New York City Department of Health and Mental Hygiene
Bureau of Communicable Disease
&
New York City Department of Environmental Protection
Bureau of Water Supply

Waterborne Disease Risk Assessment Program

14th Semi-Annual Report (for January – June 2011)

August 31, 2011

Prepared in accordance with the United States Environmental Protection Agency Filtration Avoidance Determination

Prepared by:
Sharon Balter, M.D. - DOHMH
Daniel Cimini, R.N., C.P.H. - DOHMH
Lisa Alleyne, M.P.A. - DOHMH
Anne Seeley, M.P.H. - DEP

With: David Lipsky, Trang Nguyen, Marc Paladini, and other members of the Waterborne Disease Risk Assessment Program Team

THE WATERBORNE DISEASE RISK ASSESSMENT PROGRAM TEAM

The Waterborne Disease Risk Assessment Program (WDRAP) is an interagency program involving the New York City Departments of Environmental Protection and Health and Mental Hygiene.

- **New York City Department of Health and Mental Hygiene (DOHMH)**
  Bureau of Communicable Disease (BCD)
  42-09 28th Street, CN-22A, Queens, NY 11101-4132

Marcelle Layton, M.D., Assistant Commissioner
Don Weiss, M.D., M.P.H., Medical Director, Surveillance & Data Analysis Unit
Sharon Balter, M.D., Medical Director (*WDRAP Coordinator for DOHMH)*
Daniel Cimini, R.N., C.P.H., City Research Scientist (*WDRAP Asst. Coordinator)*
Lisa Alleyne, M.P.A., Public Health Epidemiologist

Bureau of Communicable Disease:
Erlinda Amoroso, Michael Antwi, Fazlul Chowdhury, Paula Del Rosso, Marie Dorsinville, Jennifer Hsieh, Muhammad Iftekharuddin, Lucretia Jones, Nimi Kadar, Lan Li, Yin Ling Leung, Michelle Middleton, Ann Murray, Trang Nguyen, Daniel Osuagwu, Marc Paladini, Jose Poy, Anna Smorodina, Rajmohan Sunkara

- **New York City Department of Environmental Protection (DEP)**
  Bureau of Water Supply
  59-17 Junction Blvd., 20th Floor, Flushing, NY 11373-5108.

David Lipsky, Ph.D., Chief, Distribution Water Quality Science & Research Division
Anne Seeley, M.P.H., Section Chief, Health Assessment & Policy Coordination (*WDRAP Coordinator for DEP)*

==========

Additional copies of WDRAP reports are available from Anne Seeley at the DEP address listed above, by phone (718-595-5346), or E-mail: aseeley@dep.nyc.gov

Copies of the questionnaires used for disease surveillance are available from Daniel Cimini at the DOHMH address listed above, by phone (347-396-2623), or E-mail: dcimini@health.nyc.gov.

The authors wish to acknowledge the dedication of the other members of the Waterborne Disease Risk Assessment Program Team, and the assistance of Kathleen Czarnogorski (DEP), Neeraja Nalamothu (DEP), Fran Guerriero (DEP), and Giselle Merizalde (DOHMH).

WATERBORNE DISEASE RISK ASSESSMENT PROGRAM -- SEMI-ANNUAL REPORT (JANUARY – JUNE 2011)

PART I: SURVEILLANCE FOR GIARDIASIS AND CRYPTOSPORIDIOSIS

Introduction

Under the Waterborne Disease Risk Assessment Program, New York City established active surveillance for giardiasis and cryptosporidiosis to ensure complete reporting of all laboratory-diagnosed cases of these potentially waterborne illnesses. Active laboratory surveillance, involving regular visits to or telephone contact with parasitology laboratories by DOHMH staff members, began in July 1993 for giardiasis and in November 1994 for cryptosporidiosis. (Adoption of a New York City Health Code amendment by the New York City Board of Health on November 16, 1993 made cryptosporidiosis a reportable disease in New York City, effective January 3, 1994.) Active surveillance for giardiasis and cryptosporidiosis continued in New York City through 2010.

As reported in the WDRAP 2010 Annual Report, in January 2011 active laboratory surveillance for giardiasis and cryptosporidiosis was discontinued, as it has been replaced by an electronic reporting system. The decision to discontinue active laboratory surveillance was based on the following reasons. By January 2011 almost all NYC clinical laboratories were fully enrolled in the Electronic Clinical Laboratory Reporting System (ECLRS), which was developed in order to ensure complete and rapid reporting of conditions such as giardiasis and cryptosporidiosis. Electronically reported health data is more complete than paper-based systems, and more timely than active surveillance. Laboratories no longer maintain paper log books since all testing data is stored in computers; therefore active surveillance was no longer necessary since there are no log books to examine, and laboratories were simply printing out giardiasis and cryptosporidiosis disease reports for the DOHMH staff members, often the same disease reports that were transferred to DOHMH through ECLRS. We do not anticipate that this change in surveillance will have a significant impact on the program or the completeness or quality of giardiasis and cryptosporidiosis surveillance data.

Interviews of persons with giardiasis were routinely conducted through July 1995. Interviews of cryptosporidiosis case-patients have been conducted from January 1995 to the present. For all cryptosporidiosis cases, and as needed for giardiasis cases, public health epidemiologists contact case-patients to verify the data collected on the case report, to collect additional demographic and clinical information, and to identify possible sources of exposure.

Part I of this report presents highlights from NYC's parasitic disease surveillance program. Further details can be found in the tables and figures, which appear at the end of the report. Additional data will be provided in the Annual Report. For this report the population denominators used to calculate rates were obtained utilizing intercensal population estimates. For the years 1994 through 1999, intercensal population estimates per year were used based upon linear interpolation between the 1990 and 2000 US Census.[1] For the years 2000 through 2009,

[1] See http://sasebiweb100.health.dohmh.nycnet/EpiQuery/Census/index.html

intercensal population estimates per year were used from data produced by DOHMH based on the US Census Bureau Population Estimate Program, and housing unit data obtained from the NYC Department of City Planning.[2] Because complete data from the recent 2010 Census are not yet available, for the years 2010 and 2011, the year 2009 intercensal population estimate was used. Intercensal population estimates will be updated in the 2011 Annual Report, by which time data obtained from the 2010 Census will be available. Because rates for the years 2000 through 2011 were calculated for this report using intercensal population estimates, they may differ from previously reported rates based on year 2000 US Census data. Other variations in data between this report and previous reports may be due to factors such as disease reporting delays, correction of errors, and refinements in data processing (for example, the removal of duplicate disease reports). All rates reported in the current report are semi-annual case rates. Caution must be exercised when interpreting rates based on small case numbers. This report provides data on cases diagnosed between January 1, 2011 and June 30, 2011. All data for 2011 in this report should be considered preliminary.

Year 2000 US Census data included two race/ethnicity categories which had not been used in DOHMH disease surveillance data at that time. These race/ethnicity categories were: "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." When determining intercensal estimates since 2000, the US Census Bureau Population Estimate Program retained the race/ethnicity category "Non-Hispanic of Two or More Races" but did not include the category "Non-Hispanic of Single Race, other than White, Black/African American, Asian, Pacific Islander, American Indian and Alaskan Native." In this report, race/ethnicity-specific case rates are based upon intercensal population estimates and include the race/ethnicity categories used by the US Census Bureau Population Estimate Program.

For presentation of geographic data, the 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 semi-annual rates by UHF neighborhoods are included in this report.

Surveillance for Giardiasis (January – June 2011, preliminary data)

A total of 462 giardiasis cases were diagnosed among NYC residents in the first half of 2011, for a semi-annual rate of 5.5 per 100,000 population. Data for the first half of 2011 and for the first half of earlier years are presented in Table 1. The number of cases diagnosed each month for the period July 1993 through June 2011 is indicated in Figure 1. Since September 1995, case investigations for giardiasis are conducted only for case-patients who are in a secondary transmission risk category (e.g., food handler, health care worker, child attending day care, or day care worker). Investigations have been completed for all such giardiasis cases diagnosed during the first half of 2011.

[2] See http://sasebiweb100.health.dohmh.nycnet/EpiQuery/Census/index2001.html

Sex
Information regarding sex was available for all 462 cases of giardiasis. The number and rate of giardiasis cases were higher in males than females, with 299 males (7.5 cases per 100,000) and 163 females (3.7 cases per 100,000) reported (Table 2).

