PATHOLOGY DEPARTMENT
HOSPITAL TUANKU FAUZIAH
KANGAR, PERLIS.

PATHOLOGY LABORATORY HANDBOOK
HOSPITAL TUANKU FAUZIAH
HTF/PL/BP-5
VERSION 10
17 MARCH 2025

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PIC LABORATORY HANDBOOK	QUALITY MANAGER	HEAD OF DEPARTMENT

CONTENTS

GENERAL STATEMENTS

This laboratory handbook is specifically for users of Hospital Tuanku Fauziah laboratory service and serves as a comprehensive guide that outlines the operational framework, policies, procedures, and services provided by the laboratory. It is designed to ensure the consistency, reliability, and quality of laboratory practices while adhering to applicable regulatory standards and accreditation requirements. The handbook provides essential information to laboratory personnel, healthcare providers, and other stakeholders, facilitating a shared understanding of the laboratory's objectives and processes.

While all effort has been made to ensure the latest information for all tests provided by the department, the dynamic and progressive nature of medical laboratory testing may cause some updated new tests not being included. In this case, the update will be communicated through letter, meeting minutes or memorandum and later included in the revised edition of this handbook.

The current edition is available on the hospital's website at htf.moh.gov.my and has been shared with all authorized customers through an official notification letter.

Pathology Department, Hospital Tuanku Fauziah has the right to make additions, deletions or modifications to the contents. With this new edition dated 17 March 2025, the old edition (Versi 9, 2023) is obsolete.

Previous Version:
2010, 2012, 2017, 2018, 2019, 2021, 2023

Overview of Changes
HTF Pathology Laboratory Handbook Version 10, March 2025 replaces the previous version of the book, Version 9, July 2023, published in 2023.

ABBREVIATION

ABBREVIATION	WORD/PHRASE
ABG	Arterial blood gas
AE	Accident and Emergency
BAL	Bronchoalveolar lavage
BMA	Bone marrow aspirate
C&S	Culture and sensitivity
COVID-19	Coronavirus Disease
CSF	Cerebrospinal fluid
EQA	External Quality Assurance
FBC	Full blood count
HTF	Hospital Tuanku Fauziah
IC	Identification Card
IQC	Internal Quality Control
LTAT	Laboratory turn around time
NPS	Nasopharyngeal swab
POCT	Point of Care Testing
PPE	Personal Protective Equipment
SFA	Seminal Fluid Analysis
TA	Tracheal aspirate
TDM	Therapeutic drug monitoring
TFT	Thyroid function test
VTM	Viral transport medium

DEPARTMENT OF PATHOLOGY
HOSPITAL TUANKU FAUZIAH

VISION STATEMENT

Pathology Department, Hospital Tuanku Fauziah strives to be among the best laboratory services in Malaysia by achieving international standards of excellence in laboratory diagnostic and healthcare.

MISSION STATEMENT

To provide high quality pathology services by producing accurate and reliable results, within an agreed timeframe and performed by trained and competent personnel.

CLIENT CHARTER

We are committed to delivering accurate and timely test results to support efficient clinical decision-making.

Urgent test results will be issued within the following time frame from the moment the sample is received.

Unit	Service	LTAT	Standard
Haematology	Urgent Full Blood Count (FBC)	≤45 minutes	≥90%
Chemical Pathology	Urgent request for BUSE/Renal Profile and Neonatal Bilirubin (SBV)	≤1 hour	≥90%
Microbiology	CSF gram stain Validation of Blood Culture Positive	1 hour 3 days	≥80% ≥80%
Histocytopathology	HPE small urgent biopsy FNAC/non-gynae fluid	3 working days 3 working days	≥95% ≥95%

SERVICE SCOPE/MAIN ACTIVITIES

The laboratory activities cover activities performed in the main laboratory, point-of-care testing sites and sample collection center.

