Epi Data Brief

Invasive Pneumococcal Disease Surveillance in New York City

- Pneumococcal disease is caused by bacteria called *Streptococcus pneumoniae.*

- *S. pneumoniae* can cause infections of the lung (pneumonia), middle ear (otitis media), sinuses (sinusitis), lining of the brain (meningitis), and blood (bacteremia).

- Invasive pneumococcal disease (IPD) occurs when *S. pneumoniae* invades parts of the body that usually are free from bacteria, such as blood or cerebrospinal fluid.

- IPD is a laboratory-reportable disease in New York City. The Health Department started IPD case surveillance in 2000 to monitor disease trends and antibiotic susceptibility patterns.

Rates of Invasive Pneumococcal Disease, NYC, 2001-2009
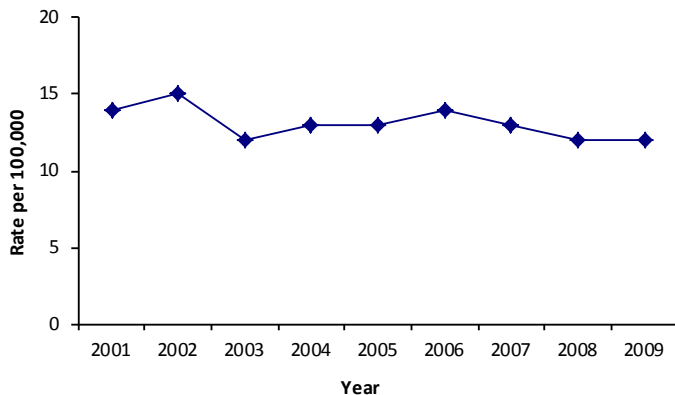
Source: New York City Department of Health and Mental Hygiene, Bureau of Communicable Disease

- Overall, IPD rates decreased slightly from 14 to 12 per 100,000 between 2001 and 2009.

- The main strategy to prevent IPD is immunization:

  o Since 2000, immunization against pneumococcal disease has been part of the routine childhood immunization schedule.

  o A different pneumococcal vaccine is used to immunize adults aged 65 years and older and those with certain underlying medical conditions.

  o For CDC's complete vaccine recommendations, visit http://www.cdc.gov/vaccines/vpd-vac/pneumo/default.htm.

Invasive Pneumococcal Disease (IPD) Surveillance Methods in NYC

Case Definition

- NYC IPD cases are classified using the Centers for Disease Control and Prevention (CDC)/Council of State and Territorial Epidemiologists IPD case definition. For more information, visit http://www.cdc.gov/ncphi/disss/nndss/casedef/Streptococcuscurrent.htm.

Data Elements

Case Data

- IPD surveillance data include name, date of birth, address, specimen collection date and specimen source.

- IPD surveillance methods have undergone changes since 2001, including a transition from paper to electronic reporting in 2007.

- Additional data, including address and gender, became available with electronic reporting.

Penicillin susceptibility

- After *S. pneumoniae* is grown from a specimen, the laboratory determines how well the organism is killed by penicillin. Laboratories use standard criteria to determine this susceptibility to penicillin.

- NYC clinical laboratories report penicillin susceptibility results for all IPD cases to the Health Department.

- For more information on penicillin susceptibility criteria, visit: http://www.clsi.org/Content/NavigationMenu/Committees/Microbiology/AST/AST.htm.

Case Investigations

- In-depth IPD case investigations are conducted by the Health Department's Bureau of Immunizations only for cases in children younger than five years to determine the vaccination status of the case and to identify vaccine failures. These data are not presented here.

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Rates of invasive pneumococcal disease in New York City vary by age and are comparable to or lower than national rates

- Overall IPD rates in NYC in 2009 were less than national rate estimates (12/100,000 vs. 14/100,000).

- By age group, NYC IPD rates remain comparable to or lower than those in the U.S. overall, with the exception of 2-4 year olds.

- IPD rates are highest among New Yorkers 65 years and older, and children younger than five years.

**National and NYC IPD Rates, by Age Group, 2009**
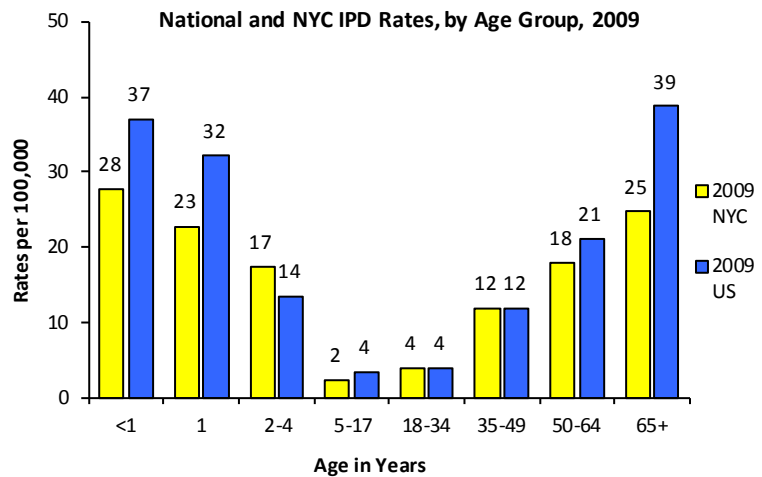
Sources: NYC DOHMH Bureau of Communicable Diseases; NYC DOHMH neighborhood population estimates, modified from US Census Bureau vintage population estimates, 2009; CDC, Active Bacterial Core Surveillance (ABCs), 2009 (http://www.cdc.gov/abcs/reports-findings/survreports/spneu09.html).

