8.1
Stapleton-St. George	Stat Is	9	116227	7.7
Bed Stuyvesant-Crown Hgts	Brooklyn	24	317296	7.6
Jamaica	Queens	21	285339	7.4
Willowbrook	Stat Is	6	84821	7.1
Flushing-Clearview	Queens	18	255542	7.0
Coney Island-Sheepshead Bay	Brooklyn	18	286901	6.3
Canarsie-Flatlands	Brooklyn	12	197819	6.1
East New York	Brooklyn	9	173716	5.2
South Beach-Tottenville	Stat Is	8	179892	4.4
Southeast Queens	Queens	7	198846	3.5
Bayside-Littleneck	Queens	2	88164	2.3

*Excludes four cases who reside in NYC zip codes not assigned to UHF neighborhoods.

TABLE 4: Number of cases and annual case rate per 100,000 population by age group and sex - Active surveillance for **giardiasis** in New York City (2002)

	Sex		
Age group	Male number (rate)	Female number (rate)	Total number (rate)
<5 years	107 (38.7)	66 (25.0)	173 (32.0)
5-9 years	87 (30.4)	79 (28.7)	166 (29.6)
10-19 years	92 (17.2)	65 (12.6)	157 (14.9)
20-44 years	502 (32.2)	135 (8.1)	637 (19.8)
45-59 years	143 (22.5)	53 (7.1)	196 (14.2)
60 years +	46 (9.2)	43 (5.7)	89 (7.1)
Unknown	1	0	1
Total	978 (25.8)	441 (10.5)	1419 (17.7)

TABLE 5: Number of cases and annual case rate per 100,000 population by age group and borough of residence - Active surveillance for **giardiasis** in New York City (2002)

	Borough of residence					
Age group	Citywide number (rate)	Manhattan number (rate)	Bronx number (rate)	Brooklyn number (rate)	Queens number (rate)	Stat Is number (rate)
<5 years	173	46	45	41	33	8
	(32.0)	(60.5)	(41.0)	(22.5)	(23.1)	(26.9)
5-9 years	166	25	59	39	43	0
	(29.6)	(34.1)	(49.3)	(20.6)	(29.6)	
10-19	157	36	40	50	31	0
years	(14.9)	(24.9)	(19.1)	(13.9)	(11.2)	0
20-44	637	358	54	117	94	14
years	(19.8)	(50.5)	(10.6)	(12.4)	(10.5)	(8.5)
45-59	196	129	16	27	18	6
years	(14.2)	(45.5)	(7.8)	(6.5)	(4.6)	(6.9)
60 years	89	48	9	12	19	1
+	(7.1)	(19.2)	(5.0)	(3.2)	(5.1)	(1.5)
Unknown	1	0	0	0	1	0
Total	1419	642	223	286	239	29
	(17.7)	(41.8)	(16.7)	(11.6)	(10.7)	(6.5)

TABLE 6: Number of cases and annual case rate per 100,000 population by race/ethnicity and borough of residence - Active surveillance for **giardiasis** in New York City (2002)*

	Borough of residence					
Race/Ethnicity	Citywide number (rate)	Manhattan number (rate)	Bronx number (rate)	Brooklyn number (rate)	Queens number (rate)	Stat Is number (rate)
Hispanic	380	112	126	62	75	5
	(17.6)	(26.8)	(19.5)	(12.7)	(13.5)	(9.3)
White non-Hispanic	740	445	43	138	95	19
	(26.4)	(63.2)	(22.2)	(16.1)	(13.0)	(6.0)
Black non-Hispanic	131	35	29	47	17	3
	(6.7)	(14.9)	(7.0)	(5.5)	(4.0)	(7.6)
Asian, Pac Islander, Amer	120	26	17	28	47	2
Indian, Alaska Native	(15.0)	(17.8)	(40.0)	(14.8)	(11.9)	(7.8)
Unknown	48	24	8	11	5	0
Total	1419	642	223	286	239	29
	(17.7)	(41.8)	(16.7)	(11.6)	(10.7)	(6.5)

* Because year 2000 U.S. Census data include race/ethnicity categories not included in disease surveillance data, 3.5% of the total population was not included in the denominator used to calculate rates by race/ethnicity. Rates pertaining to race/ethnicity may therefore be inflated.

