

# Epi Data Brief

New York City Department of Health and Mental Hygiene

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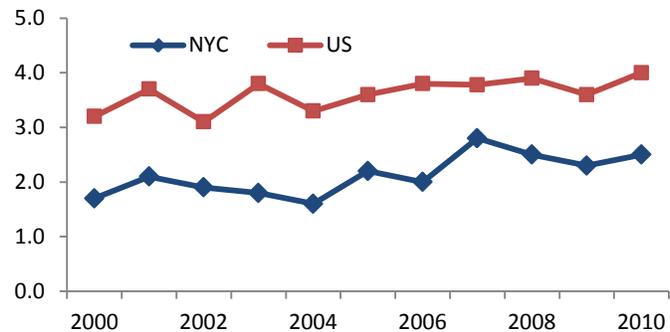
## Invasive Group A Streptococcal Infection in New York City

Group A Streptococcal (GAS) infection is caused by bacteria called *Streptococcus pyogenes*. These bacteria live in the noses and throats of healthy people and can be transmitted by respiratory droplet or direct person-to-person contact with others. Typically GAS causes mild illness such as sore throat (“strep throat”) or skin infections (e.g. impetigo, cellulitis). About 5% to 20% of healthy people have GAS in their throat or other body site, but have no signs or symptoms of infection. Occasionally GAS bacteria can get into parts of the body where bacteria are not normally found (such as blood and cerebrospinal fluid), called “invasive” infections. GAS can also cause toxic shock syndrome (TSS), a potentially fatal condition. Many different subtypes of GAS bacteria exist, and rates of disease may increase or decrease when new subtypes enter the population. New subtypes may be more likely to cause severe disease if they are more virulent or if there is less population immunity to the subtype. Currently, no vaccine exists to prevent GAS infections, but effective antibiotics are available to treat most GAS infections.

### Incidence of invasive GAS infection in New York City and the United States

- Annual unadjusted rates of new cases of invasive GAS infection (incidence) fluctuated in New York City from 2000 to 2010, but increased overall from 1.7 to 2.5 per 100,000 NYC residents (137 to 205 cases per year).
- During this decade, New York City rates of GAS remained below national rates, which have also increased from 3.2 to 4.0 per 100,000.
- Rates of invasive GAS were highest among New Yorkers aged 65 years and older and increased from 4.8 to 7.1 per 100,000 older adults during the decade.

#### Incidence rates of invasive GAS infections, NYC and US\*, 2000- 2010



\*US rates are adjusted by race and sex to the US 2010 population.

Sources: NYC DOHMH Bureau of Communicable Disease; NYC DOHMH population estimates, modified from US Census Bureau intercensal population estimates, file date 11/2012; CDC Active Bacterial Core Surveillance system

### Invasive Group A Streptococcus (GAS) Surveillance Methods in New York City

**Case Definition:** Invasive GAS is a laboratory-reportable disease in New York City (NYC). Case surveillance is used to monitor disease trends and detect clusters. A case is defined as a NYC resident with GAS cultured from a normally sterile body site or from a non-sterile site in a person with a clinical diagnosis of necrotizing fasciitis (NF) or toxic shock syndrome (TSS).

**Data Elements:** GAS surveillance methods have undergone changes, including a transition from paper to electronic reporting in 2006. Data include name, date of birth, address, specimen collection date and specimen source. From 2005 to 2010, medical chart abstractions using a standardized form were conducted for all cases. Death status was determined at the time of chart review.

Definite nosocomial infections were defined as invasive GAS in patients whose illness onset began 48 hours after admission to a hospital or long-term care facility (LTCF) or within 48 hours of discharge from one of these facilities. In LTCF residents who spent time in the community during the 48 hours before illness onset, infections were defined as possible nosocomial infections. In this brief, possible and definite nosocomial cases were combined.

Admitting diagnosis and underlying illness data are presented in the attached tables. These conditions were determined by medical chart review as written by the attending clinician; standardized case definitions were not applied.