Borough of case-patient residence
The borough in which case-patients resided was known for all 462 giardiasis case-patients who were reported as residing in New York City. Manhattan had the highest borough-specific case rate (11.2 cases per 100,000) (Table 3). The highest UHF neighborhood-specific case rate was in Chelsea-Clinton in Manhattan (28.7 cases per 100,000) (Map 1 and Table 4).

Age
Information regarding age was available for all 462 cases of giardiasis. The highest age group-specific case rate was among children less than 5 years old (10.5 cases per 100,000) (Table 5).

Race/Ethnicity
Information regarding race/ethnicity was available for 77 of 462 cases (17%). Ascertainment of race/ethnicity status for giardiasis cases was poor. Giardiasis case-patients are not routinely interviewed unless they are reported as being in occupations or settings that put them at increased risk for secondary transmission, as noted above. For the majority of giardiasis cases, race/ethnicity information, when provided, is not based upon self-report, but rather upon the impressions of health care providers, which may be inaccurate. For this reason, and because race/ethnicity information was missing from most giardiasis disease reports, race/ethnicity findings pertaining to giardiasis cases diagnosed in the first half of 2011 are not presented in this report.

Surveillance for Cryptosporidiosis (January – June 2011, preliminary data)

A total of 37 cryptosporidiosis cases were diagnosed among NYC residents in the first half of 2011, for a semi-annual case rate of 0.4 per 100,000 population. Data for the first half of 2011 and for the first half of earlier years are presented in Table 6. Case-patient interviews, health care provider interviews, or chart reviews have been completed for 35 of 37 patients diagnosed during the first half of 2011 (95%). The number of cases diagnosed each month for the period November 1994 through June 2011 is indicated in Figure 2. Because diagnosis may occur some time after onset, information is collected in the interview regarding the date of onset of symptoms. The date of onset can be used more accurately than date of diagnosis to estimate when case-patients most likely were exposed to *Cryptosporidium*. The number of cryptosporidiosis cases by month of onset for the period January 1995 through June 2011 is presented in Figure 3.

Sex
Information on sex was available for all 37 cases of cryptosporidiosis. The number and rate of cryptosporidiosis cases were higher in males than females, with 25 males (0.6 cases per 100,000) and 12 females (0.3 cases per 100,000) reported (Table 7).

Borough of case-patient residence

Borough of case-patient residence was known for all cryptosporidiosis case-patients. Manhattan had the largest number of cases and case rate (17 cases, with a rate of 1.0 per 100,000) (Table 8). The highest UHF neighborhood-specific case rate was found in Central Harlem-Morningside Heights in Manhattan (3.6 cases per 100,000). The next highest UHF neighborhood-specific case rate occurred in Chelsea-Clinton (2.1 cases per 100,000) (Map 2 and Table 9).

Age

Information regarding age was available for all cases. The highest age group-specific case rate occurred among adults 20 – 44 years old (case rate 0.6 per 100,000). The next highest age group-specific case rates occurred among children less than five years old and persons 45 to 59 years old (case rate 0.5 per 100,000 in both age groups) (Table 10).

Race/Ethnicity

Race/ethnicity information was available for 35 of 37 cases (95%). Of the case-patients for whom race/ethnicity information was available, the highest racial/ethnic group-specific case rate occurred among non-Hispanics of two or more races (2.9 cases per 100,000); however, there were only three cases in this race/ethnicity group. The largest number of cases occurred among Hispanics (13 cases, with a rate of 0.6 per 100,000), and White non-Hispanics (11 cases, with a rate of 0.4 per 100,000) (Table 11).

PART II: SYNDROMIC SURVEILLANCE/OUTBREAK DETECTION

Introduction

The tracking of sentinel populations or surrogate indicators of disease ("syndromic surveillance") can be useful in assessing gastrointestinal (GI) disease trends in the general population. Such tracking programs provide greater assurance against the possibility that a citywide outbreak would remain undetected. In addition, such programs can potentially 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 monitors the number of stool specimens submitted to participating clinical laboratories for microbiological testing, and a third system utilizes hospital emergency department (ED) chief complaint logs to monitor for outbreaks. The City also utilizes two separate systems for monitoring sales of anti-diarrheal medications: one system is known as the ADM system and the other as the OTC system. All of NYC's syndromic surveillance systems rely upon the voluntary participation of the institutions providing the syndromic data. A summary of syndromic surveillance findings pertaining to GI illness for the first half of 2011 is provided in the final section of this part, on pages 9-10.

Program Components – Overviews and Updates

A. Nursing Home Sentinel Surveillance

The nursing home surveillance system began in March of 1997 and was significantly modified in August of 2002. Under the current protocol, when a participating nursing home notes an outbreak of gastrointestinal illness that is legally reportable to the New York State Department of Health (NYSDOH), the nursing home also notifies designated WDRAP team members working in the DOHMH BCD. 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 bacterial culture and sensitivity, ova and parasites, *Cryptosporidium,* viruses, and *Clostridium difficile* toxin testing. Though *C. difficile* is not a waterborne pathogen, *C. difficile* toxin testing was added in April 2010 in order to address a need expressed by infection control practitioners in the nursing homes, and was intended to help ensure compliance with the sentinel nursing home protocol.

DOHMH BCD staff facilitates transportation of stool specimens to the City's Public Health Laboratory. Testing for culture and sensitivity occurs at the Public Health Laboratory. On May 1, 2011 the DOHMH Public Health Laboratory discontinued parasitology testing. Specimens for ova and parasites and *Cryptosporidium*, as well as for viruses and *C. difficile* toxin testing, are currently being sent to the NYSDOH Wadsworth Center. There are eight nursing homes participating in the program. Three are in Manhattan, two are in the Bronx, two are in Queens, and one is in Brooklyn. As feedback for their role in outbreak detection, participating nursing homes are provided with copies of the Waterborne Disease Risk Assessment Program semi-annual and annual reports.

B. 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. In March 2010, one of the two clinical laboratories that were participating in the program discontinued operations. Clinical Laboratory Monitoring stool specimen submission data which previously would have been received from that laboratory is now included in data received from the laboratory that continued to participate in the program in 2010 and throughout the period of this report. That laboratory ("Laboratory A") transmits data by fax transmission to DOHMH BCD daily to three times per week, indicating the number of stool specimens examined per day for: (a) bacterial culture and sensitivity, (b) ova and parasites, and (c) *Cryptosporidium.*

Clinical Laboratory Monitoring results are reviewed upon receipt. 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, that is, since November 1995 for Laboratory A. Sundays and holidays are removed because the laboratory does 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.)

C. Anti-Diarrheal Medication Monitoring

The tracking of sales of anti-diarrheal medications is a potentially useful source of information about the level of diarrheal illness in the community. NYC began tracking anti-diarrheal drug sales as a public health indicator in 1995.[3] Modifications to NYC's anti-diarrheal surveillance program have been made over the years, and in 2002 NYC's program was enhanced by two additional drug-tracking systems, the OTC system and the National Retail Data Monitor (NRDM) system. Participation of DOHMH in the NRDM system was discontinued in November 2007. Currently NYC utilizes two separate systems to monitor sales of anti-diarrheal medications: the ADM system and the OTC system. (NOTE: the program names "ADM" and "OTC" are abbreviations for "Anti-diarrheal Medications" and "Over-the-Counter." Both systems involve the tracking of over-the-counter or non-prescription anti-diarrheal medications, but the program names were chosen simply as a way to distinguish the two systems.)

The ADM System

In 1996, NYC's ADM system was established; utilizing volume-of-sales information of non-prescription anti-diarrheal medications obtained weekly from a major store chain. As discussed in previous WDRAP reports, a number of significant enhancements have been made to DEP's ADM program since that time. In March 2010, DEP implemented an enhanced ADM system as a pilot program. The pilot program is still in operation and includes the following features: (a) ADM data is received in digital format on a daily basis; (b) More products and more stores are included; (c) Health and Beauty products sales volume data is now utilized in the analysis in an effort to "normalize" the data (e.g., to help account for changing store traffic on different days of the week); (d) Data on promotional sales vs. non-promotional sales is provided directly by the data provider; and (e) CDC's Early Aberration Reporting System (EARS) is used for analysis of signals. EARS uses three aberration detection methods which are based on a one-sided positive CUSUM calculation. Data is analyzed in terms of citywide sales and sales by borough.