TABLE 7: Number of cases and annual case rate per 100,000 population by race/ethnicity and age group - Active surveillance for **giardiasis** in New York City (2002)*

	Age group							
Race/ ethnicity	< 5 years number (rate)	5-9 years number (rate)	10-19 years number (rate)	20-44 years number (rate)	45-59 years number (rate)	60 + years number (rate)	Unk.	Total number (rate)
Hispanic	84 (45.3)	80 (40.7)	57 (16.2)	112 (12.4)	26 (8.2)	20 (9.7)	1	380 (17.6)
White non-Hispanic	48 (35.8)	39 (31.1)	40 (16.0)	408 (38.0)	145 (26.3)	60 (9.0)	0	740 (26.4)
Black non-Hispanic	13 (8.9)	17 (10.2)	18 (5.7)	64 (8.6)	15 (4.6)	4 (1.5)	0	131 (6.7)
Asian, Pac. Is., Amer. Indian, Alaska Native	25 (49.8)	26 (52.3)	29 (30.1)	31 (8.3)	4 (2.8)	5 (5.6)	0	120 (15.0)
Unknown	3	4	13	22	6	0	0	48
Total	173 (32.0)	166 (29.6)	157 (14.9)	637 (19.8)	196 (14.2)	89 (7.1)	1	1419 (17.7)

* Because year 2000 U.S. Census data include race/ethnicity categories not included in disease surveillance data, 3.5% of the total population was not included in the denominator used to calculate rates by race/ethnicity. Rates pertaining to race/ethnicity may therefore be inflated.

Chart 2: Cryptosporidiosis by Month of Diagnosis, New York City, November 1994-December 2002