The laboratory activities include:

a. Provides medical laboratory testing in the field of chemical pathology, medical microbiology, immunology, virology, hematology, histopathology, and cytopathology.

b. Provides consultation services to clinicians including laboratory advice and result interpretation.
c. Provides related laboratory training to health personnel, non-health personnel and students.
d. Build networking in medical research development.
e. Coordinating and providing technical advice for Point-of-Care testing (POCT) services in the hospital.
f. Conducting quality activities in accordance with MS ISO 15189:2022, MSQH, and other regulatory or accreditation body requirements.

SERVICE HOUR

Service hours of each unit:

Unit	Service Hour
Haematology	24 hours
Chemical Pathology	24 hours
Microbiology	24 hours
Histocytopathology	Working day: 8.00 am - 5.00 pm During working hours, the specimen reception is performed at the Unit's Counter. Specimen reception after working hours or SFA specimens are done at the Main Counter.

The laboratory's main receiving counter provides 24-hour services.

Medical Officers and Pathologists on-call are available for consultation or assistance after office hours. Their contact numbers are available from the hospital's operator.

LABORATORY LOCATION

The Pathology department is located at 29A, Ground Floor, Clinical Service Block (Clinical Service Block) which is adjacent to the Department of Radiology and facing the children's playground in front of Block A main building.

Visitors and users can access the laboratory via the front entrance leading to the main counter. Access to the working areas in the laboratory is limited to the laboratory personnel and authorized personnel.

TELEPHONE EXTENSION NUMBER OF PATHOLOGY DEPARTMENT

LOCATION	EXTENSION NUMBER
Head of Department	8183
Complaint (PIC)	8188
ADMINISTRATION UNIT	
Pathology Counter	8191
Administration Office	8193
Medical Laboratory Technologist U6/U7/U8	8194
Microscopic Room (Specialist/Medical Officer)	8402
HEMATOLOGY UNIT	
Head of Unit/Pathologist (Hematology)	8203
Scientific Officer	8189
Haematology Laboratory	8189
CHEMICAL PATHOLOGY UNIT	
Head of Unit/Pathologist (Chemical Pathology)	8196
Senior Scientific Officer (Chemical Pathology)	8205
Scientific Officer (Chemical Pathology)	8204
Chemical Pathology Laboratory	8190/8209
Drug Laboratory	8208
MICROBIOLOGY UNIT	
Head of Unit/Pathologist (Microbiology)	8181/8183
Senior Scientific Officer (Microbiology)	8181
Scientific Officer (Microbiology)	8183
Microbiology Laboratory	8182
HISTOCYTOPATHOLOGY UNIT	
Head of Unit/Pathologist (Anatomic Pathology)	8188/8562
Histopathology Laboratory	8186
Cytology Laboratory (Diagnostik Room)	8187
Cytology Laboratory (Demographic Room)	8561

General line : 04-9738000

Call from outside can be made directly to 04-973 followed by the extension number of the officer you wish to contact.

LABORATORY POLICIES

General Policy of Pathology Department

(General Policy of the Pathology Department summarizes the key aspects of the Quality Manual/Operational Policy, Department of Pathology)

1. The Department of Pathology is a department in Hospital Tuanku Fauziah, the state government Hospital under the purview of the Ministry of Health Malaysia. It is a legal entity that can be held legally responsible for its activities.
2. The Head of Department/Laboratory Director shall be a Pathologist appointed by the Hospital Director. The day-to-day operations of the service may be delegated to suitably qualified and experienced officers, supported by appropriately qualified staff.
3. The laboratory ensures impartiality in its activities and will not allow financial, commercial, or any other pressures to compromise its impartiality.
4. The laboratory is responsible for safeguarding the privacy and confidentiality of all patient information obtained or created during the performance of its activities.
5. In certain circumstances, the Department of Pathology, Hospital Tuanku Fauziah may disclose personal information if it is required by law, with the patient's consent or if it is justified in public interest or patients' best interest.
6. The laboratory treats patients, samples, and remains with care and respect and upholds patients' rights to non-discriminatory care.
7. The laboratory activities cover activities performed in the main laboratory, point-of-care testing sites and sample collection center.
8. The laboratory provides appropriate advice and interpretation to meet the needs of its patients and users.
9. The laboratory designed and established quality policies representing laboratory overall intention and direction related to quality. The laboratory also defined quality objectives and quality indicators that are measurable and consistent with the established quality policy.
10. The laboratory shall have available and adequate resources including personnel, facilities, equipment, reagents, consumables, and support services to manage and perform its activities.
11. The laboratory is responsible for ensuring that there are an adequate number of competent personnel available to perform laboratory activities. The laboratory established training needs assessment and staff development plan which provides the knowledge and skills required for staff to maintain competency in their current positions and future advancement.
12. The laboratory will ensure adequate space, appropriate environmental conditions, and proper facilities to carry out its activities without compromising the quality of work, validity of results, or the safety of patients, visitors, laboratory users, and personnel.
13. The laboratory provides a safety manual, readily accessible to all staff, detailing its health and safety policies and procedures.
14. The laboratory ensures access to adequate and appropriate equipment for sample preparation, processing, measurement, testing, and storage to guarantee the correct performance of tests.
15. The laboratory has established sufficiently detailed calibration and traceability requirements to ensure consistent accuracy and reliability of examination results.
16. The laboratory ensures reagent and consumable required for testing has been verified for performance before putting into use.

