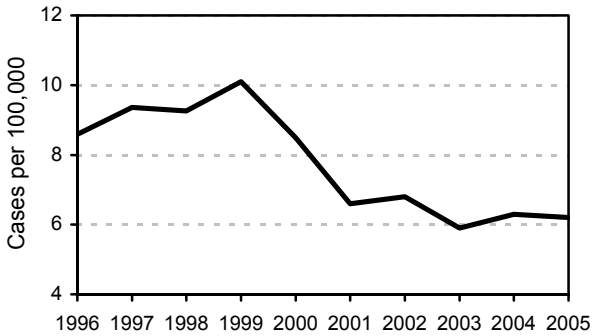
PNEUMOCOCCAL DISEASE, INVASIVE

CRUDE DATA	
Number of Cases	590
Annual Incidence[a]	
LA County	6.2
United States	12.9[b]
Age at Diagnosis	
Mean	52
Median	55
Range	0–101 years
Case Fatality	
LA County	14%[c]
United States	13%[b]

Figure 1
Invasive Pneumococcal Disease
Incidence Rates by Year of Culture
LAC, 1996–2005



[a] Cases per 100,000 population.

[b] National projection of IPD incidence from Active Bacterial Core Surveillance areas data, 2004 [1].

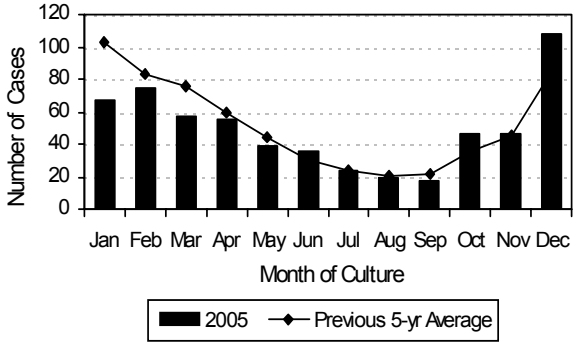
[c] 50% of outcomes known.

DESCRIPTION

Invasive pneumococcal disease (IPD) is a leading cause of illness in young children and causes considerable illness and death in the elderly. The infectious agent, *Streptococcus pneumoniae*, is spread by direct and indirect contact with respiratory discharge and attacks various parts of the body resulting in pneumonia, bacteremia, and meningitis. *S. pneumoniae* has become increasingly resistant to antibiotics during the last decade. Disease caused by *S. pneumoniae* is vaccine-preventable.

ACDC has followed IPD as a special surveillance project since late 1995 and added IPD to its list of reportable diseases in October 2002. Cases are defined as LAC residents with a positive isolate for *S. pneumoniae* collected from a normally sterile site (e.g., blood, cerebral spinal fluid,). Antibiotic susceptibility is determined by disk diffusion or dilution diffusion. Minimum inhibitory concentration (MIC) breakpoints utilized by participating laboratories are based on standards developed by the Clinical and Laboratory Standards Institute (formerly the National Committee for Clinical Laboratory Standards). For this report, an isolate of *S. pneumoniae* is considered nonsusceptible to an antibiotic if the results indicate intermediate or high-level resistance.

Figure 2
IPD Cases By Month of Culture
LAC, 2005



DISEASE ABSTRACT

- The incidence rate remains the same as 2004.
- There was an increase in penicillin nonsusceptible infections, particularly within the <1 age group (Figure 3).
- The highest incidence of IPD occurred among

Blacks—the rate among this group is at least twice as high as that of Whites or Latinos (Figure 4).

STRATIFIED ANALYSIS

Trends: IPD occurred at an incidence rate of 6.2 per 100,000 in 2005 (N=590). This is very similar to the incidence rate for 2004 (6.3 per 100,000, N=603) (Figure 1).

Seasonality: The seasonal trend in 2005 followed the typical peak for IPD in the winter months, dropping in the spring and summer months (Figure 2).

Sex: The male to female rate ratio was 1.1:1.

Age: The age of IPD cases ranged from birth to 101 years old with a mean of 52 years and median of 55 years (crude data). The distribution of incidence across age groups in 2005 remained similar compared to previous years. However, an increase is seen within the vaccine-preventable age group of <1 (Figure 3).

