Ministry of Health

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Contents Table:

Acknowledgment

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Acronyms:

BA	Blood agar
BAL	Bronchoalveolar lavage
CA	Chocolate agar
MAC	MaConkey
ATCC	American Type Culture Collection
H&S	Health and Safety
ID	Identification
IQC	Internal Quality Control
SOP	Standard operating procedure
WHO	World Health Organization

1. **Purpose**

This document describes the procedure for bronchoalveolar lavage (BAL) investigation.

2. **Scope**

This document is applicable for all medical laboratories under MOH and other collaborative governmental and non-governmental health institutions.

3. **Definitions**

3.1 leak-proof sterile container: constructed in such a manner that it will not allow its contents to spill out without being opened and physically discharging the contents.

3.2 Bronchoalveolar lavage: a diagnostic method of the lower respiratory system in which a bronchoscope is passed through the mouth or nose into an appropriate airway in the lungs, with a measured amount of fluid introduced and then collected for examination.

4. **Procedure**

4.1. Clinical background:

- Bronchial washings and bronchoalveolar lavage (BAL) require a specialized technique that involves instillation of saline into the bronchial tree to sample a larger area. These specimens should be processed in the laboratory without delay, as quantitative cultures may be required.
- Bronchial washings are the secretions aspirated through a bronchoscope channel after instillation of saline into a major bronchus. These washings are considered similar in quality to sputa or endotracheal aspirates.
- A variable volume of saline is injected through the lumen and aspirated out in three or four aliquots. It is estimated that >1 million alveoli are sampled by this technique, with approximately 1 ml of actual lung secretions obtained.

4.2. Principle:

- BAL is a reliable method for making a definitive etiological diagnosis of pneumonia and other pulmonary infections.
- BAL is considered as sterile fluid so any organism grow should be taken seriously

4.3. Pre – analytical stage:

4.3.1. Sample:

- Bronchoalveolar lavage (BAL) should be collected in a leak proof sterile container and transported in a sealed plastic bag.

- Bronchoalveolar lavage (BAL) should be transported and processed as soon as possible.
- As large a volume as possible is preferred.
- If processing is delayed, refrigeration is preferable to storage at ambient temperature.
- Delays of over 48 hours are undesirable.

4.3.2. Material:

Reagents	**Consumables/Supplies**	**Equipment**
MacConkey plate Blood Agar plate Chocolate plate Sabroud plate Gram stain reagent API identification test Susceptibility discs	Microscopic slides Sterile loops sterile pipette	Microscope Slide dryer Safety cabinet class II Incubators Automated ID machine McFarland photometer tool Centrifuge

4.3.3. Safety precaution:

- All specimens need to be treated as potentially infectious. Standard procedures for handling of biohazard material must be followed at all times. Universal Precautions must be practiced at all stages of these procedures.
- All sputum and associated specimens are to be processed in the biohazard safety cabinet.

4.3.4. Quality control:

- Check the expiry dates of all media, reagents and stains before use.
- All media, reagents, kits, and stains MUST be quality controlled before use.
- Identification tests should be run with appropriate controls.
- Record the quality control results in the appropriate QC sheet.

4.4. Analytical stage:

4.4.1 Direct examination and culture setup**:**

- With appropriate precaution, centrifuge BAL at 1200 xg for 10 mins.

- Discard the supernatant except 0.5mL and re-suspend the remaining centrifuged deposit using sterile pipette.
- Gram Stain: A representative portion of the specimen is chosen to prepare a film for Gram stain.
- Quantitate the presence of pus cells and organisms.
- Modified acid fast stain - If Actinomyces or Nocardia is requested or suggested on Gram stain.
- Calcofluor white stain (if available) - If fungus is requested.
- Culture: Apply the specimen on the surface of a 3 plates of BA, CA, MAC. Using sterile loop, streak according to the following table:

Media	**Incubation**
Blood agar Chocolate Agar (CHOC)	CO_2, 35ºC x 48 hours
MacConkey Agar (MAC)	O_2, 35ºC x 48 hours
If fungus culture is requested or seen in gram stain, **add** 2 Sabroud agar	1. O_2, 30ºC x 7 to 14 days 2. O_2, 35ºC x 7 to 14 days

- Note: Set-up for Nocardia, fungi, and Legionella only upon request or suggested on direct exam.

4.4.2 Identification and isolation:

- Any growth of a potentially pathogenic organism is worked-up. If there are any questions about the significance of an organism consult the charge technologist or a microbiologist.

4.4.3 Susceptibility Testing:

- As appropriate for the isolate.

4.5. Post – analytical stage:

4.5.1. Reporting:

- Quantitate pathogens and "normal respiratory flora", (Quantitate as light, moderate or heavy growth)
- Report Negative: "No growth" or "Normal respiratory flora".
- Positive report: Significant isolates with appropriate susceptibilities. (Quantitate as light, moderate or heavy growth).
- Communicate the significant culture result to microbiologist.

4.5.2. Limitation:

- BAL is usually a sterile site; however, it can be contaminated during procedure. Therefore, result should be interpreted with precaution.
- It is advisable to collect BAL before antibiotic if possible.

5. Responsibilities

5.1. Responsible staff:

- To ensure the adherence to critical result communication procedure
- To facilitate the alternative communication channels once needed

5.2. Quality manager /officer

- To follow up the implementation of the procedure
- To monitor regularly communication of critical results and raise non-conformance with corrective action once needed.

5.3. All lab staff:

- To adhere to the procedure.
- To document record and release results as recommended
- To report test failures or incident

6. Document History and Version Control

Version	Description	Review Date
1	Initial Release	May 2026

5 References

Title of book/ journal/ articles/ Website	Author	Year of publication	Page
Public Health England. (2019). Investigation of bronchoalveolar lavage, sputum and associated specimens. UK Standards for Microbiology Investigations. B 57 Issue 3.5. https://www.gov.uk/uk-standards-for-microbiology-investigations-smi-quality-andconsistency-in-clinical-laboratories	PHE	2019	
Bailey and Scott's., Diagnostic Microbiology. Twelfth edition, chapter 53.			