New York City Department of Health and Mental Hygiene
Bureau of Communicable Disease

and

New York City Department of Environmental Protection
Bureau of Water Supply

Waterborne Disease Risk Assessment Program

2004 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 2004 program achievements and results are presented.

Prepared by: The Waterborne Disease Risk Assessment Program Team

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EXECUTIVE SUMMARY

New York City's Waterborne Disease Risk Assessment Program was established 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 program, jointly administered by the Departments of Health and Mental Hygiene and Environmental Protection, began in 1993. This report provides an overview of program progress, and data collected, during 2004.

ACTIVE DISEASE SURVEILLANCE

Active disease surveillance for giardiasis and cryptosporidiosis began in July 1993 and November 1994, respectively. Between 2003 and 2004, the number of giardiasis cases decreased from 1,214 to 1,087, and the number of cases of cryptosporidiosis increased from 126 to 138. 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.

SYNDROMIC SURVEILLANCE/OUTBREAK DETECTION

Gastrointestinal (GI) disease trends in the general population can be monitored via tracking of sentinel populations or surrogate indicators of disease. Such tracking programs provide greater assurance against the possibility that an outbreak would remain undetected. In addition, such programs can play a role in limiting the extent of an outbreak by providing an early indication of a problem so that control measures may be rapidly implemented. Over the past several years, the City has established and maintained a number of distinct and complementary outbreak detection systems. One system monitors and assists in the investigation of GI outbreaks in sentinel nursing homes. Another system, the Clinical Laboratory Monitoring System, tracks the number of stool specimens submitted to clinical laboratories for microbiological testing. Two program changes occurred in 2004 in the Clinical Laboratory Monitoring System: (1) one of the three participating laboratories discontinued business operations in March 2004, and (2) beginning in August 2004 the City implemented a computer model to establish statistical cut-offs for significant increases in clinical laboratory submissions. A third system utilizes hospital Emergency Department chief complaint logs to monitor for outbreaks. NYC also utilizes three separate systems for monitoring sales of anti-diarrheal medication: one tracks the weekly volume of sales of non-prescription anti-diarrheal medications at a major NYC drug store chain; an additional pharmacy system tracks daily sales of non-prescription anti-diarrheal medications at another drug store chain; and a third system tracks retail pharmacy data obtained from the National Retail Data Monitor. Year 2004 findings for these systems pertaining to gastrointestinal illness are summarized.

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.

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 (DOHMH). 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 DOHMH Bureau of Communicable Disease. Staff members employed by DEP and DOHMH 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 2004. 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). For this report, for calculation of rates, the base population figures used (i.e., denominators) were obtained from year 2000 U.S. Census data. 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 42 UHF neighborhoods. 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 to ensure complete reporting of all laboratory-diagnosed cases. Active laboratory surveillance (regular site visits or telephone contact with laboratories) continued in 2004. 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 2004, a total of 1,087 cases of giardiasis were reported to DOHMH and the annual case rate was 13.6 per 100,000. The case rate decreased 57% from 1994 to 2004 (see Table 1 below, and Chart 1).

Table 1: Number of Cases and Case Rates* for Giardiasis, Active Disease Surveillance, New York City, 1994 - 2004.

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	1,897	23.9
2000	1,771	22.1
2001	1,530	19.1
2002	1,423	17.8
2003	1,214	15.2
2004	1,087	13.6

* For 1994-1999, rates were calculated using intercensal population estimates. For 2000-2004, 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, 2004. Additional data is presented in the tables that appear later in this report.

Location of case-patient residence

Location of case-patient residence was known for all 1,087 giardiasis case-patients who resided in New York City. In addition, there were 7 giardiasis case-patients whose city of residence was unknown, and who are not included in this report. Manhattan had the highest borough-specific annual case rate (31.0 cases per 100,000 population) (Table 2). The highest UHF neighborhood-specific case rate was found in the Chelsea-Clinton neighborhood in Manhattan (81.3 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 742 males (19.6 cases per 100,000) and 345 females (8.2 cases per 100,000) reported. The highest sex- and borough-specific case rate was observed among males residing in Manhattan (48.0 cases per 100,000) (Table 2).

Age

Information regarding age was available for 1,085 of 1,087 cases (99.8%). The highest age group-specific annual case rates were among children under 5 years old (25.9 cases per 100,000), and children 5-9 years old (24.4 cases per 100,000) (Table 4). The highest age group- and sex-specific case rates were among males 5-9 years old (28.0 cases per 100,000), males under 5 years old (26.0 cases per 100,000), and females under 5 years old (25.7 cases per 100,000). The highest age group- and borough-specific case rates were among children less than 5 years old in Manhattan (53.9 cases per 100,000), children 5-9 in Manhattan (39.5 cases per 100,000), and children 5-9 years old in the Bronx (39.2 cases per 100,000) (Table 5).

Race/Ethnicity

Information regarding race/ethnicity was available for 872 of 1,087 cases (80.0%). The racial/ethnic group-specific case rate was highest among White non-Hispanics (14.9 cases per 100,000) (Table 6). The highest borough- and racial/ethnic group-specific case rate occurred among non-Hispanic Whites in Manhattan (36.5 cases per 100,000). The highest age group- and race/ethnicity-specific case rates were among children less than 5 years old in the grouping that includes Asian/Pacific Islanders and American Indian/Alaskan Natives (49.8 cases per 100,000) and children 5-9 years old in this racial/ethnic grouping (36.2 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 began in November 1994 and continued during 2004. 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 2004, a total of 138 cases of cryptosporidiosis were reported to DOHMH and the annual case rate was 1.7 per 100,000. The case rate has declined 71% from 1995 to 2004 (See Table 8 below, and Chart 2). The most substantial decline occurred in the first three full years of active surveillance (i.e., 1995 through 1997), coinciding with the introduction of highly active antiretroviral therapy (HAART) for persons living with HIV.

Table 8: Number of Cases and Case Rates* for Cryptosporidiosis, Active Disease Surveillance, New York City, 1994 - 2004.

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
2003	126	1.6
2004	138	1.7

* For 1994-1999, rates were calculated using intercensal population estimates. For 2000-2004, 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, 2004. Additional data is presented in the tables that appear later in this report.

Location of case-patient residence

Information on location of residence was available for all cases of cryptosporidiosis. Manhattan had the highest borough-specific annual case rate (3.4 cases per 100,000) (Table 9). The highest UHF neighborhood-specific case rate was found in the Chelsea-Clinton neighborhood in Manhattan (12.2 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 112 males (3.0 cases per 100,000) and 26 females (0.6 cases per 100,000) reported. The borough- and sex-specific case rate was highest for males in Manhattan (6.4 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 persons 20-44 (2.5 cases per 100,000) and persons 45-59 years old (2.1 cases per 100,000) (Table 11). The highest age group- and sex-specific case rates occurred among males 20-44 years old (4.6 cases per 100,000) and males 45-59 (4.1 cases per 100,000). The highest age group and borough-specific case rates were among persons 45-59 years old in Manhattan (4.6 cases per 100,000), persons 20-44 years old in Manhattan (4.2 cases per 100,000), and children 5-9 years old in Manhattan (4.1 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 had the highest race/ethnicity- and borough-specific case rates (5.1 cases per 100,000). The highest age group- and race/ethnicity-specific case rate was in children less than 5 years old in the grouping that includes Asian/Pacific Islanders and American Indian/Alaskan Natives (6.0 cases per 100,000) (Table 14). However, this rate only represents 3 cases in that age group and racial/ethnic category. The next highest age group- and race/ethnicity-specific case rate occurred among 20-44 year old Black non-Hispanics (4.4 cases per 100,000).

