ANNUAL REPORT

DIVISION OF DISEASE CONTROL: 2007

Philadelphia Department
of Public Health

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Introduction

OVERVIEW

This annual report provides an epidemiologic summary of conditions reported to the Division of Disease Control (DDC) in 2007. The report highlights the most commonly reported conditions and those of public health importance. Conditions with limited reports are only included in the summary table (Appendix C). The report is also available on the DDC website:
http://www.phila.gov/health/units/ddc/html/DDC_Annual_Reports.html

A standard reporting case definition has been set for most reportable conditions by the Centers for Disease Control and Prevention (CDC) and the Council of State and Territorial Epidemiologists (CSTE). These case definitions may differ from the criteria used to make a clinical diagnosis. The current case definition list is available here:
http://www.cdc.gov/ncphi/disss/nndss/casedef/case_definitions.htm

REPORTING TO PDPH

We want to take this opportunity to thank the medical and laboratory communities for their disease reporting activities. As a reminder, reports can be submitted to DDC by telephone, fax, mail (see DDC contact information below), or through PA-NEDSS. The most recent PDPH Notifiable Disease Case Report Form can be found in Appendix A and on the DDC website:
http://www.phila.gov/health/units/ddc/assets/applets/New_notifiable_disease_form.pdf

The list of reportable conditions is in Appendix B and on the DDC website:
http://www.phila.gov/health/units/ddc/assets/applets/PDPH_Notifiable_List_2005-seal.pdf

HOW DDC CAN ASSIST HEALTH CARE PROVIDERS

If you suspect a disease outbreak or that a patient is infected with a disease of urgent public health importance (Appendix B), DDC can facilitate diagnostic testing and assist with infection control and disease management. To speak with a medical specialist, please use the contact information below.

DDC CONTACT INFORMATION

Business Hours Consultation	215-685-6748
Urgent After-hours Consultation	215-686-1776 Ask for Division of Disease Control on-call staff.
Disease Reporting by Telephone	215-685-6748
Disease Reporting by Fax	215-545-8362
Disease Reporting by Mail	PDPH DDC, 500 South Broad Street, Philadelphia, PA 19146

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COMMONLY USED ABBREVIATIONS

AACO	AIDS Activities Coordination Office
ACIP	Advisory Committee on Immunization Practices
AIDS	Acquired Immunodeficiency Syndrome
AVHPC	Adult Viral Hepatitis Prevention Coordinator
CDC	Centers for Disease Control and Prevention
CRS	Congenital Rubella Syndrome
CSF	Cerebrospinal fluid
CSTE	Council of State and Territorial Epidemiologists
DNA	Deoxyribonucleic acid
DDC	Division of Disease Control
DFA	Direct fluorescent antibody
DOT	Direct observed therapy
DTaP	Diptheria, tetanus, acellular pertussis vaccine
ED	Emergency Department
EHS	Philadelphia Department of Public Health Environmental Health Services
EIA	Enzyme Immunoassay
GAS	Group A *Streptococcus*
GI	Gastrointestinal
HAV	Hepatitis A Virus
HBIG	Hepatitis B immunoglobulin
HBsAg	Hepatitis B surface antigen
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HCW	Health Care Worker
HIV	Human Immunodeficiency Virus
HRC	Health Resource Centers
Ig	Immunoglobulin
IFA	Immunofluorescent Assay
ILI	Influenza-like illness
INH	Isoniazid
IPD	Invasive Pneumococcal Disease
LD	Legionnaires' Disease
LTBI	Latent Tuberculosis Infection
MDR-TB	Multi-drug Resistant Tuberculosis
MMR	Measles, mumps, rubella vaccine
MRC	Medical Reserve Corps
MSM	Men who have sex with men
NAAT	Nucleic acid amplification tests
PCV	Pneumococcal-Conjugate Vaccine
PEP	Post-exposure prophylaxis
PID	Pelvic Inflammatory Disease
PDPH	Philadelphia Department of Public Health
PFGE	Pulsed Field Gel Electrophoresis
PHBPP	Perinatal Hepatitis B Prevention Program
PHL	Philadelphia Department of Public Health Laboratory
POD	Point of Dispensing site
P&S	Primary and secondary (syphilis)
PZA	Pyrazinamide
RNA	Ribonucleic acid
RWI	Recreational Water Illnesses
SPDR	Drug resistant *Streptococcus pneumoniae*
STEC	Shiga-toxin producing *Escherichia coli*
STD	Sexually Transmitted Disease
TB	Tuberculosis
Td	Tetanus, diphtheria vaccine
Tdap	Tetanus, diphtheria, acellular pertussis vaccine
TMP/SMX	Trimethoprim/Sulfamethoxazole (Bactrim)
US	United States
VFC	Vaccines for Children Program
VFAAR	Vaccines for Adults at Risk Program
WNV	West Nile Virus

Central Nervous System
Infections and Sepsis

Meningococcal Infection *(Neisseria meningitidis)*

Neisseria meningitidis is a gram-negative diplococci (bacterium). It can be carried in the nasopharynx of healthy human hosts and is normally transmitted through close person-to-person contact via respiratory secretions of an infected person or asymptomatic carrier. Invasive meningococcal infection can result in meningococcemia, meningitis, or less common manifestations such as pneumonia, febrile occult bacteremia, or conjunctivitis. The incubation period is usually less than four days but can range from one to ten days. Meningitis can include progression to purpura fulminans, septic shock, and possible death. Over 13 serogroups of *N. meningitidis* have been identified, with serogroups A, B, C, Y, and W-135 accounting for the majority of invasive disease. In the US, a polysaccharide and conjugate vaccines are available to help prevent invasive infection caused by serogroups A, C, Y, and W135. One dose is routinely recommended for all children 11-18 years of age, all college freshmen living in a dormitory, as well as for other individuals 2-55 years of age at increased risk of invasive meningococcal disease.

A confirmed meningococcal infection requires *N. meningitidis* to be isolated from a normally sterile site (cerebral spinal fluid, blood, or other less common sites) in a person with characteristic symptoms. A probable case has a clinically consistent presentation and evidence of *N. meningitidis* infection either by DNA detection (polymerase chain reaction on a sterile site) or by immunohistochemical antigen detection on CSF in the absence of a positive culture. A suspect case would lack a positive blood culture, other appropriate tests, and have purpura fulminans alone or a consistent clinical presentation with gram-negative diplococci identified in a normally sterile site.

Invasive Meningococcal Disease Surveillance in Philadelphia – 2007

In 2007, nine cases of invasive meningococcal disease were reported to DDC. All were epidemiologically unlinked and two were classified as suspect cases. Two-thirds of the cases were male. The median age of cases was 30 years (range: 6-67 years). One case resulted in a fatal outcome. Serogroup information was available for the seven confirmed cases – four were typed as C, two as Y, and one as Z (Table 1).

Table 1. Meningococcal Serogroups in Philadelphia, 2000 to 2007

Serogroup	2000	2001	2002	2003	2004	2005	2006	2007	7-Year Total n	(%)
B	3	1	5	3	1	1	0	0	14	(16)
C	7	2	2	5	3	0	0	4	23	(26)
W	0	0	0	1	0	0	1	0	2	(2)
Y	9	5	7	4	6	4	0	2	37	(42)
Z	0	0	0	0	1	0	0	1	2	(2)
Not grouped	2	1	1	2	1	3	1	0	11	(12)
Total	21	9	15	15	12	8	2	7	89	(100)

Invasive *Haemophilus influenzae* Disease

Haemophilus influenzae is a pleomorphic gram-negative coccobacillus that can cause a spectrum of illness including pneumonia, febrile bacteremia, meningitis, middle ear infections, and other less common manifestations. The bacteria are transmitted through respiratory droplets in encapsulated or unencapsulated forms. *Haemophilus influenzae* type b (Hib), the serotype that causes 95% of invasive disease, was the leading case of bacterial meningitis before Hib vaccine was introduced into the routine childhood schedule in the mid-1980s.

Invasive *H. influenzae* Disease Surveillance in Philadelphia – 2007

PDPH mandates reporting for only invasive disease (isolates from normally sterile body sites) caused by *H. influenzae*. Non-invasive infections, which include common presentations in pediatric populations, are not reportable in Philadelphia. In 2007, there were 19 confirmed reports of invasive disease caused by *H. influenzae*. Fourteen (74%) invasive *H. influenzae* infections were among females. The median age was 49 years, ranging from 8 months to 91 years. Of the 19 confirmed cases, nine (47%) had primary bacteremia, seven (37%) experienced pneumonia, two (11%) had meningitis, and one (5%) had osteomyelitis. Sixteen (84%) cases were hospitalized and one case was fatal.

Of the 18 isolates with serotyping results, nine (47%) were non-typeable, four (21%) were serotype f; two (11%) were serotype b; and serotypes a, c, and d each had one isolate. The two *H. influenzae* b infections were in adult females

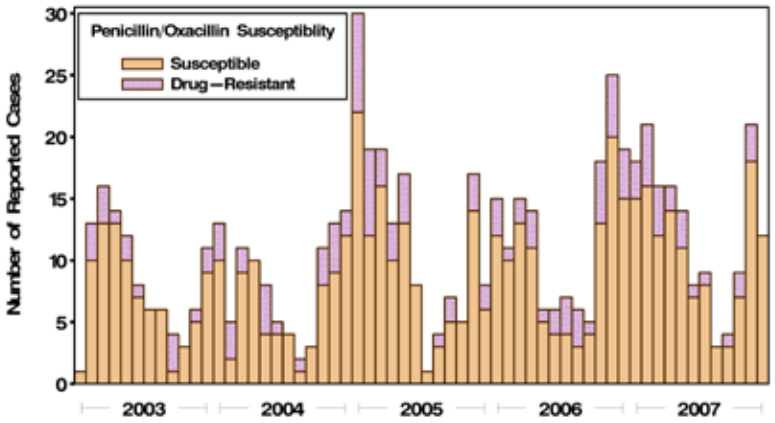
(60 year old and 40 year old) – neither with vaccination history or known contact with high-risk populations.

Invasive *Streptococcus pneumoniae* Disease

Streptococcus pneumoniae is a gram-positive encapsulated coccus (bacterium) that can be found living in the nasal cavities of many healthy individuals. *S. pneumoniae* causes both non-invasive (acute otitis media, sinusitis, and pneumonia) and invasive disease (pleural empyema, bacteremia, and meningitis). Those at the highest risk for pneumococcal disease include the very young (children under 5 years old), the elderly, and immunocompromised persons. Particular health conditions that are predisposing for invasive pneumococcal disease (IPD) include cardiovascular disease, chronic respiratory disease, renal dysfunction/failure, and risk behaviors, such as smoking. Cases tend to occur during the colder months (Figure 1).

The high morbidity and mortality associated with IPD in both young children and the elderly drove the development and licensure of two *S. pneumoniae* vaccines (one for children and another for adults). During the 1970s, the adult 23-valent pneumococcal polysaccharide vaccine was licensed for use in adults over 65 years old. In 2003, the Advisory Committee of Immunization Practice (ACIP) recommended a pneumococcal conjugate 7-valent vaccine (PCV) for routine vaccination in children less than 15 months of age. These vaccines, in particular the childhood one, have made a significant impact on IPD in the US.

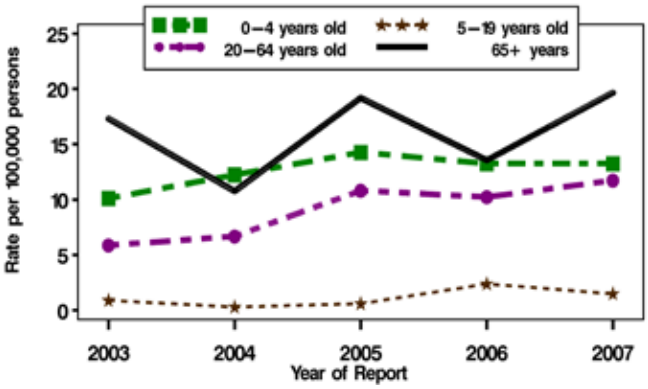
Figure 1. Invasive Pneumococcal Disease (IPD) and Drug Resistant IPD, by Month of Report: Philadelphia, 2003 to 2007



IPD Surveillance in Philadelphia – 2007

In Philadelphia during 2003, invasive *S. pneumoniae* infections became reportable. There were 162 reports of invasive IPD in Philadelphia during 2007. Close to half of the cases were among females (48%), and the median age of infection was 53 years (range: 2 weeks-92 years). Thirteen cases (8%) were in children under 5 years of age and 41 (25%) were in those 65 years and older, which when considered relative to the population size confirms the increased risk in these two groups (Figure 2). Further discussion of the epidemiology of these invasive IPD reports will be presented separately for children under 5 years old and those 5 years and older to better reflect population risks.

Figure 2. Age Specific Rates of Invasive Pneumococcal Disease by Year of Report: Philadelphia, 2003 to 2007



Drug Resistant Invasive *S. pneumoniae* Infections

Due to high levels of antibiotic resistance among *S. pneumoniae* infections, PDPH collects available susceptibility results. In 2007, 25 (16%) of the 161 isolates with susceptibilities were fully or intermediately resistant to penicillin and/or oxacillin (Table 2).

Table 2. Antibiotic Susceptibilities of *Streptococcus pneumoniae* Isolates: Philadelphia, 2007

Antibiotics	Isolates Tested (No.)	Susceptible Isolates (%)
Penicillin/Oxacillin	161	84
Ceftriaxone	162	99
Erythromycin	72	90
Clindamycin	28	89
TMP/SMX	68	96
Penicillin/Oxacillin & Erythromycin	72	80
Vancomycin	56	100
Fluoroquinolones	97	100

In previous years (2004-2006), the proportion of penicillin/oxacillin-resistant *S. pneumoniae* (SPDR) isolates was between 22% and 24%. Figure 1 depicts the total number of IPD cases caused by non drug resistant and drug resistant *S. pneumoniae* each month.

Children Under 5 Years of Age

All but one of the 13 children under 5 years of age with IPD during 2007 were hospitalized. The presentations included ten (77%) bacteremia – six secondary to pneumonia and four without known focus, two with septic arthritis, and one with meningitis. One unvaccinated infant who was less than one month old died following pneumococcal meningitis. Another child too young to have completed the vaccine series (2 months old) was infected with a serotype not covered by the infant vaccine (serotype 29). Serotype data were available for two other isolates (19A and 19F), which are covered by the vaccine. Among the 11 children under 5 years with complete vaccine information in the PDPH vaccine registry, KIDS, nine (82%) were age appropriately vaccinated with PCV as shown in Table 3.

Table 3. Age Specific Vaccination Status of Children < 5 Years of Age with Invasive Pneumococcal Disease (IPD): Philadelphia, 2007

Age Group (months)	# in Age Group	Number of PCV Doses Received Prior to Illness by Each Case in the Age Group*					Missing Vaccination Information
		0	1	2	3	4	
Under 2	1	1	0	0	0	0	0
2- 4	1	0	1	0	0	0	0
4-6	1	1	0	0	0	0	0
6-12	4	1	0	0	3	0	0
12-59	6	0	0	0	0	4	2

*ACIP recommends 1 dose given at age 2, 4, and 6 months and a fourth booster dose at 12-15 months

Individuals 5 Years and Older

Over half of the 149 persons 5 years and older reported with IPD had pneumonia with concurrent bacteremia (78 cases, 52%), 62 (42%) had bacteremia alone, five (3%) had clinical meningitis (three of which had *S. pneumoniae* isolated from the CSF), one had pneumonia alone, one emphyema (pleural fluid infection) and the remaining three (2%) had no clinical manifestation documented. There were slightly more reports among males than females; and the median age was 56 years (range: 9-92 years old). Nearly all reports were hospitalized (138, 93%) and 18 (12%) died.

Nearly 60% of the 146 with underlying conditions reported had at least one pre-existing health condition or risk factor (most frequently noted: diabetes mellitus, congestive heart failure, HIV infection, smoking and alcohol or drug abuse). Only seven cases (5%) had recorded vaccination histories; however, collection of immunization status was incomplete. Vaccination levels were very low among those recommended for it – none of the 17 HIV infected individuals reported vaccination. Only two of the 42 individuals 65 years or older recalled a previous pneumococcal vaccination. Twenty-four infections were drug resistant. The only serotyped specimen (19A) was from an immunocompromised 9-year-old, who received a single dose of pneumococcal vaccine.

Listeriosis (*Listeria monocytogenes*)

Listeriosis, a rare but serious infection caused by the gram-positive rod *Listeria monocytogenes,* most commonly presents as meningitis or bacteremia. Contaminated food products are the primary source of infections. *Listeria* disproportionately affects persons who are older, immunocompromised, or pregnant – including the fetus or neonate.

Listeriosis Surveillance in Philadelphia – 2007

In 2007, there were eight cases of listeriosis in Philadelphia residents with equal distribution among males and females. All cases were adults aged 50 years or older except for one neonate delivered prematurely at 33 weeks (median age: 75 years, range: 0-85 years). PDPH did not identify any links between these cases – they occurred sporadically in time and place, and the DNA fingerprints of the five isolates that underwent pulsed field gel electrophoresis were all different. All isolates were obtained from blood cultures alone. All but two cases (one with unknown history) had a known underlying, predisposing condition (cancer [2], diabetes [1], kidney disease and dialysis [1], HIV+ [1], and born to HIV+ mother [1]). Two cases were fatal – including the infant.

Other Bacterial Meningitis

Bacterial meningitides not caused by *Neisseria meningitidis*, *Haemophilus influenzae*, *Listeria monocytogenes*, or *Streptococcus pneumoniae* are included in this category. Cases are confirmed when individuals with a clinical presentation consistent with meningitis concurrently have bacteria isolated from CSF or blood.

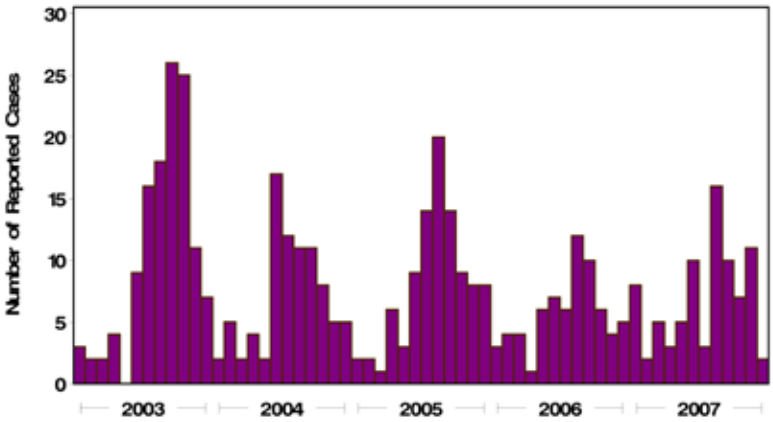
In 2007, four cases of bacterial meningitis fit this category. Cases were equally distributed by sex, and the median age at symptom onset was 13 years (range: 2 weeks-58 years). One case died as a result of this illness. *Streptococcus* Group B was isolated from two cases. The remaining two cases were caused by *Cornybacterium* and *Staphylococcus aureus.*

Aseptic Meningitis

Aseptic, or viral meningitis, is described as the clinical diagnosis of meningitis without laboratory evidence of bacterial or fungal infection. CSF analyses must demonstrate findings consistent with meningitis, such as elevated white blood cell count, but with no growth of bacteria or fungus in culture. This classification excludes aseptic meningitis caused by West Nile Virus, which is discussed later. Common causes of aseptic meningitis in the US include enteroviruses (such as coxsackie viruses), echoviruses, arboviruses, herpes simplex, and varicella viruses.

