II Microbiology

1 Contact information

General enquiries	2319 8360
Clinical microbiology	2319 8254
Bacteriology	2319 8352
Mycobacteriology	2319 8213
Mycology	2319 8367
Parasitology	2319 8376
Virology	2319 8239
Immunocytometry	2319 8234

2 Scope of service

The list of specific examinations for individual sample types available from Microbiology Division together with description of the test methods used can be accessed from the following HOKLAS website: https://www.itc.gov.hk/en/quality/hkas/doc/scopes/801P.pdf.

3 Materials provided on request

Item	Description	Intended use
P1	Stool container (yellow-capped)	Bacterial culture; ova and cyst examination; viral gastroenteritis investigation
P2	Sterile sputum container (pink-capped)	Bacterial culture; fungal culture
P3	Sterile swab with bacterial transport medium	Bacterial culture
P4	Urine bottle, plain (white-capped)	Urine for biochemistry tests (e.g. bilirubin)/ microscopy/ pregnancy test/ *Legionella* urinary antigen test
P5	Urine bottle, with preservatives (red-capped)	Bacterial culture and microscopy for urine
P6	Spore strips (biological indicators)	Monitoring of steam sterilizers
P7	Sterile container (30 mL)	Sterile site specimens (e.g. tissue, body fluids and pus etc.) for bacterial and fungal culture
P8	Blood culture bottles (aerobic and anaerobic)	Blood culture (aerobic and anaerobic culture)
P9	Envelope for superficial specimen	Fungal/ scabies examination of superficial skin sites, hair and nail
P10	Sterile swab with Amies transport medium with charcoal	Nasopharyngeal swab culture and PCR for *Bordetella pertussis*
P16	EMU bottle (1 litre)	Early morning urine for mycobacterial culture
P17	Container for AFB (sterile translucent container with white cap)	Sputum / stool for acid fast bacillus (AFB) smear and mycobacterial culture
P18	*Chlamydia trachomatis* transport medium ("Chlam")	*Chlamydia trachomatis* culture
P19	Single-welled glass slide	Immunofluorescence test for *Chlamydia trachomatis* / herpes simplex virus (HSV) / varicella zoster virus (VZV)
P20	Dacron swab	*Chlamydia trachomatis* culture; virology studies
P21	Cytomegalovirus transport medium ("CMV")	Cytomegalovirus (CMV) culture
P22	Viral transport medium ("TM")	Virology studies
P24	Vacuette plain clotted blood collection tube (red-capped)	Serology tests
P30	Sterile bijou bottle	Cerebrospinal fluid (CSF) testing
C3 / C6	EDTA-blood collection tube (purple-capped) with / without barcode	Blood smears for parasites; lymphocyte immuno-phenotyping; nucleic acid detection studies

Note 1: Other specialized materials for specimen collection are provided with prior arrangement.
Note 2: All materials provided should not be used after expiry if applicable.

4 Timing of specimen collection

(a) Direct detection and culture: As soon as possible after onset of illness

(b) Antibody detection:
- IgM: Usually 5-7 days after onset of illness
- Antibody titre: Paired acute and convalescent sera preferably 10-14 days apart
- IgG: Any time after window period for persistent infection and immunity testing

5 Guideline for specimen collection and storage

(a) Collect specimens with safety precautions / personal protective equipment in accordance with infection control guidelines of your institution.

(b) Specimen collection should be with reference to clinical features and aetiological agents (please refer to Table 1 for information on collection of non-clinical specimens). In general:
   i. Specimens from relevant anatomical sites should be collected for direct detection tests. Occasionally, other specimens might be useful (e.g. faecal specimens for enterovirus detection for meningitis, myocarditis and rash illness).
   ii. Serology testing for acute infection is retrospective and not usually recommended as first line diagnostic tests. Some exceptions where serology testing are useful include IgM antibody detection for Japanese encephalitis in CSF and serum specimens, IgM antibody detection for diagnosing measles and rubella, antibody titre determination for hantavirus and rickettsial infections, NS1 antigen/ IgM antibody detection for diagnosing dengue fever, and detection of Epstein-Barr virus specific antibody for diagnosing infectious mononucleosis.