Cryptosporidiosis and Immune Status

Trends observed over the years in reported number of cryptosporidiosis cases have differed between persons living with HIV/AIDS and those who are immunocompetent. Reported cryptosporidiosis cases among persons living with HIV/AIDS decreased considerably, from 392 in 1995 to 95 in 2004, thus causing a decline in the overall number of cryptosporidiosis cases in New York City (see Table 15 below, and Charts 3 and 4). This decrease coincides with the introduction of HAART, as noted previously.

<u>Table 15</u>: Number of Cases of Cryptosporidiosis by Year and Immune Status, New York City, 1995-2004.

Immune Status	YEAR									
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Persons with HIV/AIDS	392	244	80	79	118	91	66	94	76	95
Immunocompetent	71	83	83	122	139	79	54	47	48	38
Immunocompro-mised Other Than HIV/AIDS	4	3	7	2	3	2	2	7	2	5
Unknown Immune Status	5	4	2	5	1	0	1	0	0	0
Total	472	334	172	208	261	172	123	148	126	138

<u>Cryptosporidiosis and Potential Risk Exposures</u>

Summary data for 1995 through 2004 on commonly reported potential risk exposures, obtained from case-patient interviews, are presented in Table 16. Information has also been collected and presented regarding type of 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). 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. We presented these findings for 2003 in Table 18 of the 2003 Annual Report, however Table 18 is not included in this current report, for the reasons discussed below.

Because most of the boxes in Table 18 regarding median glasses of different types of water consumed were zero, we felt this table was not useful. We were also concerned about the possibility of misclassification and misquantification, as case-patients are asked to estimate the quantity of water consumed in the categories of boiled, filtered and unboiled/unfiltered. Because of these concerns Table 18 is not presented here this year. Table 17 includes information about whether patients report drinking NYC tap water that is unboiled and unfiltered, boiled, or filtered. It also includes information as to whether case-patients report drinking no NYC tap water or only incidentally drinking NYC tap water. While the problem of misclassification is still an issue it is less serious, as this table presents general practice rather than specific quantities. Thus, we feel this table more accurately reflects the proportion of cryptosporidiosis case-patients who drink unboiled/unfiltered NYC tap water, who attempt to avoid drinking NYC tap water, or who boil or filter the water they drink.

PART II: SYNDROMIC SURVEILLANCE/OUTBREAK DETECTION

Introduction

Gastrointestinal (GI) disease trends in the general population can be monitored via tracking of sentinel populations or surrogate indicators of disease. Such tracking programs provide greater assurance against the possibility that an outbreak would remain undetected. In addition, such programs can play a role in limiting the extent of an outbreak by providing an early indication of a problem so that control measures may be rapidly implemented. 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 utilizes hospital Emergency Department chief complaint logs to monitor for outbreaks. NYC also utilizes three systems for monitoring sales of anti-diarrheal medication. One tracks the weekly volume of sales of non-prescription anti-diarrheal medication at a major NYC drug store chain. An additional pharmacy system tracks daily sales of over-the-counter anti-diarrheal medications at another drug store chain (referred to as the OTC system). A third system tracks retail pharmacy data obtained from the National Retail Data Monitor (referred to as the NRDM system). All systems rely upon the voluntary participation of the institutions providing the syndromic data.

Nursing Home Sentinel Surveillance

The nursing home surveillance system began in March of 1997 and was modified significantly in 2002, at which time nine New York City nursing homes were participating. Under the current system, when a participating 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 DOHMH. Such an outbreak is defined as onset of diarrhea and/or vomiting involving 3 or more patients on a single ward/unit within a 7-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 bacterial culture and sensitivity, ova and parasites, *Cryptosporidium* and viruses. DOHMH Bureau of Communicable Disease staff facilitates transportation of the specimens to the City's Public Health Laboratory. Testing for culture and sensitivity, ova and parasites, and *Cryptosporidium* occurs at the Public Health Laboratory. If preliminary tests for bacteria and parasites are negative, specimens are sent to the New York State Department of Health laboratories for viral testing. All nine nursing homes are participating in the current system. As feedback, nursing homes are provided with copies of Waterborne Disease Risk Assessment Program semi-annual and annual reports.

From January through December 2004, one participating nursing home reported a GI outbreak. The outbreak began on December 30, and affected 7 residents and 5 staff members on 2 wards. The predominant symptom was vomiting, though there were also a few cases of diarrhea and fever. Stool specimens were collected from the 3 residents who were experiencing diarrhea. For all 3 residents, stool specimens were negative for ova and parasites, *Cryptosporidium,* bacterial pathogens, and calicivirus.

Clinical Laboratory Monitoring

The number of stool specimens submitted to clinical laboratories for bacterial and parasitic testing also provides information on gastrointestinal illness trends in the population. Participating laboratories transmit data by fax or by telephone report to DOHMH's Bureau of Communicable Disease indicating the number of stool specimens examined per day for: (a) bacterial culture and sensitivity, (b) ova and parasites, and (c) *Cryptosporidium.* Participation of two clinical laboratories (Laboratory A and Laboratory B) continued during 2004. A third clinical laboratory (Laboratory C), which had been participating in the Clinical Laboratory Monitoring system since 1995, discontinued business operations in March 2004.

Clinical Laboratory Monitoring results are reviewed upon receipt. Prior to August 2004, reviewers visually compared current results to previous data to assess whether current submissions appeared to be unusually high. Beginning in August 2004, DOHMH started implementation of a computer model to establish statistical cut-offs for significant increases in clinical laboratory submissions. The model uses the entire historical dataset, beginning November 1995 for Laboratory A and beginning January 1997 for Laboratory B. Sundays and holidays are removed because the laboratories do not test specimens on those days. Linear regression is used to adjust for average day-of-week and day-after holiday effects as certain days routinely have higher volumes than other days. The cumulative sums (CUSUM) method is applied to a two-week baseline to identify statistically significant aberrations (or "signals") in submissions for ova and parasites and for bacterial culture and sensitivity. CUSUM is a quality control method that has been adapted for aberration-detection in public health surveillance. (CUSUM is described further in: Hutwagner L., Maloney E., Bean N., Slutsker L., Martin S. Using Laboratory-Based Surveillance Data for Prevention: An Algorithm for Detecting *Salmonella* Outbreaks. *Emerging Infectious Diseases.* 1997; 3(3): 395-400.)

At Laboratory A, prior to the implementation of CUSUM to identify significant increases in stool specimen submissions, submissions appeared to be unusually high on 25 dates. From January 1 through February 11, there were seven dates on which there were increases in submissions for bacterial culture, ova and parasites, or *Cryptosporidium.* In each instance, increases were not sustained during the days immediately following the increase. During the period January 1 through February 11, a total of 608 ova and parasite specimens were tested for *Cryptosporidium*; 8 (1.3%) were positive.

From February 23 through March 30, there were a total of 16 dates on which there appeared to be an increase in stool specimen submissions at Laboratory A. For two dates, laboratorians reported that increases occurred because specimens were received from an affiliated laboratory due to understaffing at the affiliated facility. For three other dates during this period, Laboratory A reported no internal changes in business practice that would account for submission increases. From February 23 through March 30, 566 ova and parasite specimens were tested for *Cryptosporidium*; 4 (0.7%) were positive. Laboratory A reported that, despite increases in number of stool submissions for bacterial culture during this period, there were no increases in percent positive bacterial submissions. However, on March 22, Laboratory A reported that though there had not been an increase in percent positive submissions for bacterial cultures or parasitology submissions thus far for the month of March, there had been an increase in percent positive stool submissions for rotavirus at the Virology Division of the Laboratory. There were two additional dates during which there was an unusual increase in stool specimen submissions at Laboratory A: April 27 and June 15. On both occasions, the increase was not sustained.

At Laboratory A, following implementation of CUSUM, 4 signals for ova and parasite submissions and 4 signals for bacterial culture submissions were identified. Of the 8 total instances in which there were signals, 2 signals occurred on one day only, 5 signals were sustained for 2 consecutive working days (July 24-26, September 11-13, November 26-27, December 4-6, and December 16-17), and 1 signal was sustained for 3 consecutive working days (October 25-27). During the 4 periods when there were signals in ova and parasite submissions at Laboratory A, 77 ova and parasite specimens were tested for *Cryptosporidium*; no *Cryptosporidium*-positive specimens were identified.