In 2007, 86 cases of aseptic meningitis among Philadelphia residents were reported and confirmed by DDC. The median age of these individuals was 29 years (range: 4 weeks-83 years. Cases were nearly equally distributed by sex (51% male). One fatality was reported among these cases. Most aseptic meningitis occurred in August, November, June, and September (Figure 3). Fifteen individuals were tested and found to be negative for WNV. For the 13 samples with enterovirus testing, ten were positive, two had indeterminate results, and one was negative.

Figure 3. Reported Cases of Aseptic Meningitis by Month of Diagnosis: Philadelphia, 2003 to 2007



Respiratory *Infections*

Influenza and Respiratory Virus Surveillance (2007-2008 Season)

Influenza virus (the flu) can cause a highly communicable and potentially lethal respiratory disease. Several types of influenza virus exist, but only two cause significant disease in humans – the influenza A and B viruses. Every flu season in the US, there are approximately 200,000 hospitalizations and over 36,000 deaths, with the elderly, young children and immunocompromised individuals experiencing the majority of severe outcomes.

Vaccination Recommendations

Influenza vaccine (available as an injection of inactivated influenza virus or as a nasal spray of a live attenuated virus vaccine) remains the most important measure for preventing influenza and influenza-related compliations – including death. For the 2007-2008 season, the CDC targeted a number of high-risk groups for vaccination including children aged 6-59 months, adults 50 years or older, immunocompromised or chronically ill individuals, pregnant women, and those living or working in close contact with high-risk persons. For the 2008-2009 season, CDC is expanding routine pediatric recommendations to include annual influenza vaccination for all children aged 6 months through 18 years, to be implemented as soon as feasible, but no later than the 2009-2010 season.

In cooperation with Philadelphia Corporation for Aging, the Federally Qualified Health Centers, local Nursing Schools, and other volunteer providers, DDC promotes adult influenza and pneumococcal vaccination in Philadelphia with its Community-based Influenza Vaccination Campaign, targeting adults with no alternative sources of medical care, including the uninsured and underinsured, the homeless, and the frail or infirm. Approximately 13,000 flu shots were administered at over 250 community-based clinics in Philadelphia during the 2007-2008 season. In addition to vaccination, the campaign works to raise awareness and knowledge in the community about these diseases.

Influenza-like Illness Surveillance

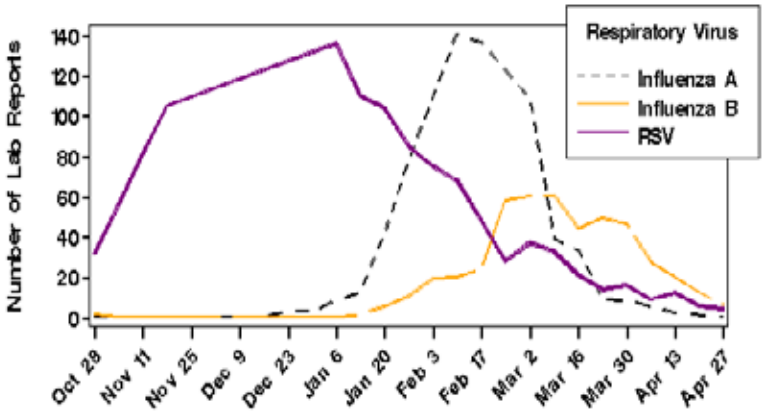
In an attempt to monitor the impact of influenza, the CDC and local health departments annually recruit local area clinicians to participate in weekly surveillance for influenza-like illness (fever ≥100° F AND cough and/or sore throat [in the absence of a known cause other than influenza]). In the past, however, this Influenza Sentinel Provider Surveillance Network has been prone to poor participation.

For the 2007-2008 season, DDC launched a semi-automated approach by utilizing electronic data from a network of select pediatric ambulatory clinics to make reporting easier and more efficient for both the participating clinicians and PDPH. The result has been 100% participation by sites, definite reductions in surveillance related workload, and increases in pediatric influenza-like illnesses coincident with increases of positive influenza A laboratory reports.

Respiratory Virus Surveillance

In addition to monitoring for influenza-like illness, DDC also conducts active, laboratory-based surveillance of circulating respiratory viruses to monitor for influenza and other viral respiratory illnesses in Philadelphia. Eight hospital laboratories currently participate in this surveillance system, providing aggregate weekly counts of influenza. Six of the laboratories also provide data on respiratory syncytial virus (RSV), parainfluenza, and adenovirus. Test methods vary and may include rapid antigen tests, viral culture, and PCR. As shown in Figure 4, the 2007-2008 respiratory virus surveillance season picked up in late October with sharp increases in RSV, which did not completely subside until March. Influenza A was prevalent in the community from January through March, and influenza B in February through April.

Figure 4. Respiratory Virus Reports from 8 Hospital Laboratories by Week: Philadelphia, 2007 to 2008 Season

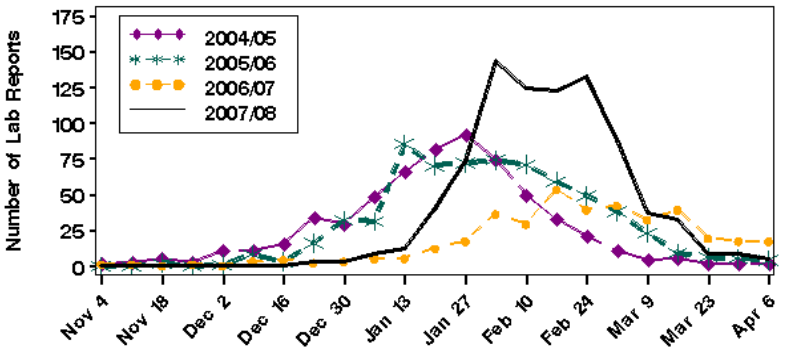


Suboptimal vaccine match

In late January of 2008, CDC reported that circulating strains of influenza B virus, and, to a lesser degree, those of influenza A did not match the vaccine. Considering the proportion of morbidity due to pneumonia and flu, pediatric hospitalization rates, and the percentage of outpatient visits for influenza-like illness, the severity of the 2007-08 season nationally was similar to that of the 2004-05 season.

By February in Philadelphia, it was clear that the current influenza season was more severe than other recent seasons (Figure 5), which was further supported by a higher number of influenza outbreaks in long-term care facilities reported to DDC (16 compared to 8 for the previous season). As in other seasons, DDC aided institutions with outbreak monitoring and management by providing current recommendations for infection control, chemoprophylaxis for exposed individuals, treatment, and intensive surveillance for further spread or outbreak resolution.

Figure 5. Laboratory Confirmed Influenza A Reports from 6 Hospital Labs by Week of Report: Philadelphia, 2004/05 to 2007/08 Influenza Seasons



Legionellosis (*Legionella pneumophila*)

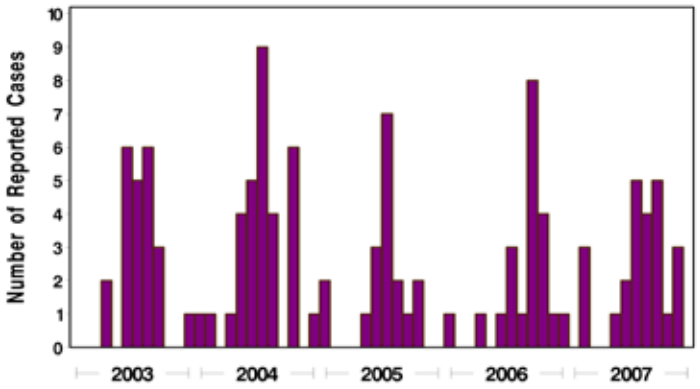
Legionnaires' disease (LD) is a form of pneumonia caused by infection with the bacterium *Legionella pneumophila.* Pontiac fever is the milder form of the infection that occurs without pneumonia. In both forms of the infection, symptoms include chills, anorexia, malaise, myalgia and headache. LD is transmitted when water contaminated with *L. pneumophila* is inhaled as aerosols or droplets. There is no evidence that this infection is transmitted person-to-person. The organism is found naturally in the environment, thriving in warm, stagnant water. It has been isolated from hot water systems, air conditioning towers, hot tubs, and hot and cold water taps and showers. Still, the large majority of *Legionella* infections are sporadic and never connected to known outbreaks. There is typically an increase in the number of cases during the summer to fall months (Figure 6). Those at highest risk for contracting LD are persons who smoke, immunocompromised individuals, and those with underlying conditions such as diabetes or lung disease.

The CDC defines a confirmed legionellosis case as a clinically compatible case with a confirmatory laboratory test (culture from a normally sterile site, at least a four-fold rise in paired serum antibody titers to *L. pneumophila* serogroup 1, detection of *L. pneumophila* serogroup 1 antigen in urine). Though urine antigen detection is most commonly used test for legionellosis, other species and serogroups than *L. pneumophila* serogroup 1 are not detectable by this method or serologic diagnosis.

Legionellosis Surveillance in Philadelphia – 2007

In 2007, 24 confirmed cases of LD were reported in Philadelphia. Diagnosis was established with urine antigen testing in 22 (92%) and culture in the other two (8%). Over half (54%) of the cases were male. Ages ranged from 26 to 88 years with a median age of 63 years. Of the 22 cases with risk factor information available, 29% were smokers and 21% had diabetes mellitus. Onset during the summer (June through August) was most common (12 cases) with ten onsets in July or August (Figure 6). Although Philadelphia had no *Legionella* outbreaks during 2007, two cases were associated with a healthcare facility outside of Philadelphia.

Figure 6. Reported Cases of Legionellosis by Month of Diagnosis: Philadelphia, 2003 to 2007



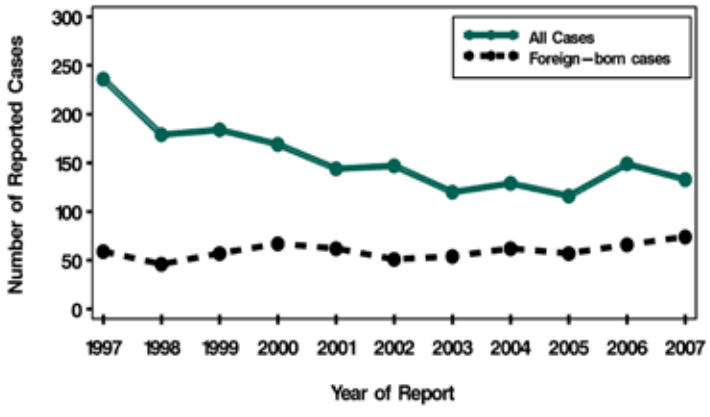
Tuberculosis
(*Mycobacterium tuberculosis*)

Tuberculosis (TB) is chronic infection with the bacterium *Mycobacterium tuberculosis* that may cause lesions on the lungs, bones, and other parts of the body. Infection typically occurs in the lung (pulmonary TB) in about 70% of cases, although the disease can less frequently affect other organs such as the brain, kidneys, and bones. Symptoms of active TB may include persistent cough lasting three weeks or longer, weakness or fatigue, fever, weight loss, and spitting up blood. Only about 10% of infected individuals develop active TB – and about half of these active cases will arise in the first two years after infection. The other 90% of infected individuals develop a latent form of TB infection (LTBI).

TB Surveillance in Philadelphia – 2007

Over the last 10 years, the number of confirmed TB case reports in Philadelphia has declined from 236 cases in 1997 to 133 cases in 2007 (Figure 7). The overall TB case rate in 2007 was approximately 9.0 cases per 100,000 population, which exceeds the National Healthy People 2010 Objective of 3.5 per 100,000 population. Of the 133 cases reported in 2007, 100 (75%) were diagnosed with pulmonary TB, 23 (17%) with extra-pulmonary TB, and 10 (8%) with both. Eight cases, all with pulmonary TB, had previously been diagnosed. Of the 90 individuals with documented HIV test results, 13 (14%) were infected with HIV. Two cases (both pulmonary) died, although not directly related to the TB infection. Decreases in TB are driven by reductions in pediatric cases (from 23 in 2006 to 15 cases in children under 10 years old) and clinically diagnosed cases (from 59 in 2006 to 32 infected individuals who were not confirmed as culture-positive cases).

Figure 7. Reported Cases of Tuberculosis by Natality: Philadelphia 1997 to 2007



Drug Resistant TB

Isolates were available for 100 (75%) cases reported during 2007, and of these 95 (95%) had susceptibility results reported. Two isolates were multi-drug resistant (MDR-TB), defined as resistance to at least isoniazid (INH) and rifampin. Another 22 (23%) isolates demonstrated partial drug resistance (13 with resistance to a single drug: streptomycin [5], INH [4], pyrazinamide (PZA) [3], or rifampin [1]; and nine with resistance to more than one medication: INH and streptomycin [5]; INH, streptomycin and PZA [1]; INH, streptomycin and ethionamide [1]; streptomycin and PZA [1]; and streptomycin, PZA and kanamycin [1]). In total, five MDR-TB cases were under management and receiving Directly Observed Therapy (DOT) in Philadelphia during 2007.

Populations at High Risk for TB Infection

The proportion of foreign-born cases reported in Philadelphia has more than doubled since 1997 and now exceeds that for US-born cases (Figure 7). In 2007, 28 of the 69 foreign-born cases were from Western Pacific countries, including Vietnam the Philippines, and China. An additional 20% of foreign-born cases were from Africa, mainly from Liberia and other West African countries. The changing profile of TB in Philadelphia demonstrates the challenges of conducting a control program in modern, urban America, which requires a culturally sensitive and linguistically capable public health workforce.

For the first time since TB reporting in Philadelphia was initiated, fewer than half (49%) of the reported cases were Non-Hispanic Black, equivalent to a case rate of over 10 cases per 100,000 population. Despite this being such a milestone for African Americans, the 2007 rates are still nearly five times higher than those for Non-Hispanic Whites (2.2 cases per 100,000 population) and twice those for Hispanics (5.4 cases per 100,000 population). The only group with higher rates in 2007 was Asian Pacific Islanders, with over 70 cases per 100,000 population.

Outreach and targeted testing programs in long term care facilities (LTC), correctional facilities, and throughout the homeless shelter network have led to early detection and prevention of TB cases in these populations. In 2007, seven (5%) cases were homeless, five (4%) resided in LTC at diagnosis, and three (2%) were identified in correctional facilities. More cases were identified in these settings in 2007 than in 2006.

Treatment Completion

PDPH's continuing top priority for the TB Control Program is to increase the number of cases completing a curative course of therapy in 12 months. Treatment completion rates have steadily increased since the 1990s, when less than half of patients completed treatment, to nearly 90% among the 128 cases in 2006 completing treatment (most recent data). DOT is the standard of treatment for suspect and confirmed TB

cases, and is provided along with other clinical services at the Flick Memorial Center for the Treatment of Tuberculosis.

Reporting of TB in Philadelphia

Providers are reminded to report suspected and confirmed TB cases within 24 hours to the TB Control Program at 215-685-6873. PDPH TB Control continues to remind labs and hospitals of the importance of assessing the drug susceptibility of TB infections – even if a patient dies prior to treatment. Isolate genotyping is handled in the PDPH Public Health Laboratory (PHL).

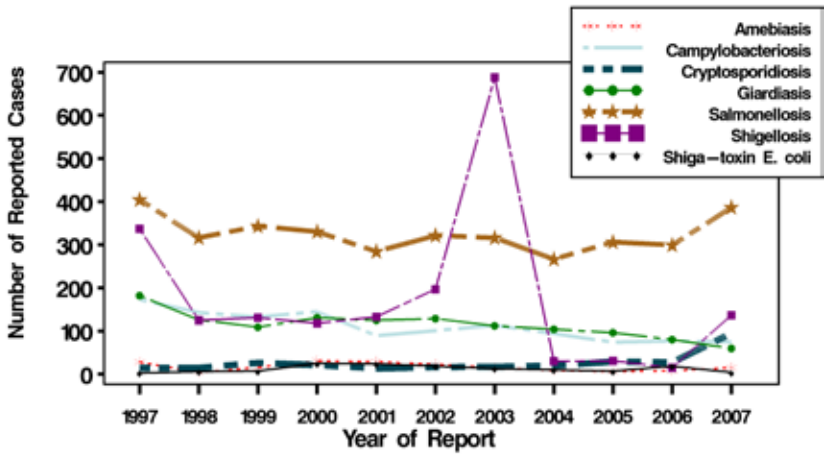
Gastrointestinal *Infections*

PDPH receives reports on at least eight notifiable gastrointestinal (GI) infections – *Entamoeba histolytica*, *Campylobacter*, *Cryptosporidia*, shiga-toxin producing *Escherichia coli*, *Giardia*, *Listeria* (included in the section on central nervous system infections), *Salmonella,* and *Shigella*. All of these infections require culture to be truly attributed to the agent. Generally, the most commonly reported notifiable GI illness in Philadelphia is *Salmonella* (Figure 8).

In 2007, DDC responded to a number of GI outbreaks – most notable of which were a cluster of *Salmonella* infections linked to a single church supper and increases in swimming pool associated *Cryptosporidia* infections (both described below). In outbreak situations, DDC performs outbreak identification (enhanced surveillance and coordination of specimen collection and testing) and control (providing guidance on infection control, treatment, and exclusion of individuals; informing the medical community and general public; and coordination with other involved agencies).

PDPH receives reports on outbreaks due to other GI agents including norovirus and rotavirus. For these other GI outbreaks, DDC also aids in outbreak identification and management, and annually issues a Norovirus Control and Management Health Alert, which is targeted at long term care (LTC) facilities, hospitals, and schools to help prepare for outbreaks in these commonly affected facilities. During 2007, DDC received reports of 21 norovirus outbreaks – 15 (71%) in LTC, four (19%) in hospitals and two (10%) in schools.

Figure 8. Reported Cases of Gastrointestinal Diseases: Philadelphia, 1997 to 2007



Amebiasis (*Entamoeba histolytica*)

Amebiasis is caused by infection with the parasite *Entamoeba histolytica*. The clinical spectrum of disease ranges from asymptomatic infection, which is most common, to amebic dysentery with severe, painful bloody diarrhea and fever. In rare cases, the infection can also spread to other organs such as the liver, lungs, brain and skin, causing a spectrum of symptoms and complications. The parasite can be found worldwide but is concentrated in tropical and subtropical areas of Africa, Asia, and Central and South America, particularly where poor sanitation and nutrition are commonplace. The disease is acquired by the fecal-oral route via person-to-person transmission or through contaminated food and water. Generally for residents of the US, those at highest risk for infection are travelers to developing countries, immigrants from areas with endemic infection, institutionalized persons, and men who have sex with men (MSM).

