Ministry of Health

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Acknowledgment

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Acronyms:

AST	Antimicrobial Susceptibility Testing
BA	Blood agar
BHS	Beta hemolytic Streptococci
BSC II	Biosafety Cabinet Class two.
BSI	Bloodstream Infection
BSL	Biosafety Level
BMS	Biomedical Scientist
CR-BSI	Catheter-related blood stream infections bloodstream infection
CVCs	Central Venus Catheters
CVP	Central Venus pressure
CoNS	Coagulase Negative Staphylococcus
GNB	Gram Negative Bacilli
H&S	Health and Safety
ID	Identification
IQC	Internal Quality Control
LIS	Laboratory Information System
MDRO	Multidrug Resistant Organism
MRSA	Methicilin Resistant Staph. Aureus
SOP	Standard operating procedure

1. **Purpose**

This SOP describes the methods of processing intravenous catheter tips eg CVP, Hickman lines.

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 Catheter-related blood stream infections (CR-BSI) : the isolation of the same organism ie identical species from the colonised catheter and peripheral blood in a patient with accompanying clinical signs and symptoms of bloodstream infection (BSI) and no other apparent source of BSI.

3.2 Peripheral lines: inserted into the veins of the forearm or the hand to administer medication, fluids or nutrition eg Venflons and Parenteral nutrition catheters. They can be used either short term or long term .

3.3 Midline catheters : inserted via the antecubital fossa into the proximal basilic or cephalic veins. They do not enter the central veins and are for short-term use to sample blood or administer fluids intravenously

3.4 Central lines: inserted into central veins (such as triple lumen, subclavian lines, jugular lines or less commonly femoral lines) with the tip residing in the vena cava. This permits intermittent or continuous infusion of irritant, vesicant or hyper-osmolar drugs/fluids and/or access into the venous system and can be used short term or long term eg peripherally inserted central catheter (PICC).

4. **Procedure**

4.1.Clinical background:

Insertion of intravascular lines allows continuous and painless access to the circulation for administration of fluids and electrolytes, medications, blood products and nutritional support. In addition, the intravascular access can be used for blood sampling, haemodynamic monitoring and haemodialysis. Line- related infections are amongst the most important nosocomial infections. In high risk patients, central venous line infections carry a significant mortality rate and a high cost. Most central venous line-associated infections are caused by organisms from the skin near the exit site which gains access to the intravascular segment of the cannula.

The common organisms associated with line related infections as in the table (1):

Bacteria	**Fungi**
Coagulase negative staphylococci (CoNS) Staphylococcus aureus including(MRSA) Enterobacterales Enterococci Pseudomonads Corynebacterium species Streptococci Bacillus species Acinetobacter spps.	Candida albicans and other yeasts Aspergillus species Fusarium species Malassezia furfur (in patients receiving intra-lipid infusions)

Note: Other organisms may be isolated and should be given consideration depending on clinical details.

4.2.Pre – analytical stage:

4.2.1. Sample:

4.2.1.1 Sample type: Intravascular catheters may include central, CVP, Hickman, Broviac, arterial, umbilical, hyperalimentation, hemodialysis, port-a-cath and Swan-Ganz catheters.

4.2.1.2 4 cm of the line tip received into an appropriate CE marked leak proof container using sterile scissors.

4.2.1.3 Peripheral lines are not suitable specimens for cultures and should not normally be sent to the laboratory for testing.

4.2.1.4 If >4cm length tip was sent, consult senior staff/ microbiologist and use a sterile scissor to cut the distal end to reduce it to a 4cm length.

4.2.1.5 Sample stability and storage requirements:

- The optimal time for specimen collection is prior to antimicrobial therapy where possible.
- Compliance with transport and storage regulations is essential.
- Specimens should be processed as soon as possible.
- If processing is delayed, refrigeration is preferable to storage at ambient temperature.