17. The laboratory establishes and reviews agreements for providing testing with laboratory users as well as POCT users.
18. The laboratory ensures that products and services from external providers, which impact laboratory activities, are appropriate and fit for purpose.
19. The laboratory has established risk management activities throughout pre-analytical, analytical, and post-analytical processes to identify risks and evaluate effectiveness of the mitigation processes according to the potential harm to the patient.
20. Laboratory tests shall be requested by a **registered Medical/Dental Officer** involved in patient management with an exception on pap smear test, cord blood TSH screening and drug of abuse test. Specialist authorization is required for certain special tests.
21. All tests requested shall use specific controlled forms and specimen containers as stated in the details for testing in this handbook.
22. Only a completed request form and specimen labeling will be accepted. Rejection shall be done in accordance with the laboratory rejection criteria.
23. In certain cases, the laboratory may accept compromised samples when it is clinically critical or irreplaceable such as CSF samples, body fluid obtained from invasive procedures, tissue, bone marrow, forensic or pediatric samples. The laboratory will advise caution when interpreting results that can be affected.
24. The laboratory manages oral requests in situations such as requesting an early report, request for special test that requires laboratory approval before sending samples and request for additional test on samples. All oral requests must be followed by confirmatory request forms within a specified timeframe. Time limits for requesting additional examination or further examination on the same primary sample must be followed.
25. The responsibility for obtaining patient consent lies with the clinicians requesting laboratory tests.
26. Requesting clinicians are responsible for ensuring that samples are transported to the laboratory with appropriate packaging, within the required timeframe, under proper temperature control, and in compliance with any specific instructions related to the requested test.
27. All specimens taken from a patient with a highly infectious disease will be managed appropriately based on procedure for epidemic specimen management.
28. Urgent test requests will be handled according to URGENT test request procedure outlined in this handbook.
29. The laboratory selects and uses examination methods which have been validated for their intended use to assure the clinical accuracy of the examination for patient testing. Validated examination procedures used without modification will be subject to independent verification by the laboratory before being introduced into routine use.
30. The laboratory defines the biological reference intervals and clinical decision limit when needed for interpretation of examination results. The biological reference intervals or clinical decision limits will be incorporated into patients' result/report for clinician reference.
31. The laboratory maintains quality procedures including Internal Quality Control (IQC) and External Quality Assessment (EQA) to monitor and ensure validity of examinations results.
32. The laboratory evaluates and maintains the MU of measured quantity values for its intended use. Upon request, the laboratory will make measurement uncertainty information available to laboratory users.
33. The laboratory ensures comparability of examination results when different methods or equipment or both are used and reported for patients testing.