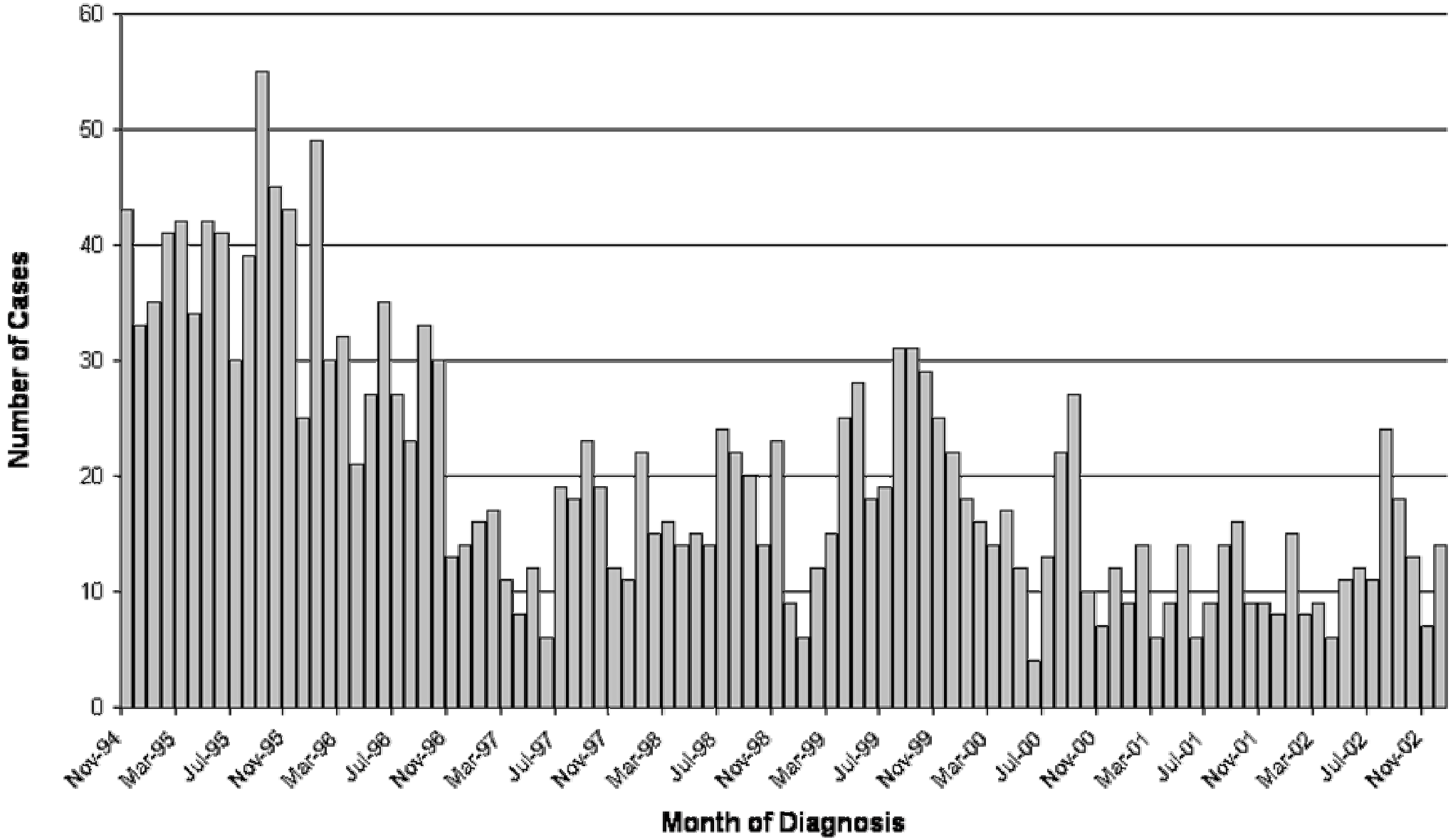
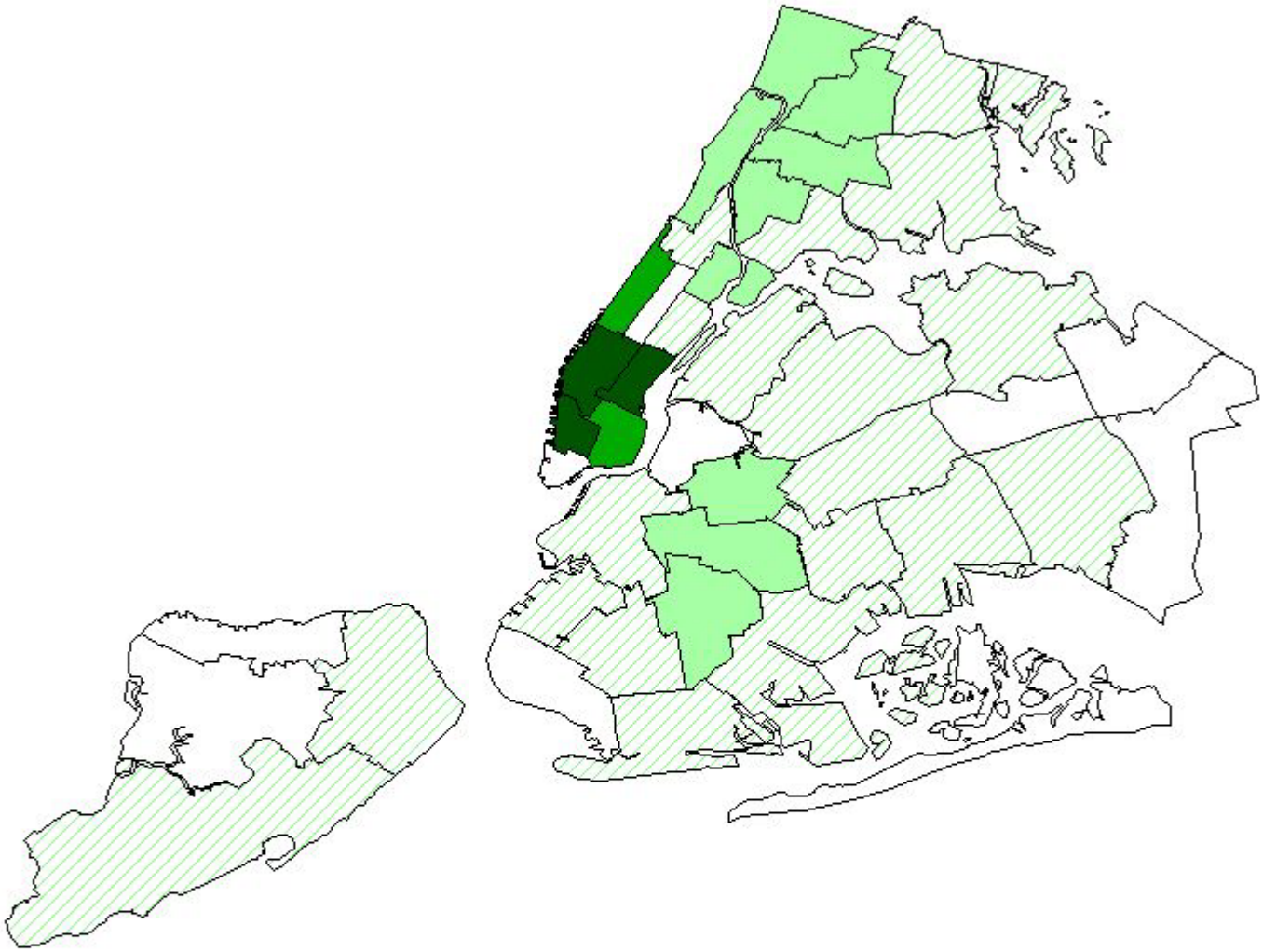


