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Keynote Lecture
Streptococcus pneumoniae, the perennial pathogen
D.M. Musher* (Houston, US)

Despite reductions in disease attributable to widespread use of protein-conjugate polysaccharide vaccines (PCV), the pneumococcus retains its role as a principal pathogen of the respiratory tract, causing many or most cases of otitis media, acute sinusitis, and pneumonia and occasional exacerbations of chronic lung disease. Diseases outside the respiratory tract include bacteremia with no recognized focus, meningitis, septic arthritis, endocarditis, peritonitis and osteomyelitis. The complex polysaccharide capsule repels ingestion and killing by innate immune mechanisms or by polymorphonuclear leukocytes. Peptidoglycan, the principal constituent of cell wall, and pneumolysin each stimulate an intense inflammatory response. Disease of the respiratory tract results when the host fails to clear organisms and inflammatory products accumulate. Treatment of extra-CNS infection has remained straightforward, with most pneumococci remaining susceptible to beta-lactam antibiotics in commonly used doses and to fluoroquinolones. Even meningitis, in most cases, responds to commonly recommended high doses of third-generation cephalosporins. Some newer antibiotics such as ceftaroline appear to be effective against penicillin-resistant organisms. Widespread use of 7-valent PCV has led to emergence of replacement strains, and use of 13-valent PCV is almost certain to have the same effect, limiting the usefulness of any polysaccharide-based vaccine in the future. Pneumolysin, a major virulence factor of pneumococci, and proteins that are expressed on the surface are currently under investigation as potential vaccine components.