

STREPTOCOCCUS PNEUMONIAE, INVASIVE DISEASE (ISP, Pneumococcal Infection)

REPORTING INFORMATION

- **Class B2:** Report by the end of the business week in which the case or suspected case presents and/or a positive laboratory result to the local public health department where the patient resides. If patient residence is unknown, report to the local public health department in which the reporting health care provider or laboratory is located.
- Reporting Form(s) and/or Mechanism: [Ohio Confidential Reportable Disease form](#) (HEA 3334, rev. 1/09), [Positive Laboratory Findings for Reportable Disease form](#) (HEA 3333, rev. 8/05), the local health department via the Ohio Disease Reporting System (ODRS), or telephone.
- Additional reporting information, with specifics regarding the key fields for the Ohio Disease Reporting System (ODRS) reporting can be located in [Section 7](#).

AGENT

Streptococcus pneumoniae (pneumococci) are lancet-shaped, Gram-positive diplococci. Ninety pneumococcal serotypes, designated by number, have been identified. Most pneumococcal disease is caused by 23 of these serotypes. Certain of these serotypes are prevalent in adults; others are prevalent in children. Serotypes 4, 6B, 9V, 14, 18C, 19F and 23F are responsible for the majority of invasive *Streptococcus Pneumoniae* (ISP) infections in children in the United States.

Throughout the past two decades several serotypes have developed resistance to penicillin, to which they were formerly highly susceptible. Serotypes 6B, 9V, 14, 19A, 19F and 23F are the most frequent isolates associated with resistance to penicillin. This antibiotic resistance is known as DRSP (drug-resistant *Streptococcus pneumoniae*). Factors bringing pressure upon this bacterium to develop resistance include widespread and sometimes indiscreet use of antibiotics, inadequate treatment regimens and inadequate patient compliance (i.e. failure to complete treatment). Because antibiotics for treatment of pneumococcal disease are often, of necessity, selected empirically, surveillance to identify the character and extent of this resistance is needed. A 7-valent pneumococcal conjugate vaccine (PCV) is available to provide protection for children against the 7 serotypes which are responsible for most ISP infections in children. A 23-valent pneumococcal polysaccharide vaccine (PPV) is available for high risk children ≥ 2 years of age and adults to provide protection against the 23 most prevalent serotypes, which are represented in the vaccine. For specific vaccine information see the ODH Vaccine Protocol Manual.

CASE DEFINITION

Clinical Case Definition

Streptococcus pneumoniae causes many clinical syndromes, depending upon the site of infection (e.g. acute otitis media, pneumonia, bacteremia, meningitis).

Laboratory Criteria for Diagnosis

Isolation of *S. pneumoniae* from a normally sterile site (e.g. blood, cerebrospinal fluid, or, less commonly, joint, pleural or pericardial fluid). Laboratory reports of *S. pneumoniae* from sterile sites must identify tests for antibiotic sensitivity and results of these tests, when performed. **Only invasive cases of *S. pneumoniae* are reportable. Please do not report cases from non-sterile sites (e.g. sputum, urine, skin).**

Case Classification

Two ISP reporting categories exist in Ohio:

- 1) Cases that are susceptible or where the antimicrobial susceptibilities are not

available/unknown and

2) Cases demonstrating resistance or intermediate resistance to one or more antibiotics.

Suspect*: A clinically compatible case that is not yet laboratory confirmed and is not epidemiologically linked to a confirmed case.

Probable*: A clinically compatible case that is epidemiologically linked to a confirmed case.

Confirmed: A clinically compatible case that is laboratory confirmed.

Not a Case: This status will not generally be used when reporting a case, but may be used to reclassify a report if investigation revealed that it was not a case.

Comment: Confirmation is based on laboratory findings. Clinical illness is not required.

* This case classification can be used for initial reporting purposes to ODH as CDC has not developed a classification.

SIGNS AND SYMPTOMS

Onset of invasive *S. pneumoniae* disease is usually sudden with high fever, chills, productive cough, shortness of breath, rapid breathing, lethargy or coma and signs of meningeal irritation. Case-fatality rates for some high-risk patients have been reported to exceed 40% for bacteremia and 55% for meningitis, despite appropriate antimicrobial therapy.

DIAGNOSIS

See case definition.

EPIDEMIOLOGY

Source

Humans are the reservoir of pneumococci, which are commonly found in the upper respiratory tract of healthy persons throughout the world.

Occurrence

Pneumococcal infections are among the leading causes worldwide of illness and death for young children, persons who have underlying debilitating medical conditions and the elderly. Each year in the United States, pneumococcal disease is estimated to account for 6,000 cases of meningitis, 50,000 cases of bacteremia, 500,000 cases of pneumonia, 7,000,000 cases of otitis media and 52,000 deaths.

Mode of Transmission

Pneumococci are transmitted from person-to-person by droplet spread, by direct oral contact and indirectly through articles freshly soiled with respiratory discharges. Although these routes of transmission are easily accomplished, illness among casual contacts and attendants of patients is infrequent.

Period of Communicability

Communicability associated with respiratory infection likely persists while pneumococci are present in respiratory secretions. Treatment with an antibiotic to which the infecting organism is sensitive can be expected to terminate communicability within 24 hours.