TABLE 9: Number of cases and annual case rate per 100,000 population by sex and borough of residence - Active surveillance for **cryptosporidiosis** in New York City (2002)

	Borough of residence					
Sex	Citywide number (rate)	Manhattan number (rate)	Bronx number (rate)	Brooklyn number (rate)	Queens number (rate)	Stat Is number (rate)
Male	116	62	15	26.0	11	2.0
	(3.1)	(8.5)	(2.4)	(2.2)	(1.0)	(0.9)
Female	32	9.0	12	8	3	0
	(0.8)	(1.1)	(1.7)	(0.6)	(0.3)	
Total	148	71	27	34	14	2
	(1.8)	(4.6)	(2.0)	(1.4)	(0.6)	(0.5)

Map 2

Cryptosporidiosis annual case rate per 100,000 population by UHF neighborhood - Active surveillance data for New York City (2002)



Cryptosporidiosis 2002 Rate per 100,000

- 0
- 0.01 - 1.99
- 2.00 - 3.99
- 4.00 - 5.99
- >5.99

N
W E
S

TABLE 10: Number of cases and annual case rate per 100,000 population by UHF neighborhood of residence - Active surveillance data for **cryptosporidiosis** in New York (2002)

UHF Neighborhood	Borough	Number	Population	Rate
Chelsea-Clinton	Manhattan	17	122998	13.8
Greenwich Village-Soho	Manhattan	8	83709	9.6
Gramercy Park-Murray Hill	Manhattan	8	124468	6.4
Union Sq-Lower East Side	Manhattan	10	197138	5.1
Upper West Side	Manhattan	11	220706	5.0
High Bridge-Morrisania	Bronx	7	189755	3.7
Williamsburg-Bushwick	Brooklyn	6	194305	3.1
Washington Heights-Inwood	Manhattan	8	270677	3.0
Crotona-Tremont	Bronx	6	199530	3.0
East Harlem	Manhattan	3	108092	2.8
East Flatbush-Flatbush	Brooklyn	8	316734	2.5
Bed Stuyvesant-Crown Hgts	Brooklyn	8	317296	2.5
Fordham-Bronx Park	Bronx	6	250491	2.4
Kingsbridge-Riverdale	Bronx	2	88989	2.2
Upper East Side	Manhattan	4	216441	1.8
Downtown-Heights-Slope	Brooklyn	3	214696	1.4
Long Island City-Astoria	Queens	3	220960	1.4
Jamaica	Queens	4	285339	1.4
C Harlem-Morningside Hgts	Manhattan	2	151113	1.3
East New York	Brooklyn	2	173716	1.2
Northeast Bronx	Bronx	2	185998	1.1
Pelham-Throgs Neck	Bronx	3	290052	1.0
Canarsie-Flatlands	Brooklyn	2	197819	1.0
Stapleton-St. George	Stat Is	1	116227	0.9
Hunts Point-Mott Haven	Bronx	1	122875	0.8
Sunset Park	Brooklyn	1	120441	0.8
Southwest Queens	Queens	2	269952	0.7
Coney Island-Sheepshead Bay	Brooklyn	2	286901	0.7
West Queens	Queens	3	477516	0.6
Borough Park	Brooklyn	2	324411	0.6
South Beach-Tottenville	Stat Is	1	179892	0.6
Ridgewood-Forest Hills	Queens	1	240901	0.4
Flushing-Clearview	Queens	1	255542	0.4

TABLE 11: Number of cases and annual case rate by age group and sex - Active Surveillance for **cryptosporidiosis** in New York City (2002)

	Sex		
Age group	Male number (rate)	Female number (rate)	Total number (rate)
<5 years	12 (4.3)	4 (1.5)	16 (3.0)
5-9 years	5 (1.7)	1 (0.4)	6 (1.1)
10-19 years	2 (0.4)	2 (0.4)	4 (0.4)
20-44 years	75 (4.8)	16 (1.0)	91 (2.8)
45-59 years	17 (2.7)	8 (1.1)	25 (1.8)
60 years +	5 (1.0)	1 (0.1)	6 (0.5)
Total	116 (3.1)	32 (0.8)	148 (1.8)

