

Thailand Ministry of Public Health –  
U.S. Centers for Disease Control and Prevention

International Emerging Infections Program (IEIP)

**POPULATION-BASED SURVEILLANCE  
FOR MICROBIAL AGENTS OF PNEUMONIA AND SEPSIS  
WITH DETECTION OF *STREPTOCOCCUS PNEUMONIAE***

**STANDARD OPERATING PROCEDURES  
FOR CLINICAL AND LABORATORY STAFF**



## Document History

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# Introduction

Twelve hospitals in the Thai province of Nakhon Phanom, on the Lao border, and 8 hospitals in the eastern Thai province of Sa Kaeo on the Cambodian border currently participate in a pneumonia disease surveillance network directed through a Thai Ministry of Public Health (MOPH) - U.S. Centers for Disease Control and Prevention (CDC) collaboration. This Thai-U.S. collaboration uses active surveillance to determine the population-based incidence of radiographically confirmed pneumonia.

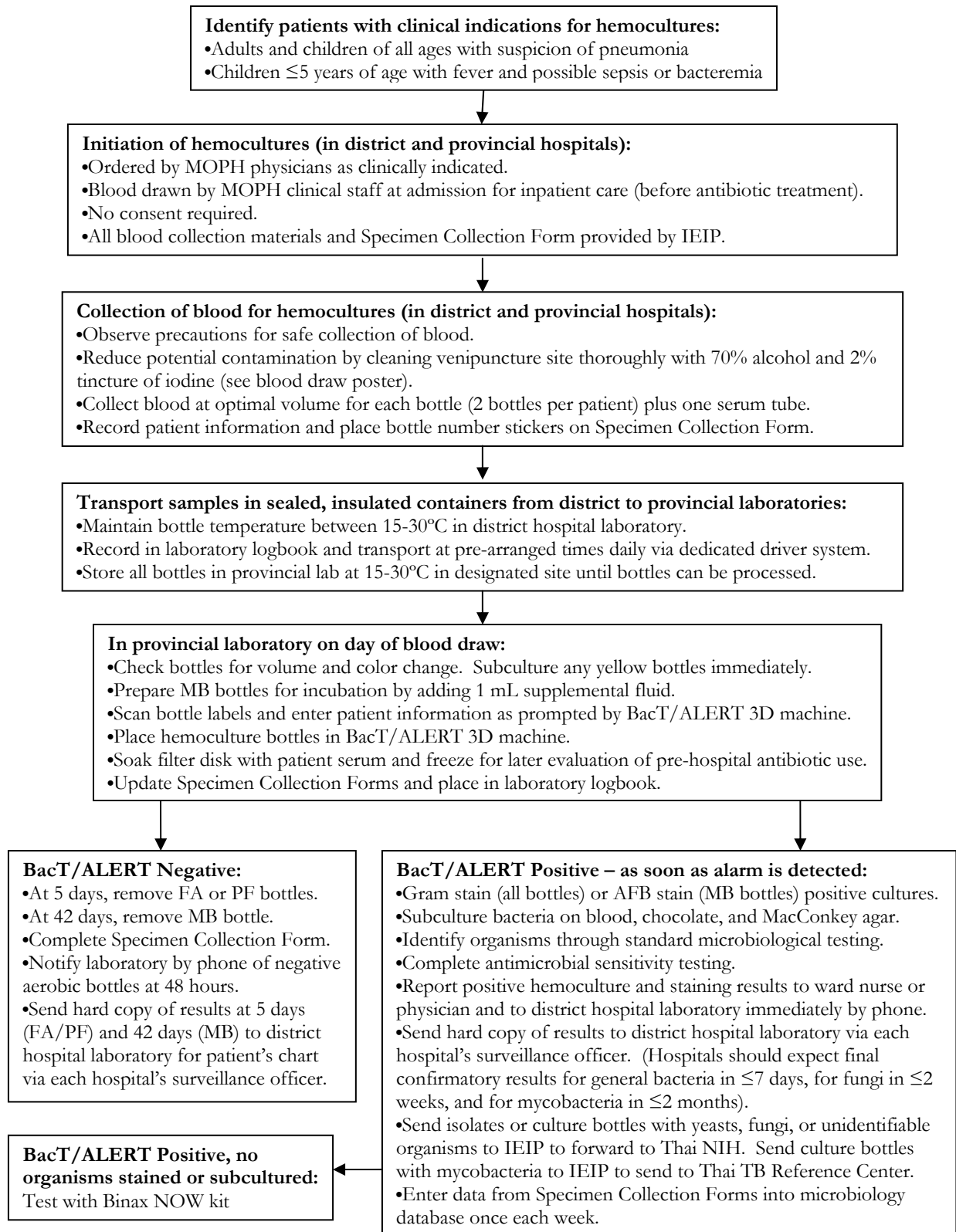
With the support of the PneumoADIP program at Johns Hopkins University and the Global Alliance for Vaccines and Immunization (GAVI), the Thai-U.S. CDC collaboration now aims to strengthen microbiology laboratory capacity in Nakhon Phanom and Sa Kaeo. This support will allow MOPH clinicians to request sensitive blood cultures as clinically indicated, with special emphasis on patients with suspected pneumonia and children with fever and possible bacteremia. This increased microbiology capacity will:

- strengthen the Thai MOPH system for population-based pneumonia surveillance;
- allow clinicians to meet the recommended standards of clinical care for pneumonia and sepsis;
- help define the population-based incidence of invasive bacterial disease, including *Streptococcus pneumoniae*, in these two provinces; and
- provide a profile of antimicrobial sensitivity for *S. pneumoniae* and other bacteria.

Using pre-treatment blood cultures to identify disease etiology for patients who require hospitalization for community-acquired pneumonia, as emphasized by internationally accepted practice guidelines, can improve care of individual patients by allowing selection of the most effective therapies. Microbiological diagnosis can also advance knowledge and improve care of other patients by detecting pathogens of potential epidemiological importance and patterns of antibiotic resistance, and can help physicians select antibiotics to limit development of microbial resistance in the community.<sup>1,2</sup>

*Streptococcus pneumoniae* (or pneumococcus) affects children and adults worldwide, causing invasive diseases such as pneumonia, meningitis, and sepsis, and accounting for about two-thirds of all cases of community-acquired bacteremic pneumonia.<sup>3</sup> An accurate assessment of the disease burden from pneumococcus in these two provinces will allow for better characterization of potential benefits from routine use of existing or new pneumococcal vaccines in Thailand. Therefore, the collection, transport, culture, and storage protocols described in this manual have been designed to collect potential pneumococcus isolates as efficiently as possible. The techniques adopted to preserve notoriously fastidious pneumococcus cultures for comprehensive analysis should allow for high-throughput, high-sensitivity detection of a wide spectrum of invasive bacterial and mycotic diseases.

# Overview of Hemoculture Process



# Quality Assurance and Quality Control

Throughout these standard operating procedures (SOPs), boxed sections refer to Quality Control and Quality Assurance steps. These boxes serve as reminders of specific actions that must be taken to assure clinicians and patients that the laboratory results can be trusted.

Quality Assurance (QA) can be defined as the overall system for assuring a reliable standard of work. QA includes internal quality control (defined below), comprehensive record-keeping to demonstrate the validity and performance of tests, training of personnel, monitoring of results to improve laboratory efficiency and reliability, and external assessments to test laboratory proficiency. QA exists not only to detect errors when they occur, but to improve the laboratory system continuously. A comprehensive QA program spans the entire laboratory process, from collection of specimens to feedback from clinical staffs.

Quality Control (QC) refers to the steps that laboratory technicians take with every procedure to demonstrate that their tests provide reliable results. QC includes selecting the right assays, media, and reference control strains for every situation; assessing whether media, reagents, equipment, and assays perform correctly; including appropriate controls to confirm that microbiological techniques yield results that make sense and fall within normal parameters; maintaining essential environmental conditions in media quality, temperature, humidity, CO<sub>2</sub> levels, and sterility; and keeping accurate records that allow technicians to share and validate their results quickly.

Many comprehensive references to QA/QC systems exist. The American Society for Microbiology and the Clinical Laboratory Standards Institute (formerly NCCLS) offer numerous publications on general and specific QA/QC procedures. The *Manual for the Laboratory Identification and Antimicrobial Susceptibility Testing of Bacterial Pathogens of Public Health Importance in the Developing World* (World Health Organization, Geneva, 2003) describes QC practices for many common bacterial causes of pneumonia and sepsis. The World Health Organization's Southeast Asian Regional Office has also posted *Blood Safety and Clinical Technology: Quality Assurance in Bacteriology and Immunology* online at: <http://w3.whosea.org/EN/Section10/Section17/Section53/Section375.htm>.























































































































