During the period of January 1 to June 30, 2011, the ADM system experienced some data analysis and reporting delays. Delays were due to program resource limitations. DEP and DOHMH are working together, and with the data provider, to explore potential options to improve ADM system operation and to possibly enhance data analysis.

[3] The first NYC anti-diarrheal tracking system, involving data from a regional distributor serving independent pharmacies, was implemented in 1995. This system was discontinued in 2000 due to a diminishing data stream. This summary of NYC antidiarrheal medication monitoring programs therefore begins with discussion of the ADM system which was implemented in 1996 and is ongoing.

The OTC System

The second of the currently operating drug monitoring systems, the OTC system, was started in 2002 by DOHMH. This system involves the monitoring of anti-diarrheal medication sales at a second large store chain. In developing the OTC system, the goal was to develop a system that would provide more timely and detailed data than the ADM tracking system in place at the time. Also, the OTC system collects data on other medicines, including fever and allergy medications, for broader bioterrorism and emerging infectious disease surveillance purposes. Each daily electronic file contains data for, on average, 32,000 non-prescription medication sales. A separate file is also sent daily by the same data provider which contains 7,100 prescription medication sales. However, the prescription medications have not been found to be as useful as the non-prescription medications for monitoring diarrheal illness in the OTC system, and therefore sales data of prescription anti-diarrheal medications are not routinely analyzed. Routine daily analyses began in mid-December 2002. Drugs are categorized into key syndromes, and trends are analyzed for citywide increases in sales of non-prescription anti-diarrheal medications. The gastrointestinal category includes generic and brand name loperamide-containing agents and bismuth subsalicylate agents.

On August 22, 2011, DOHMH noted that there had been a decrease in the number of stores reporting medication sales in the OTC system. Further investigation indicated that the decrease resulted from a disruption in data transmission that occurred because the store chain that submits the data is undergoing a revision to their data systems, and stores within the chain are being gradually moved over to the new system. As stores are added to the new system they temporarily drop from OTC data transmission until the store chain data supplier refeeds the store data to DOHMH. DOHMH had expected that there would be advance notification of this disruption in data transmission, but there was not. Investigation of the data suggests the decrease began gradually in mid-June. DOHMH is following up with the supplier to determine exactly when the decrease in reporting began and when the data migration will be complete and all of the data restored. This change affected the ability of the OTC system to detect signals in anti-diarrheal medication sales starting approximately in mid-June.

D. Emergency Department System

NYC initiated monitoring of hospital emergency department visits as a public health surveillance system in 2001. At the start of 2011, DOHMH received electronic data from 49 of New York City's 54 EDs. By June 30, 2011, the same number of EDs (49 of 54) operating in NYC were participating in ED syndromic surveillance, reporting approximately 11,000 visits per day, roughly 95% of all 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, and daily analyses are conducted to detect any unusual patterns, or signals. The two syndromes used to track gastrointestinal illness are vomiting syndrome and diarrhea syndrome. 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. Spatial analyses scan the data for geographic clustering in syndrome visits on the most recent day compared to the previous 14 days. Clustering is examined by both hospital location and residential zip code. Statistical significance is based on Monte Carlo probability estimates that adjust for the multiple comparisons inherent in examining

many candidate clusters each day. The threshold of significance for citywide and spatial signals was set at $P<.01$, indicating that fewer than 1 out of every 100 analyses would generate a cluster due to chance alone. Beginning March 11, 2005, the threshold of significance for spatial signals was changed to $P<.005$, while the threshold of significance for citywide signals remained at $P<.01$. (The system is described further in: Heffernan 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.)

Findings: Summary of Syndromic Surveillance Signals

Syndromic surveillance signals alone cannot be used to determine etiologic diagnoses. Also, experience has shown that most signals, especially localized spatial signals in the emergency department system or signals in the laboratory or OTC systems, may be statistical aberrations and not related to public health events. The systems are therefore used in concert. A signal in one system is compared to other systems to see whether or not there are concurrent signals. In this report we present a summary of GI disease signals from NYC's syndromic surveillance systems in three figures: Figures 4, 5, and 6. Figures 4 and 5 summarize ED system trends and signals. Figure 6 is a summary of signal results from the syndromic surveillance systems operated by DOHMH and DEP during this reporting period.

Figure 4 shows a graphic representation of the ratio of daily ED visits for the vomiting syndrome to all other daily ED visits for syndromes not tracked by ED syndromic surveillance ("other visits") from January 1 to June 30, 2011. The graph also includes an indication of citywide signals and of the spatial residential zipcode and hospital signals. Figure 5 is the same graph for the syndrome of diarrhea. Figures 4 and 5 indicate that there were citywide vomiting signals on February 6 and February 21, and from February 13-15, and citywide diarrhea signals from February 27-28. ED signals for vomiting and diarrhea in February are consistent with historical experience showing a seasonal increase in viral gastroenteritis. Sporadic citywide signals for diarrhea next occurred on March 20 and April 3. There were no ED citywide signals for the diarrhea or vomiting syndromes in May and June. No spatial signal was sustained in the same geographic location for more than one day.

Figure 6 is a time-series plot of signals from NYC syndromic surveillance systems for the gastrointestinal syndrome covering the period January 1 to June 30, 2011. The systems included are the emergency department system, the clinical laboratory monitoring system, the OTC anti-diarrheal medication system operated by DOHMH, the ADM anti-diarrheal medication system operated by DEP, and the nursing home sentinel surveillance system. For the ED system (as well as for the ADM and OTC systems), only citywide signals have been included. As discussed above, there was citywide ED system signaling for the vomiting syndrome in February, most likely representing the seasonality of rotavirus and calicivirus (specifically, the genus norovirus). There were two GI outbreaks in sentinel nursing homes, one in February and one in early March. Details concerning the outbreaks are presented below. In the clinical laboratory system, there were no signals in January and February; there were sporadic, non-sustained signals March through June. In the OTC system, there was one non-sustained signal on May 15. As previously noted, there was a disruption in data transmission to the OTC system in mid-June, affecting signal detection in this system during the latter part of June.

Regarding the two GI outbreaks in sentinel nursing homes, the first outbreak occurred in a nursing home in the Bronx. Thirty-three patients on four units were affected. The symptoms were vomiting, diarrhea, fever and abdominal pain, and the onset was February 6. There were two hospitalizations and no deaths. The facility sent six stool specimens from two nursing home residents to the Public Health Laboratory for testing. Two specimens were tested for ova and parasites, including *Cryptosporidium*, two for bacterial pathogens, and two for viruses and *C. difficile*. One of the specimens sent for ova and parasite testing was positive for *Cyclospora cayetanensis*. The *Cyclospora*-positive resident had no recent history of travel to countries in which *Cyclospora* is endemic, and had not consumed any uncooked produce that could harbor *Cyclospora*. No other residents or staff members were diagnosed with cyclosporiasis. It remains unclear how this resident acquired cyclosporiasis. The specimens sent for pathogenic bacteria were negative. Viral and *C. difficile* specimens were sent to the NYSDOH Wadsworth Virology Laboratory. The *C.difficile* specimens were negative. However, one specimen from the *Cyclospora*-negative resident was found to be positive for norovirus by polymerase chain reaction (PCR).

The second GI outbreak occurred in a sentinel nursing home in Manhattan. There were five patients affected. Symptoms were diarrhea, nausea and vomiting, and the onset date was March 7. There were no deaths or hospitalizations. The facility sent six stool specimens from two patients to the Public Health Laboratory for testing. Two specimens were tested for ova and parasites including *Cryptosporidium*, two for bacterial pathogens and two for viruses and *C.difficile*. The specimens tested for ova and parasites and for bacteria were negative. The viral and *C.difficile* specimens were sent to NYSDOH Wadsworth Virology Laboratory and the *C.difficile* specimens were negative. The viral specimens were positive for norovirus by PCR.