### National Group A Streptococcus Surveillance Methods

National estimates of invasive GAS for this brief are extrapolated from the Active Bacterial Core Surveillance (ABCs) system (<http://www.cdc.gov/abcs/index.html>). The ABCs system conducts active surveillance, including laboratory audits, for all invasive GAS cases from counties in ten states, representing approximately 30 million people. NYC collects data on all reported cases; however no laboratory audits are conducted. Some differences between NYC and US rates may be due to these differences in methodology.

## Clinical presentation and underlying illness among invasive GAS infections in New York City

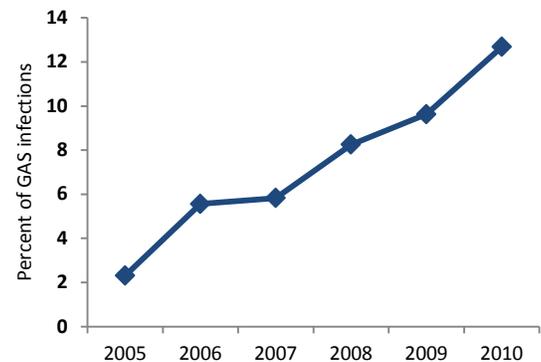
- The most common presenting syndromes among invasive GAS cases in New York City included: bacteremia/septicemia (50%), cellulitis (42%), pneumonia (19%), and TSS (16%). Note that these are not mutually exclusive syndromes.
- Underlying medical conditions were found in 80% of all invasive GAS cases and varied by age:
  - 93% of cases among those older than 65 years had at least one underlying illness, the most common of which were heart disease, diabetes, cancer, and chronic lung disease.
  - Only 28 cases (31%) among children younger than five years had at least one underlying illness, the most common of which was chronic lung disease.

## Invasive GAS infections acquired in hospitals or group-living facilities

GAS can be transmitted among hospitalized patients and residents of long-term care facilities (LTCFs), which is called “nosocomial infection.” Early detection of nosocomial infections allows for timely investigation and implementation of control measures to prevent additional cases. Therefore, all cases of invasive GAS are evaluated to determine if nosocomial transmission was likely.

- Nosocomial infections increased from 2% of cases in 2005 to 12% in 2010. Activities to improve detection and reporting of nosocomial infections during this time period likely account for some of this increase.
- Every nosocomial case of invasive GAS is investigated to identify factors that may have put the patient at risk and to reinforce infection control measures to prevent further spread.
- Only one disease cluster, defined as two or more definite nosocomial infections with a similar molecular pattern in the same institution during a one-year period, was detected between 2005 and 2010. After infection control recommendations and enhanced surveillance activities were implemented in the facility, no additional cases were identified.

### Percent of invasive GAS infections acquired in hospitals or group-living facilities (nosocomial infections), NYC, 2005-2010

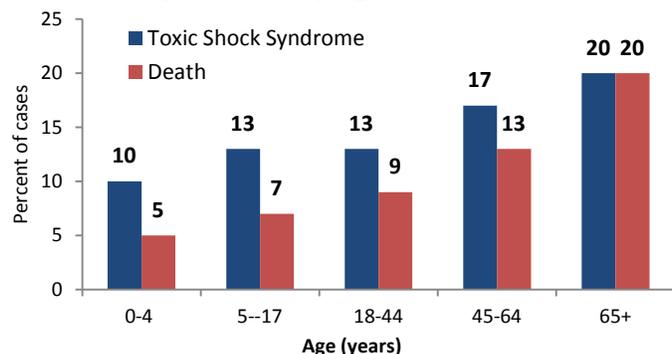


Sources: NYC DOHMH Bureau of Communicable Disease; NYC DOHMH population estimates, modified from US Census Bureau intercensal population estimates, file date 11/2012

## Disease severity and mortality of invasive GAS infections

- The age-adjusted invasive GAS mortality rate in New York City fluctuated but decreased overall from 0.4 deaths in 2005 to 0.3 deaths in 2010 per 100,000 people.
- The percent of cases with TSS increased with increasing age. The percent of adults aged 65 years and older with TSS was twice that of young children (20% vs. 10%).
- Similarly, fatal cases of invasive GAS were much more likely among older patients (65 years and older) than those younger.
- TSS was significantly associated with death among persons older than 5 years; among younger children it was not.