34. The laboratory results are released by authorized personnel.
35. The Laboratory will ensure that all customer information is submitted to authorized requestors only. The laboratory results/reports can be traced via a web-based system by authorized laboratory users. Hardcopies will be provided upon request and when there is prior agreement with the laboratory users.
36. All test results that fall into critical value will be notified promptly. In instances where the responsible person cannot be reached, the laboratory has established an escalation procedure of notifying the next level of responsibility at the requesting site.
37. When the laboratory releases an interim report, the final report is always forwarded to the requester.
38. In the event of a delay or possible delay in the issuance of a result, the requester will be notified via appropriate method to the impact of the delay to patients' management including written memo, verbally or other communication method.
39. For any result provided orally including frozen section results, record of such communication is maintained. Results provided orally shall be followed by a verified formal result.
40. The laboratory maintains sample identification post analysis and stores samples in an appropriate environment to ensure the sample is suitable for additional examination if required. Safe disposal of samples after retention time has elapsed is carried out in accordance with local and national regulations and hospital support service recommendations for waste management.
41. The laboratory identified and managed any nonconforming works in its activities according to laboratory defined procedures.
42. The laboratory manages its Laboratory Information System (LIS) by appointing LIS manager(s). The LIS is safeguarded to maintain system integrity, ensure information security, and protect the confidentiality of the customer's personal data.
43. Laboratory users are given access to a web-based tracing system using personal password according to laboratory established procedures. The password shall be renewed every 6 months.
44. Results for medicolegal cases, selected reports and VVIP are restricted for online/web-viewing by authorized laboratory users only.
45. Result amendment for errors or omission detected by laboratory users or laboratory personnel shall follow laboratory established procedures. Amendments due to errors shall be subjected to non-conformities procedures.
46. Result amendment due to special circumstances that are not due to errors or omission shall follow established laboratory procedures. These amendments are not subjected to non-conformities procedures.
47. The laboratory accepts written or verbal complaints from internal and external customers. The laboratory will substantiate and investigate all complaints received and ensure appropriate immediate and corrective actions are taken. An acknowledgement letter will be given to the complainant within 2 weeks after the issuance of complaint followed by outcome and/or progress report as appropriate.
48. The laboratory established procedures to enable continued operations in the event of emergency situations or other conditions such as water and electricity disruptions, equipment malfunctions, and personnel shortages when laboratory activities are limited or unavailable.
49. The laboratory actively seeks feedback from users and personnel to improve its management system, activities, and services through yearly customer satisfaction survey and staff satisfaction survey.

Quality Policy of Pathology Department

1. To provide pathology service that always complies with MS ISO 15189 requirements and related documents.
2. To ensure all staff are provided with opportunities for personnel development to improve their knowledge and skill.
3. To reduce specimen handling defects and preanalytical errors by monitoring specimen rejection.
4. To ensure the pathology department is equipped with appropriate equipment that is well maintained and functions well through scheduled PPM.
5. To ensure the test results are accurate and traceable to the highest possible level of traceability by conducting calibration and performance checking of the measuring device.
6. To ensure all non-conformities (NC) are handled in a timely manner through NC acknowledgement monitoring.
7. To increase the staff productivity by providing a healthy workplace through the “Wellness Clinic Program”.
8. To continually maintain and improve the quality management system by conducting clinical audit.
9. To provide appropriate test results in a timely manner for management of patients through LTAT monitoring.
10. To provide accurate results through EQA monitoring.
11. To provide a safe work environment for laboratory staff and visitors through regular safety audits.
12. To maintain a customer responsive service by conducting customer satisfaction surveys
13. To continually maintain and improve the quality management system in Point of Care Testing (POCT) through regular audits.
14. To maintain the quality pathology service and continually improve the service through quality indicators monitoring.

LABORATORY GENERAL PROCEDURES

Instructions for completion of request form

1. All test requests must use controlled forms.
   - **For the latest list of forms, please refer to ePaT@HTF.**
   - **Scan or click the QR code**

https://perlis.moh.gov.my/intrajknpls/elabhtf/web/site/utama

   - **To download the forms, please refer to list of request forms.**
   - **Scan or click the QR code**

https://drive.google.com/drive/folders/1K50hkntT6lBE1f9dFtswsWXkavvCFp6_?usp=drive_link

2. The instructions for completing the PER-PAT 301 request form is as follows. All areas marked with **X, MUST BE COMPLETED**:

Nota : Ruangan bertanda X WAJIB diisi

KEMENTERIAN KESIHATAN MALAYSIA
HOSPITAL TUANKU FAUZIAH
KANGAR, PERLIS.

