CASE STUDY #1

Answer Key

1. *Streptococcus pneumoniae*

2. Elderly, individuals with malignancy (multiple myeloma for example), individuals receiving immunosuppressive drugs

3. Optochin resistant streptococcus organisms belong the “viridians streptococci” or “green streptococci” and the most common cause of bacterial pneumonia is *S. pneumoniae*.

4. Such strains are referred to as beta-lactam resistant strains. They possess penicillin-binding proteins (PBPs) with reduced affinity to these drugs. Normally, beta-lactam drugs act by binding to these proteins and inhibit their activity. Most of these strains have multi-drug resistance due to possession of a transposon which codes for several different types of resistance genes, including erythromycin which acts by inhibiting protein synthesis in prokaryotes.

5. Such multiply drug-resistant pneumococci are being encountered more and more frequently. Two principal factors contribute to this problem: 1) day-care centers serve as site for easy spread and 2) the infected children are frequently receiving antimicrobial agents—hence ease of transmission and antimicrobial pressure. These factors have led to widespread dissemination of drug-resistant organisms.

6. Polysaccharide capsule. A second virulence factor that can also contribute to increased virulence is pneumolysin, a hemolysin that has cytotoxic activity when injected into lungs of experimental animals.

7. Indiviuals who are asplenic or functionally asplenic; chronic diseases such as diabetes, heart, liver, or kidney disease; sickle cell disease; immunosuppressed individuals due to disease or drugs; HIV infected individuals; those over 65 years and under 2 years of age.