In 2007, 19 total cases of amebiasis were reported, compared to four cases in 2006. While this is nearly a 4-fold increase over 2006, the 2007 numbers are well within the historic limits for Philadelphia (annually: 4-31 cases). No outbreaks or clusters of amebiasis were identified during 2007. Of those infected with *E. histolytica*, 11 cases (58%) were female. Seven (50%) of the 14 cases with travel histories taken reported travel during their incubation period (Thailand [3] and Liberia [4]). Two of the three adult males interviewed reported having sex with men (MSM).

Campylobacteriosis (*Campylobacter* spp.)

Campylobacteriosis is a disease caused by infection with *Campylobacter* spp. Predominant symptoms, which generally occur within seven days of exposure to the agent, include diarrhea, which is sometimes bloody, cramping, nausea, vomiting, and fever. Infections are often mild – resembling viral gastroenteritis – and can resolve within

one week. In persons with compromised immune systems, *Campylobacter* spp. can occasionally spread to the bloodstream and cause more serious prolonged illness. Most cases of campylobacteriosis are sporadic – unlinked to other cases by common exposures – and are typically associated with handling of raw poultry, ingestion of raw or undercooked poultry, drinking untreated water, and drinking raw or unpasteurized milk.

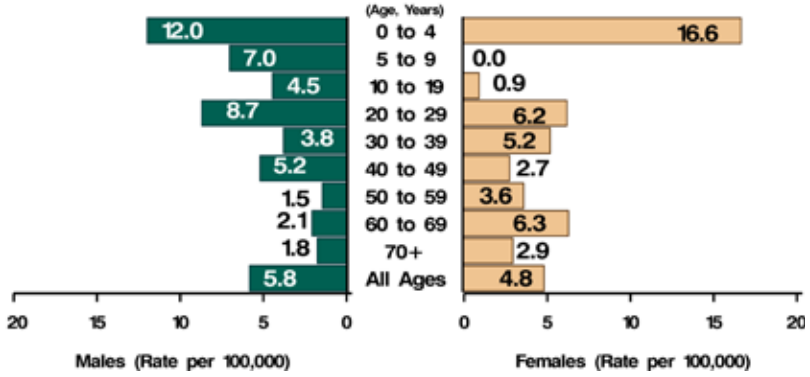
Campylobacter Surveillance in Philadelphia – 2007

In 2007, a total of 80 cases of campylobacteriosis were reported among Philadelphia residents. Of the 2007 reports, 78 were culture confirmed, and two were classified as probable cases – both were epidemiologically linked to confirmed cases in their household.

The cases were nearly equally divided by gender (51% male). The median age was 27 years (range: 2 months-83 years), but much of the burden was among infants and young children (Figure 9). Information on symptoms was available for 67 cases (84%) – 96% reported diarrhea, 59% abdominal pain, 51% fever, 32% vomiting, and 23% nausea. Fourteen (22%) of the 65 of the cases available for interview reported traveling to a foreign country during their incubation period. There were no campylobacteriosis fatalities reported.

Of the nine isolates with serotype information, all were *Campylobacter jejuni*. Antibiotic susceptibility for ciprofloxacin was available on 24 *Campylobacter* isolates. Of these, five isolates (21%) were resistant to ciprofloxacin (Table 4), and of these two traveled (India and Israel) and one had animal exposure (horse).

Figure 9. Rates of Campylobacteriosis per 100,000 Population by Age and Gender: Philadelphia, 2007



Cryptosporidiosis (*Cryptosporidium* spp.)

Since 1976, when the first human cases of *Cryptosporidium* infection were described, protozoa from the genus *Cryptosporidium* have been increasingly recognized as an important cause of diarrheal illness, especially in young children (<5 years of age) and immunocompromised persons. Young children are often affected because of the increased potential for fecal-oral exposure and decreased immunity in this age group. Risks for infection include exposure to (1) contaminated recreational water at pools, beaches and splash parks; (2) domestic and farm animals; (3) untreated drinking water, and (4) day cares. Cryptosporidiosis is generally a self-resolving illness of abdominal cramping, fever, and voluminous watery diarrhea lasting 5-10 days with potential recurrence even weeks after the first symptoms. Illness is more severe and prolonged in immunocompromised persons and can lead to severe weight loss, malnutrition and death. Nationwide disease surveillance has demonstrated increasing reports of *Cryptosporidium* infection particularly since 2005. It is unclear whether these increases are due to an actual upsurge in disease incidence or are related to increased clinical awareness and testing prompted by the introduction of effective therapy. In 2007, there were 10,243 cases of Cryptosporidiosis reported in the US (provisional data), nearly twice the 5,636 cases reported in 2006.

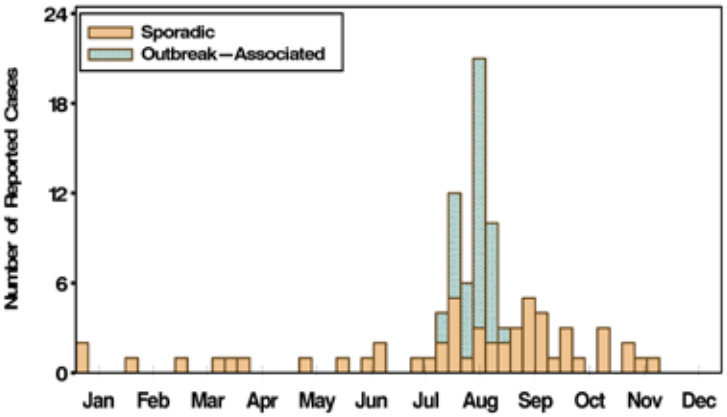
Cryptosporidium Surveillance in Philadelphia – 2007

In 2007, a total of 94 cases of cryptosporidiosis were reported in Philadelphia, which is over a three-fold increase from the 29 confirmed cases reported in 2006. Sixty-five (69%) reports were confirmed and 29 (31%) were classified as probable cases. Slightly over half of the cases (54%) were male and the median age was 24 years (range: 14 months-54 years). Among those with available data, 16% (12/73) were hospitalized, 1% (1/87) had an associated fatal outcome, and 31% (18/59) traveled outside of Pennsylvania during the incubation period. A single outdoor swimming pool outbreak comprised 41 (44%) of all the 2007 cases (Figure 10).

Outbreak Associated with Swimming Pool

In the pool-associated outbreak, the majority of cases were young children and their parents (18 families), mirroring national trends for cryptosporidiosis outbreaks. The outbreak persisted for four weeks before pool disinfection measures were able to interrupt the chain of disease transmission. There were no hospitalizations or deaths. Several risk factors were identified that may have preceded the outbreak: a common water filtration system between the shallow water "kiddie pool" and the deep water adult pool; high fecal colony counts in the weeks immediately before the outbreak suggesting fecal contamination of the pool water; and inconsistent enforcement and education of patrons regarding exclusion policies for those with diarrheal illness.

Figure 10. Cryptosporidiosis, Sporadic Cases versus Pool–Associated Outbreak Cases by Week of Diagnosis: Philadelphia, 2007



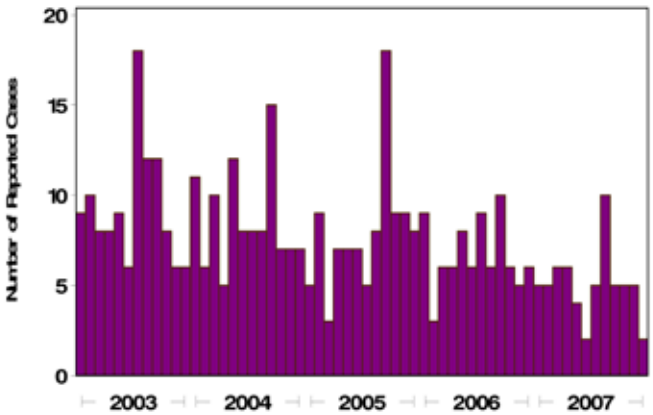
and unique features of *Cryptosporidium* that facilitate its transmission: chlorine-resistance, low infectious dose, an extended period of shedding after infection, and an ability to survive for long periods on environmental surfaces. When combined with improper pool maintenance, which is fairly common, these features of *Cryptosporidium* make the chances of an outbreak very likely. For this reason, the CDC recommendations to prevent recreational water illnesses (RWI) focus on reducing behaviors that may result in water contamination including public education about pool hygiene and enforcing policies to exclude swimmers with diarrhea – especially diaper-aged children. These recommendations emphasize the role of pool staff in maintaining safe recreational water by carrying out routine maintenance operations according to disinfection guidelines and public health regulations. These include: (1) accurately measuring, recording, and maintaining pH and free chlorine levels in ranges that optimize disinfection, (2) establishing a fecal accident response log and (3) implementing minimum pool closure times for disinfection following fecal accidents.

Giardiasis (*Giardia lamblia*)

Giardiasis is a diarrheal disease caused by the protozoa *Giardia lamblia,* which can live within the intestine and can be transmitted to the environment in a cyst form through feces. The protozoa can persist for long periods of time in many environments including soil, water, food, water, and surfaces contaminated from infected humans or animals. Humans who become infected after coming into contact with contaminated surfaces or ingesting contaminated food or water may present with symptoms within 1-4 weeks. Clinical manifestations of giardiasis are broad, but primarily include diarrhea lasting 1-2 weeks or longer, flatulence, abdominal cramping, anorexia, and foul-smelling stools. Some infected persons, however, may be asymptomatic. There were over 17,000 reports of giardiasis in the US during 2007 (provisional data).

In 2007, 65 cases of confirmed giardiasis were reported among Philadelphia residents (Figure 11). Males accounted for 57% of cases. Cases ranged in age from 1 to 88 years with a median age of 27 years. There were no fatalities as a result of giardiasis. For the 62 confirmed cases with available symptom information, diarrhea was the most commonly reported symptom (69%), followed by abdominal pain (48%), nausea (26%), vomiting (23%), and fever (16%). Of the 61 cases with reported risk factors during their incubation period, 19 cases (31%) traveled or lived in a foreign country with Africa and Southeast Asia as the most common locations reported, 13 cases (21%) reported swimming, three (5%) attended or worked at daycare centers, three (5%) reported ingesting untreated water. A number of the individuals with foreign travel included those screened upon arrival in the US as displaced persons.

Figure 11. Reported Cases of Giardiasis, by Month of Report: Philadelphia, 2003 to 2007



Shiga-toxin Producing *Escherichia coli* (STEC)

Disease caused by shiga-toxin producing *Escherichia coli* (STEC) can include severe abdominal pain, diarrhea (often bloody), and little to no fever. The most notable STEC serotype is *E. coli* O157:H7, which has a typical incubation period of 3 to 4 days. Hemolytic uremic syndrome (HUS) is a rare STEC outcome that affects the kidneys and occurs in 8% of children with *E. coli* O157:H7 infections. In adults, STEC disease may also manifest as thrombotic thrombocytopenic purpura, a condition that causes blood clots in small blood vessels throughout the body. STEC is primarily transmitted via contaminated food or water with ground beef being one of the most common food sources. Additional modes of transmission include contact with animals and their environment, person-to person spread, or contact with contaminated surfaces. In the US during 2007, 4,397 reports of STEC were received (provisional data), which is very similar to the 4,432 case reports received in 2006.

STEC Surveillance in Philadelphia – 2007

Of the four STEC cases reported in 2007 (19 reported in 2006), three were confirmed and one was a suspect case. *E. coli* O157:H7 was isolated from one confirmed case. The four cases of STEC were equally distributed by gender and had a mean age of 42 years. All three cases for whom symptom and risk factor information were available reported experiencing diarrhea, fever, and abdominal cramps. Two cases reported bloody diarrhea and one was diagnosed with hemolytic uremic syndrome. No deaths were associated with STEC infection. Only one case reported consumption of ground beef prior to symptom onset. None of the cases reported being on a farm, consuming well water, or traveling to a foreign country during their incubation period.

Salmonellosis (*Salmonella* spp.)

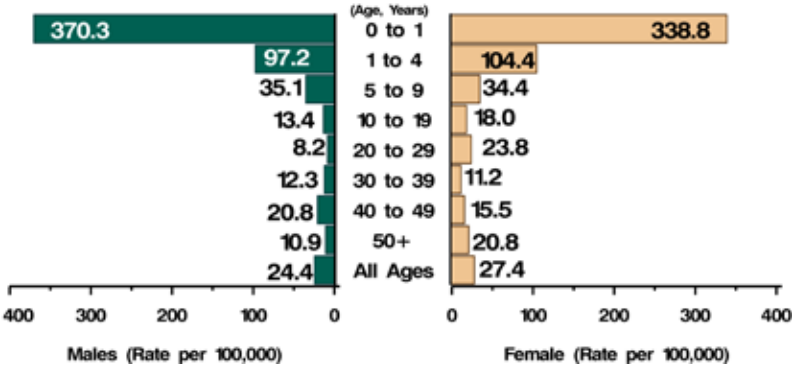
Salmonellosis is caused by infection with *Salmonella* bacteria. Salmonellosis is characterized as a gastrointestinal disease in which diarrhea, abdominal cramps, and fever are the most predominant symptoms. Infection with *Salmonella* serotype Typhi causes a different spectrum of symptoms (e.g. sustained fever, headache, abdominal pain, malaise, anorexia, non-productive cough, and splenomegaly) and is classified as typhoid fever. Food is the primary vehicle for *Salmonella* transmission. In addition to food, ingestion of contaminated water, contact with animals (particularly reptiles or amphibians), exposure to contaminated medical instruments, and person-to-person spread may transmit *Salmonella*. There were 319 reports of typhoid fever and 43,748 of *Salmonella* in the US during 2007 (provisional data). The national goal (Healthy People 2010) for *Salmonella* incidence is 6.8 per 100,000 population, which is 53% lower than the national rate in 2007 of 14.5 reported cases per 100,000 population.

Salmonella Surveillance in Philadelphia – 2007

In 2007, no cases of typhoid fever were reported in Philadelphia. The reported number of laboratory-confirmed cases of *Salmonella* in the city of Philadelphia was 321. Eighty-three additional probable cases were identified via epidemiologic links. The incidence rate of salmonellosis was 26.6 per 100,000 persons compared to 19.9 per 100,000 persons in 2006. Females had a slightly higher proportion of disease compared to males (56% vs. 44%). Disease incidence was the highest in those under one year of age (Figure 12). Over 90% of the 336 cases with symptom histories reported experiencing diarrhea. Additional symptoms reported include fever (58%), abdominal pain (52%), vomiting (34%), and nausea (25%). Twenty-six cases were hospitalized for salmonellosis and two persons died. Of the 290 cases with available information on risk factors during the incubation period, 106 (37%) reported contact with an animal including 15 with reptile exposure and 13 (4%) reported foreign travel.

At least 39% of cases were part of a *Salmonella* cluster – including households, specific events, or laboratory based clusters (common PFGE pattern).

Figure 12. Rates of Salmonellosis per 100,000 Population by Age and Gender: Philadelphia, 2007



Serotype information was available for 296 (92%) of the 321 confirmed cases. The most common serotypes were *S.* enteritidis (50%) and *S.* typhimurium (20%).

Of the 321 confirmed *Salmonella* reports, 277 (86%) had antibiotic susceptibility for ampicillin performed and 12% were resistant (Table 4).

Outbreak of *S.* Typhimurium at Church Catered Event

DDC investigated one local outbreak of *S.* typhimurium (see the PFGE section for additional details) associated with catered food served at a church function including 11 lab-confirmed cases and 55 probable cases. Fifty-two of these cases were Philadelphia residents. Although no specific food item was linked to the outbreak, poor environmental health conditions in the caterer's kitchen were believed to support transmission and growth of bacteria in the food.

Shigellosis (*Shigella* spp.)

Bacteria of the species *Shigella* can cause an acute disease characterized by repeated bouts of diarrhea (sometimes bloody), severe abdominal cramping, and fever. There are four *Shigella* species, or serogroups: *S. sonnei* and *S. flexneri* cause the most morbidity in the US; whereas, *S. boydii* and *S. dysenteriae* affect mainly developing countries or regions with poor sanitation. The risk for a shigellosis outbreak is especially high for individuals with no recent or previous exposure to the bacterium, such as daycare attendees or school children. Since the most common route of transmission is fecal-oral, any failures in infection control (inadequate surface disinfection or poor handwashing) can allow for an outbreak. Only a few fecal particles containing *Shigella* are sufficient to infect a susceptible person. In the

US during 2007, there were 17,193 shigellosis cases reported (provisional data).

Shigella Surveillance in Philadelphia – 2007

During 2007, PDPH received 138 reports of shigellosis, of which only 61 (44%) were culture-confirmed. As can be seen in Figure 13, many of the 2007 reports, and an especially large proportion of the 77 probable cases (96%), were associated with a specific school outbreak, which is discussed in more detail below.

Of the 25 non-outbreak cases, 23 (92%) were laboratory-confirmed, 22 (88%) experienced diarrhea, and seven cases (28%) were associated with three separate household clusters. The median age for these cases was 33 years (range: 1 year-83 years). Only four hospitalizations occurred among these cases. Four cases reported travel during their incubation period (Costa Rica, Italy, and Puerto Rico). Of the 22 isolates with serotyping results, four (18%) were *S. flexneri* type II (with no apparent links to other cases) and the rest were *S. sonnei*.

Of the 41 isolates that were tested for antibiotic susceptibility, 32% exhibited resistance to bactrim (trimethoprim-sulfamethoxazole) and almost a quarter were ampicillin resistant (Table 4). In 2006, only nine isolates were tested – none were resistant to bactrim and 24% were resistant to ampicillin.

Outbreak of *S. sonnei* in a School

In mid-November 2007, an elementary school in Northeast Philadelphia notified PDPH of a gastrointestinal illness circulating among students and staff. Through an outbreak investigation, PDPH linked 112 cases among Philadelphia residents occurring during 2007 to the school (Figure 13). Two additional cases resided in surrounding jurisdictions and eight Philadelphia cases were reported in early 2008 (all among household contacts). Seventy-four outbreak cases (66%), including a number of household contacts, were classified as probable due to lack of laboratory confirmation.

The median age for the outbreak was 8 years old (range: 11 months-63 years), which is younger than the non-outbreak cases. Three cases experienced diarrhea severe enough to warrant hospital admission. All 38 culture-confirmed infections associated with the outbreak during 2007 were *S. sonnei* (see PFGE section for further information about this outbreak).