Incubation Period

The incubation period varies by type of infection and can be as short as 1-3 days.

PUBLIC HEALTH MANAGEMENT

Case

Investigation

The principal role of local and state public health agencies in the management of invasive pneumococcal disease is to contribute to the descriptive epidemiology of disease caused by this agent. This is accomplished through the reporting of cases of confirmed invasive disease, and associated drug resistance, in order that regional and statewide trends in disease incidence and results of antibiotic resistance can be identified. Publication of compilations of disease incidence and antibiotic susceptibility trends is useful to clinicians in the selection of empiric treatment regimens likely to be effective.

Field investigation of cases of pneumococcal disease and their contacts in an attempt to identify source of infection is ordinarily of no practical value and is not recommended.

Isolation

None.

Contacts

No prophylactic treatment is recommended for contacts of cases of invasive pneumococcal infections. Encourage a high index of suspicion and early medical care for contacts that develop cough, chills, fever and other nonspecific symptoms within a few days after contact with a case. Quarantine of contacts is not warranted.

Prevention and Control

Avoid overcrowding in schools, child care centers, residence facilities and other institutions. Immunization with either the 13-valent pneumococcal conjugate vaccine (PCV13) or the 23-valent pneumococcal polysaccharide vaccine (PPSV23), as appropriate, is recommended. For specific vaccine information, see the ODH Vaccine Protocol Manual. Also, see the Advisory Committee on Immunization Practices (ACIP) 2010 updated recommendations for complete vaccine information: <http://www.cdc.gov/vaccines/pubs/ACIP-list.htm#pcv>.

What is pneumococcal disease?

Pneumococcal disease is defined as infections that are caused by the bacteria *Streptococcus pneumoniae*, also known as pneumococcus. The most common types of infections caused by this bacteria include middle ear infections, pneumonia, blood stream infections (bacteremia), sinus infections, and meningitis.

Which children are most likely to get pneumococcal disease?

Young children are much more likely than older children and adults to get pneumococcal disease. Children under 2, children in group child care, and children who have certain illnesses (for example sickle cell disease, HIV infection, chronic heart or lung conditions) are at higher risk than other children to get pneumococcal disease. In addition, pneumococcal disease is more common among children of certain racial or ethnic groups, such as Alaska Natives, Native Americans, and African-Americans, than among other groups.

How prevalent is pneumococcal disease?

Each year in the U.S. *Streptococcus pneumoniae* causes approximately 480 cases of meningitis, 4,000 cases of bacteremia or other invasive disease in children under the age of 5. Children under 2 average more than 1 middle ear infection each year, many of which are caused by pneumococcal infections. *Streptococcus pneumoniae* is the most common cause of bacteremia, pneumonia, meningitis and otitis media in young children.

Who is at most serious risk?

Children at increased risk of pneumococcal infections include those with anatomic or functional asplenia (including sickle cell disease), patients taking immunosuppressive chemotherapy and having diseases associated with this treatment, those with congenital and acquired immune deficiency (including HIV infections), those with chronic heart, lung, metabolic and renal disease and children with cochlear implants or cerebrospinal leaks. Children less than 60 months of age in out-of-home day care are at 2-3 fold higher risk of experiencing invasive pneumococcal infections than children in home care.

How serious is pneumococcal disease?

Pneumococcal disease is a very serious illness in young children. Pneumococcal infections are now the most common cause of invasive bacterial infection in U. S. children. In the United States it is estimated that pneumococcal infections cause 100 deaths, 450 cases of meningitis, 4,000 cases of bacteremia or other invasive disease, and 3.1 million cases of otitis media (ear infections) annually in children under 5 years of age.

Meningitis is the most severe type of pneumococcal disease. Of children less than 5 years of age with pneumococcal meningitis, about 5% will die of their infection and others may have long-term problems such as hearing loss. Many children with pneumococcal pneumonia or blood stream infections will be ill enough to be hospitalized; about 1% of children with blood stream infections or pneumonia with a blood stream infection will die of their illness. Nearly all children with ear infections recover, although children with recurrent infections can suffer hearing loss.

How is pneumococcal disease spread?

The bacteria are spread through contact between persons who are ill or who carry the bacteria in their throat. Transmission is mostly through the spread of respiratory droplets from the nose or mouth of a person with a pneumococcal infection. It is common for people, especially children, to carry the bacteria in their throats without being ill from it.

How is pneumococcal disease treated/cured?

Pneumococcal disease is treated with antibiotics. Over the last decade, many pneumococci have become resistant to some of the antibiotics used to treat pneumococcal infections; high levels of resistance to penicillin are common.

Is there a vaccine available?

The pneumococcal conjugate vaccine, **PCV13** or Prevnar®, licensed in 2010, is replacing the first pneumococcal vaccine that could be used in children under the age of 2 years (PCV7), which was licensed in 2000. However, pneumococcal vaccines for the prevention of disease among children and adults who are 2 years and older have been in use since 1977. Pneumovax® is a 23-valent polysaccharide vaccines (**PPSV23**) that is currently recommended for use in all adults who are older than 65 years of age and for persons who are 6 years and older and at high risk for disease (e.g. sickle cell disease, HIV infection, or other immunocompromising condition.)