Diphtheria

**Clinical Features**  Respiratory diphtheria presents as a sore throat with low-grade fever and an adherent membrane of the tonsils, pharynx, or nose. Neck swelling is usually present in severe disease. Cutaneous diphtheria presents as infected skin lesions which lack a characteristic appearance.

**Etiologic Agent**  Toxin-producing strains of *Corynebacterium diphtheriae*.

**Incidence**  Approximately 0.001 cases per 100,000 population in the U.S. since 1980; before the introduction of vaccine in the 1920s incidence was 100-200 cases per 100,000 population. Diphtheria remains endemic in developing countries. The countries of the former Soviet Union have reported >150,000 cases in an epidemic which began in 1990.

**Complications**  Myocarditis, polyneuritis, and airway obstruction are common complications of respiratory diphtheria; death occurs in 5%-10% of respiratory cases. Complications and deaths are much less frequent in cutaneous diphtheria.

**Transmission**  Direct person-to-person transmission by intimate respiratory and physical contact. Cutaneous lesions are important in transmission.

**Risk Groups**  In the pre-vaccine era, children were at highest risk for respiratory diphtheria. Recently, diphtheria has primarily affected adults in the sporadic cases reported in the U.S. and in the large outbreaks in Russia and New Independent States of the Former Soviet Union.

**Surveillance**  National surveillance through the National Electronic Telecommunications System for Surveillance (NETSS). Cases also identified by requests for diphtheria antitoxin (DAT); since 1997 DAT is available in the U.S. only through CDC.

**Trends**  Respiratory diphtheria has become a rare disease in the U.S. (0-5 cases per year.) An increasing proportion of cases occurs among older children and adults; in the prevaccination era, younger children were most often affected.

**Challenges**  Circulation appears to continue in some settings even in populations with >80% childhood immunization rates. An asymptomatic carrier state exists even among immune individuals.

Immunity wanes over time; decennial booster doses are required to maintain protective antibody levels. Large populations of adults are susceptible to diphtheria in developed countries--appear to be increasing in developing countries as well.

In countries with low incidence, the diagnosis may not be considered by
clinician and laboratory scientists. Prior antibiotic treatment can prevent recovery of the organism.

Limited epidemiologic, clinical, and laboratory expertise on diphtheria.

**Opportunities**

New molecular typing methods allow for characterization of strains and closely related groups (clones) of strains. Will facilitate epidemiologic studies and possibly identification of other virulence factors.

Recent identification of persistent foci in the U.S., Canada, and Australia may allow studies to determine risk factors for persistence and needed control measures.

Diphtheria antitoxin is available only in the United States through CDC; this should improve the reporting of suspected diphtheria cases.