PDPH issued guidelines for outbreak management that included school exclusion policies for symptomatic students and staff; recommendations for cleaning and hand washing; guidance for parents regarding medical care of symptomatic family members and sample submission for cultures. Sitevisits by DDC and PDPH Environmental Health Services (EHS) resulted in no critical violations, and the source of the outbreak was not identified.

Figure 13. Shigellosis: Sporadic Cases Versus School–Associated Outbreak Cases by Week of Diagnosis: Philadelphia, 2007

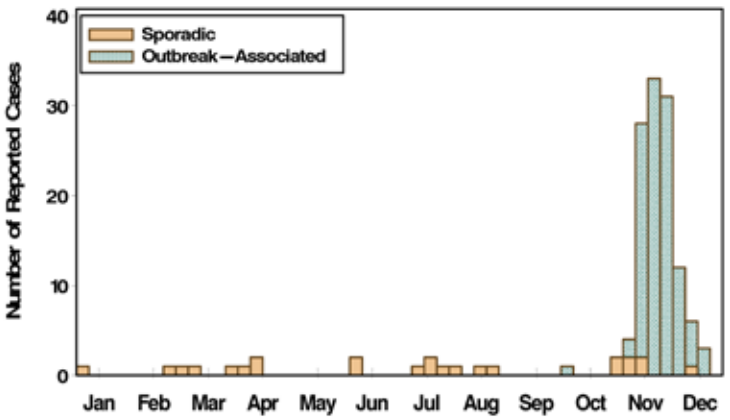


Table 4. Antibiotic Resistance of Selected Enteric Pathogens in Philadelphia, 2007

Pathogen	Antibiotics Tested	Total Tested	Resistant n (%)	Intermediate n (%)
Campylobacter				
	Ciprofloxacin	24	5 (21)	0 (0)
	Erythromycin	18	1 (6)	0 (0)
	Trimethoprim-Sulfamethoxazole	8	0 (0)	1 (13)
Salmonella				
	Ampicillin	277	32 (12)	0 (0)
	Ceftriaxone	86	0 (0)	3 (3)
	Ciprofloxacin	258	0 (0)	0 (0)
	Erythromycin	8	1 (13)	0 (0)
	Trimethoprim-Sulfamethoxazole	266	2 (1)	0 (0)
Shigella				
	Ampicillin	41	10 (24)	0 (0)
	Ciprofloxacin	39	0 (0)	0 (0)
	Trimethoprim-Sulfamethoxazole	44	14 (32)	0 (0)

Pulsed-Field Gel Electrophoresis (PFGE)

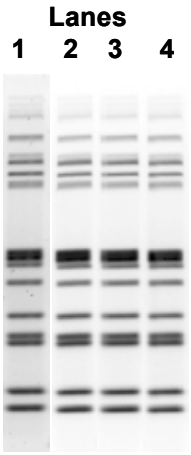
Foodborne diseases cause an estimated 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths in the US each year. One of the most important tools available for the investigation of foodborne outbreaks is PFGE, a technique used by laboratorians to separate fragments of bacterial DNA to create a "fingerprint," or PFGE pattern. The PFGE patterns are used to link cases to outbreaks or common source exposures, such as a contaminated food product.

In 1993, the CDC used PFGE to identify cases associated with a large *E. coli* O157:H7 foodborne outbreak. These cases with identical PFGE patterns were linked to contaminated hamburger. In response to that outbreak, CDC created a national database called PulseNet to collect PFGE patterns submitted to CDC by designated PFGE laboratories and federal food regulatory agencies. All PulseNet participants utilize a standardized PFGE protocol and specialized software to produce and compare local bacterial DNA fingerprinting results with those submitted by other sites, which allows for outbreaks to be identified.

The Philadelphia Public Health Laboratory (PHL) PFGE section has been in development since 2002. The laboratory has achieved CDC PFGE certification for *Salmonella*, *Shigella*, Shiga toxin-producing *E. coli* (including *E. coli* O157:H7), and *Listeria monocytogenes*. In 2007, PHL performed PFGE on 33 *Salmonella* isolates, seven *Shigella* isolates and 14 *Listeria monocytogenes* isolates.

The PFGE lab played a major role in the investigation of two large 2007 outbreaks – *Salmonella* typhimurium and *Shigella sonnei*. In September 2007, DDC investigated a large *S.* typhimurium outbreak linked to a church supper, detailed in the salmonellosis section. The PFGE lab determined that the PFGE pattern from four cases were identical to the *S.* typhimurium PFGE pattern found in the caterer's kitchen sink, a link that helped establish that source of the infection (Figure 14). In November 2007, the PHL PFGE laboratory assisted with the investigation of an outbreak of *S. sonnei* linked to an elementary school by PFGE. Early in this outbreak, PHL linked isolates by PFGE. There were five distinct (but very similar) PFGE patterns associated with the outbreak that had not previously reported to PulseNet. The PFGE information provided by the PHL also helped distinguish cases of *S. sonnei* associated with the outbreak from those sporadic background cases occurring in the community.

Figure 14: PFGE Pattern of Salmonellosis Church Outbreak. PFGE patterns for *Salmonella* isolates obtained from cases (lanes 1,2,3) and the caterer's food preparation sink (lane 4).



PDPH PHL is always willing to accept isolates of *Salmonella*, *Shigella,* Shiga toxin-producing *E. coli* (including *E. coli* O157:H7), and *Listeria monocytogenes* for PFGE. To submit isolates for PFGE, please contact the DDC Acute Communicable Disease Program at (215) 685-6740.

Hepatitis *Infections*

Hepatitis A

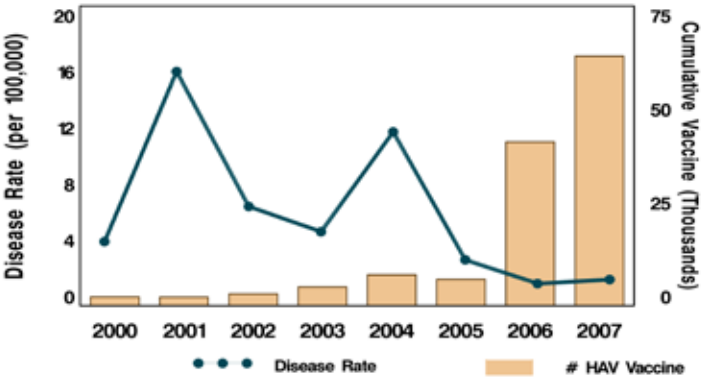
Hepatitis A is an acute, self-limited disease of the liver caused by the hepatitis A virus (HAV). The virus is transmitted via the fecal-oral route and is most commonly spread person-to-person, although common-source foodborne outbreaks still occur. Characteristic symptoms of HAV infection include jaundice, diarrhea, fever, fatigue, abdominal pain, nausea, and loss of appetite. The incubation period is 28 days (range: 15-50 days), and the virus is present in the blood and feces 10-12 days post infection. In about 15% of infected individuals, the disease can be prolonged or can include relapses for as long as 6-9 months. The likelihood of symptomatic illness increases with age. At least 70% of infected adults and older children have symptoms that can last several weeks, whereas only 30% of younger children (< 6 years of age) are symptomatic. Confirmation of HAV infection requires laboratory confirmation of HAV immunoglobulin M (IgM) antibodies in the presence of either discrete onset of jaundice or elevated serum aminotransferase levels, which is indicative of liver damage.

Infection with HAV induces life-long immunity. The disease is also vaccine-preventable by the hepatitis A vaccine, which was licensed in 1995. In 2006, the Advisory Committee on Immunization Practices (ACIP) recommended that all children receive their first dose of vaccine at 12-23 months of age followed by a booster dose 6-18 months after the first dose. Adults recommended to receive HAV vaccine (one dose followed by a booster 6-12 months later) include international travelers, men who report having sex with men (MSM), illegal drug users, persons with occupational risk, and persons with chronic liver disease. As HAV vaccination coverage in the US becomes more widespread, reported HAV cases continue to drop: there were 2,708 reports in 2007, compared to 13,397 in 2000.

Hepatitis A Surveillance in Philadelphia – 2007

In 2007, DDC investigated over 63 reports of suspect hepatitis A infections. Of these, nine were found to be confirmed acute hepatitis A cases, which represents a 36% decrease from 2006 and a continuation in decreasing HAV reports in Philadelphia as vaccination coverage increases (Figure 15). In 2007, five confirmed cases (56%) were male. Cases ranged in age from 8 to 80 years, with a median age of 43 years. None of the cases were epidemiologically linked. The most frequently reported sign or symptom was high alanine aminotransferase (ALT) levels (67%). Five cases (56%) were jaundiced or had a loss of appetite, four (44%) reported fatigue, abdominal pain, nausea, or vomiting, and three cases (33%) had diarrhea. There was one hospitalization and no fatalities. None of the individuals reported hepatitis A vaccination prior to infection. Only two cases reported any risk factors – one reporting foreign travel, and the other, consumption of raw shellfish.

Figure 15. Rates of Reported Hepatitis A and Cumulative HAV Vaccine Distribution: Philadelphia, 2000 to 2007



Acute and Chronic Hepatitis B

Hepatitis B is a viral infection that can cause acute illness and long-term sequelae for those chronically infected, including cirrhosis (scarring) of the liver, liver cancer, liver failure, and death. The risk of chronic infection is highest among the young, occurring in 90% of exposed infants and 25-50% of exposed children under 5 years of age (see the Perinatal Hepatitis B Infection section for more detail). Hepatitis B virus (HBV) can be spread through direct contact with the blood and other body fluids of infected individuals, usually through sexual contact or needle stick exposure. Approximately 3,940 acute HBV infections were reported in the US during 2007, which continues the decreasing trend since the mid-1990s. Although probably an underestimate of the true acute hepatitis B burden, this still represents a major decline in acute – and eventually chronic – HBV infection mainly due to the national hepatitis B vaccine campaign. This campaign now targets all infants at birth, any child under 19 years of age who has not completed the 3-dose series, and adults potentially at increased risk for infection (health care workers, individuals on dialysis, intravenous drug users, household or sexual contacts of individuals HBV surface antigen positive

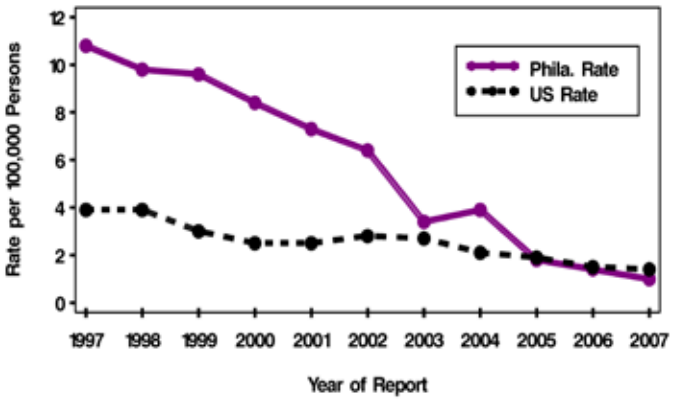
(HBsAg+), men who have sex with men (MSM), and those living in group homes). Available data from Philadelphia suggest very high HBV vaccine coverage for young children – 89% of 2 years old have a complete series.

Acute Hepatitis B Surveillance in Philadelphia – 2007

According to the CDC case definition, for cases to be classified as acute hepatitis B infection, the individual must exhibit signs and symptoms that are clinically consistent with acute hepatitis such as jaundice, elevated liver enzymes, and antibodies (IgM) against the hepatitis B core antigen (IgM–Hbc). Without the IgM-Hbc, public health officials cannot determine the true burden of acute hepatitis B in the population.

In 2007, there were 15 confirmed case reports of acute HBV infection in Philadelphia. This represents a dramatic decrease over the past decade (Figure 16). The median age of acute HBV cases was 37 years (range: 17-52 years). None of the infected individuals reported a history of HBV vaccination. Nine (60%) cases were female. All individuals had evidence of jaundice and six were hospitalized. The main risk factors reported were sexual – same sex partnerships for four of the six male cases, and more than one partner in the six months prior to infection for seven of the 14 individuals with risk factor information available.

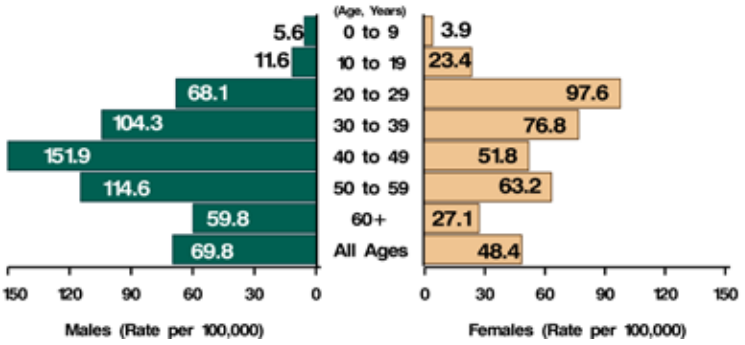
Figure 16. Rates of Acute Hepatitis B : Philadelphia and US, 1997 to 2007



Chronic Hepatitis B Surveillance in Philadelphia – 2007

In 2007, the CDC expanded the chronic hepatitis B case definition to allow for probable cases based on initial laboratory results (HBV DNA, envelope antigen [HBeAG], or surface antigen [HbsAg] detection). Chronic hepatitis B cases can be confirmed with a second positive laboratory test six months after the initial test. During 2007, PDPH received 1,644 reports of which 907 were probable cases and 739 were confirmed chronic hepatitis B infections. Of the 1,624 chronic case reports with age or sex information, 56% were males and the median age was 41 years (range: 13 months-88 years). The rates of reported chronic HBV infection were highest among adult males aged 30 to 59 years (Figure 17). Current PDPH priorities for hepatitis B case investigation and disease control focus on the identification of women of childbearing age with chronic active hepatitis B to screen for any potential cases of perinatal Hepatitis B (described in the following section). Further expansion of outreach and education regarding HBV transmission, and testing and vaccination of contacts at risk are targets for the coming years.

Figure 17. Rates of Newly Reported Chronic Hepatitis B per 100,000 Population by Age and Gender: Philadelphia, 2007



Perinatal Hepatitis B

Philadelphia administers a Perinatal Hepatitis B Prevention Program (PHBPP) through the DDC Immunization Program, which is aimed at HBV infection prevention among infants born to women with chronic hepatitis B virus (HBV) infection and preventing spread of HBV among other household contacts of those infected with HBV. HBV is highly likely to be transmitted from an infected mother to her baby during childbirth. As many as 90% of infants who become HBV-infected at birth go on to develop chronic HBV infections. Therefore, HBV prevention among infants at high risk for infection is key for disease prevention in the broader population.

The Philadelphia Board of Health requires that all women be screened for HBV infection in pregnancy through use of a hepatitis B surface antigen (HBsAg) test, and that positive HBsAg results be reported to DDC. The PHBPP Nurse Manager works with pregnant women who test positive for chronic HBV infection and their medical care providers (primary care and obstetrical) to ensure that their infants receive hepatitis B immune globulin (HBIG) prophylaxis at delivery, a birth dose of hepatitis B vaccine, and at least two additional doses of vaccine 1 and 6 months after the birth dose. After at least three doses of hepatitis B vaccine have been administered, these infants receive serologic testing to define their immune status to HBV. The follow-up process – from prenatal identification to birth to vaccination and post-immunization screening – can take up to 2 years.

In 2006, the most recent completed year, 119 live infants were born to women with chronic HBV who reside in Philadelphia,

which is 14% lower compared to 2005 (138 reports). In 2006, 55% of women with chronic HBV originated from Asian countries, most commonly China, Korean and Japan. Every infant received the birth dose of HBV vaccine and 99% received HBIG within one calendar day of birth. More than 94% of the infants received HBIG and three doses of vaccine by the 8 months of age and 97% received all immunoprophylaxis (HBIG and three vaccine doses) by 1 year of age. Complete serological testing was not possible for three infants (3%) whose parents refused and 13 (11%) whose families left the US after completion of vaccine series. Of the 103 infants with serological results, 99 infants (96%) were found to be immune, two susceptible (2%), and two antigen positive (2%). Both of the infants with perinatal transmission had been immunized with HBIG and HBV vaccine series on time. In addition, the vaccination series was repeated for both children who remained susceptible after the first series – one was immune upon completion, but the other was unable to be retested after completion due to refusal by the parents.

During home visits, 197 household contacts of HBsAg+ mothers and infants were identified, educated, and offered free serological testing. Of the 151 contacts tested, 17 (11%) were positive for HBV infection, 118 (78%) were immune, and 16 (11%) were susceptible. Nine (56%) of the 16 susceptible household contacts completed a three-dose HBV vaccine series provided by DDC staff.

Complete 2007 PHBPP results will not be available until 2009. The PHBPP learned of 110 infants born to mothers with chronic HBV infections in 2007, and as of July 2008, all received a birth-dose of HBV vaccine and 108 infants (98%) received HBIG. Data collection, follow-up, and serologic testing will continue as the year progresses.

Hepatitis C

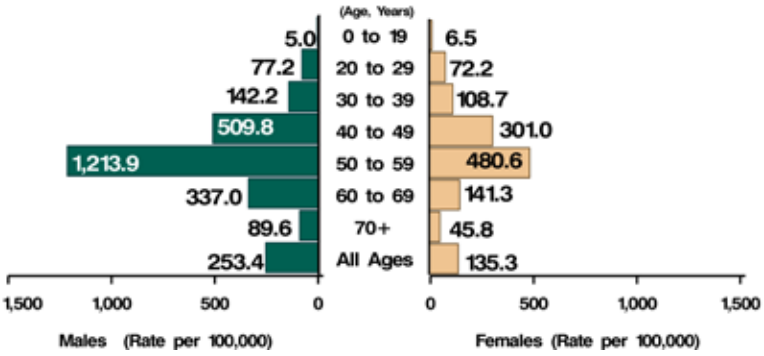
Hepatitis C Virus (HCV) is the most common chronic bloodborne infection in the US. The CDC estimates that 4.1 million Americans (1.6% of the US population) have been infected with HCV, of whom 78% are chronically infected. HCV infection, often transmitted through injection drug use or perinatally, can lead to cirrhosis of the liver and liver cancer. Approximately 70% of chronically infected individuals have chronic liver disease. Persons with acute HCV infection can be asymptomatic or have a mild clinical illness. True HCV incidence is difficult to determine since acute hepatitis C is not well reported and comprehensive serologic testing to adequately confirm infection is often not performed. As HCV is a growing public health issue, national recommendations rely on preventative activities to reduce risk of transmission through education, clinical, and public health interventions.

Hepatitis C Surveillance in Philadelphia – 2007

DDC has maintained a registry of positive HCV laboratory results since 1998. The registry, which includes mainly individuals with chronic infections, is used to monitor disease trends and reporting, as well as to facilitate counseling, education, and follow-up of infected persons. In 2007, DDC added 4,628 reports to the HCV registry, which was 13% lower than in 2006. There were no acute HCV infections reported during 2007. Of those reported, 2,886 (62%) could be classified as confirmed, 21 (<1%) were considered probable cases (positive antibody tests and elevated liver enzymes but lacking additional confirmatory testing), and 1,721 (37%) only had positive HCV antibody tests. Of the 2,886 confirmed reports, 1,785 (62%) were male and the median age was 50 years (range: 0 years-105 years) as shown in Figure 18. These cases represent opportunities for outreach and education to prevent the complications of infection and to interrupt transmission.