National IPD Surveillance Methods (http://www.cdc.gov/abcs/index.html)

National estimates of IPD rates are calculated from the Active Bacterial Core Surveillance (ABCs) system. ABCs methodology differs from NYC surveillance in that national estimates are based on a sample of IPD cases from counties in 10 states, representing approximately 30 million people. In contrast, NYC surveillance reports every case of IPD in the city. In addition, all ABCs cases are investigated and the bacterial species and antibiotic susceptibility results are confirmed in a reference laboratory. Some differences between NYC and US rates may be due to these differences in methodology.

Penicillin susceptibility for invasive pneumococcal disease cases in New York City

- *S. pneumoniae* bacteria were once routinely susceptible to, and therefore treatable with, penicillin. Starting in the late 1980s, the bacteria began to exhibit resistance to penicillin with increasing frequency.

- In NYC, the proportion of IPD cases that were susceptible to penicillin from 2001 to 2007 was unchanged at approximately 70%.

- In 2008, the Clinical Laboratory Standards Institute (CLSI) made the laboratory criteria for determining penicillin susceptibility less stringent, so more cases of IPD were considered susceptible. As a result, more than 90% of IPD cases in 2008 and 2009 were classified as penicillin-susceptible. This increase cannot be interpreted as a change in the disease, but rather as a change in the definition of penicillin susceptibility.

Penicillin Susceptibility of IPD Cases, NYC, 2001-2009
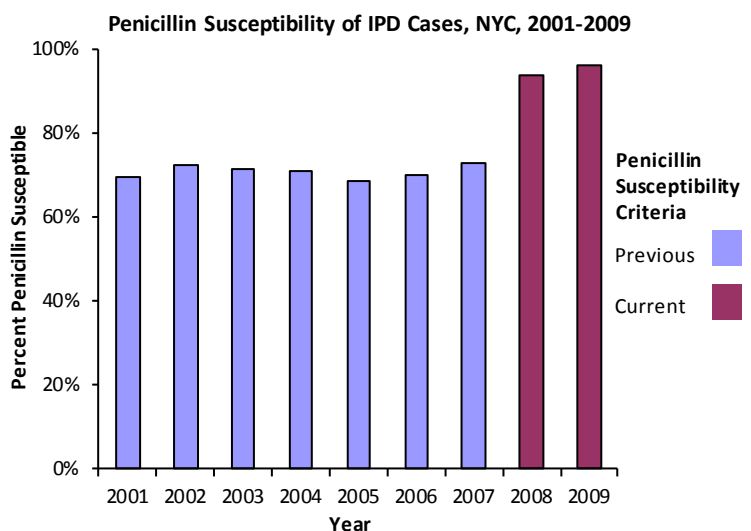
Cases for which penicillin susceptibility data were not available were excluded.
Source: NYC DOHMH Bureau of Communicable Disease

Invasive pneumococcal disease rates are higher in high-poverty neighborhoods

- In high-poverty New York City neighborhoods, IPD rates are more than twice as high as rates in very low-poverty neighborhoods.

- Living in high-poverty neighborhoods does not cause IPD. However, rates of underlying medical and behavioral conditions that may increase the risk of IPD, such as diabetes and smoking, often are higher in high-poverty neighborhoods. The Health Department does not collect information about these underlying conditions for IPD cases, but it is likely that they are related to the increased risk of IPD in neighborhoods with higher poverty levels.

Neighborhood Poverty: Income is defined by the percent of households in a New York City Census tract area with incomes below 100% of the federal poverty level (Census 2000). For this analysis, poverty levels are separated into four groups: very low-poverty (<10%), low-poverty (10-19%), medium-poverty (20%-29%), and high-poverty (≥30%).

Invasive pneumococcal disease rates by neighborhood poverty levels, NYC 2009

Poverty Level	# of Cases	Rate
Very Low	173	8.4
Low	190	8.5
Medium	186	10.8
High	357	18.2
Total	**906**	**11.3**

Data from census tracts with fewer than 300 people were excluded. In addition, cases from census tracts where poverty levels could not be determined were excluded.
Sources: NYC DOHMH Bureau of Communicable Disease, 2009; NYC DOHMH neighborhood population estimates, modified from US Census Bureau vintage population estimates, 2009.

MORE New York City Health Data and Publications
- For complete tables of data presented in this Brief, visit www.nyc.gov/html/doh/downloads/pdf/epi/datatable7.pdf
- Communicable disease surveillance system (CDSS) data: a816-healthpsi.nyc.gov/epiquery/EpiQuery/CDSS/index.html
- Visit EpiQuery – the Health Department's online, interactive health data system at www.nyc.gov/health/EpiQuery