At Laboratory B, prior to the implementation of CUSUM, there were seven instances in which submissions appeared to be unusually high. For all dates, increases were not sustained during the days immediately following the increase. DOHMH Bureau of Communicable Disease staff called Laboratory B in relation to three of the above dates. For one date, the laboratory reported that the increase in submissions may have been caused by transportation delays due to a snowstorm the previous day. For the other two dates, laboratorians reported that there were no internal changes in business practice that would account for submission increases.

Following implementation of CUSUM, there were 5 signals for ova and parasite submissions and 4 signals for bacterial culture submissions at Laboratory B. Of the 9 total instances in which there were signals, 2 signals occurred on one day only, 4 signals were sustained for 2 consecutive working days (July 2-3, July 9-10, August 30-31, and October 15-16), and 3 signals were sustained for 3 consecutive working days (July 27-29, August 10-12, and September 13-15). During the 5 periods when there were signals in ova and parasite submissions at Laboratory B, three ova and parasite specimens were tested for *Cryptosporidium,* and one was found to be positive.

At Laboratory C, for the period January 1 to March 26 (date of laboratory closure), there were no increases in stool submissions that appeared to be unusually high.

There was no evidence based on Clinical Laboratory Monitoring of an outbreak of cryptosporidiosis in 2004. The increase in percent positive rotavirus specimens at Laboratory A in March suggested that there was an increase in rotavirus in the community during that time period.

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. New York City now utilizes three systems for tracking ADM sales.

In the first 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. Weekly sales volume data (i.e., electronic point-of-sale data for loperamide and non-loperamide ADMs) 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. In 2004, no increases in weekly sales volume were observed above the general variability of the historical data.

In 2002, a new more comprehensive monitoring system for over-the-counter (OTC) drugstore sales was established with a second large pharmacy chain. The goal was to develop a system that would provide more timely and detailed data than the existing ADM tracking system. The new OTC system better serves bioterrorism surveillance since it also collects data on other medicines, especially for fever and flu. In August 2002 daily electronic transmission began. Each daily file contains data on an average of 6,000 prescription and 32,000 non-prescription medication sales. Routine daily analyses began in mid-December 2002. Drugs are categorized into key syndromes, and trends are analyzed for citywide increases in sales of anti-diarrhea and cold medications. The gastrointestinal (GI) category contains only non-prescription medications and includes generic and brand name loperamide-containing agents and bismuth subsalicylate agents.

From January 1 to December 31, 2004, the OTC system signaled for the gastrointestinal syndrome on five separate days, March 16, April 8, November 11, November 25 and December 25. No signal lasted more than one day. The signal on March 16 appeared to be due to a decrease in analgesic sales, which decreased the baseline for comparisons. The April 8 and November 11 signals did not correlate with sustained increases in any other syndromic system. The November 25 and December 25 signals occurred after a citywide increase in visits to emergency departments for the vomiting and diarrheal signals and were felt to be related to norovirus season (see below).

In May 2003, DOHMH began receiving daily data from a third tracking program, the National Retail Data Monitor (NRDM). This system, operated by the University of Pittsburgh, gathers retail pharmacy data from national chains for use in public health surveillance. The NRDM provides a daily file containing over-the-counter "stomach remedies" (bismuth subsalicylate, attapulgite, and loperamide) and electrolyte sales data from retail stores located in New York City. Citywide counts are adjusted for day-of-week variability and analyzed using the CUSUM method with a two-week baseline.

Results from the period from January 1 through December 31, 2004 showed an initial decrease in electrolyte sales during January that corresponded with declines in community-wide influenza A. A one-day signal in electrolyte sales occurred on January 28 that could not be explained by promotions and did not correspond with sustained increases in other syndromic systems. Electrolyte sales increased by 50% during February and March (peak rotavirus season). Sales of stomach remedies showed less marked seasonal variation, with a moderate increase in sales during the winter months and a decline to baseline during April and May. From November 7 through December 31, there were 8 signals for electrolyte sales, corresponding to the norovirus season and to increases in other syndromic systems. There were also two signals for stomach remedies, one from November 17-19 and one from December 23-24. Electrolyte sales in the past have correlated with norovirus, rotavirus and influenza season. Sales of stomach remedies have shown less marked seasonal variation, with a moderate increase in sales during the winter months and a decline to baseline during April and May.

Hospital Emergency Department Monitoring

DOHMH currently receives electronic data from 48 of New York City's 65 emergency departments (EDs), reporting 8500 visits per day, roughly 89% of ED visits citywide. Hospitals transmit electronic files each morning containing chief complaint and demographic information for patient visits during the previous 24 hours. Patients are classified into syndrome categories (the two syndromes for gastrointestinal illness are vomiting and diarrhea), and daily analyses are conducted to detect any unusual patterns. Data is analyzed for both citywide trends and spatial clusters within the city seven days a week. Temporal ("citywide") analyses assess whether the frequency of ED visits for the syndrome 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. Significant signals are defined as a probability of the clustering occurring fewer than 10 times out of 1000. (The system is described further in: Hefferman R., Mostashari F, Das D., Karpati A., Kulldorf M., Weiss D. Syndromic Surveillance in Public Health Practice, New York City. *Emerging Infectious Diseases*. 2004; 10(5): 858-864.)

From January 1, 2004 – December 31, 2004 there were 46 spatial signals (hospital or zip code) gastrointestinal signals. Fourteen of these signals were for vomiting and 32 were for diarrhea. There were 46 citywide signals, 22 for vomiting and 24 for diarrhea. No spatial signals persisted in the same place for two or more days. There were 11 citywide signals that were sustained for two or more days.

The first three sustained signals were citywide diarrhea signals that occurred February 16-19, February 22-23 and February 29-March 2. Simultaneously, there were citywide vomiting signals February 15-19 and Feb 22-23. To investigate these signals, DOHMH worked with a group of primary care clinics in an effort to obtain stool specimens from the community. Stool specimen collection kits were delivered to 5 clinics in Manhattan and the Bronx. Stool specimens were collected from 10 children and were sent to DOHMH Public Health Laboratory. Of those, 3 were tested for ova and parasites, including *Cryptosporidium*, 9 for culture and sensitivity, and 5 were sent to NYSDOH for viral testing. None of the specimens tested positive for bacterial pathogens or parasites. Four tested positive for calicivirus. This suggested that there was a citywide outbreak at the time of calicivirus and was consistent with the fact that there were simultaneous diarrhea and vomiting signals.

There were also sustained citywide diarrhea signals from November 20-24, December 12-13 and December 19-21. Simultaneously, there were citywide vomiting signals November 21-27 and December 18-21. In addition, a sustained citywide vomiting signal occurred December 25-27. Since DOHMH began ED surveillance three years ago, an increase in visits to EDs for vomiting and diarrhea beginning in November has been noted. This appears to be a seasonal trend and is most likely related to the winter norovirus season. The sustained citywide signals of November and December 2004 involved both vomiting and diarrhea which is consistent with norovirus, and two outbreaks investigated by DOHMH at the same time were determined to be caused by norovirus. The signals were attributed to norovirus and no additional investigation was done.

DOHMH surveillance data did not indicate an outbreak of cryptosporidiosis during periods when signals were detected in any of these syndromic surveillance systems.