4.2.2. Material:

Reagents	Consumables/Supplies	Equipment
Gram stain reagents Agar plates Oil Susceptibility discs	Sterile forceps Sterile scissor	CO_2 incubator O_2 incubator (Ambient air) Hot plate Light microscope BSC-II

4.2.3. Safety precaution:

4.2.3.1 All specimens need to be treated as potentially infectious.

4.2.3.2 Standard procedures for handling of biohazard material must be followed at all times.

4.2.4. Quality control:

4.2.4.1 Check the expiry dates of all media, reagents and stains before use.

4.2.4.2 All media, reagents, kits, and stains MUST be quality controlled before use and checked for sterility.

4.2.4.3 Identification tests should be run with appropriate controls.

4.2.4.4 Record the quality control results in the appropriate QC sheet.

4.3.Analytical stage:

4.3.1 Microscopy:

4.3.1.1 Not applicable for the specimen.

4.3.1.2 May stain any suspicious isolate using gram stain technique.

4.3.2 Catheter tips culture:

4.3.2.1 In the safety cabinet, roll the terminal 4 cm segment across Blood agar surface back and forth several times (4-5 times) using a sterile forceps. This is to cover as much of the agar surface and external line surface as possible.

4.3.2.2 The inoculated Blood agar plate is incubated overnight

4.3.2.3 The number of colonies on the plate is counted after incubation.

4.3.2.4 A threshold of >15 colonies of any organism is commonly accepted to predict line-related sepsis

- Multiple isolates present at >15 cfu are counted individually
- After inoculation, the plate should be incubated as soon as possible, as per (Table 3):

Table 3: Culture plate selection for Catheter specimens

Clinical/ Gram Stain	**Medium**	**Incubation**			**Culture read**	**Significant isolates**
		Temp (˚C)	**Atmosphere**	**Time (hrs)**		
Any pathogen	Blood Agar	35-37	5-10 % CO_2	40-48	Daily (for 2 days)	≥15 cfu per plate of any pathogen

4.3.3 Identification and Isolation:

4.3.3.1 Full Identification of ≤ 3 significant organisms (as on Table 1) and of ≥ 15 cfu/each.

4.3.3.2 If more than 3 isolates which are > 15 colonies, consult microbiologist or senior staff.

4.3.4 Susceptibility Testing (AST):

4.3.4.1 Susceptibility testing is only performed on ≤ 3 significant organisms.

4.3.4.2 AST as per the national antibiotic susceptibility testing guidelines.

4.4.Post – analytical stage:

4.4.1 Reporting:

4.4.1.1 Culture reporting:

- Preliminary report: 24 hours.
- Final report : 48 hours
- Report the growth as follows:

Culture result after 48 hours	Reporting comments
Negative report	"No growth"
Insignificant growth < 15 cfu of pathogens > 3 organisms even if > 15 cfu	• No significant growth • Mixed growth of (list morphotype of organism/s), NO Antibiotic susceptibility required.
≤ 3 significant organisms (≥ 15 cfu per each)	Full ID and report AST as appropriate. May add this comment: "May be associated with systemic line-related infection, or may represent superficial colonisation or contamination. Correlate with blood culture results.

- **Note**:
- Final positive culture reports are entered in the LIS by the laboratory technician, and then verified and authorized by the medical microbiologist/ senior laboratory technologist.
- Notify infection control in case of isolation of MDRO's / others as indicated clinically.

5. Responsibilities

5.1. Responsible staff:

5.1.1 To ensure the adherence to critical result communication procedure

5.1.2 To facilitate the alternative channels once needed

5.2. Quality manager /officer

5.2.1 To follow up the implementation of the procedure

5.2.2 To monitor regularly communication of critical results and raise non-conformance with corrective action once needed.

5.3. All lab staff:

5.3.1 To adhere to the procedure.

5.3.2 To document record and release results as recommended

5.3.3 To report test failures or incident

6. Document History and Version Control

Version	Description	Review Date
1	Initial Release	May 2026

7. References

Title of book/ journal/ articles/ Website	Author	Year of publication	Page
Investigations of intravascular cannula associated specimens.	Public Health England. UK Standards for Microbiology Investigations.	**2017**	B20 Issue 6.1
Inoculation of culture media for bacteriology.	Public Health England. UK Standards for Microbiology Investigations	2017	Q 5 Issue 2.
Intravascular Catheter Tips (Miscellaneous Culture Manual)	Mount sinai Hosputal, Medical Microbiology	2022	Version 1.14