TABLE 12: Number of cases and annual case rate per 100,000 population by age group and borough – Active surveillance for **cryptosporidiosis** in New York City (2002)

	Borough of residence					
Age group	Citywide number (rate)	Manhattan number (rate)	Bronx number (rate)	Brooklyn number (rate)	Queens number (rate)	Stat Is number (rate)
<5 years	16 (3.0)	5 (6.6)	5 (4.6)	4 (2.2)	2 (1.4)	0
5-9 years	6 (1.1)	1 (1.4)	3 (2.5)	2 (1.1)	0	0
10-19 years	4 (0.4)	2 (1.4)	0	1 (0.3)	0	1 (1.6)
20-44 years	91 (2.8)	50 (7.1)	13 (2.6)	19 (2.0)	8 (0.9)	1 (0.6)
45-59 years	25 (1.8)	10 (3.5)	5 (2.4)	7 (1.7)	3 (0.8)	0
60 years +	6 (0.5)	3 (1.2)	1 (0.6)	1 (0.3)	1 (0.3)	0
Total	148 (1.8)	71 (4.6)	27 (2.0)	34 (1.4)	14 (0.6)	2 (0.5)

TABLE 13: Number of cases and annual case rate per 100,000 population by race/ethnicity and borough of residence - Active surveillance for **cryptosporidiosis** in New York City (2002)*

	Borough of residence					
Race/Ethnicity	Citywide number (rate)	Manhattan number (rate)	Bronx number (rate)	Brooklyn number (rate)	Queens number (rate)	Stat Is number (rate)
Hispanic	42 (1.9)	15 (3.6)	16 (2.5)	5 (1.0)	6 (1.1)	0
White non-Hispanic	49 (1.7)	37 (5.3)	1 (0.5)	7 (0.8)	2 (0.3)	2 (0.6)
Black non-Hispanic	52 (2.7)	17 (7.2)	10 (2.4)	22 (2.6)	3 (0.7)	0
Asian, Pac Islander, Amer Indian, Alaska Native	5 (0.6)	2 (1.4)	0	0	3 (0.8)	0
Total	148 (1.8)	71 (4.6)	27 (2.0)	34 (1.4)	14 (0.6)	2 (0.5)

* Because year 2000 U.S. Census data include race/ethnicity categories not included in disease surveillance data, 3.5% of the total population was not included in the denominator used to calculate rates by race/ethnicity. Rates pertaining to race/ethnicity may therefore be inflated.

TABLE 14: Number of cases and annual case rate per 100,000 population by race/ethnicity and age group - Active surveillance for **cryptosporidiosis** in New York City (2002)

	Age group						
Race /ethnicity	< 5 years number (rate)	5-9 years number (rate)	10-19 years number (rate)	20-44 years number (rate)	45-59 years number (rate)	60 + years number (rate)	Total number (rate)
Hispanic	7 (3.8)	4 (2.0)	0	22 (2.4)	6 (1.9)	3 (1.5)	42 (1.9)
White non-Hispanic	3 (2.2)	2 (1.6)	2 (0.8)	30 (2.8)	10 (1.8)	2 (0.3)	49 (1.7)
Black non-Hispanic	4 (2.7)	0	2 (0.6)	36 (4.8)	9 (2.7)	1 (0.4)	52 (2.7)
Asian, Pac Islander, Amer. Indian, Alaska Native	2 (4.0)	0	0	3 (0.8)	0	0	5 (0.6)
Total	16 (3.0)	6 (1.1)	4 (0.4)	91 (2.8)	25 (1.8)	6 (0.5)	148 (1.8)

* Because year 2000 U.S. Census data include race/ethnicity categories not included in disease surveillance data, 3.5% of the total population was not included in the denominator used to calculate rates by race/ethnicity. Rates pertaining to race/ethnicity may therefore be inflated.

Chart 3: Cryptosporidiosis Among Persons With HIV/AIDS by Month of Diagnosis, New York City, Jan 1995-Dec 2002