PART III: INFORMATION SHARING AND PUBLIC EDUCATION

Information pertaining to New York City's Waterborne Disease Risk Assessment Program and related issues continues to be available on both the DEP and DOHMH websites, including results from the City's source water protozoa monitoring program. Documents on the websites include:

DOHMH Webpages:

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

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

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, 2001, 2002 and 2003 Waterborne Disease Risk Assessment Program's Annual Reports*
  http://www.nyc.gov/html/dep/html/wdrap.html

- *1997, 1998, 1999, 2000, 2001, 2002, 2003 and 2004 New York City Drinking Water Supply and Quality Statement*
  http://www.nyc.gov/html/dep/html/wsstate.html

Chart 1: Giardiasis by Month of Diagnosis, New York City, July 1993-December 2004

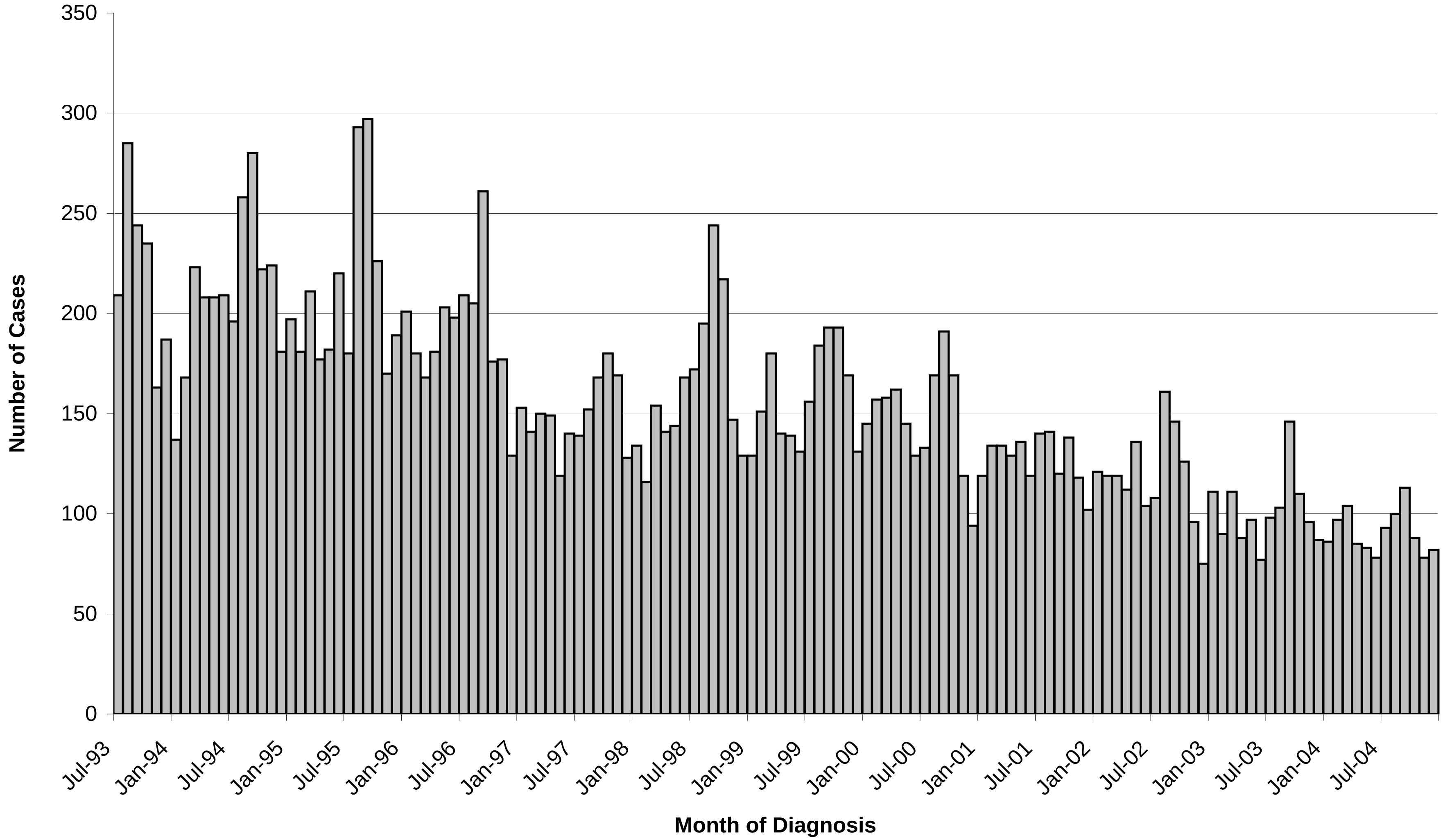
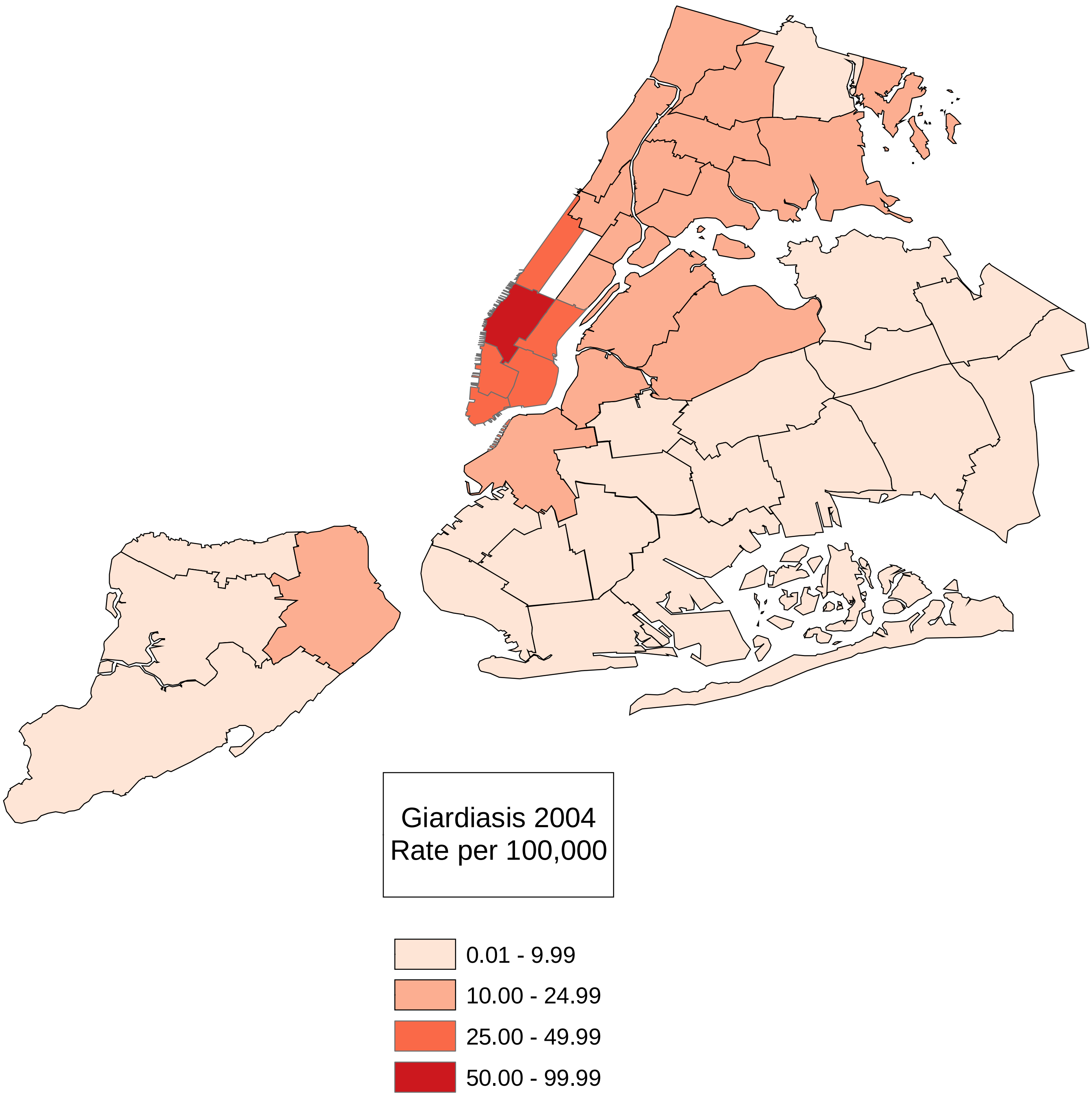