PERKHIDMATAN PATOLOGI

PER—PAT 301

UNTUK KEGUNAAN MAKMAL
LAB NO.

1. Nama: X		2. No. Pendaftaran:
3. No. Kad Pengenalan: X		4. Jantina: [X] Lelaki or [X] Perempuan
5. Umur: X	6. Keturunan: X	7. Wad/Klinik: X
8. Tarikh Masuk Wad:	9. Pekerjaan:	10. Taraf Perkahwinan: / 11. [ ] Bayar [ ] Percuma
12. No. Laporan Dahulu:		13. Butiran Penting: Please tick where applicable

14. Ringkasan Klinikal, Penemuan Pembedahan dan Riwayat Keluarga:

X

1.Please write down the related history and physical examination for the requested special test (e.g. FBP, HB Analysis, Mixing test, D-Dimer, BMAT, Factor VIII and IX level, C&S tests)

2.Please stamp or state the index patient for thalassemia cascade screening.

	Ya	Tidak
Jaundice	[ ]	[ ]
Lymphadenopathy	[ ]	[ ]
Hepatomegaly	[ ]	[ ]
Splenomegaly	[ ]	[ ]
Bleeding Tendency	[ ]	[ ]
H/O Transfusion	[ ]	[ ]

Haematinics _____

Drug/Chemical History _____

Data Makmal Terdahulu

Hb _____

Platelet _____

TWDC _____

15. Diagnosis: **X (Diagnosis or differential diagnosis)**

16. Kategori Permohonan/Jenis Ujian:

Patologi Kimia		Klinikal		Hematologi	
B. Sugar	[ ]	Bld. Count	[ ]	PBP	[ ]
B. Urea	[ ]	ESR	[ ]	BM Asp.	[ ]
S. Elec	[ ]	BFMP	[ ]	Hb Analysis	[ ]
B. Gases	[ ]	U. Sugar	[ ]	Coagulation	[ ]
S. Billirubin	[ ]	U. Alb.	[ ]		
LFT	[ ]	U. ME	[ ]		
Se. Creatinine	[ ]	Stool ME	[ ]		

Histo/Saitologi	Mikro/Immunologi	
Specimen	Specimen	Ujian

Lain-lain **X (Please tick above where applicable or write down the requested test)**

17. Pengambilan Specimen: Tarikh: [X] Masa: [X]

18. Nama Doktor: X

19. Tarikh: X

X
Tandatangan dan Cop Doktor

Patologi/95
KJT01717—PNMB.,A.S

LAPORAN "SILA LIHAT SEBELAH"

1. Name:	MANDATORY field to be completed ● FULL NAME of the patient as per identification card/Passport/BDM patient details. ● If more than one patient is using mother's/father's/guardian's name as identification (e.g twin), the specific twin identity must be clearly stated (First twin, second twin).
2. No Pendaftaran:	Noted if available
3. No. Kad Pengenalan:	MANDATORY field to be completed. ● For inpatient newborn without IC, use mother's/father's/guardian's IC No. Write down the complete IC including alphabet and numbers following the IC number provided by Bilik Daftar Masuk, HTF. ● For patients without IC No, use passport number, UNHCR number or any unique identification number provided by the local service provider (AE No, Registration No).
4. Jantina:	MANDATORY field to be completed. ● Mark the appropriate box
5. Umur:	MANDATORY field to be completed. ● For a newborn without their own IC, write down Date of Birth instead of age.
6. Keturunan:	MANDATORY field to be completed.
7. Ward/Klinik location:	MANDATORY field to be completed. ● For requests from A&E please indicate zone green, yellow, or red for faster critical value notification. ● Results will be dispatched according to location. Should any query about the request be needed or critical value to be informed, the laboratory will contact the requesting doctor or location.
8-13. Butiran Penting:	Write relevant information if available/applicable.
14. Ringkasan klinikal:	MANDATORY field to be completed. ● The clinical summary should be relevant to the testing requested and should provide information about indications for testing. Non indicated tests may be rejected.