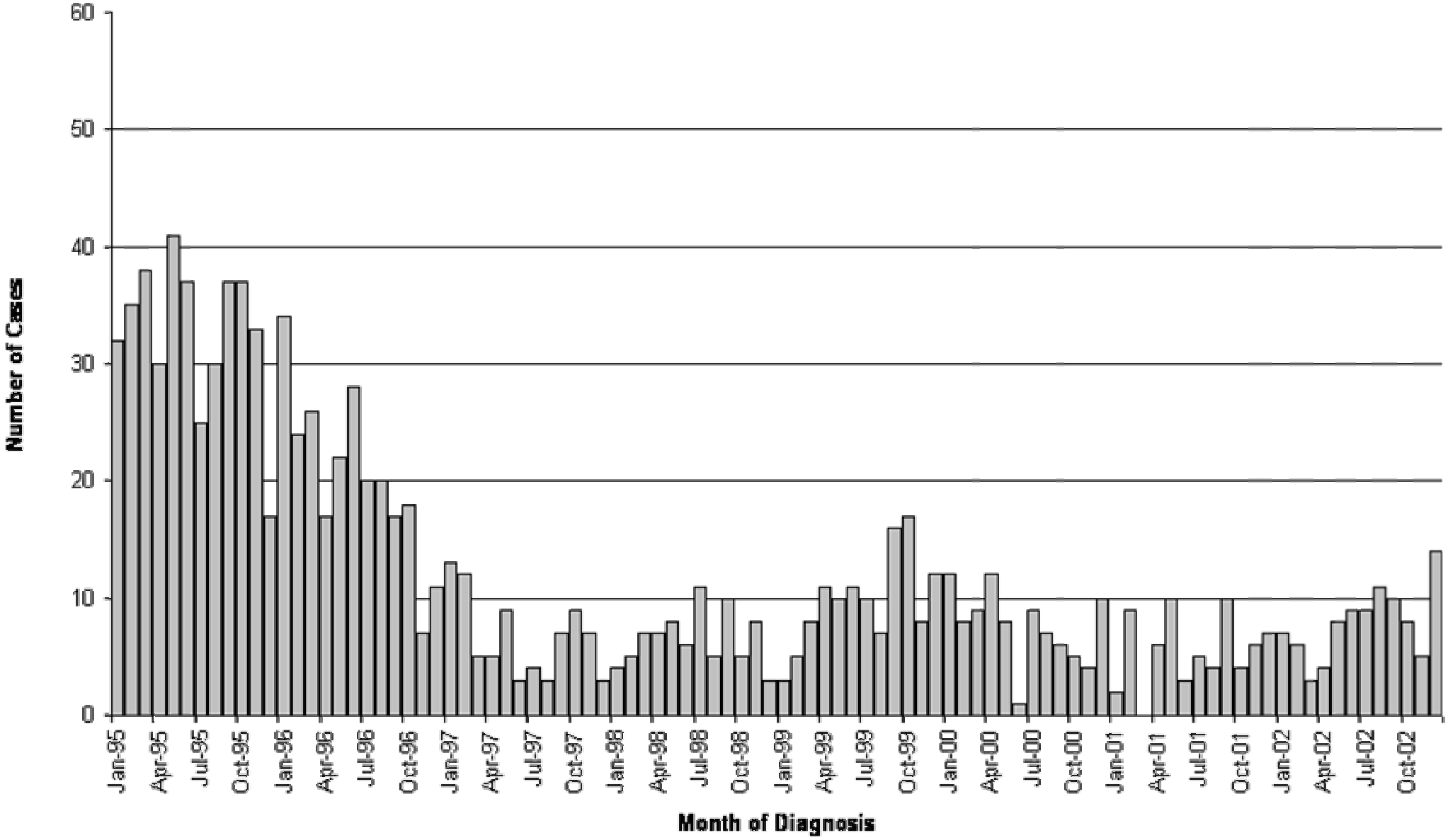


Chart 4: Cryptosporidiosis Among Immunocompetent Persons by Month of Diagnosis, New York City, Jan 1995-Dec 2002