TABLE 2: Number of cases and annual case rate per 100,000 population by sex and borough of residence - Active surveillance for **giardiasis** in New York City (2004)

	Borough of residence					
Sex	Citywide number (rate)	Manhattan number (rate)	Bronx number (rate)	Brooklyn number (rate)	Queens number (rate)	Stat Is number (rate)
Male	742 (19.6)	350 (48.0)	107 (17.3)	149 (12.9)	116 (10.8)	20 (9.3)
Female	345 (8.2)	127 (15.7)	77 (10.8)	69 (5.3)	60 (5.2)	12 (5.2)
Unknown	0	0	0	0	0	0
Total	1087 (13.6)	477 (31.0)	184 (13.8)	218 (8.8)	176 (7.9)	32 (7.2)

Map 1

Giardiasis annual case rate per 100,000 population by UHF neighborhood - Active surveillance data for New York City (2004)



<u>Table 3:</u> Number of cases and annual case rate per 100,000 by UHF neighborhood of residence - Active surveillance for **giardiasis** in New York City (2004)

UHF Neighborhood	Borough	Number	Population	Rate
Chelsea-Clinton	Manhattan	100	122998	81.3
Greenwich Village-Soho	Manhattan	38	83709	45.4
Upper West Side	Manhattan	90	220706	40.8
Lower Manhattan	Manhattan	11	29266	37.6
Union Sq-Lower East Side	Manhattan	59	197138	29.9
Gramercy Park-Murray Hill	Manhattan	33	124468	26.5
High Bridge-Morrisania	Bronx	45	189755	23.7
Upper East Side	Manhattan	50	216441	23.1
Downtown-Heights-Slope	Brooklyn	49	214696	22.8
Washington Heights-Inwood	Manhattan	53	270677	19.6
Hunts Point-Mott Haven	Bronx	24	122875	19.5
Long Island City-Astoria	Queens	40	220960	18.1
C Harlem-Morningside Hgts	Manhattan	26	151113	17.2
Geenpoint	Brooklyn	20	124449	16.1
East Harlem	Manhattan	17	108092	15.7
Stapleton-St. George	Stat Is	18	116227	15.5
Crotona-Tremont	Bronx	28	199530	14.0
Kingsbridge-Riverdale	Bronx	12	88989	13.5
Pelham-Throgs Neck	Bronx	36	290052	12.4
Fordham-Bronx Park	Bronx	29	250491	11.6
West Queens	Queens	50	477516	10.5
Sunset Park	Brooklyn	12	120441	10.0
Borough Park	Brooklyn	30	324411	9.2
Ridgewood-Forest Hills	Queens	22	240901	9.1
Coney Island-Sheepshead Bay	Brooklyn	24	286901	8.4
Williamsburg-Bushwick	Brooklyn	16	194305	8.2
East New York	Brooklyn	14	173716	8.1
Fresh Meadows	Queens	7	93148	7.5
Flushing-Clearview	Queens	17	255542	6.7
Bed Stuyvesant-Crown Hgts	Brooklyn	20	317296	6.3
Willowbrook	Stat Is	5	84821	5.9
Bayside-Littleneck	Queens	5	88164	5.7
Canarsie-Flatlands	Brooklyn	11	197819	5.6
Southeast Queens	Queens	11	198846	5.5
Northeast Bronx	Bronx	10	185998	5.4
Bensonhurst-Bay Ridge	Brooklyn	10	194558	5.1
Port Richmond	Stat Is	3	62788	4.8
East Flatbush-Flatbush	Brooklyn	12	316734	3.8
Rockaway	Queens	4	106738	3.7
Southwest Queens	Queens	10	269952	3.7
Jamaica	Queens	10	285339	3.5
South Beach-Tottenville	Stat Is	6	179892	3.3

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 (2004)

	Sex			
Age group	Male number (rate)	Female number (rate)	Unknown	Total number (rate)
<5 years	72 (26.0)	68 (25.7)	0	140 (25.9)
5-9 years	80 (28.0)	57 (20.7)	0	137 (24.4)
10-19 years	52 (9.7)	40 (7.8)	0	92 (8.7)
20-44 years	373 (23.9)	105 (6.3)	0	478 (14.8)
45-59 years	120 (18.9)	56 (7.5)	0	176 (12.7)
≥ 60 years	44 (8.8)	18 (2.4)	0	62 (5.0)
Unknown	1	1	0	2
Total	742 (19.6)	345 (8.2)	0	1087 (13.6)

<u>TABLE 5</u>: 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 (2004)

	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	140 (25.9)	41 (53.9)	40 (36.5)	28 (15.3)	26 (18.2)	5 (16.8)
5-9 years	137 (24.4)	29 (39.5)	47 (39.2)	35 (18.5)	21 (14.4)	5 (15.2)
10-19 years	92 (8.7)	25 (17.3)	30 (14.4)	14 (3.9)	20 (7.2)	3 (4.9)
20-44 years	478 (14.8)	257 (36.2)	43 (8.4)	98 (10.4)	65 (7.2)	15 (9.1)
45-59 years	176 (12.7)	92 (32.4)	16 (7.8)	30 (7.3)	34 (8.6)	4 (4.6)
≥ 60 years	62 (5.0)	32 (12.8)	7 (3.9)	13 (3.4)	10 (2.7)	0
Unknown	2	1	1	0	0	0
Total	1087 (13.6)	477 (31.0)	184 (13.8)	218 (8.8)	176 (7.9)	32 (7.2)

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 (2004)*

	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	275 (12.7)	69 (16.5)	100 (15.5)	33 (6.8)	63 (11.3)	10 (18.7)
White non-Hispanic	418 (14.9)	257 (36.5)	15 (7.7)	85 (9.9)	50 (6.8)	11 (3.5)
Black non-Hispanic	104 (5.3)	33 (14.1)	27 (6.5)	33 (3.9)	8 (1.9)	3 (7.6)
Asian, Pac Islander, Amer Indian, Alaska Native	75 (9.4)	20 (13.7)	8 (18.8)	15 (7.9)	32 (8.1)	0
Unknown	215	98	34	52	23	8
Total	1087 (13.6)	477 (31.0)	184 (13.8)	218 (8.8)	176 (7.9)	32 (7.2)

* 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 (2004)*

Race/ ethnicity	Age group < 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	46 (24.8)	59 (30.0)	48 (13.7)	83 (9.2)	24 (7.6)	15 (7.3)	0	275 (12.7)
White non-Hispanic	33 (24.6)	15 (12.0)	10 (4.0)	219 (20.4)	110 (20.0)	30 (4.5)	1	418 (14.9)
Black non-Hispanic	11 (7.5)	10 (6.0)	13 (4.1)	51 (6.8)	12 (3.6)	7 (2.7)	0	104 (5.3)
Asian, Pac. Is., Amer. Indian, Alaska Native	25 (49.8)	18 (36.2)	9 (9.3)	19 (5.1)	4 (2.8)	0	0	75 (9.4)
Unknown	25	35	12	106	26	10	1	215
Total	140 (25.9)	137 (24.4)	92 (8.7)	478 (14.8)	176 (12.7)	62 (5.0)	2	1087 (13.6)