### Percent of invasive GAS cases resulting in death or in toxic shock syndrome, by age, NYC, 2005-2010\*

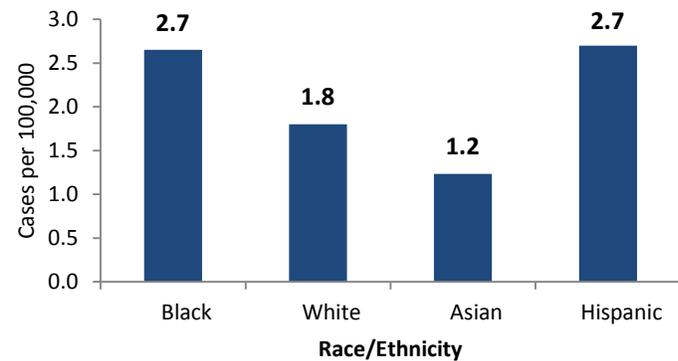


Case types (toxic shock syndrome and death) are not mutually exclusive.  
Source: NYC DOHMH Bureau of Communicable Disease

## Age-adjusted rates of invasive GAS infections by neighborhood poverty and race/ethnicity

- Rates of disease were highest among black and Hispanic New Yorkers (2.7 cases per 100,000 population for both); these were significantly higher than rates among whites (1.8/100,000) and Asians (1.2/100,000) during 2005 to 2010.
- Persons living in the highest poverty level neighborhoods had the highest rates (3.9 cases per 100,000 population), higher than those of the highest race/ethnic group.
- Case fatality proportions did not vary significantly by poverty level.

### Age-adjusted rates of invasive GAS infection by race/ethnicity, NYC, 2005-2010



Source: NYC DOHMH Bureau of Communicable Disease; NYC DOHMH population estimates, modified from US Census Bureau intercensal population estimates, file date 11/2012

### Age-adjusted GAS rates and case fatality proportion by neighborhood poverty, NYC, 2005-2010

Neighborhood Poverty Level	# of Cases	Rate*	Case Fatality
			Proportion # (%)
Low	239	1.9	38 (16%)
Medium	248	2.0	34 (14%)
High	240	2.6	34 (14%)
Very high	373	3.9	46 (12%)

\*Cochran-Armitage trend test,  $p < 0.001$

Sources: NYC DOHMH Bureau of Communicable Disease; Census 2000

**Neighborhood Poverty:** Poverty level is defined by the percent of households in a New York City census tract area with incomes below 100% of the federal poverty level, according to the Census 2000. For this analysis, poverty levels are separated into four groups: low poverty (<10%), medium-poverty (10-19%), high-poverty (20%-29%), and very high-poverty ( $\geq 30\%$ ). Cases missing address data, cases from census tracts where poverty levels could not be determined, and data from census tracts with fewer than 300 people were excluded ( $n=55$  [5%]).

**Population Data:** NYC population estimates for 2000 through 2010 were based on the Census Bureau's interpolated intercensal population estimates for each year, updated in the fall of 2012 from previously used estimates available before Census 2010 data were released (file date 11/2012). Neighborhood poverty rates by Census tract were calculated using denominators from the 2000 Census.

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- For complete tables of data presented in this Brief, visit [nyc.gov/html/doh/downloads/pdf/epi/datatable23.pdf](http://nyc.gov/html/doh/downloads/pdf/epi/datatable23.pdf)
- Visit EpiQuery – the Health Department's online, interactive health data system at [nyc.gov/health/EpiQuery](http://nyc.gov/health/EpiQuery)
  - Communicable disease surveillance system data: [a816-healthpsi.nyc.gov/epiquery/EpiQuery/CDSS/index.html](http://a816-healthpsi.nyc.gov/epiquery/EpiQuery/CDSS/index.html)

Data & Statistics at [nyc.gov/html/doh/html/data/data.shtml](http://nyc.gov/html/doh/html/data/data.shtml)