The PDPH Adult Viral Hepatitis Prevention Coordinator (AVHPC) is responsible for coordinating activities related to viral hepatitis prevention, including: testing programs; outreach, training and education programs; the development and dissemination of hepatitis-related information geared towards the healthcare community and general public; and coordination with appropriate programs citywide to ensure access to hepatitis vaccination for adults at high risk for hepatitis A and B (there is no vaccine for HCV). The AVHPC also supports hepatitis surveillance activities and appropriate disease control measures.

Figure 18. Rates of Newly Confirmed Hepatitis C Virus, Past or Present Infection per 100,000 Population by Age and Gender: Philadelphia, 2007



Vector-borne *Diseases*

Lyme Disease *(Borrelia burgdorferi)*

Lyme disease is a bacterial infection caused by the spirochete *Borrelia burgdorferi*. The bacteria normally live in small mammals and are transmitted to humans through the bite of an infected deer tick (*Ixodes scapularis* and *I. pacificus* in the US). Early manifestations of Lyme disease, which usually occur 3 to 32 days after a tick bite, may include fever, headache, fatigue and a characteristic skin lesion called erythema migrans (occurs in 70-80% of those infected). If left untreated, late manifestations involving the joints, heart and nervous system can occur.

A major obstacle for confirmation of Lyme disease infection is standardization of serological tests. Serum immunoglobulin G (IgG) or M (IgM) to Lyme bacteria can be used to demonstrate infection; however, assays for IgMs have a higher likelihood of false-positive results. The serological test for IgG has been determined as the more reliable of the two tests, thereby making testing for IgG the better choice for diagnosis of Lyme disease. Additionally, testing for Lyme disease includes a two-tiered method, starting with either an enzyme immunoassay (EIA) or immunofluorescent assay (IFA) and followed with a Western immunoblot for those positive on EIA or IFA. Recommendations on Lyme test performance and interpretation from the CDC are available (CDC. MMWR. 1995; 44:590–1).

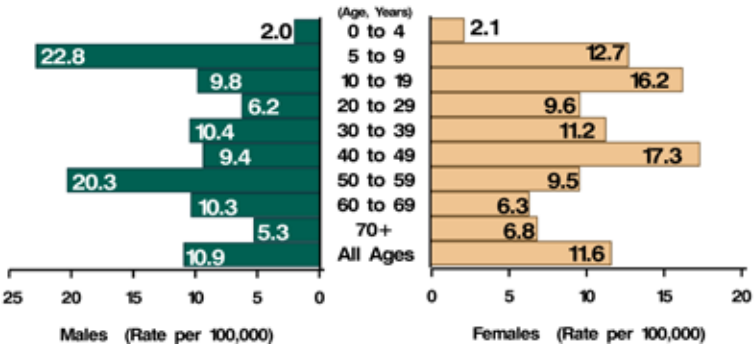
Lyme Disease Surveillance in Philadelphia – 2007

In 2007, clinical laboratories reported positive Lyme disease serologic tests on 766 unique individuals. Upon investigation, 172 (22%) of these individuals were determined confirmed cases. The remaining cases were not confirmed due to lack of clinical information from the healthcare provider, failure to fulfill the clinical case definition, or the individual lived outside of Philadelphia.

The median age among confirmed cases was 31 years (range: 2-88 years) and 95 cases (55%) were female. Overall, the rate of Lyme disease appears to be slightly higher in women (Figure 19). Among the clinical manifestations of the disease, 85 reported cases (49%) had erythema migrans, 94 (55%) arthritis, 11 (6%) Bell's palsy, ten (6%) radiculopathy, and two (1%) carditis. Twenty-eight cases (16%) had multiple symptoms reported.

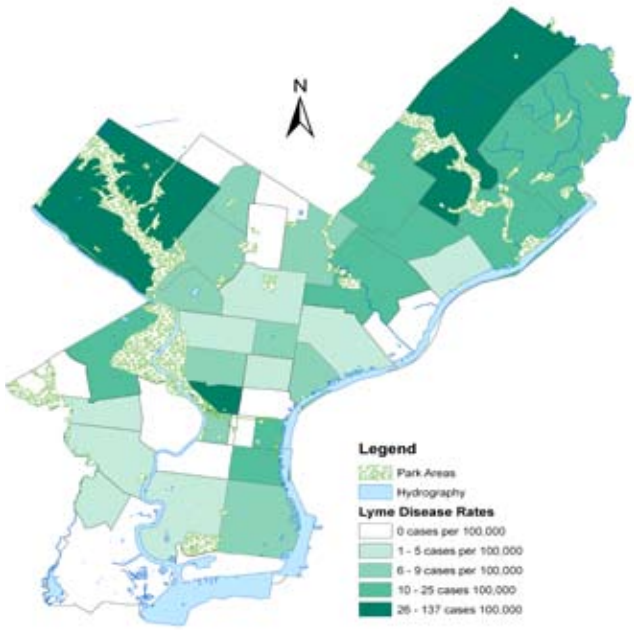
The distribution of laboratory test dates supports the known increases during summer and coincides with increase outdoor acitivity and potential exposure to *B. burdorferi*-infected ticks.

Figure 19. Rates of Lyme Disease per 100,000 Population by Age and Gender: Philadelphia, 2007



The highest numbers of cases were from the northeast and northwest areas of the city bordering two of the city's major parks, Wissahickon River Valley and Pennypack (Figure 20).

Figure 20. Rates of Lyme Disease per 100,000 Population by ZIP code: Philadelphia, 2007



West Nile Virus

West Nile Virus (WNV), an RNA flavivirus, is transmitted to humans primarily through the bite of mosquitoes carrying the virus. Mosquitoes acquire the virus by feeding on infected birds. Rarely, WNV can be transmitted among humans via organ transplants, blood transfusions, and from mother to child during pregnancy. Approximately 80% of persons infected with WNV are asymptomatic. Mild symptoms are typically self-limiting and consist of fever, headache, nausea, vomiting, and myalgia. More severe sequelae such as stupor, disorientation, coma, tremors, convulsions, vision loss, numbness, aseptic meningitis, and flaccid paralysis can last for several weeks with permanent neurological damage possible. WNV emerged in the US (New York City) during 1999. Philadelphia WNV cases peaked at 24 in 2003 after first identification in 2001 and have sharply declined since the peak, which is consistent with national trends. The current case definition for WNV infection includes both neuroinvasive and non-neuroinvasive (e.g. WNV fever) disease. In 2007, there were 1,172 neuroinvasive and 2,332 non-neuroinvasive WNV reports nationally (provisional data). There was one asymptomatic WNV infection in Philadelphia during 2007, identified during routine blood donation screening.

WNV prevention necessitates a close partnership between DDC and the PDPH Environmental Health Services (EHS) Vector Control Program. EHS performs surveillance for WNV in mosquitoes, as well as targeted treatment of mosquito pools, which is the primary means of reducing WNV transmission. From May 15 to September 15, 2007, the EHS program treated 64,178 catch basins (storm-water sewers) with larvicide in order to kill mosquito larvae. EHS also conducted 35 adult-focused treatments including barrier treatments for control and ultra low volume spray events between May and October 2007. During this period, 17 sampled mosquito pools in locations throughout the city tested positive for WNV, indicating that the virus was still circulating within Philadelphia.

Malaria (*Plasmodia* spp.)

Malaria is a parasitic infection that is spread from person to person by the bite of an infected *Anopheles* mosquito. Symptoms of malaria have a flu-like presentation that includes chills, headache, myalgia and erratic fever. Malaria is not endemic in the US, and the large majority of cases reported in this country are in individuals who traveled to endemic areas (Southeast Asia, Sub-Saharan Africa, and tropical/subtropical regions of Latin and South America).

In 2007, seven confirmed cases of malaria were reported to PDPH, a 53% decrease from 2006. Of the seven cases reported, three (43%) were male. The median age was 28 years (range: 3 - 55 years). Five cases had parasitemia with *Plasmodium falciparum*, one with *P. malariae*, and one was unknown. All cases reported travel to malaria-endemic countries prior to the onset of symptoms (five to West African countries and two to India). Of the six cases with prophylaxis information, four reported no prophylaxis prior to travel.

Dengue Fever

Dengue Fever, primarily a tropical or sub-tropical disease, results from infection with one of the four related *Flavivirus* serotypes (DEN-1, DEN-2, DEN-3, and DEN-4). Immunity to infection is serotype-specific, so it is possible to have up to four different Dengue infections. The infection is spread through a cycle involving humans and mosquitoes of the *Aedes* species. Infection with one of these viruses can result in a large variety of clinical illness ranging from a nonspecific viral syndrome with sudden fever onset, severe headache, muscle and joint aches to serious and potentially fatal hemorrhagic disease, which is more rare (~5% case fatality rate). The severity of clinical disease is related to viral serotype, prior infections, and age with younger individuals (under 15 years of age) experiencing the most severe disease. Worldwide approximately 50-100 million cases of Dengue Fever occur annually. Dengue Fever is endemic in most tropical areas in Africa, the Americas, Asia, the Caribbean, and the South Pacific.

During 2007, DDC received seven probable and one confirmed report of Dengue Fever, compared to only one report in 2006 and none prior to 2006. Of these eight reports, five cases (63%) were female. The median age was 31 years (range: 25-60 years) with nearly half (43%) being 21-30 years old. Seven cases reported travel during the incubation period, with the most common location being the Caribbean.

Immunizations and *Vaccine-Preventable Diseases*

Currently, children should be routinely immunized against 16 vaccine-preventable diseases, including influenza, hepatitis A and B, varicella, invasive *Streptococcus pneumoniae* disease, invasive *Haemophilus influenzae* disease, and meningococcal infections – which are discussed in this report. A number of vaccines are recommended for adults as well, with indications determined by health condition, age, lifestyle, and occupation.

Through the Federal Vaccines For Children program (VFC), the DDC Immunization Program provides over $22 million in free vaccine to nearly 300 health care providers in Philadelphia annually. This enables more than 280,000 children in the city to receive immunizations and offers substantial cost savings to VFC-enrolled physicians. VFC allows eligible children (0-18 years of age, and on Medicaid or uninsured) to receive all recommended childhood vaccines without out-of-pocket costs to their families, removing a significant barrier to timely immunizations. The Immunization Program operates an extensive quality assurance program with VFC-enrolled providers to ensure compliance with immunization standards, including vaccine storage and handling, immunization documentation, and timely and appropriate administration of immunizations. The Vaccines for Adults At Risk program (VFAAR) provides vaccines to select health care providers who serve adults at high risk for vaccine-preventable diseases.

The KIDS Immunization Registry is a web-based system that serves as a centralized repository of immunization information on all children 0-18 years of age who receive vaccinations in Philadelphia. KIDS is populated by birth data from the state and immunization data submitted by health care providers. Overall, KIDS has information on approximately 480,000 children and about 5.5 million pediatric immunizations. The Immunization Program, which maintains the KIDS registry, continually works to improve the registry by increasing the number of immunizations captured and providers utilizing the system.

KIDS allows providers to determine the immunizations a child has received and those that are needed, helping promote timely immunizations, prevent missed opportunities for vaccination, and avoid overvaccination. The registry is also used to identify children who are behind in their immunizations so that they may be referred to community-based outreach services, which work with the families of these children to educate them on the importance of timely immunizations and assist them in establishing a consistent source of medical care. The registry is also used for citywide planning and policy purposes, since analysis of the KIDS data can identify undervaccinated populations in the City. Based on these analyses, Immunization Program resources can be directed to those areas of increased need and risk.

Visit the Immunization Program website for more information: https://kids.phila.gov/

Pertussis *(Bordetella pertussis)*

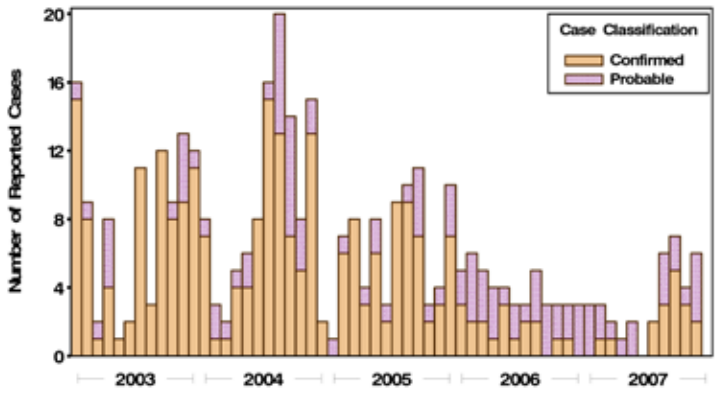
Pertussis (whooping cough) is a highly communicable disease caused by the bacterium *Bordetella pertussis*, which often infects the upper airway. In an unimmunized population, 12-17 individuals would be expected to be infected with pertussis from contact with a single primary case. Despite long-term decreases in pertussis incidence in the US, increases have been observed since 2001 with a peak in 2005. Many of the cases in the post-2000 surge have been among non-infants. However, infants are still at the greatest risk for clinical disease and complications because they are too young to be fully vaccinated. Often adults, including family members and health care workers (HCW), are identified as the source of infant infections. In 2007, 8,797 cases (2.9 cases per 100,000 population) were reported in the US (provisional data).

For a case to truly be considered pertussis, there must be either laboratory confirmation (positive culture for those with an acute cough illness of any duration or positive PCR for those with classical pertussis symptoms) or epidemiologic link to a laboratory confirmed case (either PCR or culture positive). For suspected pertussis cases, DDC can facilitate diagnostic testing (provide guidance for specimen collection, provide specimen collection materials if necessary, and test or aid in shipment to testing facilities). In potential outbreak situations, DDC can assist with infection control and disease management.

Pertussis requires high vaccine coverage (92-94% of population) to create "herd protection" to safeguard the entire population. This is achieved through a four dose infant/childhood DTaP vaccination series (DTaP: diphtheria, tetanus toxoids, and acellular pertussis vaccine) followed by a fifth dose at 4-6 years of age, and regular boosters later in life to counteract waning immunity. Adolescents 11-18 years of age can receive a single dose of Tdap (Tdap: tetanus, diphtheria, and acellular pertussis) rather than Td (Td: tetanus and diphtheria) in order to allow for another pertussis booster. And for adults (19-64 years) Tdap can be substituted for a Td booster to assure protection against pertussis in adulthood. High priority Tdap vaccination includes adults with close infant contact – family members and HCW in obstetric units, neonatal units, and pediatric offices. Women should receive a dose of Tdap before becoming pregnant, and immediately post-partum if not given one before pregnancy.

Figure 21 shows the overall decreasing trend in the number of pertussis cases since 2003 when 109 cases were reported.

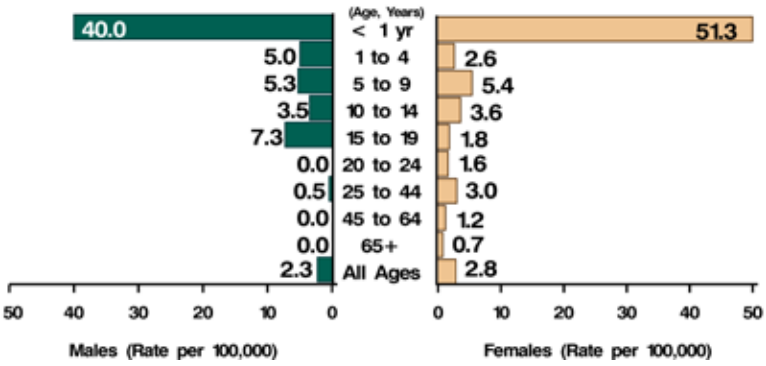
Figure 21. Reported Cases of Pertussis by Case Classification: Philadelphia, 2003 to 2007



Pertussis Surveillance in Philadelphia – 2007

The 39 pertussis reports received by PDPH in 2007 included 17 confirmed and 22 probable cases, yielding a rate of 2.6 cases per 100,000 population. Twenty-three (59%) of these cases were female, including nine women of child-bearing age (15-45 years old) (Table 5). However, the highest rates are still among infants (Figure 22). The most commonly reported symptoms included paroxysmal cough (62%), whoop (62%), post-tussive vomiting (55%), and apnea (45%). Of the 37 cases with documented antibiotic treatment, 81% received antibiotics effective against pertussis (azithromycin, clarithromycin, erythromycin or trimethoprim-sulfamethoxazole). One confirmed case was in a HCW in a children's hospital; however, no other cases were linked to this individual.

Figure 22. Rates of Pertussis per 100,000 Population by Age and Gender: Philadelphia, 2007



Most (73%) of probable cases had no PCR or culture performed (Table 5), which would have confirmed the infection if positive. Nearly half of the reported cases (18, 46%) were part of a household cluster. The average number of contacts exposed per case was 3.3 individuals (range: 1-6 individuals). Community clinicians provided prophylaxis to 79% of these contacts.

Table 5. Age and Case Classification of Pertussis Reports: Philadelphia, 2007

Age in years	Confirmed Cases		Probable Cases			Total (%)
	Lab confirmed	Epi-linked	PCR+/ not clinical case	Culture/ PCR negative	No PCR or culture	
<1	6	0	0	1	2	9 (23)
1-9	4	1	0	1	3	9 (23)
10-19	2	1	1	1	4	9 (23)
>19	2	1	1	1	7	12 (31)
Total	14	3	2	4	16	39

In the twelve cases under 5 years of age (eight confirmed and four probable), vaccination was not always appropriate for the child's age. There were three cases under 2 months old who were too young to be vaccinated – including one confirmed case who died. Among the four confirmed cases aged 2 to 6 months (first DTaP recommended for 3 months), three had received the first dose while the other had not. The two other cases under 1 year of age included an unvaccinated 9 month old probable case and a 10 month-old confirmed case with 3 doses of DTaP prior to onset. For the three cases aged 1 to 5 years, the two confirmed cases were fully vaccinated for their age (4 doses) and the one probable case had received a single dose before onset.

Mumps

Before the vaccine era, infection with the mumps virus was the most common cause of acquired deafness. Mumps is transmitted by respiratory droplets or direct contact with infected respiratory secretions or saliva. The incubation period is 16-18 days (maximum range: 12-25 days), and individuals are infectious for approximately 12 days, including the 3 days before and 9 days following symptom onset. In 30-40% of infected persons, mumps infections are characterized by swelling of the parotid (salivary) glands on one or both sides of the head. Fever, headache, fatigue, muscle aches, and/or loss of appetite often precede and accompany this glandular swelling. However, 20% of cases have asymptomatic infections. Permanent sequelae of mumps are rare; nerve deafness is the most common, while 20-50% of adolescent and adult males can have orchitis (testicular inflammation), which can lead to testicular atrophy and (rarely) diminished fertility. In 2007, mumps reports in the US decreased to around 715 cases, which is still high compared to pre-2006 reports.