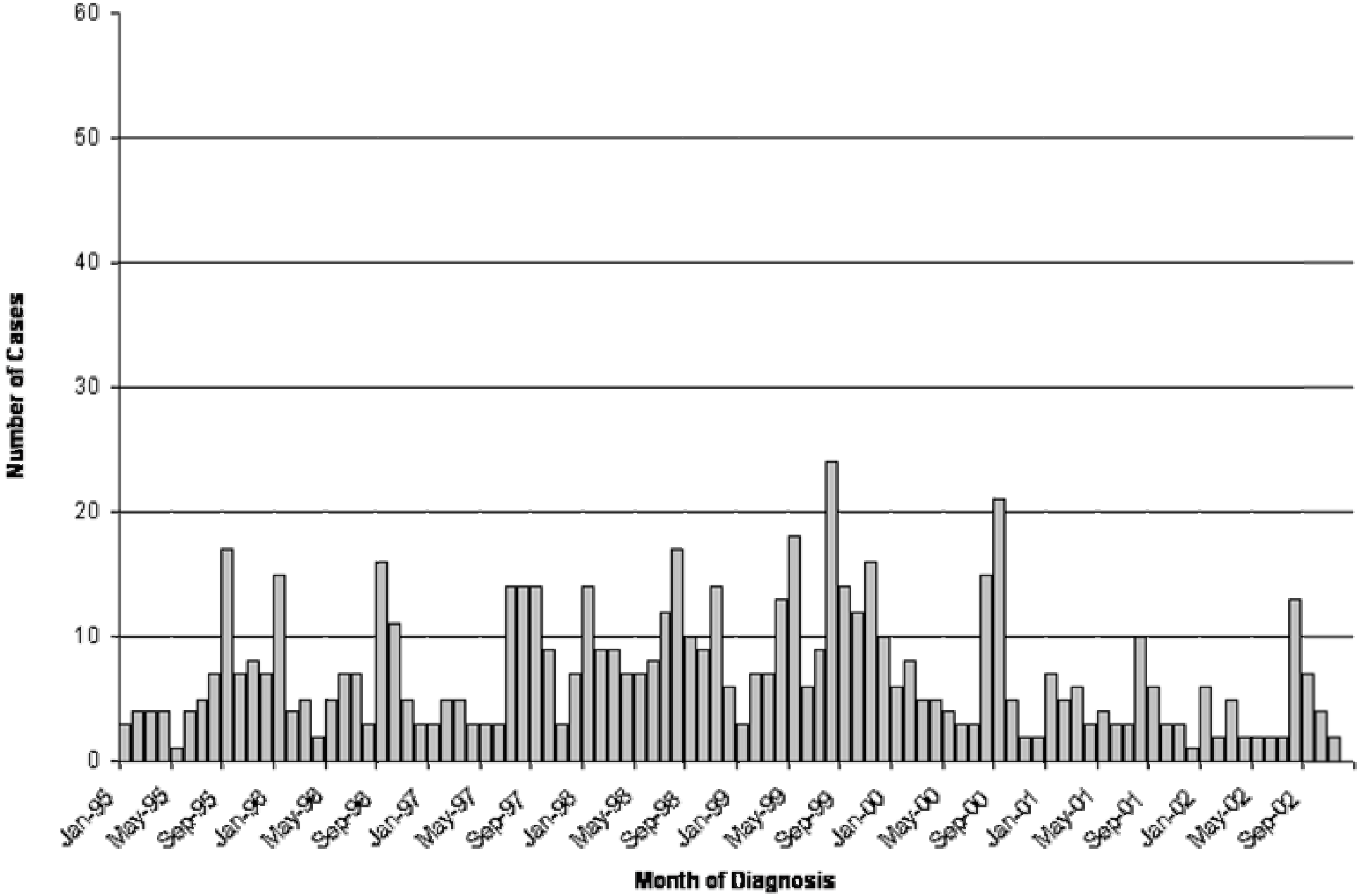


Table 16: Percentage of Interviewed **Cryptosporidiosis** Case-Patients Reporting Selected Potential Risk Exposures in the Month Before Disease Onset, by Immune Status, New York City, 1995-2002.

Exposure Type	HIV/AIDS								Immunocompetent							
	1995	1996	1997	1998	1999	2000*	2001	2002	1995	1996	1997	1998	1999	2000*	2001	2002
Contact with an Animal[a]	35%	35%	33%	36%	35%	43%	23%	42%	42%	41%	41%	32%	35%	26%	37%	35%
High-risk Sexual Activity[b] (≥ 18 years old)	22%	22%	9%	15%	20%	25%	15%	23%	16%	25%	12%	10%	12%	23%	15%	30%
International Travel[c]	9%	9%	9%	13%	18%	14%	10%	11%	30%	29%	26%	28%	28%	40%	47%	33%
Recreational Water Contact[d]	16%	8%	16%	12%	16%	15%	8%	10%	21%	27%	40%	24%	22%	32%	35%	35%

Note: • The significance of risk exposures reported by cryptosporidiosis case-patients cannot be determined without reference to a suitable control population (i.e., non-*Cryptosporidium*-infected controls).
• Format of case interview form changed on 1/1/1997, 5/11/2001 and 8/21/2002. Details on Exposure Types and changes from 1995-2002 are noted below.

[a] Contact with an Animal - Includes having a pet, or visiting a farm or petting zoo (1995-1996); expanded to include: or visiting a pet store or veterinarian office (1997-2002).