With regard to the ADM program, Figure 6 indicates all dates of citywide signals from the pilot ADM EARS analysis. The EARS program uses several different baselines to identify different types of signals; signal results are combined in Figure 6 by date. All ADM results are shared with DOHMH, and when signals or other unusual ADM sales results are observed, these results can be compared by DOHMH with results from the other syndromic systems. During the period of this report, there were 26 days of ADM EARS signals. Most (19 out of 26) of the signal dates coincided with reported ADM product promotional events. The remaining 7 signal dates did not appear to be suggestive of a notable public health event: the ADM sales ratio for 5 of these 7 dates appeared to be within background range (despite the EARS signal); the remaining 2 dates (April 19 and April 21) did not appear much above background sales level and also they did not coincide with signals in any other syndromic systems.

In summary, for the period of this report, January through June 2011, there was a predominance of citywide ED system signals for vomiting and diarrhea in February, consistent with seasonal trends in norovirus and other enteric viruses. There was no evidence of a drinking water-related outbreak in New York City.

Index to Tables, Figures and Maps

Index to Tables, Figures and Maps (continued)

TABLE 1: Giardiasis, number of cases diagnosed and semi-annual case rate, in the first half ("1st H") of the year, NYC, 1994 – 2011 (2011 data are preliminary)

Semi-annual period (Jan-June)	Number	Rate/100,000
1st H-1994	1153	15.2
1st H-1995	1168	15.2
1st H-1996	1131	14.6
1st H-1997	852	10.9
1st H-1998	857	10.9
1st H-1999	870	11.0
1st H-2000	896	11.2
1st H-2001	771	9.6
1st H-2002	711	8.8
1st H-2003	574	7.1
1st H-2004	533	6.6
1st H-2005	421	5.2
1st H-2006	467	5.7
1st H-2007	403	4.9
1st H-2008	411	4.9
1st H-2009	408	4.9
1st H-2010	407	4.8
1st H-2011	462	5.5

*Data from 2011 are preliminary

Figure 1: Giardiasis, number of cases by month of diagnosis, New York City, July 1993 - June 2011

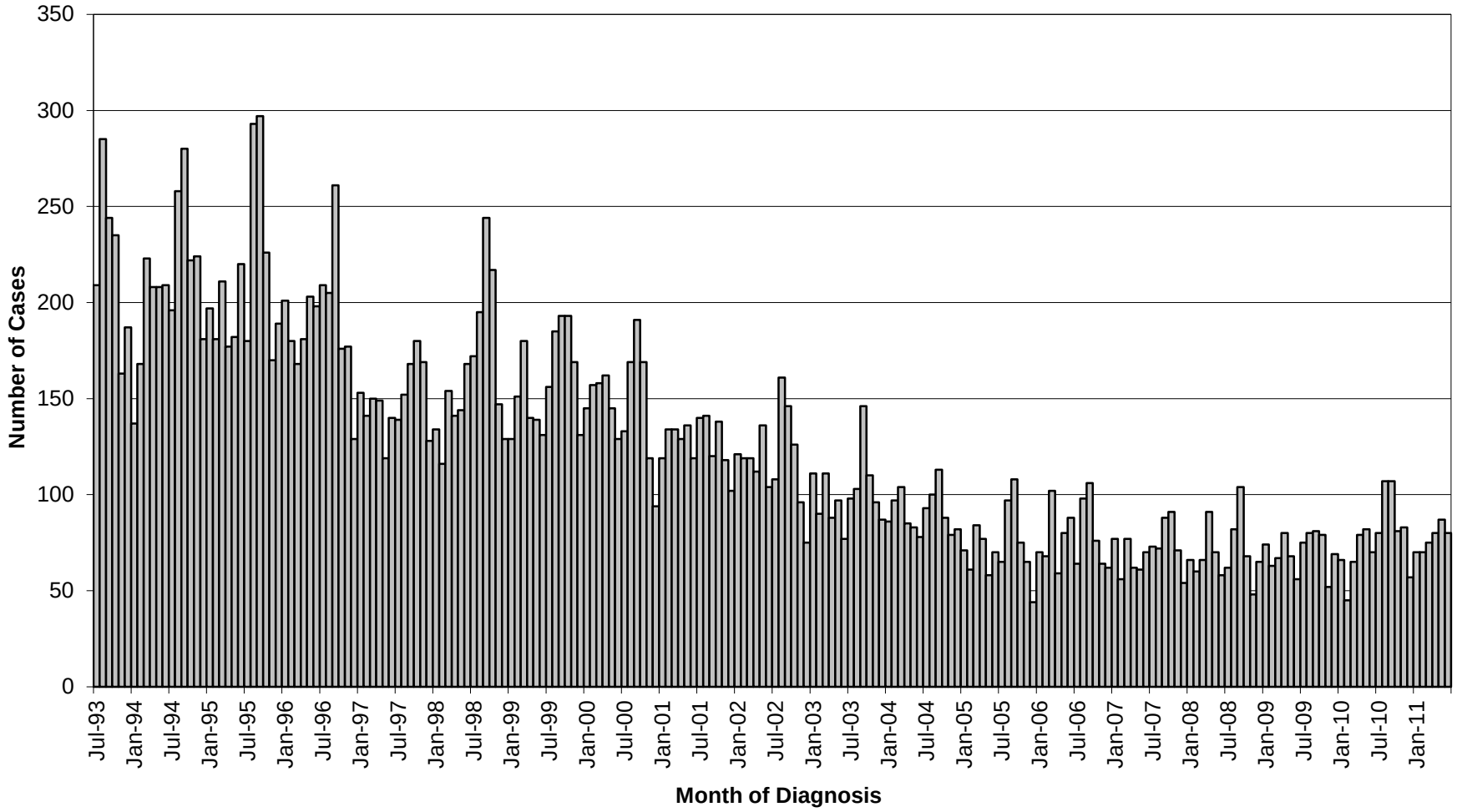


TABLE 2: Giardiasis, preliminary number of cases and semi-annual case rate per 100,000 population by sex, NYC, first half of 2011

Sex	Number	Rate
Male	299	7.5
Female	163	3.7
Total	462	5.5

TABLE 3: Giardiasis, preliminary number of cases and semi-annual case rate per 100,000 population by borough of residence, NYC, first half of 2011

Borough of Residence	Number	Rate
Manhattan	183	11.2
Bronx	67	4.8
Brooklyn	115	4.5
Queens	89	3.9
Staten Island	8	1.6
Citywide	462	5.5

Map 1

Giardiasis preliminary semi-annual case rate per 100,000 population
by UHF neighborhood - New York City
(January through June 2011)

