1. **Purpose**

The purpose of this guideline is to provide physicians with clear and concise directions on testing and interpreting laboratory reports of pathogens from the lower respiratory tract for community-based patients.

2. **Background**

Routine sputum cultures for the etiologic diagnosis of outpatients with community acquired pneumonia have limited value. Specimens should only be collected if individual antibiotic management will change based on the sputum culture results.

The following etiological agents of pneumonia are not detected in routine cultures: *Mycoplasma pneumoniae*, *Chlamydia pneumoniae*, *Legionella*, anaerobes, respiratory viruses, and *Mycobacterium tuberculosis*. If viral testing is required to confirm suspicion of a viral infection, the specimen should be forwarded in a proper viral collection kit directly to the Public Health Laboratory.

The quantity of the organisms present, source of culture, presence of a tracheostomy, immune status, and age of the patient may determine the significance of a pathogen.

*Streptococcus pneumoniae*, *Haemophilus influenzae* and *Moraxella catarrhalis* may be part of the normal respiratory flora and the presence of these organisms alone in a respiratory culture does not necessarily indicate infection.

3. **Specimen Collection Instructions**

Appropriate specimens to identify pathogens causing pneumonia include expectorated and induced sputum.

Sputum specimens should not be submitted unless a good quality specimen can be obtained, therefore collections from non-hospitalized pediatric patients are discouraged. Sputum specimens will be rejected unless they meet the laboratory’s quality score system screening requirement (ratio of squamous cells to neutrophils). Sputum samples should ideally be transported to the laboratory in less than 2 hours if at room temperature, otherwise the specimen must be refrigerated.

If an active infection with *M. tuberculosis* is suspected at least three sputum samples, preferably collected at one hour intervals, should be submitted for testing. Suspicion of *M. tuberculosis* should be specified on the requisition.

Blood culture should be considered in patients with asplenia, severe chronic liver disease, active alcohol abuse, or severe community acquired pneumonia (such as patients with cavitary disease or pleural effusions).
### 4. Most Common Isolates, Reported Antimicrobials/Susceptibility Testing, and Therapeutic Options

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<th>Pathogens</th>
<th>Reported Antimicrobials/Susceptibility Testing</th>
<th>Therapeutic Options</th>
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| **Streptococcus pneumoniae** | a) Penicillin  
b) Erythromycin  
c) Trimethoprim/sulfamethoxazole  
d) Levofloxacin | a) Lower respiratory infections due to penicillin-resistant strains will likely respond to high dosages of penicillin and/or amoxicillin. The penicillin result may predict susceptibility to ampicillin, amoxicillin, 2nd or 3rd generation cephalosporins e.g., ceprozil, cefuroxime, cefpodoxime, cefaclor.  
b) Susceptibility and resistance to azithromycin and clarithromycin may be predicted by erythromycin result. [6] |
| **Haemophilus influenzae** | β-lactamase test | Amoxicillin/ampicillin susceptibility is generally predicted by the results of β-lactamase testing. Infections due to β-lactamase producing/amoxicillin resistant strains may be empirically treated with amoxicillin/clavulanate, trimethoprim/sulfamethoxazole, cefuroxime, cefixime, cefprozil, tetracycline, clarithromycin, azithromycin, or fluoroquinolones. |
| **Moraxella catarrhalis** | None | Most Moraxella catarrhalis strains produce β-lactamase and are resistant to ampicillin and amoxicillin. Strains may be empirically treated with amoxicillin/clavulanate, trimethoprim/sulfamethoxazole, cefuroxime, cefixime, cefprozil, tetracycline, clarithromycin, azithromycin, or fluoroquinolones. |
| **Staphylococcus aureus** | a) Cloxacillin, oxacillin and methicillin susceptibilities are equivalent  
b) Erythromycin, clindamycin  
c) Trimethoprim/sulfamethoxazole  
d) Vancomycin, linezolid: Note, only reported if Methicillin-resistant Staphylococcus aureus (MRSA) or for multi-drug resistant strains | a) Cloxacillin-resistant isolates are considered to be resistant to all penicillins and cephalosporins. Cloxacillin-susceptible staphylococci can be considered susceptible to cepodoxime, ceprozil, cefuroxime, cefaclor, and some parenteral cephems e.g., ceftriaxone, cefazolin, cefotaxime.  
b) Erythromycin-resistant strains are often resistant to clindamycin. For clindamycin therapy follow results of in-vitro laboratory testing. |
| Other gram negative organisms e.g., Pseudomonas aeruginosa, Enterobacteriaceae, including Klebsiella pneumoniae, etc. | Antibiotics are reported according to Clinical Laboratory Standards Institute. Performance Standards for Antimicrobial Susceptibility Testing; Informational Supplement. | Gram negative organisms may be isolated from sputum specimens, but rarely cause pneumonia in community patients. Exceptions are patients with cystic fibrosis. |
Cited References


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External Reviewer:
Dr. Larissa M. Matukas, MD, FRCPC
Head, Division of Microbiology, St. Michael’s Hospital
Assistant Professor, Department of Laboratory Medicine and Pathobiology
University of Toronto, Toronto, ON

Internal Development Group:
Julius Kapala Ph.D., RSM (CCM), SM (ASCP)
Scientific Director Microbiology, Dynacare®
Anu Rebbapragada, Ph.D., CIC
Clinical Microbiologist, Associate Scientific Director for Microbiology, Dynacare®
Huda Almohri, MD FRCPC
Deputy Ontario Medical Director
Medical-Scientific Department - LifeLabs®

Laboratory Guidelines in Support of Clinical Practice

The OAML, through its Quality Assurance Committee, co-ordinates the development, dissemination, implementation and review of Guidelines for Clinical Laboratory Practice.

Guidelines are reviewed every 5 years, or as the literature warrants. When consensus on the Guideline is achieved by the Committee, the Guideline is submitted to the OAML’s Board of Directors for approval before distribution to Clinicians.

The comments of end users are essential to the development of guidelines and will encourage adherence. You are strongly encouraged to submit your comments on this or any other OAML Guideline to:

Chair
Quality Assurance Committee
Ontario Association of Medical Laboratories
5000 Yonge Street, Suite 1802
Toronto, Ontario, M2N 7E9
Tel: (416) 250-8555
Fax: (416) 250-8464
E-mail: oaml@oaml.com
Internet: www.oaml.com

Quality Assurance Committee Members
Virginia Walleye M.D., FRCPC
Ontario Medical Director
Medical-Scientific Department - LifeLabs®, Ontario

Joel Goodman Ph.D., FCACB
VP, Strategies and Innovation
Dynacare®

Sheila Boss, Ph.D., FCACB
Laboratory Director, LifeLabs®, Ontario

Chair
Judy Ash M.PP.A.L, B.Sc., ART, CQMgr, CQA (ASQ)
Director, Programs & Member Services
Ontario Association of Medical Laboratories

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