(c) Dispose of any potentially contaminated materials used for specimen collection in accordance with infection control guidelines of your institution and Code of Practice promulgated by the Environmental Protection Department.

(d) Specimens for microbiology studies should be transported to the laboratory as soon as possible, preferably within the same day. In general, if delay in despatch is unavoidable, keep specimens refrigerated at 4°C and send them to the Public Health Laboratory Centre (PHLC) within 48 hours except the following:

Specimen / Test	**Storage conditions**	**Time to arrive at PHLC after collection**
Blood culture bottle	Room temperature	Within 24 hours
CSF specimens		
Genital specimens (e.g. vaginal, urethral and cervical swabs)	Room temperature	Within 48 hours
Spore strip		
Dermatological specimens (e.g. skin scraping, nail clippings, skin biopsy)	Room temperature	Within 48 hours
Enteric specimens (e.g. stool, rectal swab) except for *Clostridium difficile* toxin detection		
Specimens for *Chlamydia trachomatis* culture	4°C	Within 24 hours
Stool for *Clostridium difficile* toxin detection		
Urine for *Legionella* antigen testing	(Preferable) Room temperature	Within 24 hours
	(Alternative) 4°C	1 to 7 days

(e) Specimens for virology studies should be transported to the laboratory as soon as possible, preferably within the same session of the day. If delay in despatch is unavoidable, keep specimens at 4°C for up to 72 hours except:

i. EDTA blood (6 mL) for hepatitis B virus (HBV) DNA, hepatitis C virus (HCV) RNA and human immunodeficiency virus (HIV-1) RNA quantitation, which must be kept at 2-25°C and arrive at PHLC within 24 hours of collection. If it is not feasible, plasma/serum (3 mL) should be separated within 24 hours of collection, stored at 2-8°C and sent to PHLC within 6 days.

ii. EDTA blood (3-4 mL) for lymphocyte immuno-phenotyping, which must be kept at room temperature and arrive at PHLC within 6 hours of collection.

(f) The laboratory would not contract out unavailable tests to other laboratories. Pre-arrangement with the laboratory for tests not included in this handbook is required.

6 Laboratory request form & labelling of specimen containers

The following designated Department of Health (DH) laboratory request forms should be used. Forms generated by electronic requesting system, GCRS from Hospital Authority units or CIMS from DH, and Food and Environmental Hygiene Department (FEHD) forms, are also accepted.

DH2538	:	For smear, culture, identification, antimicrobial susceptibility and other tests for mycobacteria
DH2542	:	For virology studies
DH2543	:	For syphilis serology / malaria parasite screening / immuno-phenotyping
DH2544	:	For investigations other than the above
DH2546	:	For paying cases for above investigations
Appendix 1	:	For laboratory isolates referred for identification, typing or other investigations
Appendix 2	:	For carbapenemase-producing Enterobacteriaceae isolates referred for characterization
Appendix 3	:	For susceptibility test request on Non-tuberculous Mycobacteria (NTM)

(a) The following information must be available on the request form before the sample can be processed and the appropriate tests performed:
- Full patient particulars (name, date of birth / age, sex, identity document number)
- Clinic / institution registration number
- Requesting unit
- Onset date of illness (if known)
- Clinical diagnosis and / or specific clinical features
- Antibiotics that the patient is taking, if any
- Date and time of specimen taking
- Nature of specimen
- Test requested
- Signature (for non-electronically generated request forms) and name of requesting staff

(b) The specimen container must be labelled with unique identification of the patient (e.g. Hong Kong Identity Card / HKID number, clinic reference number) matching that on the request form.

(c) Whenever two or more similar specimens from a single patient are sent (e.g. joint fluid vs. peritoneal fluid, cervical swab vs. vaginal swab, left ear swab vs. right ear swab), the anatomic site of origin of the specimen must be clearly specified on the specimen containers and request forms.

