# CHAPTER 1

## Introduction

Bacterial meningitis remains a serious global health problem.  The laboratory plays a crucial role in diagnosing this devastating disease.  By identifying the causative organism and determining antimicrobial susceptibility, laboratorians provide clinicians with the information required to deliver appropriate treatment to their patients.  Laboratories play a crucial role for communities and populations as laboratory data are the foundation of public health surveillance for bacterial meningitis.  These surveillance data guide ministries of health when responding to epidemics, making decisions about the introduction and use of vaccines, and properly allocating resources according to the needs of the population.  Thus, a well-trained and equipped diagnostic laboratory is critical for the health of individuals and populations.

In 1999, the World Health Organization published the first edition of "Laboratory Methods for the Diagnosis of Meningitis Caused by *Neisseria meningitidis*, *Streptococcus pneumoniae*, and *Haemophilus influenzae*."  That manual aimed to provide laboratories with a clear, concise guide to the basic procedures for isolating and identifying *N. meningitidis*, *S. pneumoniae*, and *H. influenzae* from the blood or cerebrospinal fluid of patients with bacterial meningitis.  The focus was on including laboratory procedures chosen for their utility, ease of performance, and ability to give reproducible results; while taking into account the diversity of laboratory capabilities, availability of materials and reagents, and their cost.  Since its publication, that manual has been widely adopted by laboratories worldwide.

In the twelve years since the first edition of this manual, important changes have occurred both in the epidemiology of bacterial meningitis and in the available laboratory techniques for isolating, identifying, and characterizing the causative organism.  In recent years, great progress has been made in increasing worldwide access to vaccines to prevent meningococcal, pneumococcal, and *H. influenzae* type b (Hib) disease.  Most recently, the historic development and implementation of a new meningococcal conjugate vaccine for serogroup A has the potential to eliminate epidemic meningitis in sub-Saharan Africa.  Surveillance for diseases caused by infectious agents that are targeted by newer vaccines will likely require a syndromic approach. Patients diagnosed with meningitis syndrome may all exhibit similar symptoms (i.e., fever, headache, stiff neck) but each individual's disease could be caused by a variety of organisms, including the bacterial meningitis pathogens *N. meningitidis*, *S. pneumoniae*, and *H. influenzae*. Hence, clinical syndromic surveillance must be complemented by a strong laboratory component to allow for diagnostic confirmation of the specific disease agent.  Laboratory networks supporting surveillance, such as the Invasive Bacterial Vaccine Preventable Diseases (IB-VPD) Surveillance Network and Integrated Disease Surveillance and Response (IDSR), have helped to improve data quality to expedite and sustain evidence-informed decisions at the global, regional, and national levels.

These developments prompted a revision of the manual to produce this second edition.  The revision follows the format of the first edition, but has been expanded to include Results Management and Reporting of Data (Chapter 3); Biosafety (Chapter 4); PCR for Detection and Characterization of Bacterial Meningitis Pathogens (Chapter 10); Antimicrobial Susceptibility Testing (Chapter 11); Characterization by Molecular Typing Methods (Chapter 12); and Quality Control/Quality Assurance (Chapter 13).