

# Epidemiology of Meningococcal Disease

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*Neisseria meningitidis* is a major cause of invasive bacterial infections globally. A notable feature of the meningococcus is its fluid epidemiology. There are substantial cyclical fluctuations in meningococcal disease incidence and the occurrence of out-breaks and epidemics. Furthermore, meningococcal incidence and serogroup distribution are highly regional. The purpose of this review is to discuss the current global epidemiology of meningococcal disease in major areas of the world, including recent changes. As most information derives from disease surveillance, apparent differences in epidemiology can only be understood in the context of the underlying surveillance systems. A major focus of this review is information on regional meningococcal disease incidence and the serogroup distribution of meningococcal strains causing invasive disease, key issues for vaccine formulation and immunization policy.

Meningococcal disease surveillance is required for the assessment of local epidemiology and assessments of disease burden. There are a variety of methods for conducting meningococcal surveillance, which vary in their ability to accurately portray the epidemiology. The gold standard is laboratory-based surveillance, which specifically identifies *N. meningitidis* in cases with clinical invasive meningococcal disease. Most laboratory-based surveillance systems for meningococcal meningitis rely primarily on cultures of cerebrospinal fluid, with some systems including all invasive form of meningococcal disease, which is usually based on isolation from blood or other normally sterile body fluids. Cultures of non-sterile body sites, such as the pharynx, are not normally used because a substantial proportion of the population is asymptotically colonized with *N. meningitidis*. In some areas of the world, non-culture-based approaches are used, usually to supplement cultures, such as latex agglutination and counter immune-electrophoresis. Since the mid-1990s, PCR-based approaches have increasingly been used to identify patients with meningococcal infection, as well as pneumococcal and

Haemophilus influenzae type b infection. In some studies, the use of PCR has substantially increased the estimates of meningococcal disease burden. One downside of the use of PCR is that no bacterial isolate is available for phenotypic studies. However, meningococcal serogroup can be determined using serogroup-specific PCR and further genotypic characterization is possible.

Meningococcal disease is a serious public health concern, associated with high case fatality rates (10% to 20%) and substantial morbidity (up to 20% of survivors of meningococcal disease develop long-term sequelae, including deafness, neurological deficit or limb amputation), despite the continued sensitivity of meningococcus to multiple available antibiotics, including penicillin. *Neisseria meningitidis* became a leading cause of bacterial meningitis in children and young adults in several Latin American countries, especially after the introduction of *Haemophilus influenzae* B routine vaccination. Most cases of meningococcal disease are sporadic, with seasonal variations and outbreaks occurring at irregular intervals. Although considered as a disease of compulsory notification in most Latin American countries, the incidence of meningococcal disease is probably underestimated because of difficulty in recovering the organism, not only because of the limitations in obtaining adequate samples for culture, but also as a consequence of previous antibiotic use. This results in the inclusion of many of these infections in the group of undetermined meningitis and highlights the need for additional surveillance studies to better estimate the real burden of meningococcal disease in Latin American countries. In this article, we present an up-to-date summary of the available epidemiological data of meningococcal disease in Latin America, review how to manage the disease in our setting and discuss the appropriateness of the introduction of new meningococcal vaccines in the region.

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