* 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 2004

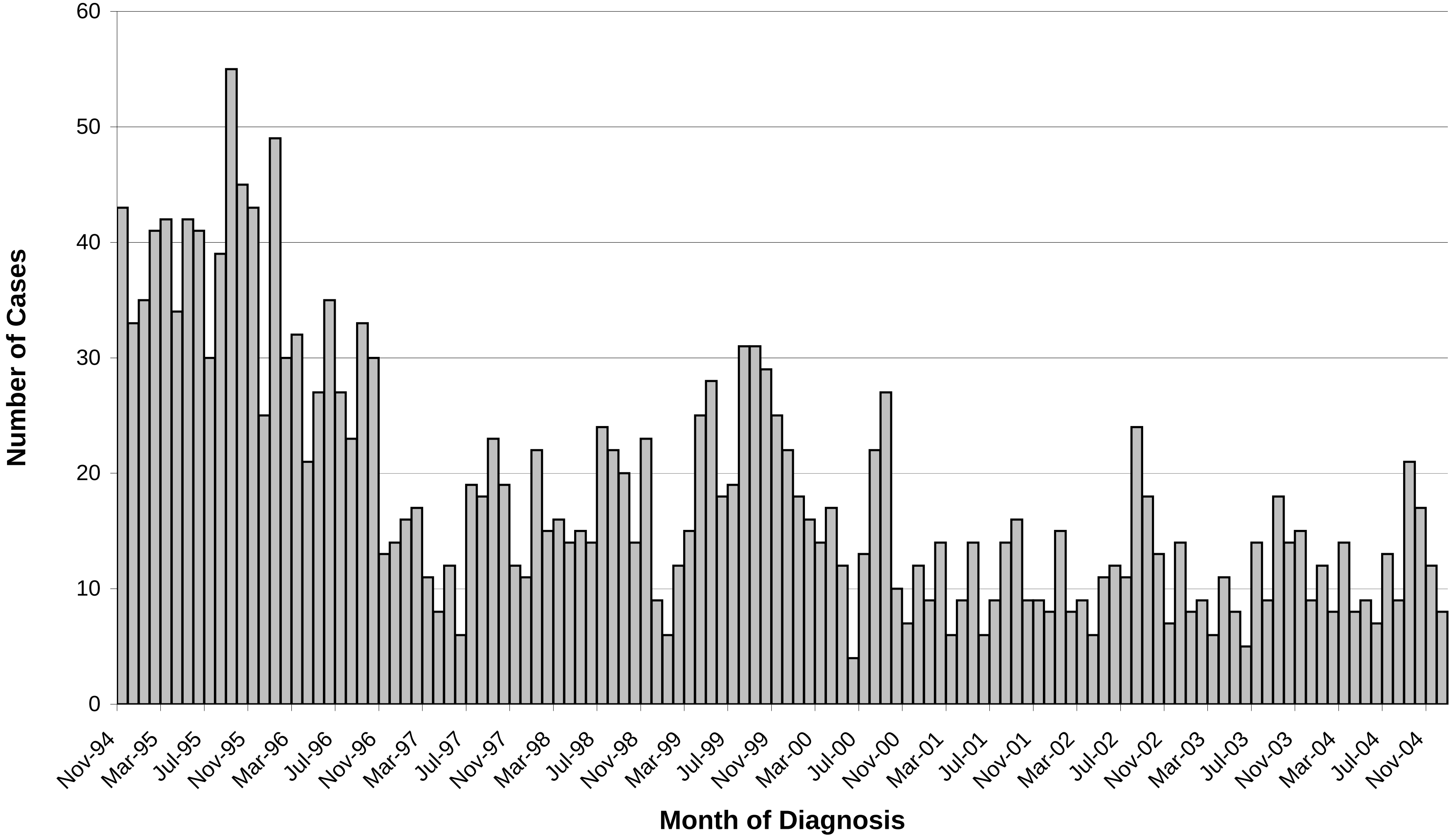
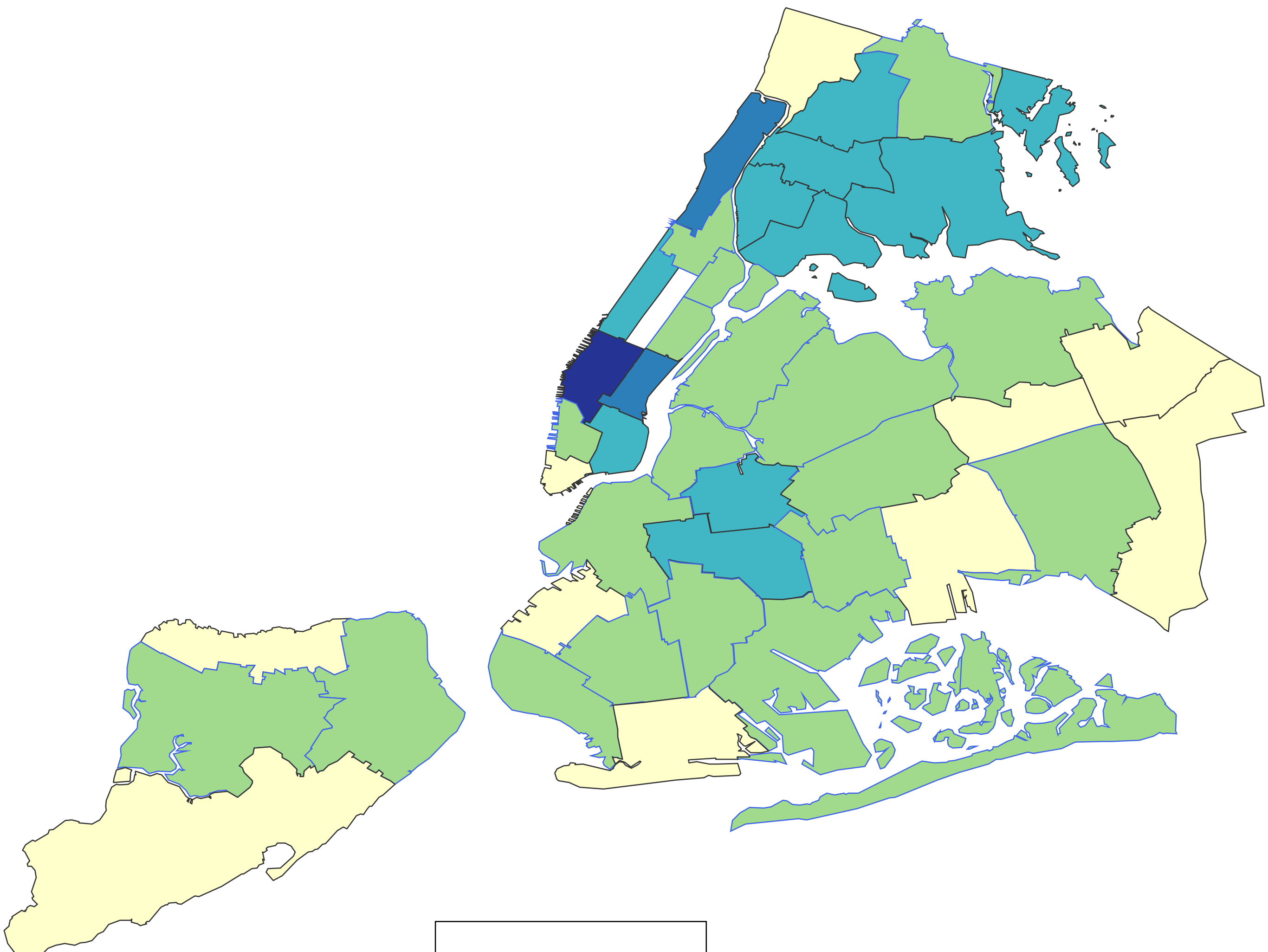


TABLE 9: Number of cases and annual case rate per 100,000 population by sex and borough of residence - Active surveillance for **cryptosporidiosis** in New York City (2004)