Following a large 2006 outbreak of mumps with more than 6,584 cases nationally, the ACIP revised the vaccination recommendations to include two doses of live mumps vaccine for school-aged children and adults at higher risk for exposure and infection. Subsequently (July 2007), the Philadelphia public school system required students from kindergarten through grade 12 to have at least two doses of mumps-containing vaccine administered after one year of age. Since 1989 most children in Philadelphia have received two measles, mumps, and rubella vaccine (MMR) doses by 5 years old. The most recent annual audit of public high school vaccination records showed over 90% of students having two documented MMR doses.

Laboratory confirmation is crucial for a mumps diagnosis because the clinical presentation is similar to other viral infections, including Epstein-Barr virus, enteroviruses, parainfluenza viruses, and adenoviruses. Mumps diagnosis can be made by a positive IgM serologic test or viral culture of buccal swab, nasopharyngeal aspirate, or urine. DDC can coordinate specimen transportation and testing at the Pennsylvania Bureau of Laboratories. A confirmed case must be quarantined for at least five days.

Of the 25 suspected Philadelphia mumps cases reported to DDC in 2007, only one case report was confirmed. The confirmed case (lab-confirmed Immunoglobulin M [IgM] positive) was a 29-year-old male medical student who received two MMR doses in the late 1980s, had no history of disease, and had no epidemiologic link explaining the infection (travel out of the country or contact with another recognized case of mumps).

Measles

Measles is a serious and highly contagious vaccine-preventable viral illness. Complications of measles infection can include pneumonia, diarrhea, ear infections, blindness, and encephalitis, with outcomes more severe among people who are malnourished or immunosuppressed. A total of 64 confirmed measles cases were reported to the CDC nationwide in 2008, which is the highest count in seven years. All cases were directly or indirectly linked to international travel (Switzerland, Israel, and India). Transmission occurred in both community and healthcare settings, and only one case had proof of vaccination (14 infants were too young for vaccination). These cases related to international travel highlight the continuing need for vigilance in international transport settings and the importance of public health law (quarantine).

Philadelphia had no confirmed measles cases in 2007. The most recent cases in Philadelphia include two travel-related cases (Mongolia in 2001 and Nigeria in 1998) and seven cases in 1996, six of which were associated with a homeless shelter.

Clinicians suspecting measles should obtain appropriate serologies (confirmation requires a positive measles IgM), interview the patient regarding recent travel, and report all suspect cases to DDC within 24 hours. In potential outbreak situations, DDC can help assist with diagnostic testing (specimen collection, testing, and shipment for testing if necessary), infection control, and disease management.

Rubella

Rubella (also known as German measles) is a vaccine-preventable viral illness transmitted by respiratory droplets with an average incubation period of two weeks. The rubella virus spreads through the body of an infected person in 5 to 7 days, and up to 50% of infections are sub-clinical. The incubation period is 12-23 days. Congenital Rubella Syndrome (CRS) is the most severe complication of rubella infection in pregnant women and is characterized by birth defects such as deafness, mental retardation, and heart defects. Up to 90% of infants born to women who are infected with rubella during the first trimester will have CRS, and the severity of damage to the fetus depends on gestational age. CRS may affect all fetal organ systems, and it can also lead to fetal death or premature delivery. In infected children and adults, other complications include arthritis and thrombocytopenia. A recent CDC national surveillance report declared that the nation had achieved the goal of eliminating endemic rubella, with only one congenital rubella case and 11 non-congenital cases confirmed in 2007 (CDC. MMWR. 2005; 54: 279-82).

Philadelphia had no reported cases of rubella in 2007. The most common cause of reports of suspect rubella cases is parvovirus. The last two cases of rubella infection recorded for Philadelphia occurred in 1998 and 1996. A rubella containing vaccine (MMR) should be given to all infants one year or older (with a second dose at age 4-6 years) and to susceptible teens and adults without evidence of rubella immunity, with an emphasis on nonpregnant women of childbearing age.

Varicella-Zoster Virus

Varicella, more commonly known as chickenpox, is caused by primary infection with the varicella zoster virus (VZV). Although incidence has decreased markedly since the licensure of varicella vaccine in 1995, the disease remains a public health concern, mainly due to the high transmissibility of the virus. Since October 1994, PDPH's Varicella Active Surveillance Project (VASP), which is conducted in collaboration with CDC, has monitored and collected data on varicella cases in West Philadelphia to assess the impact of the varicella vaccine on disease. More than 300 sites submit reports to VASP twice monthly to indicate the presence or absence of disease. In 2005, CDC and Philadelphia added varicella to their lists of reportable diseases.

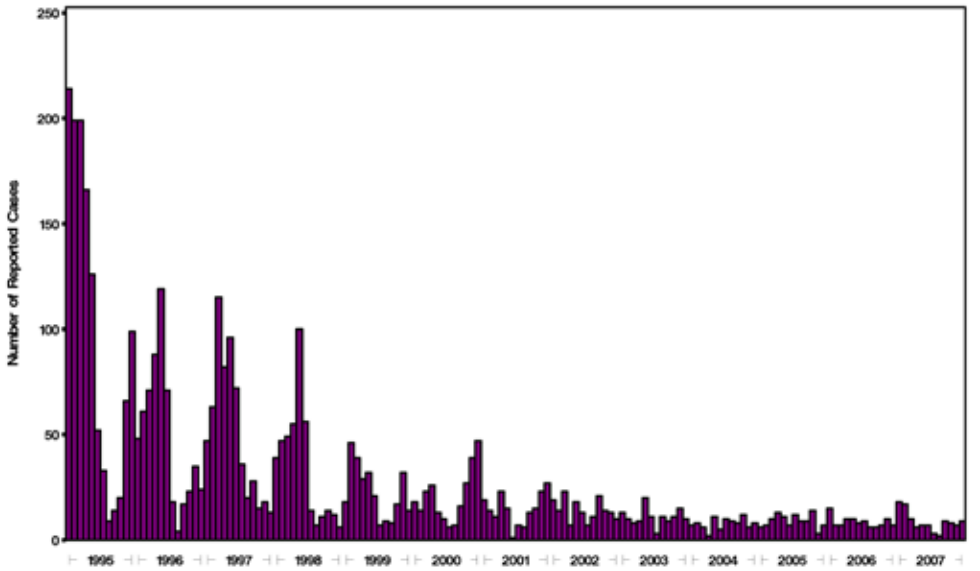
Vaccination with a single dose of varicella vaccine after one year of age, the standard regimen for a decade post-licensure, has dramatically reduced varicella disease, hospitalizations, and deaths in the US as demonstrated by VASP and other studies (CDC. MMWR.2003;52:884-5; Guris D, et al. JID.2008;197:S71-S5; Nguyen HQ, et al. NEJM.2005;352:450-8; Reynolds M, et al. JID.2008;197:S120-6). However, due to school outbreaks in highly vaccinated populations (CDC. MMWR.2004;53:389-92; Lopez A, et al. Pediatrics.2006;117:e1070-7; Parker AA, et al. JID.2008;197:S101-7), the ACIP recommended a routine second dose of varicella vaccine for persons 4 years of age and older in June 2007. According to the PDPH KIDS Immunization Registry, 27,914 (38%) children aged 4 to 6 years in Philadelphia have received a second dose of varicella vaccine in accordance with this new ACIP recommendation.

Active Varicella Surveillance in West Philadelphia – 2007

According to the National Immunization Survey, single-dose varicella vaccination rates among children aged 19 to 35 months in Philadelphia have increased from 41% in 1997 to 95% in 2006 and have remained near this level through June 2007. In 2007, 93 confirmed varicella cases were reported to VASP, and varicella disease remained markedly lower than in the early vaccination era – a 92% reduction from 1995 (Figure 23). While reductions in varicella cases occurred among all age groups in 2007 compared to 1995, the greatest declines (93%-95%) were observed among children aged 1 to 14 years, with reductions among infants <1 year of age (89%) who are not eligible for vaccination and adults aged ≥20 years (72%) most likely the result of herd effect.

The single-dose varicella vaccination regimen also has been successful in reducing the severity of varicella. The majority of patients with varicella-like illness are now vaccinated persons presenting with mild, breakthrough infections (61% of cases from 2007). Varicella-related hospitalizations also have declined in West Philadelphia, with no cases hospitalized in 2007, compared to an average of 11 hospitalizations occurring annually from 1995 to 1998.

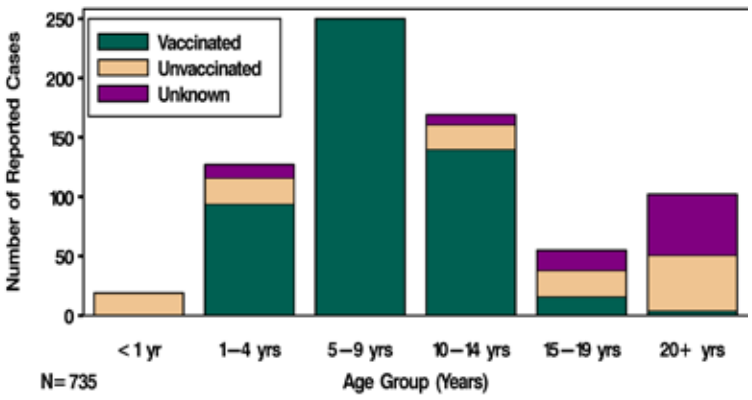
Figure 23. Reported Cases of Varicella by Month of Onset: West Philadelphia Active Surveillance Area, 1995 to 2007



City-wide Passive Varicella Surveillance in Philadelphia – 2007

During 2007, 735 varicella cases (confirmed and probable) from Philadelphia were reported through passive surveillance, marking a 7% decrease from 2006 (787 cases). Fewer varicella outbreaks occurred among school students in 2007 compared to 2006 (7 vs. 16), resulting in a lower proportion of outbreak-related cases (17% vs. 25%) and lower incidence overall. Median age for the reports was 9 years (range: 5 months-86 years). Eleven of these reported 2007 varicella cases were hospitalized, including two infants too young for varicella vaccination (<1 year of age), and nine unvaccinated adults with no/uncertain varicella history (Figure 24). Exposures were not identified for the infants and for only two of the adult cases – neither were household exposures. One infant did infect a household contact. The varicella hospitalizations of adults reinforce the importance of evaluating adults for varicella immunity and vaccinating those lacking evidence of immunity.

Figure 24. Citywide Varicella Reports by Age Group and Varicella Vaccination Status: Philadelphia, 2007



Nearly 70% (504) of the reported varicella cases had been vaccinated, including 14 children aged 4 to 13 who developed breakthrough infections after receiving a second dose of vaccine as part of the new ACIP recommendations. Varicella vaccination status varied by age group, with higher proportions of vaccinated cases occurring among those with higher use of varicella vaccine, particularly children aged 1 to 14 years.

Herpes Zoster Active Surveillance in West Philadelphia – 2007

Herpes zoster (HZ or shingles), a painful, localized rash caused by reactivation of VZV following primary varicella infection, is currently not a reportable condition nationwide or in the City of Philadelphia. To address the broader impact of varicella vaccination and the effect of the shingles vaccine (licensed in 2006 for adults 60 years of age and older), VASP initiated active surveillance of HZ among individuals less than 20 years of age in West Philadelphia starting in 2000 and in adults 50 years of age and older during 2006.

Herpes Zoster Surveillance Among Children and Adolescents

During 2007, VASP received 40 confirmed HZ cases among West Philadelphia residents <20 years of age (median age 16 years; range: 19 months to 19 years). Between 2000 and 2007, the annual number of HZ cases occurring among those aged 10 to 19 years has fluctuated with peaks during 2003 (32 cases) and 2007 (30 cases); whereas, HZ cases among children under 10 years of age have continued to be rare (≤10 cases annually). Of the 2007 cases, 19 (48%) reported a history of varicella; 14 (35%) reported prior varicella vaccination; two (5%) reported a history of disease and vaccination; two (5%) had no history of disease or vaccination, and three (8%) had an uncertain disease history and/or varicella vaccination status. The only hospitalization among children and adolescents with HZ was of an immunocompromised, 15 year old male with no vaccination or disease history who was admitted for observation and intravenous acyclovir therapy.

Of the 106 HZ cases enrolled in school and/or childcare occurring since 2000, 25 (24%) children attended school/childcare with active HZ rashes. Given the potential for transmission of VZV from HZ cases, PDPH recommends exclusion of attendees and staff with HZ from school/childcare settings until their rashes have crusted or they have received antiviral treatment for at least 24 hours.

Adult Herpes Zoster Surveillance

In 2007, VASP received 168 confirmed HZ cases among West Philadelphia residents aged ≥50 years, which was a slight increase (9%) from 2006 when 154 adult cases were reported. Most (143, 85%) of these 2007 cases experienced acute pain associated with their HZ rash, with 73 (51%) individuals reporting that the pain affected their daily activities. Thirteen (8%) HZ cases were classified with post-herpetic neuralgia or persistent pain at the rash site for more than 90 days after rash onset. Eighty-two percent received antiviral therapy and 19 (11%) were hospitalized, with no deaths related to HZ hospitalizations.

Sexually Transmitted *Diseases*

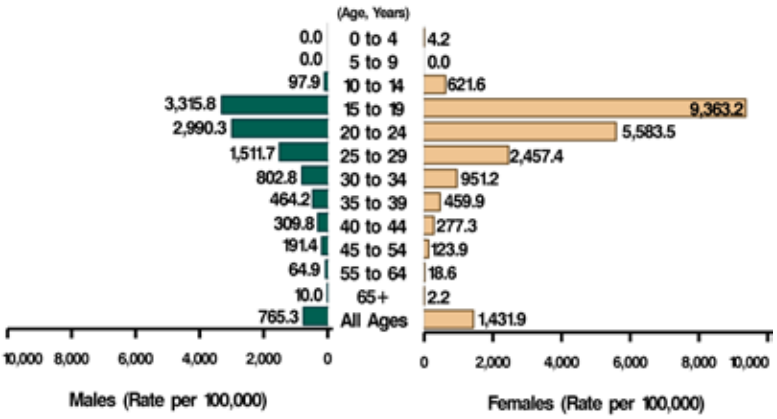
Chlamydia trachomatis

Chlamydia trachomatis is a bacterial infection that is among the most frequently reported infectious diseases in the US, with an estimated 3 million cases occurring each year. Although chlamydial infection is usually mild or asymptomatic, it can cause serious complications, even before infection is detected. These can include pelvic inflammatory disease (PID), ectopic pregnancy, and infertility in women, and urethral stricture, epididymitis, and sterility in men. Chlamydia rates are highest in those aged 15-24 years old. Chlamydial infections may be contracted at the same time as gonorrhea, and the clinical manifestations of the two diseases are often difficult to distinguish. In 2007, there were 1,025,208 chlamydial infections reported in the US (provisional data), which is nearly identical to the number reported in 2006.

Chlamydia Surveillance in Philadelphia – 2007

In 2007, there were 17,209 positive *Chlamydia trachomatis* results reported to PDPH including 10,938 (64%) as part of the PDPH STD screening program. Rates of reported chlamydial infection are consistently much higher in women than in men and are highest in 15-19 year olds, as can be seen for 2007 in Figure 25. This is similar to the age distribution seen nationally, although Philadelphia has much higher rates, especially for males, due to concerted efforts to actively screen in the adolescent population.

Figure 25. Rates of Chlamydia per 100,000 Population by Age and Gender: Philadelphia, 2007



Since 1994, PDPH has conducted intensive screening programs that target persons at risk for chlamydia and gonorrhea, particularly male and female adolescents. These screening programs performed over one million tests by the end of 2007, with the highest number of annual tests ever performed in 2007 (162,260 tests) and 10,938 (7%) chlamydia positives identified (Table 6).

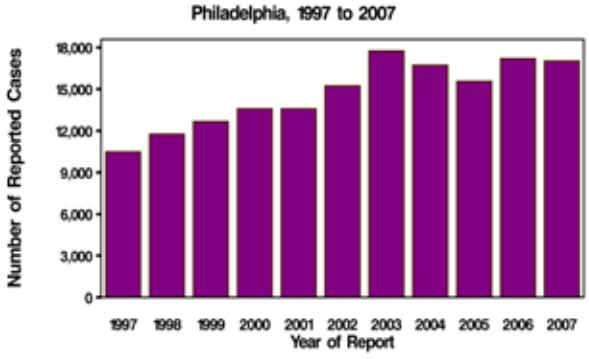
The screening programs began at Family Planning and District Health Care Center clinics in 1994; juvenile and adult detention facilities in 2000 and 2002, respectively; Philadelphia public high schools during the 2002-2003 school year (see High School Screening section), and in Family Court during 2004. Urine-based screening was incorporated into the citywide screening program at the end of 1999.

Table 6. Chlamydia Tests Performed and Percent Positive in Philadelphia – 2000 to 2007

Year	Number of tests performed	% CT positive
2007	162,260	6.7
2006	161,731	6.2
2005	156,523	6.3
2004	159,523	6.6
2003	153,324	6.9
2002	108,831	7.6
2001	90,370	7.2
2000	87,798	8.0

After steady increases in chlamydial reports from 1997 through 2003, which were related to the increased use of more sensitive testing methods (nucleic acid amplification tests [NAATs]), expansion of the citywide screening program, and increased testing by private clinicians, a 12% reduction was seen between 2003 and 2005 (Figure 26). As screening and regular testing efforts were maintained, another increase has been seen from 2005 through 2007 (9% increase), which may be in part associated with further increased testing in the private medical sector and the complete changeover to NAATs by two large private clinical laboratories.

Figure 26. Reported Cases of Chlamydia: Philadelphia, 1997 to 2007



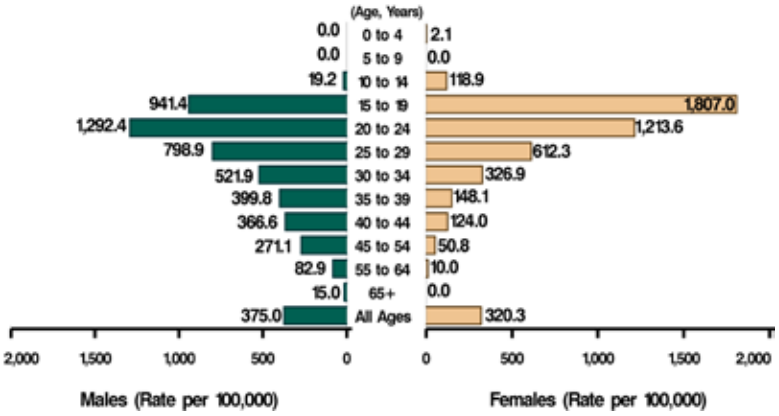
Gonorrhea (*Neisseria gonorrhoeae*)

N. gonorrhoeae infection is caused by a bacterium that can multiply in the urethra, cervix, anus, mouth/throat, and eye. Genital tract infection is often symptomatic in males, causing burning and discharge from the urethra. However, infection in females is often subtle or asymptomatic, which along with associated complications (such as PID, infertility, and ectopic pregnancy) demonstrates the need for routine screening of females. There were 332,511 cases of gonorrhea reported in the US during 2007 (provisional data).