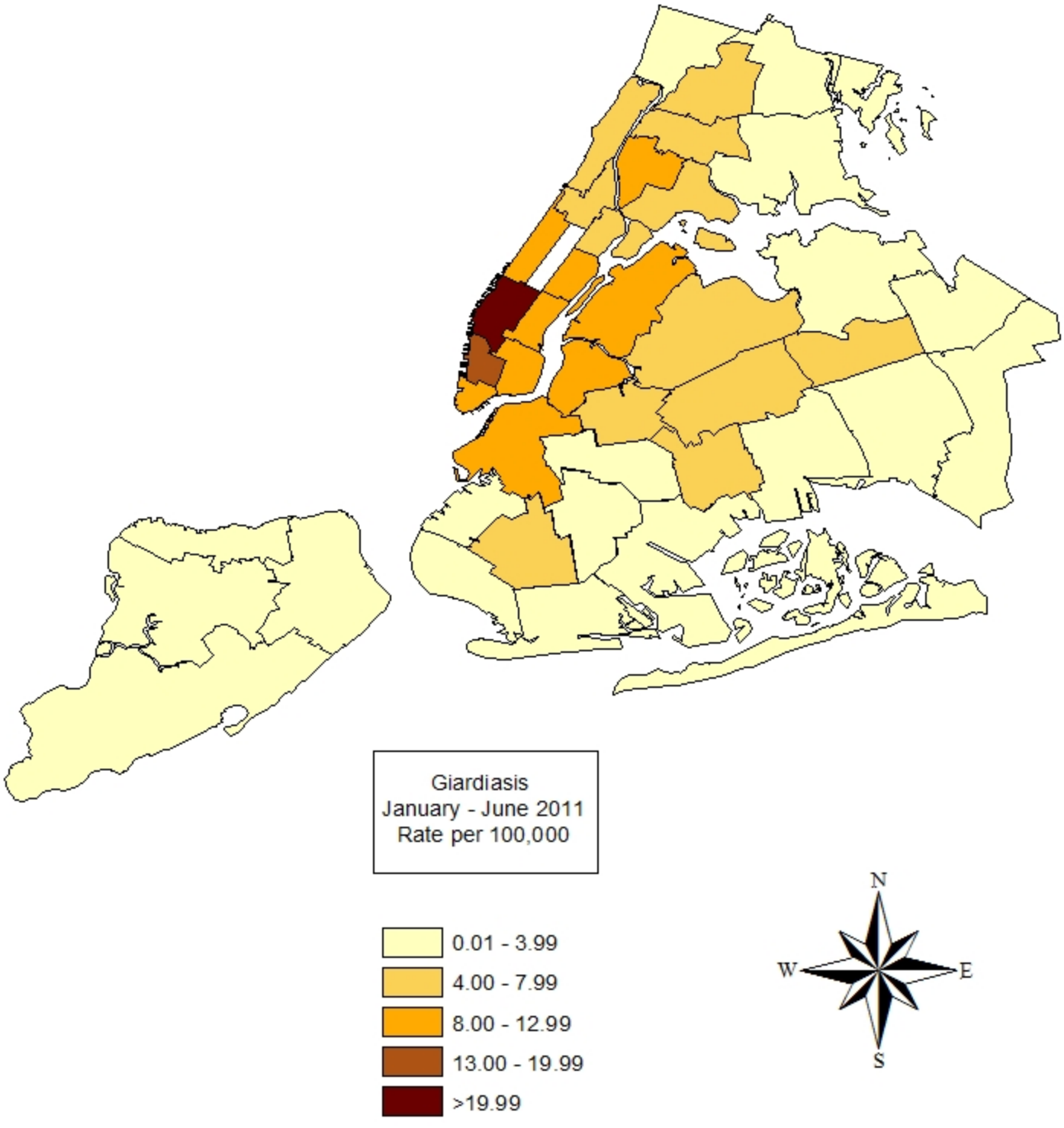


TABLE 4: Giardiasis, preliminary number of cases and semi-annual case rate per 100,000 by UHF neighborhood of residence, NYC, first half of 2011

UHF Neighborhood	Borough	Number	Population	Rate
Chelsea-Clinton	Manhattan	42	146101	28.7
Greenwich Village-Soho	Manhattan	17	95800	17.7
Union Sq-Lower East Side	Manhattan	27	213543	12.6
Upper East Side	Manhattan	27	250443	10.8
Lower Manhattan	Manhattan	4	37343	10.7
Gramercy Park-Murray Hill	Manhattan	14	139227	10.1
Greenpoint	Brooklyn	14	140099	10.0
Downtown-Heights-Slope	Brooklyn	23	236982	9.7
Long Island City-Astoria	Queens	22	227910	9.7
High Bridge-Morrisania	Bronx	19	207226	9.2
Upper West Side	Manhattan	21	246126	8.5
East New York	Brooklyn	12	177819	6.7
East Harlem	Manhattan	7	104493	6.7
C Harlem-Morningside Hgts	Manhattan	9	138670	6.5
Washington Heights-Inwood	Manhattan	15	250298	6.0
Fordham-Bronx Park	Bronx	15	259661	5.8
Crotona-Tremont	Bronx	12	214571	5.6
Borough Park	Brooklyn	19	347062	5.5
Fresh Meadows	Queens	5	95128	5.3
Williamsburg-Bushwick	Brooklyn	10	202549	4.9
West Queens	Queens	25	516458	4.8
Ridgewood-Forest Hills	Queens	11	237559	4.6
Hunts Point-Mott Haven	Bronx	6	138091	4.3
Flushing-Clearview	Queens	11	279344	3.9
Northeast Bronx	Bronx	7	188959	3.7
Coney Island-Sheepshead Bay	Brooklyn	9	304561	3.0
East Flatbush-Flatbush	Brooklyn	9	307274	2.9
Bensonhurst-Bay Ridge	Brooklyn	6	210906	2.8
Port Richmond	Stat Is	2	75154	2.7
Bedford Stuyesant-Crown Hgts	Brooklyn	8	314013	2.5
Southwest Queens	Queens	7	275236	2.5
Kingsbridge-Riverdale	Bronx	2	85228	2.3
Sunset Park	Brooklyn	3	128725	2.3
South Beach-Tottenville	Stat Is	4	193049	2.1
Pelham-Throgs Neck	Bronx	6	298024	2.0
Southeast Queens	Queens	4	199006	2.0
Bayside-Littleneck	Queens	1	89752	1.1
Willowbrook	Stat Is	1	90952	1.1
Canarsie-Flatlands	Brooklyn	2	197108	1.0
Rockaway	Queens	1	109592	0.9
Stapleton-St. George	Stat Is	1	132575	0.8
Jamaica	Queens	2	289264	0.7

TABLE 5: Giardiasis, preliminary number of cases and semi-annual case rate per 100,000 population by age group, NYC, first half of 2011

Age group	Number	Rate
<5 years	61	10.5
5-9 years	41	7.8
10-19 years	31	3.1
20-44 years	207	6.4
45-59 years	83	5.0
≥ 60 years	39	2.7
Total	462	5.5

TABLE 6: **Cryptosporidiosis**, number of cases diagnosed and semi-annual case rate, in the first half ("1st H") of the year, NYC, 1995 – 2011 (2011 data are preliminary)

Semi-annual (Jan-June)	Number	Rate/100,000
1st H-1995	235	3.1
1st H-1996	194	2.5
1st H-1997	70	0.9
1st H-1998	96	1.2
1st H-1999	104	1.3
1st H-2000	81	1.0
1st H-2001	58	0.7
1st H-2002	61	0.8
1st H-2003	47	0.6
1st H-2004	58	0.7
1st H-2005	39	0.5
1st H-2006	66	0.8
1st H-2007	33	0.4
1st H-2008	48	0.6
1st H-2009	39	0.5
1st H-2010	33	0.4
1st H-2011*	37	0.4

*Data from 2011 are preliminary

Figure 2: Cryptosporidiosis, number of cases by month of diagnosis, New York City, November 1994 - June 2011