	Borough of residence					
Sex	Citywide number (rate)	Manhattan number (rate)	Bronx number (rate)	Brooklyn number (rate)	Queens number (rate)	Stat Is number (rate)
Male	112 (3.0)	47 (6.4)	24 (3.9)	26 (2.2)	13 (1.2)	2 (0.9)
Female	26 (0.6)	5.0 (0.6)	10 (1.4)	7 (0.5)	3 (0.3)	1 (0.4)
Total	138 (1.7)	52 (3.4)	34 (2.6)	33 (1.3)	16 (0.7)	3 (0.7)

Map 2

Cryptosporidiosis annual case rate per 100,000 population by UHF neighborhood - Active surveillance data for New York City (2004)



Cryptosporidiosis
2004
Rate per 100,000

(light yellow)	0
(light green)	0.01 - 1.99
(teal)	2.00 - 3.99
(blue)	4.00 - 5.99
(dark blue)	> 5.99

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 (2004)

UHF Neighborhood	Borough	Number	Population	Rate
Chelsea-Clinton	Manhattan	15	122998	12.2
Washington Heights-Inwood	Manhattan	11	270677	4.1
Gramercy Park-Murray Hill	Manhattan	5	124468	4.0
Fordham-Bronx Park	Bronx	9	250491	3.6
Union Sq-Lower East Side	Manhattan	7	197138	3.6
Crotona-Tremont	Bronx	7	199530	3.5
Upper West Side	Manhattan	7	220706	3.2
High Bridge-Morrisania	Bronx	6	189755	3.2
Bed Stuyvesant-Crown Hgts	Brooklyn	10	317296	3.2
Hunts Point-Mott Haven	Bronx	3	122875	2.4
Pelham-Throgs Neck	Bronx	7	290052	2.4
Williamsburg-Bushwick	Brooklyn	4	194305	2.1
C Harlem-Morningside Hgts	Manhattan	3	151113	2.0
Rockaway	Queens	2	106738	1.9
East Harlem	Manhattan	2	108092	1.9
East New York	Brooklyn	3	173716	1.7
Stapleton-St. George	Stat Is	2	116227	1.7
Greenpoint	Brooklyn	2	124449	1.6
East Flatbush-Flatbush	Brooklyn	5	316734	1.6
Jamaica	Queens	4	285339	1.4
Downtown-Heights-Slope	Brooklyn	3	214696	1.4
Long Island City-Astoria	Queens	3	220960	1.4
Greenwich Village-Soho	Manhattan	1	83709	1.2
Willowbrook	Stat Is	1	84821	1.2
Northeast Bronx	Bronx	2	185998	1.1
Canarsie-Flatlands	Brooklyn	2	197819	1.0
Borough Park	Brooklyn	3	324411	0.9
West Queens	Queens	4	477516	0.8
Ridgewood-Forest Hills	Queens	2	240901	0.8
Bensonhurst-Bay Ridge	Brooklyn	1	194558	0.5
Upper East Side	Manhattan	1	216441	0.5
Flushing-Clearview	Queens	1	255542	0.4

<u>TABLE 11:</u> Number of cases and annual case rate per 100,000 population by age group and sex - Active surveillance for **cryptosporidiosis** in New York City (2004)

	Sex		
Age group	Male number (rate)	Female number (rate)	Total number (rate)
<5 years	5 (1.8)	1 (0.4)	6 (1.1)
5-9 years	3 (1.0)	6 (2.2)	9 (1.6)
10-19 years	4 (0.7)	6 (1.2)	10 (1.0)
20-44 years	71 (4.6)	9 (0.5)	80 (2.5)
45-59 years	26 (4.1)	3 (0.4)	29 (2.1)
≥ 60 years	3 (0.6)	1 (0.1)	4 (0.3)
Total	112 (3.0)	26 (0.6)	138 (1.7)

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 (2004)

	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	6 (1.1)	2 (2.6)	2 (1.8)	1 (0.5)	1 (0.7)	0
5-9 years	9 (1.6)	3 (4.1)	4 (3.3)	1 (0.5)	0	1 (3.0)
10-19 years	10 (1.0)	2 (1.4)	2 (1.0)	2 (0.6)	3 (1.1)	1 (1.6)
20-44 years	80 (2.5)	30 (4.2)	18 (3.5)	21 (2.2)	10 (1.1)	1 (0.6)
45-59 years	29 (2.1)	13 (4.6)	8 (3.9)	6 (1.5)	2 (0.5)	0
≥ 60 years	4 (0.3)	2 (0.8)	0	2 (0.5)	0	0
Total	138 (1.7)	52 (3.4)	34 (2.6)	33 (1.3)	16 (0.7)	3 (0.7)

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 (2004)*

	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	47 (2.2)	15 (3.6)	14 (2.2)	10 (2.0)	6 (1.1)	2 (3.7)
White non-Hispanic	32 (1.1)	24 (3.4)	3 (1.5)	2 (0.2)	3 (0.4)	0
Black non-Hispanic	52 (2.7)	12 (5.1)	15 (3.6)	19 (2.2)	5 (1.2)	1 (2.5)
Asian, Pac Islander, Amer Indian, Alaska Native	7 (0.9)	1 (0.7)	2 (4.7)	2 (1.1)	2 (0.5)	0
Total	138 (1.7)	52 (3.4)	34 (2.6)	33 (1.3)	16 (0.7)	3 (0.7)

* 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.

<u>TABLE 14</u>: 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 (2004)

	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	3 (1.6)	6 (3.0)	6 (1.7)	26 (2.9)	4 (1.3)	2 (1.0)	47 (2.2)
White non-Hispanic	0	0	0	19 (1.8)	12 (2.2)	1 (0.1)	32 (1.1)
Black non-Hispanic	0	2 (1.2)	3 (1.0)	33 (4.4)	13 (3.9)	1 (0.4)	52 (2.7)
Asian, Pac Islander, Amer. Indian, Alaska Native	3 (6.0)	1 (2.0)	1 (1.0)	2 (0.6)	0	0	7 (0.9)
Total	6 (1.1)	9 (1.6)	10 (1.0)	80 (2.5)	29 (2.1)	4 (0.3)	138 (1.7)

* 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 3: Cryptosporidiosis Among Persons Living with HIV/AIDS by Month of Diagnosis, New York City, January 1995-December 2004