Gonorrhea Surveillance in Philadelphia – 2007

In 2007, 5,246 cases of gonorrhea were reported in Philadelphia, a 0.5% (+28 cases) increase from 2006. Over 60% (3,172 cases) of these gonococcal infections were identified through the citywide screening programs. Similar to previous years, reports of gonorrhea in 2007 are just slightly higher for males (50%) and the highest rates are seen among 15-24 year olds (Figure 27).

Figure 27. Rates of Gonorrhea per 100,000 Population by Age and Gender: Philadelphia, 2007



Every year, DDC submits 300 *N. gonorrhoeae* isolates from male STD clinic attendees to the CDC Gonococcal Isolate Surveillance Project (GISP) for antibiotic susceptibility testing. Of the 282 isolates for 2007 that had been tested, 82 (29%) were found to be ciprofloxacin resistant. This level of resistance is similar to that found in 2006 (30%), which was an increase from previous years (14% in 2005 and 3% in 2004). Philadelphia's 2006 and 2007 ciprofloxacin resistances were higher than the most recent national GISP resistance level (15% in 2006). Still to date there is no known resistance to ceftriaxone, which is the primary recommended treatment for gonococcal infections at all anatomical sites (a single dose of 125 mg of ceftriaxone intramuscularly). In April 2008, Cefixime 400 mg, the only oral treatment for uncomplicated gonococcal infections of the urethra, cervix, and rectum, again became readily available in US.

Intensive screening and educational efforts, particularly for young, asymptomatic individuals, are needed to continue to lessen the impact of this disease. Detection of gonorrhea at body sites other than the urethra (throat, eye, and/or anus) requires a high clinical index of suspicion, particularly as urine-based NAAT screening tests can be only used to detect uro-genital infections. Clinicians are encouraged to obtain gonorrhea culture of alternate body sites when clinically appropriate. Currently, efforts to validate NAAT technology for rectal and pharyngeal samples are underway at the PDPH Public Health Laboratory (PHL).

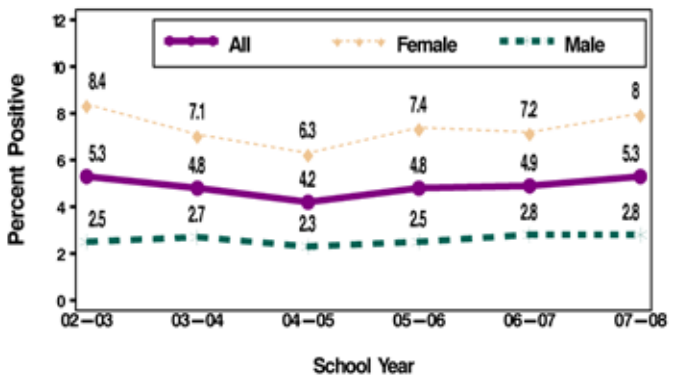
Chlamydia and Gonorrhea Screening in Philadelphia High Schools

Since January 2003, PDPH and the Philadelphia School District have collaborated to offer voluntary chlamydia and gonorrhea screening in all 72 public high schools, at select charter schools, and within the existing Health Resource Centers in certain public high schools. After screening for six consecutive school years, 99,940 screening tests have been completed on 70,344 students, resulting in 4,893 positive tests for either or both of these diseases. Treatment has been confirmed for at least 98% of the students with positive results.

Public High School Screening Program

In the 2007-2008 school year screening program, 5.3% of the 15,090 public high students screened were positive for chlamydia, gonorrhea, or both infections (Figure 28). Of the 7,325 females screened, 519 (7.1%) tested positive for chlamydia only, 27 (0.4%) for gonorrhea only, and 42 (0.6%) tested positive for both sexually transmitted diseases (STDs); of the 7,765 males screened, 202 (2.6%) tested positive for chlamydia alone, nine (0.1%) for gonorrhea alone, and eight (0.1%) for both STDs.

Figure 28. Percent of Philadelphia Public High School Students Testing Positive for CT and/or GC by Gender and School Year



Charter High School Screening Program

Since the 2006-2007 school year, the STD Control Program has also offered screening in certain City charter schools. In the 2007-08 school year, six charter schools participated and 1,099 charter school students were screened. Of the 581 females screened, 40 (6.9%) tested positive for chlamydia alone, four (0.7%) for gonorrhea alone, and three (0.5%) for both STDs; of the 518 males screened, nine (1.7%) were found to be positive for chlamydia only, none for gonorrhea only, and one (0.2%) for both infections. For both sets of high schools (public and charter), 831 (96%) of the 864 students who tested positive in 2007-08 had been treated as of August 28, 2008.

Testing in Certain Public High School Health Resource Centers

During the 2007-2008 school year, 11 public high schools operated Health Resource Centers (HRCs), which offer counseling and referral services for STDs, HIV and family planning, as well as condoms for students (who did not have parental opt outs). In the four HRCs that offered gonorrhea and chlamydia testing, PDPH provided free test kits, laboratory processing, and support services. During the 2007-2008 school year, 1,660 students received 2,143 gonorrhea and chlamydia tests in these four HRCs. Of the 1,220 tests on females, 117 (9.6%) were positive for chlamydia alone, nine (0.7%) for gonorrhea only, and 11 (0.9%) for both STDs. Of the 923 tests on males, 38 (4.1%) were positive for chlamydia alone, one (0.1%) for gonorrhea only, and three (0.3%) for both STDs.

During the 2007-2008 school year, these three programs – public school screening, charter school screening, and HRC testing – identified 1,043 students infected with both infections or either chlamydia or gonorrhea alone, and to date 983 (94%) students have documented treatment for these infections. Identification and treatment of these infections has prevented potentially hundreds of cases of pelvic inflammatory disease (PID) and associated sequelae (ectopic pregnancy and infertility) in young women, and avoided the further transmission of these infections to hundreds more individuals. Given the high level of sexual activity among Philadelphia high school students, 62% reported having ever been sexual active (CDC. MMWR. 2008; 57 (SS-4):1–131) – and therefore, risk for acquiring STDs, the STD Control Program will continue to search for new venues and innovative programs to ensure all adolescents in Philadelphia have access to STD screening.

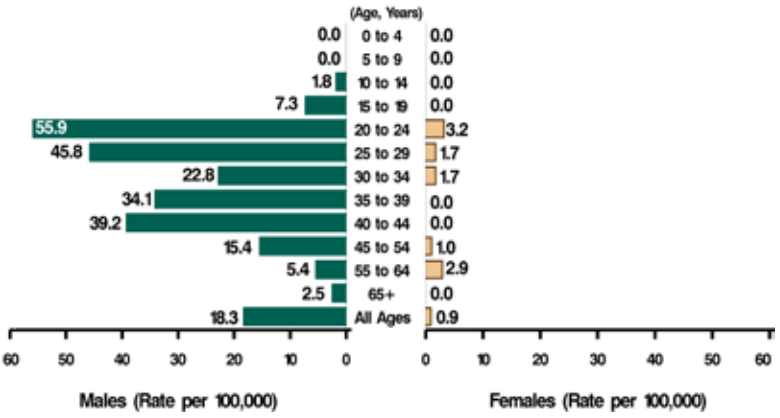
Syphilis (*Treponema pallidum*)

Syphilis is a complex disease with a highly variable clinical course. Despite nationwide efforts to eliminate syphilis by 2010, national rates have actually been rising for the past seven years. In Philadelphia, syphilis rates began to increase only in the last two years. Syphilis cases are classified based on the stage of the disease. Primary and secondary (P&S) syphilis, considered to be the most infectious stages, include the presence of a syphilitic chancre (painless sore) and/or a generalized rash and multiple swollen lymph nodes. Latent syphilis occurs when the organism persists in the body without causing overt signs or symptoms, and can further be subdivided into early, late, and unknown based upon the duration of infection. Early syphilis is defined as both P&S and early latent syphilis.

P&S Syphilis Surveillance in Philadelphia – 2007

In 2007, 136 cases of P&S syphilis were reported to PDPH, a 9% increase from 2006. In 2007, as in many previous years, P&S syphilis was disproportionately found among males (95%, Figure 29) and individuals identifying as African American (71%). Of the 129 P&S cases among males from 2007, most (100, 78%) were men who report having sex with men (MSM). Among the 100 MSM with P&S syphilis, 67 disclosed their HIV status and 50 (75%) of these men were HIV positive. Alarmingly, the number of young (<24 years old) MSM with P&S syphilis increased from 2006 by 52%. The continuing high level of syphilis in MSM certainly could be related to prevention message fatigue, which presents a difficult challenge for public health prevention efforts.

Figure 29. Rates of Primary and Secondary Syphilis per 100,000 Population by Age and Gender: Philadelphia, 2007

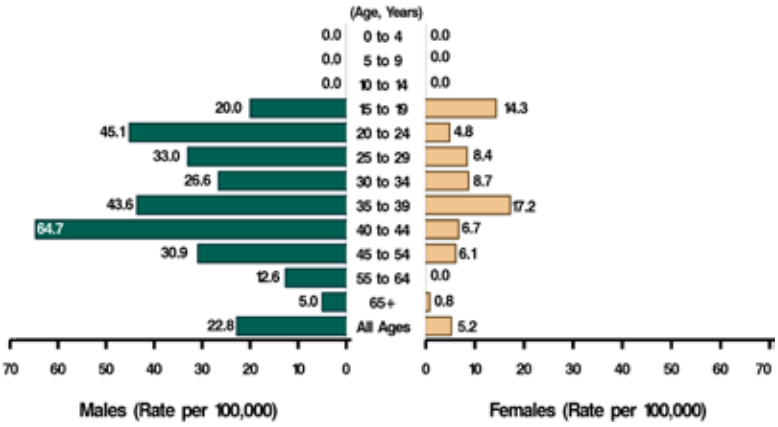


Early Latent Syphillis Surveillance in Philadelphia – 2007

There were 203 cases of early latent syphilis reported in 2007, a 10% increase over 2006. Most early latent cases were male (79%, Figure 30).

Increasing rates of early syphilis in specific populations within Philadelphia underscore the need for public health to continue partnerships with community-based organizations for intensified syphilis case management activities, particularly partner notification and treatment.

Figure 30. Rates of Early Latent Syphillis per 100,000 Population by Age and Gender: Philadelphia, 2007

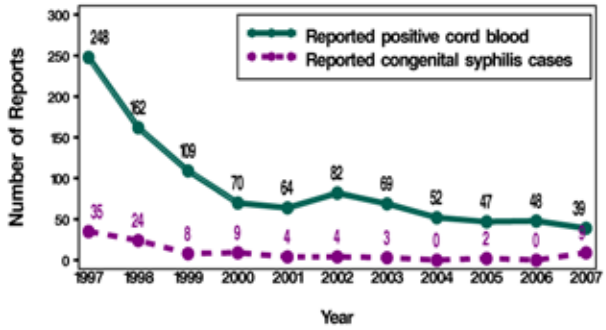


Congenital Syphilis

Pregnant women should be screened for syphilis in the first and third trimester of pregnancy, as well as at delivery, and treated when infections are identified. Congenital syphilis can occur when an infected pregnant woman is either inadequately treated or not treated at least 30 days before the birth of her child. Symptoms of congenital syphilis can include bony abnormalities, enlarged liver and spleen, and rash. Only severe cases are evident at birth in the newborn. An additional method of monitoring for congenital syphilis is testing of blood from umbilical cords (cord blood) at birth; however, maternal serological tests are preferred due to earlier treatment and the potential for non-reactive infant tests when the maternal infection is recent or of low titer.

In 2007, nine cases meeting the screening case definition of congenital syphilis were reported to PDPH. Despite this increase in reported congenital syphilis cases, the number of positive cord blood samples continued to decrease in 2007 (Figure 31). One mother and child pair identified in 2007 was co-infected with HIV.

Figure 31. Reported Cases of Congenital Syphilis and Positive Cord Blood Tests: Philadelphia, 1997 to 2007



Since a peak of congenital syphilis in 1991 (301 cases) subsequent to changes in the case definition in 1990, the number of reports has greatly decreased. However, the nine cases from 2007 represent a notable rise compared to the very low counts of the most recent years. Known risk factors for the cases reported in 2007 were no or inadequate prenatal care (89%), non-English speaking mother (56%), and maternal drug use (33%). Of note, five of the infected women presented to a Philadelphia Emergency Department (ED) at least once prior to delivery but were not tested for syphilis during these visits.

PDPH currently recommends that all pregnant women without a history of adequate prenatal care who present to an ED should be tested for syphilis. Adequate prenatal care, which includes routine screening and treatment of syphilis, clearly plays a major role in preventing congenital syphilis.

Management of Positive Syphilis Serology

When DDC receives a report of infectious syphilis, the physician is contacted to confirm the diagnosis, the stage of infection and treatment. Patients diagnosed with infectious or early syphilis (primary and secondary or early latent) are then contacted confidentially by trained DDC staff and offered voluntary disease prevention, partner notification services, and referral for treatment, if necessary. These efforts are crucial for avoiding reinfection and preventing further spread within the community. Syphilis case reports also allow DDC to maintain historical diagnostic and treatment information, which is often critical for proper patient management. For example, patients treated for syphilis may remain seropositive for decades after adequate treatment. Only through a comparison of quantitative serology results at time of initial treatment can the current status of a patient with a history of syphilis be properly evaluated. DDC maintains these records and routinely assists health care providers and their patients in obtaining this critical information, even when the patient has seen many different providers over the years.

Other Reportable *Diseases and Conditions*

HIV/AIDS

The human immunodeficiency virus (HIV), a virus that attacks immune system (specifically CD4 cells), was first identified in the early 1980s. Acquired immunodeficiency syndrome (AIDS) is often the final stage of HIV infection. Treatment options for HIV have greatly delayed the onset of AIDS in many infected individuals. Currently around one million individuals are thought to be living with HIV or AIDS in the US. During 2008, CDC released that an estimated 56,300 new HIV infections occurred during 2006 in the US (Hall HI, et al. JAMA. 2008; 300: 520), which is much higher than previous annual estimates (approximately 40,000 new cases per year). This jump was not due to increases in actual incidence, but rather improvements in HIV testing and analytic methods.

HIV Surveillance in Philadelphia - 2007

Name-based reporting of HIV diagnoses was implemented in October 2005. The AIDS Activities Coordination Office (AACO) maintains a database of incident HIV reported from laboratories and hospitals across the City. In 2007, 1,384 cases of HIV (non-AIDS) were reported to AACO; however, due to continued reporting of prevalent cases this likely overestimates the true number of new infections in Philadelphia. Newly reported HIV (non-AIDS) cases are predominantly male (72%), African American (63%), and report heterosexual contact as mode of transmission (43%).

AIDS Surveillance in Philadelphia - 2007

The City of Philadelphia is the epicenter of the HIV/AIDS epidemic in Pennsylvania. In 2007, 690 cases of AIDS were diagnosed and reported to the AACO Surveillance Unit. The AIDS epidemic in Philadelphia disproportionately affects African Americans (68%) as compared to Whites (21%) and Hispanics (9%). More than two-thirds of cases (73%) were among males, and approximately three-quarter of cases (74%) were among persons 20-49 years of age. In contrast with the early years of the epidemic, heterosexual contact is now the dominant mode of transmission (45%), compared to same sex contact (30%) and injection drug use (25%). These numbers demonstrate the significant demographic shift that has occurred in the epidemic since beginning in the 1980s, when white men who have sex with men (MSM) experienced the majority of new infections.

For additional information about HIV/AIDS in Philadelphia, please visit the AACO website: http://www.phila.gov/health/units/aaco/HIV_AIDS.html.

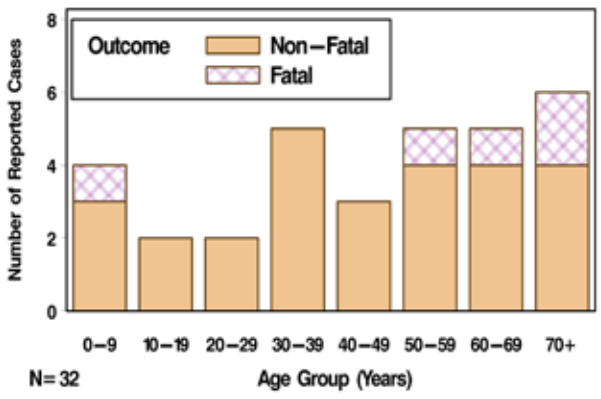
Invasive Group A *Streptococcus* (GAS)

Group A *Streptococcus* (GAS) is a bacterium often found in the throat and on the skin. The most common infections caused by GAS are acute pharyngotonsillitis ("strep throat") and skin infections. GAS is typically spread through direct contact with infected pharyngeal secretions, skin, or wounds. Invasive disease can cause severe infection, including streptococcal toxic shock syndrome and necrotizing faciitis. In some cases, the portal of entry for invasive GAS can be traced to a skin infection. Approximately 10-15% of invasive GAS infections result in death. Individuals at increased risk for invasive GAS include elderly, immunosuppressed individuals, intravenous drug users, those with certain conditions (chronic cardiac or respiratory disease, diabetes, or skin lesions, such as varicella), and anyone with a penetrating trauma or surgical wound.

GAS Surveillance in Philadelphia - 2007

In Philadelphia, only invasive GAS is reportable, which is confirmed when the organism is isolated from a normally sterile site, such as cerebrospinal fluid, blood, synovial (joint), pleural, and pericardial fluid. In Philadelphia during 2007, there were 34 reported cases of invasive GAS, or 2.3 cases per 100,000 population. GAS was isolated from blood in 28 cases (82%), synovial fluid in four cases (12%), cerebral spinal fluid in one case, and pleural fluid in the other case. Nineteen (56%) cases were female. The median age was 47 (range:1-92 years). Six of these individuals (18%) died (Figure 32).

Figure 32. Invasive Group A *Streptococcus* by Age Group and Outcome: Philadelphia, 2007



Animal Exposures and Animal Rabies Testing

Animal bites, in addition to other animal exposures that pose a risk for rabies (including scratches and contact with animal bodily fluids) are reportable conditions in Philadelphia. Animal exposure surveillance allows DDC to actively issue public health recommendations, particularly regarding post-exposure prophylaxis (PEP) for rabies. In 2007, DDC received reports of 1,499 animal exposures, the majority of which were bites (97.6%), followed by scratches (1.5%) and other miscellaneous exposures (0.9%). Dogs and cats accounted for 75% and 22% of all reported exposures respectively. Other species of animals responsible for reported exposures included: bats, raccoons, foxes, mice, guinea pigs, rabbits, and rats among others. In 70% of the exposures, the animal's owner was located; and in at least 256 exposures (17%), the victims were from the same household as the animal. There were slightly more female victims (51%). Of the 92% of reports with victim age included, the median age was 24 years (range: <1 month-105 years).