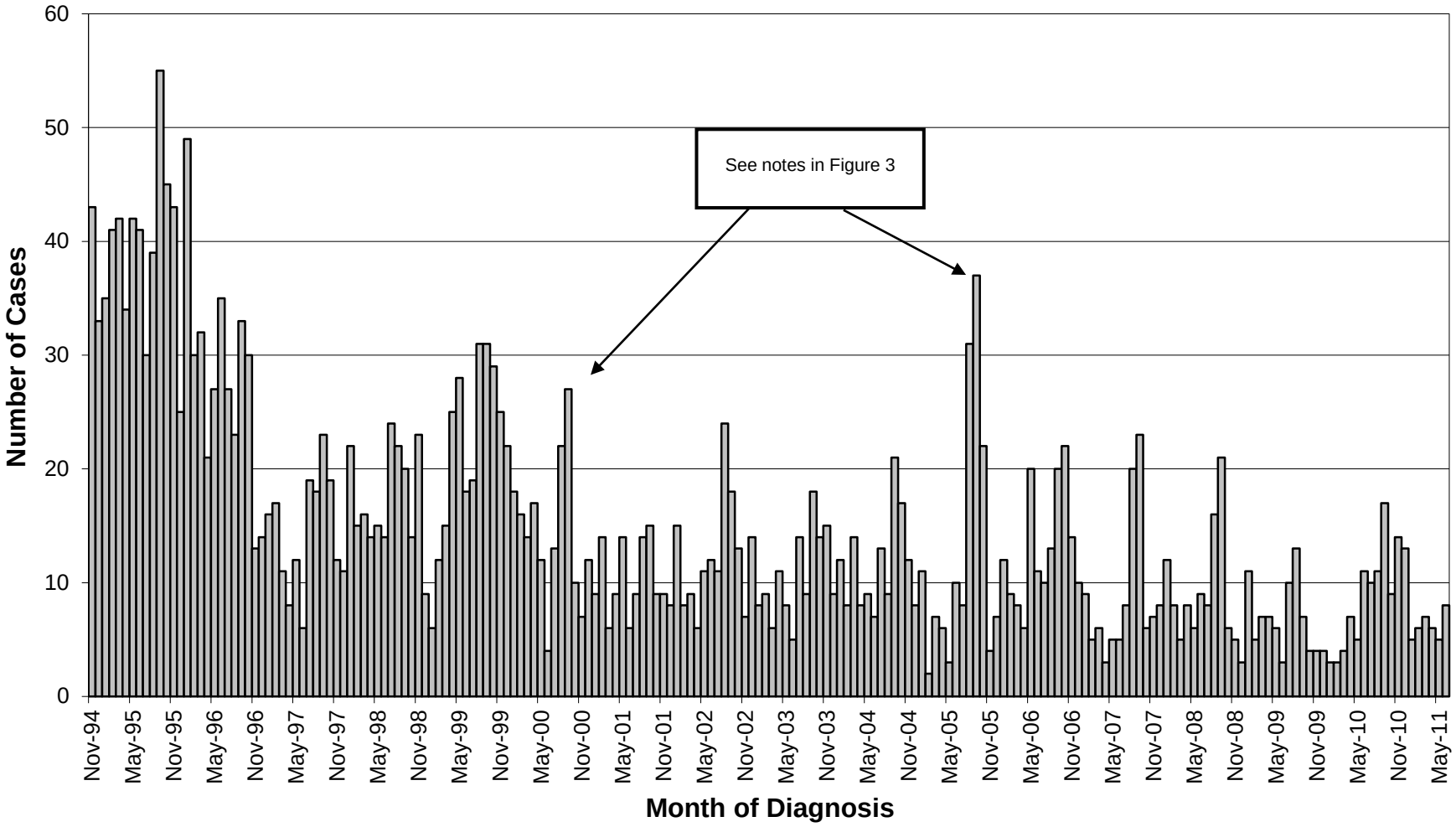
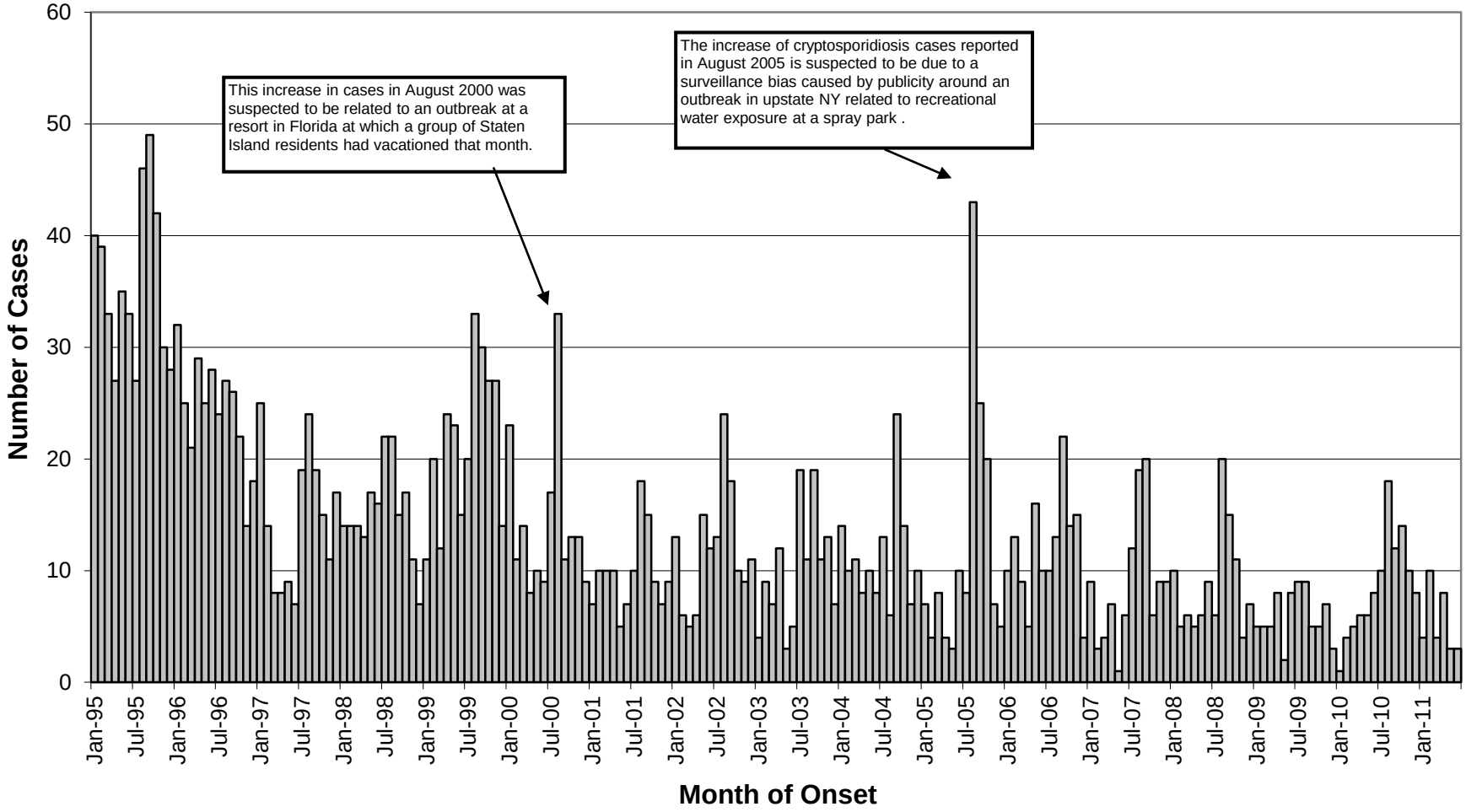


Figure 3: Cryptosporidiosis, number of cases by month of onset, New York City, January 1995 - June 2011*



* Chart does not include cases in which an onset date was unavailable (175 cases [6%], January 1995 - June 2011).

TABLE 7: Cryptosporidiosis, preliminary number of cases and semi-annual case rate per 100,000 population by sex, NYC, first half of 2011

Sex	Number	Rate
Male	25	0.6
Female	12	0.3
Total	37	0.4

TABLE 8: Cryptosporidiosis, preliminary number of cases and semi-annual case rate per 100,000 population by borough of residence, NYC, first half of 2011

Borough of Residence	Number	Rate
Manhattan	17	1.0
Bronx	7	0.5
Brooklyn	7	0.3
Queens	6	0.3
Staten Island	0	0
Citywide	37	0.4

Map 2

Cryptosporidiosis preliminary semi-annual case rate per 100,000 population
by UHF neighborhood - New York City
(January through June 2011)