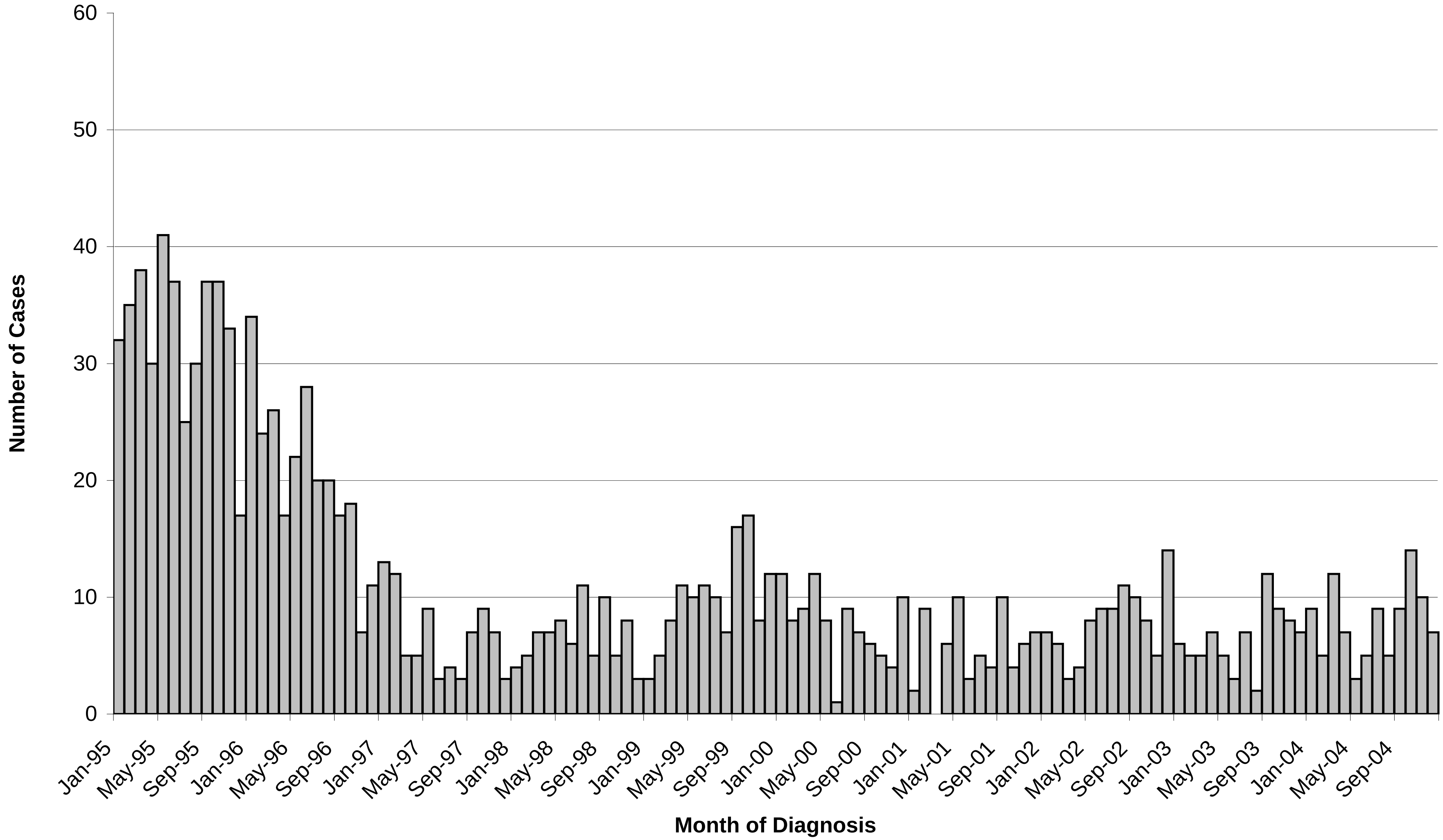


Chart 4: Cryptosporidiosis Among Immunocompetent Persons by Month of Diagnosis, New York City, January 1995-December 2004

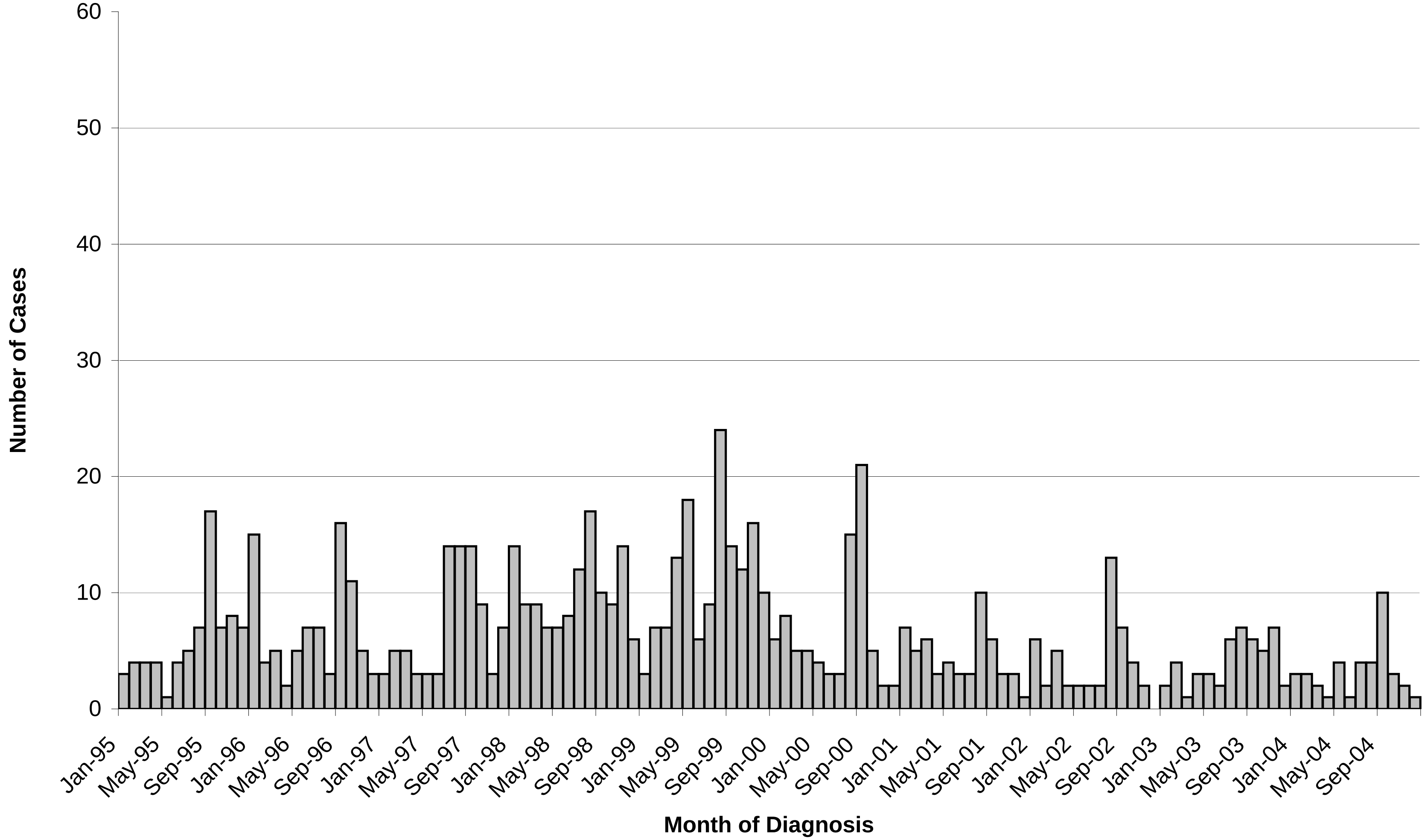


Table 16: Percentage of Interviewed **Cryptosporidiosis** Case-Patients Reporting Selected Potential Risk Exposures in the Month Before Disease Onset, by Immune Status, New York City, 1995-2004.

Exposure Type	HIV/AIDS										Immunocompetent									
	1995	1996	1997	1998	1999	2000*	2001	2002	2003	2004	1995	1996	1997	1998	1999	2000*	2001	2002	2003	2004
Contact with an Animal[a]	35%	35%	33%	36%	35%	43%	23%	42%	40%	31%	42%	41%	41%	32%	35%	26%	37%	35%	23%	34%
High-risk Sexual Activity[b] (≥ 18 years old)	22%	22%	9%	15%	20%	25%	15%	23%	24%	34%	16%	25%	12%	10%	12%	23%	15%	30%	13%	31%
International Travel[c]	9%	9%	9%	13%	18%	14%	10%	11%	13%	15%	30%	29%	26%	28%	28%	40%	47%	33%	45%	47%
Recreational Water Contact[d]	16%	8%	16%	12%	16%	15%	8%	10%	21%	13%	21%	27%	40%	24%	22%	32%	35%	35%	34%	33%

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 1995-2004 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 (1997-2004).

[b] High-risk Sexual Activity - Includes having a penis, finger or tongue in sexual partner's anus (1995-2004).

[c] International Travel - Travel outside the United States (1995-2004).

[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 (1997-2004).

* 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 1995-2004.

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%
2003	77%	13%	4%	4%	2%	36%	36%	2%	16%	9%
2004	49%	21%	6%	15%	5%	27%	30%	7%	13%	21%

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 1995-2004 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 (5/11/2001-12/31/2004).

[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 (5/11/2001-12/31/2004).

[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 (5/11/2001-12/31/2004).

[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 (1997-2004)

[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 (1997-2004).

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