Management of animal exposures and animal rabies testing requires a strong partnership with the PDPH Environmental Health Services (EHS) Vector Control Unit and the PDPH Public Health Laboratory (PHL). The Vector Control Unit assists with the observation of animals during a 10-day quarantine for rabies. Domestic animals (dog, cat, or ferret) that are reported healthy and alive after a 10-day quarantine/observation period following the date they bit or scratched a human are determined not to carry the rabies virus in their saliva.

In these instances, PEP would not be recommended for the individuals exposed. PEP is also NOT recommended when an animal available for rabies testing subsequently tests negative for rabies antibody.

The PHL tested 50 animals for rabies by direct fluorescent antibody staining of brain tissue in 2007. One animal tested positive for rabies (raccoon). In addition, during 2007 the Pennsylvania Bureau of Laboratories or the Pennsylvania Department of Agriculture tested 108 animals from Philadelphia. Three of these animals – a bat, a deer, and a groundhog – tested positive as well.

It is important that pet owners follow state law and vaccinate their animals for rabies to prevent the disease and its spread. It is also essential that PEP be administered to prevent human rabies cases when deemed appropriate by public health officials. For medical consultation on the management of animal exposure incidents, or to arrange for rabies fluorescent antibody testing of animals, contact DDC at (215) 685-6748. General guidelines regarding PEP are also available at: http://www.phila.gov/health/units/ddc/index.html

Public Health *Preparedness*

PDPH conducts activities across many public health programs to identify and respond to public health emergencies. All of these activities are dual-purpose: they support the daily work of public health practice and response while providing critical infrastructure that would be needed during large scale health emergencies that could result from biological terrorism or naturally-occurring disasters. DDC coordinates many of these activities for the Department.

Public Health Preparedness Highlights in Philadelphia – 2007

Enhanced Disease Surveillance

DDC uses a variety of clinical data sets to monitor infectious disease trends:

- DDC continued to monitor data from 23 Hospital Emergency Departments (ED) and the City's 911 Fire Communications Call Center on a daily basis (one ED closed in November 2007). Data from this system are used to identify individual cases of public health importance that are not reported to the department through other systems, and to quantify morbidity and mortality related to both infectious and non-infectious threats, ranging from illicitly manufactured and injected fentanyl, to weather extremes, to environmental events such as building implosions. Data are also used routinely to monitor trends of common disease syndromes (e.g., respiratory, gastrointestinal, and flu-like illness). For more information, see the Syndromic Surveillance section.

- Selected ambulatory health settings provided clinical data that were used to monitor influenza illness as part of the CDC's National Sentinel Provider System for influenza reporting. For more information, see the Respiratory Virus Surveillance section.

Expanded Communication Capacity

DDC continued to expand its broadcast fax and email network for urgent communications to the healthcare community. This system includes contact information for several thousand individual healthcare practitioners, health agency representatives, and other public health partners. In 2007, a total of 23 health alerts, advisories or updates were sent via a variety of communication modes to the medical community using this system.

DDC also completed development of the "Health Information Portal," a website geared for healthcare professionals with updated surveillance data, disease-related information, and health advisories. The site was beta-tested in 2007 and is now available at https://hip.phila.gov.

Preparedness Planning – Partnering with the Medical Community

Successful response to a public health emergency requires close collaboration and coordination between public health agencies and the healthcare community. DDC has developed several initiatives toward this end. In 2007, DDC planners set up and coordinated working groups of representatives from area hospitals, including infectious disease and infection control professionals, ED physicians, hospital safety and disaster planners, and biomedical ethicists, to develop guidance for healthcare facilities in preparation for pandemic influenza. These collaborations produced a comprehensive, detailed guidance for healthcare planners to help address issues around pandemic influenza, such as hospital-based disease surveillance, clinical evaluation and infection control, occupational health, the use of antiviral medications and influenza vaccine, and surge capacity. This document is available at:
http://www.phila.gov/health/units/ddc/pdf/Pan_Flu_Healthcare_Guidance_September_2007.pdf

Medical Reserve Corps

In April 2005, PDPH launched a Medical Reserve Corps (MRC) for healthcare professionals and other individuals interested in volunteering their skills to provide support during public health emergencies. During 2007, the corps recruited nearly 200 volunteers who participated in trainings, functional or field exercises, and other public health activities. Many of the educational activities in 2007 focused on training volunteers to staff Points of Dispensing sites (PODs) or emergency medication centers as part of the city's mass prophylaxis plan. In addition, volunteer healthcare professionals can expect to be called upon to participate in many capacities during disasters with health consequences – in medical evaluation centers, epidemiological investigations, and in call centers and health education programs to expand public information efforts. To learn more about the Philadelphia MRC, or to volunteer, go to: www.phila.gov/mrc.

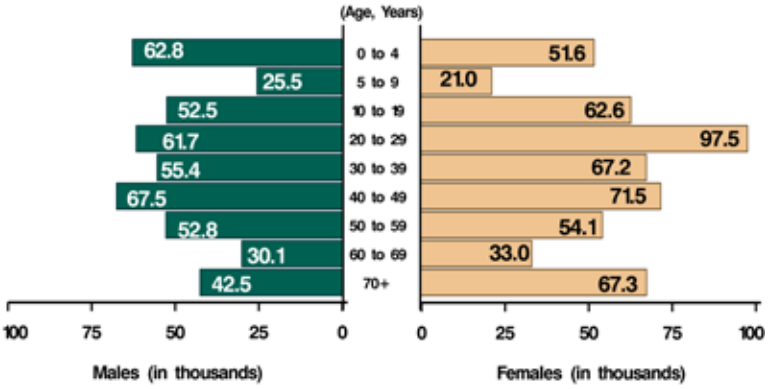
Syndromic Surveillance

With help from local area health partners, DDC continues to monitor emergency department (ED) visits and 911 emergency medical calls in order to keep track of local public health trends including overall changes in visit/call patterns as well as identification of potential notifiable conditions. De-identified data from hospital ED logs and 911 calls are received daily, cleaned and assigned into a syndrome of public health interest including fever-flu, diarrhea, vomiting, asthma, rash, and others. Analyses of these data include assessment of proportion of daily visits/calls for each syndrome and comparison to previous days to detect changes in trends over time. Any signals from the data are carefully scrutinized and investigated if unusual.

Emergency Department Surveillance

For most of 2007, 23 hospitals sent secure daily data feeds to PDPH. In late November, one data source was lost when a contributing hospital closed. By year's end, 976,978 ED visits had been analyzed. ED utilization varied by age group and gender. Females accounted for a greater proportion of the overall number of ED visits, particularly for the 20-29 year age group (Figure 33).

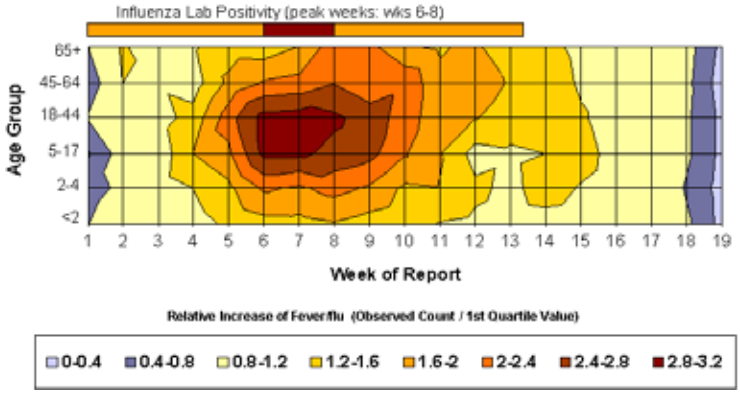
Figure 33. Counts of Emergency Department Visits by Age and Gender: Philadelphia, 2007



Fever/Flu Syndrome ED Complaints

No outbreaks of disease caused by a category A bioterrorism agent were detected in 2007 with these data; however, a larger scale disease spread, or seasonal epidemic, was identified. In late January of 2008, steady increases of flu-like complaints were being seen at participating EDs, which occurred in conjunction with increases of laboratory positive counts of influenza received from local clinical laboratories (Figure 34). The epidemiology of flu-like morbidity changed slightly this season, as young adults were the sentinel population as opposed to children, who often fall ill earliest. DDC disseminated these findings, respiratory virus surveillance data, and guidance for the management and control of influenza in certain clinical settings (LTCs) to the medical community for assistance with clinical decision-making (see respiratory virus surveillance and public health preparedness highlights). Assessment of ED data from 2007 identified 74 ED visits related to notifiable conditions that had not yet been reported through other surveillance systems.

Figure 34. Relative Increases in Fever/Flu ED Visits by Age Group: 2007-2008 Influenza Season



Notifiable Disease Case Report
(Confidential)

Philadelphia Department of Public Health
Division of Disease Control
Communicable Disease Control Program
500 S. Broad Street, Philadelphia, PA. 19146

Identification of Patient

Report Date *(Mo., Day, Yr.)*	Name *(Last, First, M.I.)*	Parent or caretaker (if applicable)

Address *(Number, Street, Apt #,City, Zip Code)*				Telephone (H) _____ (W)_____ (C) _____
DOB *(Mo., Day, Yr.)*	Age	Sex ☐ M ☐ F	Occupation	
Name of Employer or School		Address *(Number, Street, City, Zip Code)*		

Medical Information

Disease or Condition	Date of Onset *(Mo., Day, Yr.)* *(If animal bite ,Date it Occurred)*	Diagnosis (check one) ☐ Clinical ☐ Lab confirmed	Fatal (check one) ☐ Yes ☐ No

Chief Symptoms / Complaints	Suspected source of Infection (if known)

If Case Hospitalized *(Name of Hospital)*	Admission Date	Discharge Date

Laboratory Information If Pertinent *(Attach Copies If Applicable)*

Name of Tests Done	Site/Source	Results	Dates Done

Animal Exposures

Parts of Body Bitten	Type of Animal	Breed of Animal	Current Location Of Animal *(Indicate if available for testing)*

Name of Owner	Address of Owner *(Number, Street, Apt #, City, Zip Code)*

Reporter Information

Name of Person Reporting Case	Reporter ☐ ICP ☐ ED ☐ Other_____	Phone

Reporting Institution	Address (Number, Street, City, Zip Code)

DO NOT WRITE IN AREA BELOW - FOR DEPARTMENT USE

Name *(Person Receiving Report)*	Method of reporting ☐ Phone ☐ Fax ☐ Mail ☐ Active Surveillance ☐ Other_____

Any unusual illness, disease clusters or possible outbreaks should be reported *immediately* by telephone.
Please fax all completed reports to 215-545-8362, or call 215-685-6748 to report case by phone.

PHILADELPHIA DEPARTMENT OF PUBLIC HEALTH
DIVISION OF DISEASE CONTROL (DDC)

Report: 215-685-6748 **Fax: 215-545-8362**

For after hours immediate reporting & consultation: 215-686-1776 – ask for Division of Disease Control on-call staff

REPORTABLE DISEASES AND CONDITIONS

Acquired Immune Deficiency Syndrome (AIDS/HIV) ‡
Amebiasis
Animal bites (wild/stray/domestic)
Anthrax *
Botulism *
Brucellosis *
Campylobacteriosis
Chlamydia trachomatis including lymphogranuloma venereum (LGV)
Chancroid
Cholera *
Creutzfeldt-Jakob disease
Cryptosporidiosis
Cyclosporiasis
Diphtheria *
Ehrlichiosis
Encephalitis including all arboviruses *
Escherichia coli O157:H7 *
Food poisoning *
Giardiasis
Gonococcal infections
Guillain-Barré syndrome
Haemophilus influenzae, invasive disease *
Hantavirus Pulmonary Syndrome *
Hepatitis A
Hepatitis B
Hepatitis C
Hepatitis, other viral
Histoplasmosis
Influenza – pediatric mortality and institutional outbreaks
Lead poisoning
Legionnaires' disease *
Leprosy (Hansen's disease)
Leptospirosis (Weil's disease)
Listeriosis *
Lyme disease
Malaria
Measles (rubeola) *
Meningitis - all types
Meningococcal infections *
Mumps
Pelvic inflammatory disease
Pertussis (whooping cough)
Plague *
Poliomyelitis *
Psittacosis (ornithosis)
Rabies *
Rickettsial diseases
Rubella (German Measles) & Congenital Rubella *
Severe Acute Respiratory Syndrome (SARS) *
Salmonellosis
Shigellosis
Smallpox *
Staphylococcus aureus, vancomycin insensitive
Streptococcal disease, invasive group A
Streptococcus pneumoniae, invasive disease
Syphilis
Tetanus
Toxic Shock Syndrome
Trichinosis
Tuberculosis §
Tularemia *
Typhoid (*Salmonella typhi* and *paratyphi*) *
West Nile Virus *
Varicella, including zoster
Yellow Fever and other viral hemorrhagic fevers *

* Report suspected and confirmed cases within 24 hours
All other cases should be reported within 5 days

‡ Report to AIDS Activities Coordinating Office at **215-685-4781**
§ Report to TB Control Program at **215-685-6744 or -6873**

All unusual disease clusters, disease outbreaks, and unusual disease occurrences should be reported immediately

To Report a Case Call, Fax or Submit through NEDSS the Following Information to DDC:

Condition | Patient Name, Age/DOB, Sex, Address & Phone | Clinician Name, Address & Phone

Appendix C: Communicable Disease Reports

Philadelphia by Year - 1998 to 2007

NR = Not reportable, NA = Not available)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
ACQUIRED IMMUNODEFICIENCY SYNDROME	891	1,224	947	893	914	848	760	508	699	690
AMEBIASIS	4	15	31	30	20	18	9	6	4	19
ANIMAL BITES/EXPOSURES	2,345	2,130	2,096	1,894	1,922	1,612	1,353	1,418	1,457	1,499
ANTHRAX	0	0	0	0	0	0	0	0	0	0
BABESIOSIS	0	0	0	0	0	1	0	0	0	1
BOTULISM	0	1	1	1	3	3	0	1	1	1
BRUCELLOSIS	0	0	0	0	1	0	0	0	0	1
CAMPYLOBACTERIOSIS	142	132	148	90	97	114	96	74	73	80
CHLAMYDIA TRACHOMATIS	11,763	12,660	13,593	13,586	15,234	17,747	16,723	15,577	17,199	17,029
CHOLERA	0	0	0	0	0	0	0	0	0	0
CRYPTOSPORIDIOSIS	14	24	22	13	15	19	19	27	29	94
CYCLOSPORIASIS	NR	NR	NR	1	0	2	0	3	0	2
DENGUE FEVER	0	0	0	0	0	0	0	0	1	8
DIPHTHERIA	0	0	0	0	0	0	0	0	0	0
ENCEPHALITIS, PRIMARY excluding West Nile Virus	0	1	1	5	6	9	6	0	0	1
ESCHERICHIA COLI, shiga-toxin producing (STEC)	6	7	6	42	17	14	11	7	19	4
GIARDIASIS	130	105	132	120	135	113	104	93	81	65
GONORRHEA	7,271	7,776	8,170	8,061	7,277	5,731	5,206	5,053	5,218	5,246
GUILLIAN-BARRE SYNDROME	0	2	3	2	2	0	0	1	2	1
HAEMOPHILUS INFLUENZAE [type b]	NR [0]	NR [0]	NR [0]	7 [1]	8 [1]	14 [1]	9 [0]	14 [0]	16 [0]	19 [2]
HEPATITIS A	133	62	255	98	70	179	39	17	14	9
HEPATITIS B, ACUTE	155	152	134	111	97	51	60	27	21	15
HEPATITIS C, ACUTE (Non-A, Non-B until 1998)	0	3	1	1	4	3	0	2	1	0
HISTOPLASMOSIS	0	0	2	1	2	2	2	0	1	2
HUMAN IMMUNODEFICIENCY VIRUS	NR	NR	NR	NR	NR	NR	NR	NR	703	1,384
LEGIONELLOSIS	15	15	19	3	10	23	31	19	21	24
LEPTOSPIROSIS	0	0	0	1	1	0	0	0	0	0
LISTERIOSIS	5	10	12	8	19	11	11	2	7	8
LYME DISEASE	179	220	165	99	179	164	182	172	139	172
MALARIA	11	10	11	16	16	19	13	14	15	7
MEASLES	1	0	0	1	0	0	0	0	0	0
MENINGITIS, ASEPTIC	26	25	68	71	112	120	87	95	66	86
MENINGITIS, BACTERIAL	12	15	23	15	21	7*	4*	4*	1*	4*
MENINGOCOCCAL INFECTIONS	13	13	24	12	15	15	14	8	2	9
MUMPS	1	5	2	1	1	2	1	2	2	1
PERTUSSIS	31	44	61	34	31	98	109	75	50	39
PLAGUE	0	0	0	0	0	0	0	0	0	0
POLIOMYELITIS	0	0	0	0	0	0	0	0	0	0
RABIES (Human)	0	0	0	0	0	0	0	0	0	0
RICKETTSIAL DISEASES, including RMSF	1	4	0	2	4	0	7	3	8	2
RUBELLA, including congenital rubella syndrome	1	0	0	0	0	0	0	0	0	0
SALMONELLOSIS, excluding typhoid	319	346	328	287	324	316	261	305	293	404
SHIGELLOSIS	123	129	115	139	191	696	31	31	14	138
STREP PNEUMONIAE, INVASIVE	NR	NR	NR	NR	NR	101	94	151	139	162
STREPTOCOCCUS, INVASIVE Gp. A [TSS]	NR	NR	NR	14 [7]	16 [1]	43 [3]	24 [3]	27 [0]	37 [0]	34 [0]
SYPHILIS - PRIMARY & SECONDARY	89	69	67	77	71	98	72	86	125	136
SYPHILIS - CONGENITAL	24	8	9	4	4	3	0	2	0	9
SYPHILIS - TOTAL	796	826	622	639	589	587	470	417	540	500
TETANUS	0	0	0	0	0	0	0	0	0	0
TOXIC SHOCK SYNDROME, staphylococcal	1	0	0	0	1	0	0	0	0	0
TUBERCULOSIS	179	184	169	144	147	120	129	116	149	133
TULAREMIA	0	0	0	0	0	0	0	0	0	0
TYPHOID FEVER	4	1	2	2	1	1	2	1	4	0
VARICELLA	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	614	787	735
WEST NILE VIRUS	NR	NR	0	2	6	24	1	0	1	0
YELLOW FEVER	0	0	0	0	0	0	0	0	0	0

*excluding *Neisseria meningitidis*, *Haemophilus influenzae*, *Listeria*, and invasive *Streptococcus pneumonia.*

Beginning in 2003, *S. penumoniae* meningitis was counted with other *S. pneumoniae* cases.

**Citywide varicella data not available for these years.