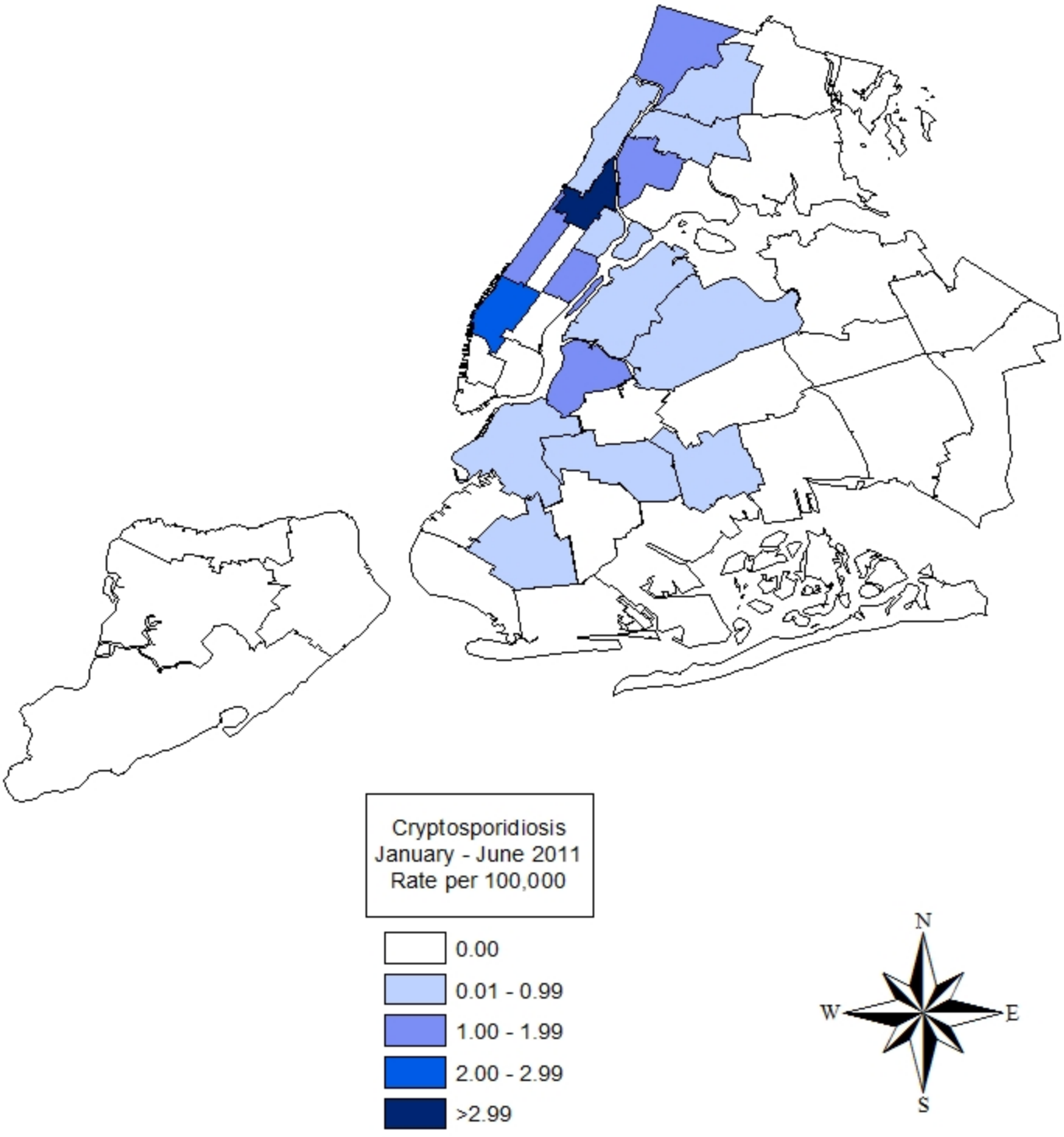


TABLE 9: Cryptosporidiosis, preliminary number of cases and semi-annual case rate per 100,000 population by UHF neighborhood of residence, NYC, first half of 2011*

UHF Neighborhood	Borough	Number	Population	Rate
C Harlem-Morningside Hgts	Manhattan	5	138670	3.6
Chelsea-Clinton	Manhattan	3	146101	2.1
High Bridge-Morrisania	Bronx	3	207226	1.4
Greenpoint	Brooklyn	2	140099	1.4
Upper West Side	Manhattan	3	246126	1.2
Upper East Side	Manhattan	3	250443	1.2
Kingsbridge-Riverdale	Bronx	1	85228	1.2
West Queens	Queens	5	516458	1.0
East Harlem	Manhattan	1	104493	1.0
Washington Heights-Inwood	Manhattan	2	250298	0.8
Fordham-Bronx Park	Bronx	2	259661	0.8
Borough Park	Brooklyn	2	347062	0.6
East New York	Brooklyn	1	177819	0.6
Crotona-Tremont	Bronx	1	214571	0.5
Long Island City-Astoria	Queens	1	227910	0.4
Downtown Heights-Slope	Brooklyn	1	236982	0.4
Bedford Stuyvesant-Crown Hgts	Brooklyn	1	314013	0.3

* Table does not include UHF neighborhoods in which there were no cases of cryptosporidiosis.

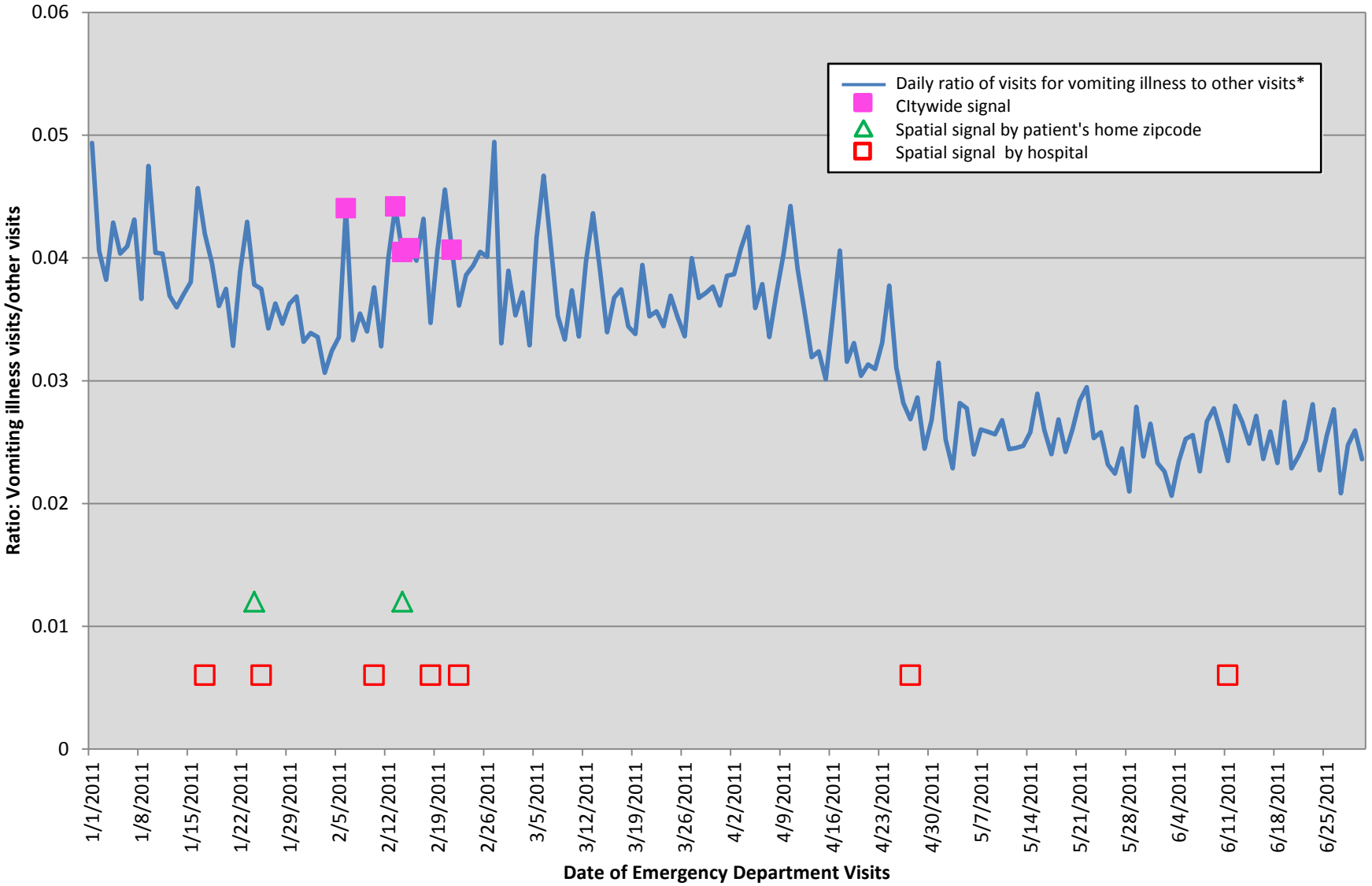
TABLE 10: Cryptosporidiosis, preliminary number of cases and semi-annual case rate per 100,000 population by age group, NYC, first half of 2011

Age group	Number	Rate
<5 years	3	0.5
5-9 years	0	0
10-19 years	1	0.1
20-44 years	19	0.6
45-59 years	8	0.5
≥ 60 years	6	0.4
Total	37	0.4

TABLE 11: Cryptosporidiosis, preliminary number of cases and semi-annual case rate per 100,000 population by race/ethnicity, NYC, first half of 2011