Race/Ethnicity: The highest incidence of IPD occurred among Blacks. With an incidence of per 100,000, this rate is at least twice as high as that of Whites or Latinos (Figure 4).

Disease Severity: During 2005, the hospitalization rate was 91% overall and higher for the over 65 age-group (97%) than the less than 5 age group (77%). The case fatality rate was 14% (crude data). Most deaths occurred among adults 65 years and over (44% [N=18]); however, the 45–64 age group followed closely at 32% (N=13).

The proportion of culture sites remain the same as previous years, mainly from blood cultures only (Figure 5). Other sites reported include joint/synovial fluid, peritoneal fluid, ascites fluid, and thoracentesis fluid.

Figure 3
Incidence Rates of IPD Cases by Age
LAC, 2002-2005

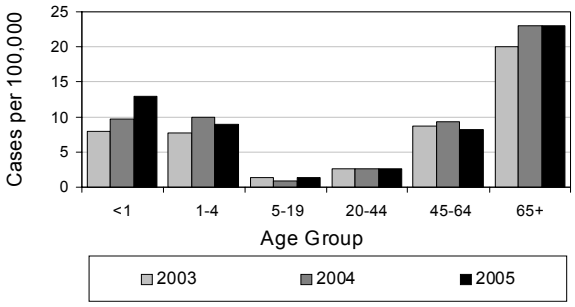


Figure 4
Incidence Rates of IPD Cases by Race/Ethnicity
LAC, 2005

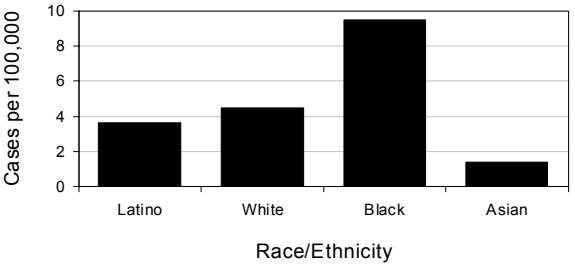
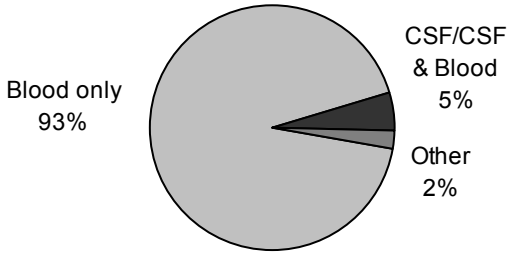


Figure 5
IPD by Culture Site
LAC, 2005 (N=590)



Antibiotic Susceptibility: For 2005, there was a rise in the proportion of penicillin nonsusceptible *S. pneumoniae* (PNSP) isolates to 25% (N=138). This continues an increasing trend occurring since 2003. The percent of isolates not susceptible to erythromycin and trimethoprim-sulfamethoxazole (TMP-SMZ) also increased slightly (Figure 6). Almost all reported cases (97%) had antibiotic resistance information provided.

Changes in the proportion of cases with PNSP isolates occurred in almost all age groups. The most dramatic change was observed among those <1 years of age, rising from 0 to 44%. The proportion of PNSP isolates remained high (40%) in the 1–4 age group since 2004 (Figure 7).

Figure 6
IPD Isolates Nonsusceptible to Selected Antimicrobial Agents
LAC, 2002–2005

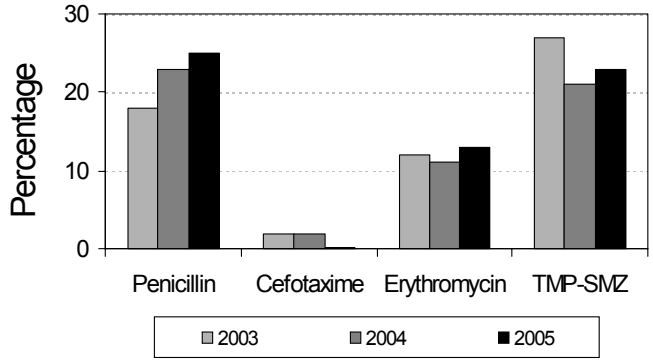
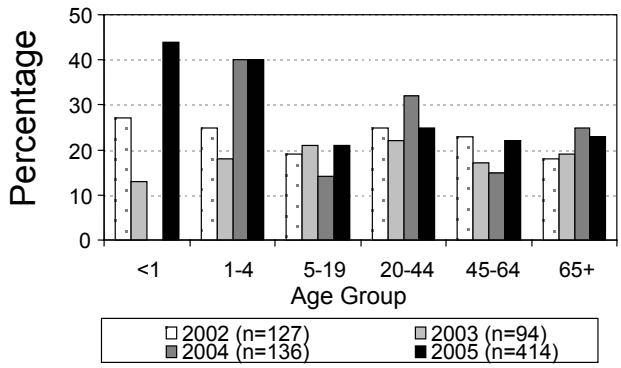