[b] High-risk Sexual Activity - Includes having a penis, finger or tongue in sexual partner's anus (1995-2002).

[c] International Travel - Travel outside the United States (1995-2002).

[d] Recreational Water Contact - Includes swimming in a pool, or swimming in or drinking from a stream, lake, river or spring (1995-1996); expanded to include: or swimming in the ocean, or visiting a recreational water park (1997-2002).

* Year 2000 percentage of interviewed cryptosporidiosis cases does not include 14 cases associated with a point source exposure at a swimming pool in Florida.

Table 17: Percentage of Interviewed **Cryptosporidiosis** Case-Patients by Type of Tap Water Exposure Reported in the Month Before Disease Onset, by Immune Status, New York City 1995-2002.

Year	HIV/AIDS					Immunocompetent				
	Plain Tap[a]	Filtered Tap[b]	Boiled Tap[c]	Incidental Plain Tap Only[d]	No Tap[e]	Plain Tap[a]	Filtered Tap[b]	Boiled Tap[c]	Incidental Plain Tap Only[d]	No Tap[e]
1995	69%	12%	7%	11%	3%	58%	18%	11%	7%	2%
1996	70%	9%	7%	15%	2%	63%	17%	10%	9%	4%
1997	71%	10%	3%	16%	2%	58%	21%	8%	12%	4%
1998	64%	18%	5%	15%	0%	67%	21%	3%	8%	3%
1999	66%	20%	3%	8%	5%	56%	25%	4%	11%	7%
2000*	63%	20%	6%	12%	4%	56%	17%	2%	8%	17%
2001	54%	14%	8%	16%	6%	43%	31%	4%	16%	6%
2002	54%	22%	0%	19%	4%	33%	44%	0%	21%	2%

Note: • The significance of risk exposures reported by cryptosporidiosis case-patients cannot be determined without reference to a suitable control population (i.e., non-*Cryptosporidium*-infected controls).
• Format of case interview form changed on 1/1/1997, 5/11/2001, and 8/21/2002. Details on Tap Water Exposure and changes from 1995-2002 are noted below.

[a] Plain Tap - Drank unboiled/unfiltered NYC tap water (1995-5/10/2001); or drank greater than 0 cups of unboiled/unfiltered NYC tap water (5/11/2001-12/31/2002).

[b] Filtered Tap - Drank filtered NYC tap water (1995-5/10/2001); or drank greater than 0 cups of filtered NYC tap water, and 0 or more cups of boiled NYC tap water, and no unboiled /unfiltered NYC tap water (5/11/2001-12/31/2002).

[c] Boiled Tap - Drank boiled NYC tap water (1995-5/10/2001); or drank greater than 0 cups of boiled NYC tap water, and no unboiled /unfiltered NYC tap water, and no filtered NYC tap water (5/11/2001-12/31/2002).

[d] Incidental Plain Tap Only - Did not drink any NYC tap water but did use unboiled/unfiltered NYC tap water to brush teeth, or to wash vegetables/fruits, or to make ice (1995-1996); expanded to include: or to make juice from concentrate (1997-2002)

[e] No Tap - Did not drink any NYC tap water and did not use unboiled/unfiltered NYC tap water to brush teeth, or to wash vegetables/fruits, or to make ice (1995-1996); expanded to include: or to make juice from concentrate (1997-2002).

* Year 2000 percentage of interviewed cryptosporidiosis cases does not include 14 cases associated with a point source exposure at a swimming pool in Florida.

Table 18: New York City Water Consumption, Quantified by Median and Range of Reported Cups Consumed per Day in the Month Before Disease Onset, Interviewed Cryptosporidiosis Case-Patients, New York City, 2002.

Case-patients interviewed	N	Median (range) cups consumed per day			
		Total NYC water	Unfiltered/unboiled NYC tap water	Filtered NYC water	Boiled NYC water
All	122	3 (0-20)	0 (0-20)	0 (0-20)	0 (0-4)
HIV/AIDS	72	3 (0-20)	1 (0-20)	0 (0-20)	0 (0-4)
Immunocompetent	43	3 (0-16)	0 (0-8)	1 (0-16)	0 (0-4)

Note: • The significance of risk exposures reported by cryptosporidiosis case-patients cannot be determined without reference to a suitable control population (i.e., non-*Cryptosporidium*-infected controls).
• Interviewers notified case-patients that 1 cup = 8 ounces.
• Some patients drank more than one kind of water (e.g. both unboiled/unfiltered tap water and filtered water) and may be represented in this table more than one time.