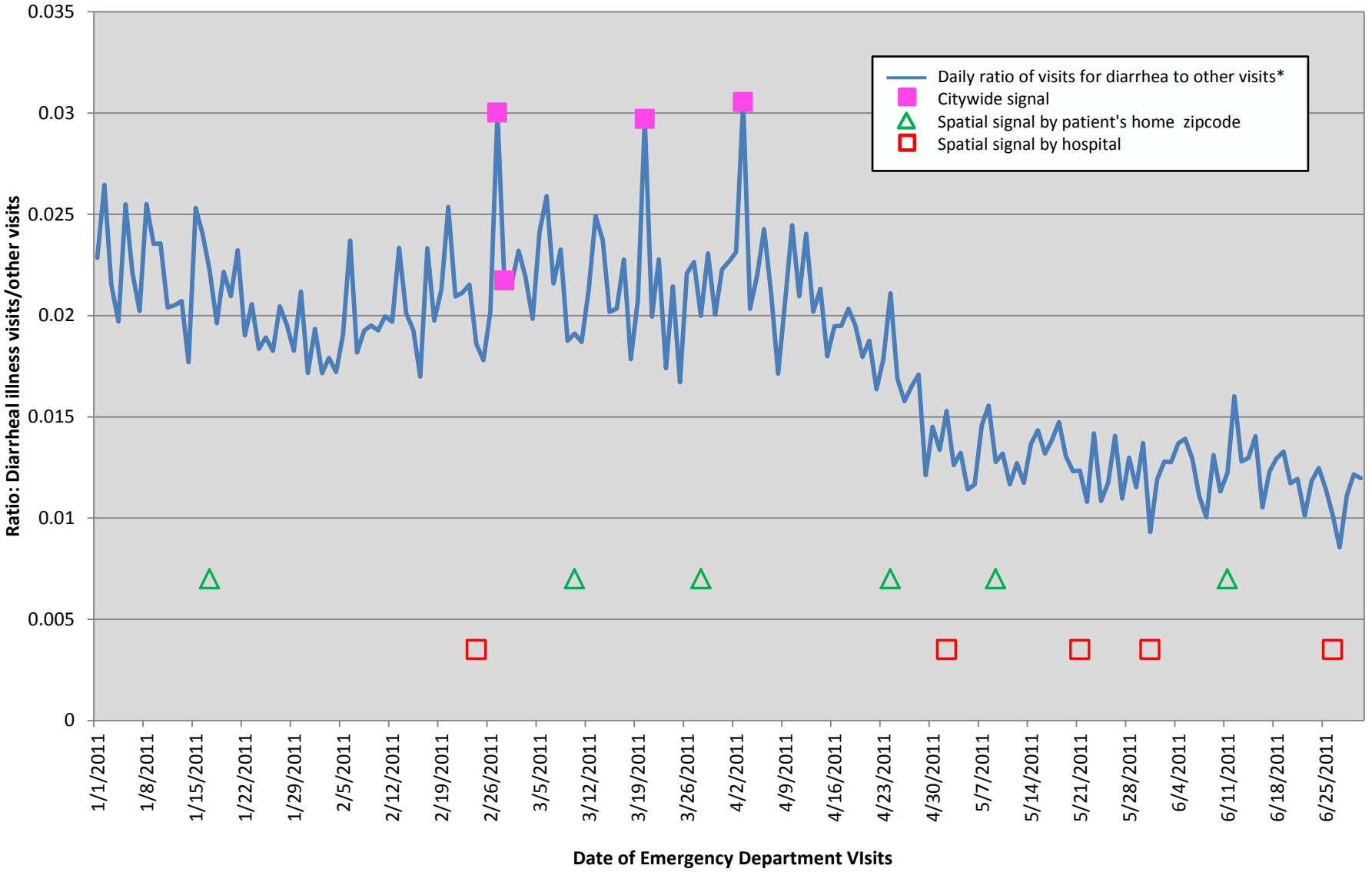
Race/Ethnicity	Number	Rate
Hispanic	13	0.6
White non-Hispanic	11	0.4
Black non-Hispanic	4	0.2
Asian, Pac. Islander, Amer. Indian, Alaska Native	4	0.4
Two or more races, non-Hispanic	3	2.9
Unknown	2	--
Total	37	0.4

Figure 4: Emergency Department Syndromic Surveillance, trends in visits for the vomiting syndrome, New York City, January 1, 2011 - June 30, 2011



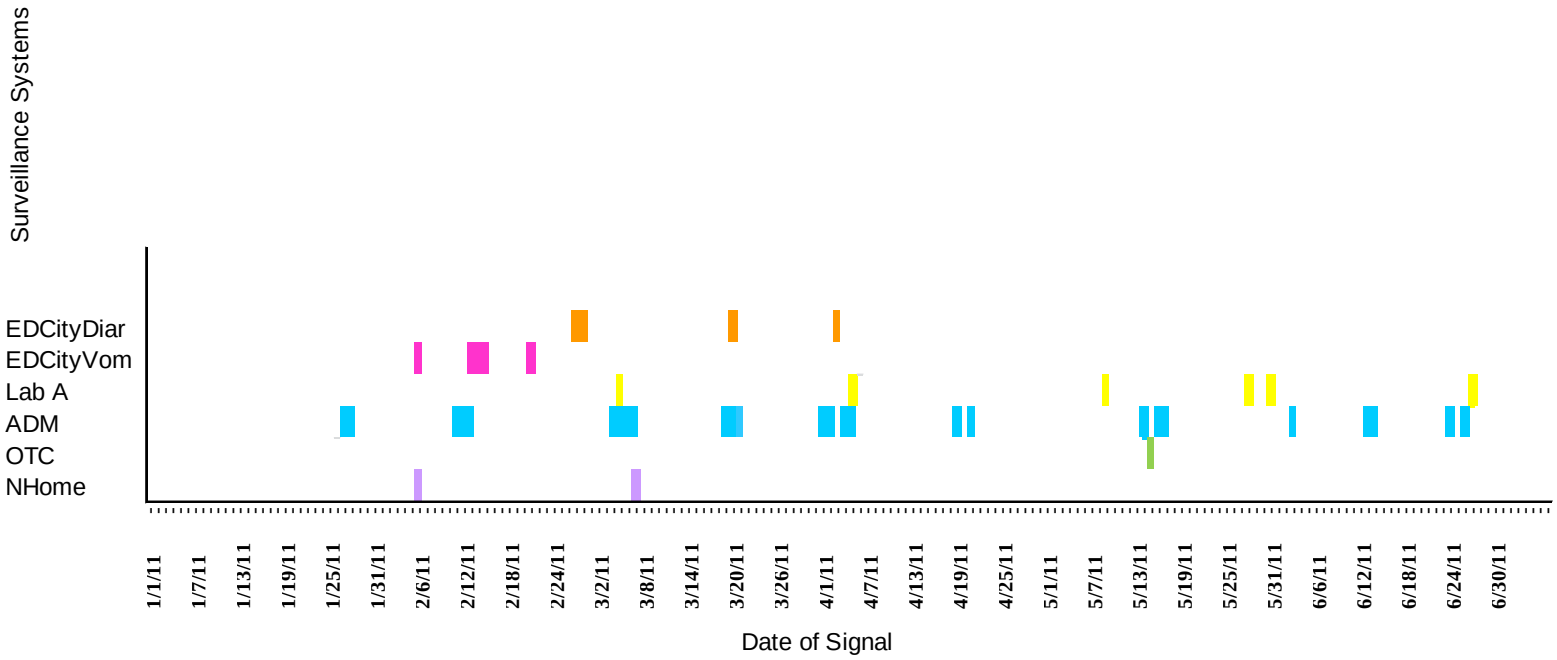
*Other visits=visits to participating ED for conditions that do not fit into one of the eight tracked syndromes (diarrhea, vomiting, respiratory, fever/influenza, asthma, sepsis, cold, rash).

Figure 5: Emergency Department Syndromic Surveillance, trends in visits for the diarrhea syndrome, New York City, January 1, 2011 - June 30, 2011



*Other visits=visits to participating ED for conditions that do not fit into one of the eight tracked syndromes (diarrhea, vomiting, respiratory, fever/influenza, asthma, sepsis, cold, rash).

Figure 6: Signals for Gastrointestinal Illness, Syndromic Surveillance Systems
New York City, January 1, 2011 - June 30, 2011



ED CityDiar: Emergency Department Citywide signal for diarrhea
ED CityVom: Emergency Department Citywide signal for vomiting
Lab A: Clinical Laboratory Monitoring signal for submissions for ova and parasites or bacterial culture and sensitivity
ADM: Citywide signal for daily antidiarrheal medication sales in DEP system
OTC: Citywide signal for daily antidiarrheal medication sales in DOHMH system
Note: Data transmission disruption in the OTC system in mid-June affected signal detection. See text for details.
NHome: Sentinel Nursing Home Gastrointestinal Outbreak. Indicates the first day of the outbreak.