Figure 7
PNSP Isolates by Age
LAC, 2002–2005



PREVENTION

Two effective vaccines are available for pneumococcal disease. Heptavalent pneumococcal conjugate vaccine (Prevnar®) is recommended by the Advisory Committee on Immunization Practices (ACIP) for all children less than age 2 years, and for children up to age 5 years who are at high risk of invasive pneumococcal infections. The 23-valent pneumococcal polysaccharide vaccines (Pnu-Imune®23 and Pneumovax®23) are recommended for all adults ≥65 years and those over age 2 years who are at high risk of invasive pneumococcal disease. For children aged 2 to 5 years who are at high risk of invasive pneumococcal infections, ACIP recommends use of pneumococcal conjugate vaccine followed at least 2 months later by the 23-valent pneumococcal polysaccharide vaccine. This regimen provides protection against a broader range of serotypes, although supporting data are limited [2].

COMMENTS

Though there continues to be a decline in overall incidence in IPD, there has been an increase in incidence rates and proportions of PNSP isolates in the vaccine-preventable age group of children <1. For 2005, the incidence rates and prevalence of PNSP isolates for this age group are indeed too small to be reliable. The relatively small case population produces unstable counts when stratified by multiple variables, such as age and penicillin nonsusceptibility.

Incidence of IPD in Blacks is over two times the incidence in Whites or Latinos in LAC. The ratio of Black-White incidence is similar to that found nationally; however, the incidence is much lower for both Whites and Blacks, which are 12.1 and 26.5 per 100,000 in the national population, respectively [3]. Whether the high rate in Blacks accounts for the apparent increases in IPD among children <1 year old is unknown, as stratifying by both age and race/ethnicity produces unstable rates. However, since incidence rates by race/ethnicity have not changed from the previous year, it is unlikely that there is a relationship. Studies have indicated that the difference in incidence among Blacks is associated with rates of breastfeeding, attendance in daycare, and underlying infections such as HIV [3].

Laboratories are the source for many of the IPD case reports to ACDC: 57% of cases were reported by laboratories only. Much of the limitations in the data are due to the minimal access that laboratories have

to patient information. Race/ethnicity data and outcome status, in particular, are often missing from laboratory reported cases. Only 67% of case reports contained race/ethnicity data and 50% contain outcome status. The unavailability of outcome status is further exacerbated by the requirements of laboratory reporting procedures. Cases often are reported before the final outcome is known due to the requirement to report positive cultures within seven days. Therefore, case fatality rates may be unreliable.

S. pneumoniae is one of the most common bacterial causes of community acquired pneumonia and otitis media (ear infections). However, these non-invasive forms of infection are not counted in our surveillance, therefore the data presented in this report is an underestimate of all disease caused by *S. pneumoniae* in LAC.

REFERENCES

1. Active Bacterial Core Surveillance Reports from 1997 to 2003 from the Centers for Disease Control and Prevention's Division of Bacterial and Mycotic Diseases. Report available at: www.cdc.gov/ncidod/dbmd/abcs/survreports.htm. Accessed 5/10/2005.
2. CDC. Prevention of pneumococcal disease: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Morb Mortal Wkly Rep. 1997; 46:1–24.
3. Flannery B, Schrag S, Bennett NM, Lynfield R, Harrison LH, Reingold A, Cieslak, PR, Hadler J, Farley MM, Facklam RR, Zell ER, and Whitney CG. Impact of childhood vaccination on racial disparities in invasive *Streptococcus pneumoniae* infections. JAMA 2004; 291: 2197-2203.
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