7 Transport of specimens

(a) The following triple packaging system shall be used:
   i. The primary container containing the specimen is watertight, leakproof, and properly and securely capped or screwed.
   ii. A second leakproof container is used to protect the primary container. Laboratory test request forms are placed outside the secondary container, using a separate plastic bag.
   iii. The third layer of outer packaging / container (transport box) has adequate strength for its capacity and intended use, and can be readily cleansed and disinfected.
   iv. Specimens are kept upright during transport to minimize the possibility of spillage.

(b) The specimen transport box shall bear the biohazard warning label.

8 Acceptance and rejection of specimens

Each laboratory has established internal criteria for acceptance and rejection of specimens. New users of laboratory service should contact the respective laboratories before making requests for laboratory testing.

Common causes of specimen rejection include:
- Spillage
- Specimen collected in inappropriate container
- Unlabelled specimen
- Wrong specimen type
- Test not available
- Quantity insufficient
- Duplicated / repeated request within short intervals
- Unmatched information between specimen and request form

9 Average turnaround times (TATs)

(a) Refer to Table 2.

(b) The TATs serve only as a general reference. In case confirmatory tests are required, the TAT may be lengthened accordingly.

(c) Reports are normally despatched to requesting units through automated facsimile server in multiple batches per day.

(d) For urgent requests, please contact medical staff for special arrangements.

10 Requests for additional tests

(a) Additional tests on specimens previously sent to the laboratory may be requested via telephone followed by written request via facsimile.

(b) Such tests will be performed on the following conditions:
- Test(s) requested by a medical staff
- Test(s) appropriate to clinical indications
- Sufficient amount of the appropriate sample available in the laboratory
- Test results not affected by storage

Table 1: Collection of non-clinical specimens (with prior arrangement)

Test	Specimens	Procedures
Norovirus RNA detection	Raw bivalve molluscs	1. Collect sufficient sample for testing: - **Oyster, clam, mussel, scallop, razor shell:** Two dozen shellfish per sample - **Cockle, geoduck, whelk, abalone:** 4-6 shellfish per sample, depending on size of each shellfish 2. Place sample in double leak-proof plastic bags and stick sample label to the inner bag. The sample label should contain the sample number and name of food supplier to match the information on the request form. 3. Complete request form, filling in all required information including outbreak case number and sign the request form. 4. Keep the specimen at its initial temperature condition (frozen at -20°C or at 4°C) during transport to the laboratory.
Dengue / Japanese encephalitis virus	Mosquitoes	1. Place the specimen in a sterile container clearly labelled with sample identification number and species information. 2. Complete laboratory request form with the following information: Sample identification number, species of mosquito, geographical site of mosquito collection, epidemiological case number of patient and sign the request form. 3. Keep at 4°C during transport.

Table 2: Average TAT of common tests

In general, the average TAT of direct detection tests (including microscopy, antigen detection and nucleic acid detection) is 1 working day and the frequency of testing is daily. Other tests are performed daily. Exceptions are presented in the following table:

Category	**Test**	**Testing duration (working days)**	**Frequency of test**
Direct detection	Nucleic acid detection on respiratory specimens for atypical pneumonia	1 day	Once per week
	Nucleic acid detection on plasma for HIV-1 RNA quantitation	1 day	Twice per week
	Nucleic acid detection on genital specimens for *Neisseria gonorrhoeae* / *Chlamydia trachomatis* / herpes simplex virus	1 day	Twice per week
Culture	Blood / CSF / body fluids for bacterial culture	7 days	Daily
	Other specimens for general bacterial culture	2 days	Daily
	Fungal culture	7 days	Daily
	Mycobacterial culture	6 weeks	Daily
	Cytomegalovirus DEAFF test	3 days	Daily
	Chlamydia trachomatis shell vial culture	4 days	Twice per week
	Conventional culture for other common viruses	7 days	Daily
Serological tests	Bacterial / fungal / amoebic serology	2 days	1-2 times per week
	HIV / hepatitis / syphilis / antenatal serology	2 days	Daily
	IgM test for measles / rubella virus	1 day	1-2 times per week
	Viral serology for other viruses	2 days	1-2 times per week
Other tests	Lymphocyte immuno-phenotyping	2 days	Daily

Appendix 1

Microbiology Division, Public Health Laboratory Services Branch (PHLSB)
Centre for Health Protection, Department of Health, HKSAR

Referral Form for Identification / Characterization of Culture Isolates

Date: _____

Referring hospital: _____

Requesting doctor: _____

Patient identifier: (OR Gum label)
Name _____
Sex / age _____
HKID no. _____

Contact phone no.: _____ Your lab. no: _____

Clinical information:

Clinical diagnosis: _____ Onset date of illness: _____

Details of request:

Specimen site: _____ Date of collection: _____

Test requested*: Identification / Others: _____

Medium sent: Name: _____ Incubated for: _____ hours

Incubation*: Aerobic / MICROaerophilic / ANaerobic

Preliminary laboratory findings:

Gram stain morphology: _____

MALDI-TOF ID: _____ Log score / Confidence: _____ *BioTyper / VITEK MS

Presumptive identification of isolate: _____

Other relevant information: _____

*Please circle

Appendix 2

Microbiology Division, Public Health Laboratory Services Branch (PHLSB)
Centre for Health Protection, Department of Health, HKSAR

Referral Form for Carbapenemase-Producing *Enterobacteriaceae* Isolates (except *Proteus*, *Providencia* and *Morganella* spp.)

Date : _____

Referring hospital : _____

Requesting doctor: _____

Patient identifier: (OR Gum label)
Name _____
Sex / age _____
HKID no. _____

Contact phone no.: _____ Your lab. no: _____

Clinical information:

Clinical diagnosis: _____ Onset date of illness: _____

Infection status*: Colonization / Infection Fatal case*: Yes / No

Referred isolate:

Specimen site: _____ Date of collection: _____

Identification of isolate: _____

Preliminary laboratory findings:

Susceptibility and combined disc tests:

	Zone diameter (mm)			MIC (μg/mL) (Optional)
	No inhibitor	+ BA	+ EDTA	
Meropenem (MEM)				
Ertapenem (ERT)				
Imipenem (IMI)				

Modified Hodge Test*: Positive / Negative	Carba NP Test*: Positive / Negative
Modified Carbapenem Inactivation Method*: Positive / Negative	Others (e.g. molecular assays):

Other relevant information: _____

* Please circle

Appendix 3

Microbiology Division, Public Health Laboratory Services Branch (PHLSB)
Centre for Health Protection, Department of Health, HKSAR

Request Form for Susceptibility Test on Non-tuberculous Mycobacteria (NTM)

Date: _____

Referring unit: _____

Requesting doctor: _____

Contact phone no.: _____

Patient identifier: (OR Gum label)
Name _____
Sex / age _____
HKID no. _____

Signature: _____

A. Details of Request

Identity of NTM isolated: _____

Specimen type: _____

DH Laboratory no.(s): _____ Date(s) of collection: _____

Specific drugs for susceptibility testing (if any): _____

Reminders:
- *Susceptibility testing should only be carried out when there is clinical suspicion of disease.*
- *Single positive culture from non-sterile site specimen is not diagnostic for NTM disease and could be due to environmental contamination.*
- *Susceptibility testing is not routinely performed for species of low pathogenicity, e.g. M. gordonae.*

B. Clinical Information

Clinical diagnosis: _____ Onset date of illness: _____

Features suggestive of NTM disease: _____

_____

Radiological findings (if any): _____

_____

Other relevant information (e.g. past medical history, treatment history): _____

_____

Notes: *1. This form should be filled in by the doctor in-charge.*
2. Please fax the completed form with a copy of the laboratory report to Mycobacteriology laboratory, PHLSB, at 2776 0344.
3. Susceptibility testing will be considered based on the above information. Please ensure accuracy of information provided as it will constitute part of medical record.