	● Please refer to the specific test information for further information. ● DO NOT leave this field blank.
15. Diagnosis:	MANDATORY field to be completed. ● Write down the diagnosis. If diagnosis is not available, write down the differential or working diagnosis. ● DO NOT leave this field blank.
16. Jenis ujian:	MANDATORY field to be completed. ● Tick the appropriate box(es) or write down the test requested. ● Be specific in the test request. DO NOT request for a profile test that is not listed in ePAT (e.g. Tumor markers, antibodies, etc.) Consult laboratory staff for advice if necessary.
17. Pengambilan specimen:	MANDATORY field to be completed. ● Write down the date and time of the sample collection.
18. Requester name, signature and official stamp:	MANDATORY field to be completed. ● Name, initial and official stamp of the requesting Medical/Dental Officer. ● The test request can only be made by a Registered Medical and Dental Officer involved in patient management. with an exception on pap smear test, cord blood TSH screening and drug of abuse test. ● Some special tests may require specialist or subspecialty authorization. Please refer to specific tests for the requester authorization details. Requests from unauthorized requesters may be rejected.
19. Date of request:	MANDATORY field to be completed.

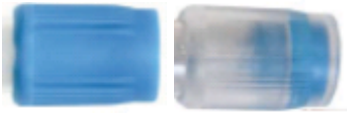
3. Filled up other test request forms according to the specific form's requirements. Refer to test details in ePATH for more information.
4. Please observe the minimum allowable retesting interval for specific tests. Repeated/redundant testing may be rejected.
5. Incomplete request form will delay the testing and patient's management.

Instruction for sample collection

The following points should be paid attention to:

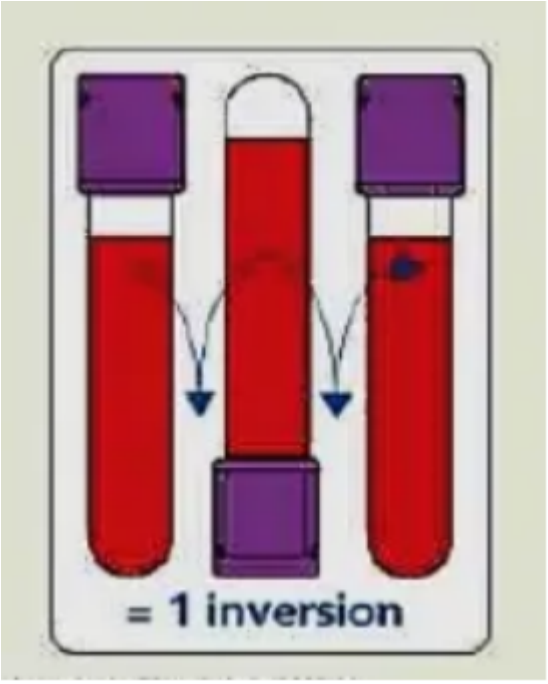
1. **Patient identification**
   - Verify the patient's identity by asking the patient's name (if the patient is conscious and rational) AND by checking other identification such as the patient's wristband before taking the specimen.
2. **Specimen type**
   - Ensure the specimen taken is correct according to the type of test requested.
3. **Collection time**
   - Ensure specimens are collected at the right time.
   - Test results can be affected by the time of specimen collection.
4. **Collection technique**
   - Ensure the collection technique is correct.
   - Blood samples collected from the infusion site will cause inaccurate results.
   - Use of tourniquet for too long (>3 minutes) and non-drying alcohol wipes will cause lysis samples.
   - If the collection of specimens does not follow the procedure outlined in this handbook, the applicant must state it clearly in the request form.
5. **Container**
   - Ensure the tube/container used is correct according to the type of test. Refer to **Appendix 1**: Specimen container guide, for further information.
   - Ensure the tube/container containing additive has not yet expired.
   - IMPORTANT. For blood specimens, fill the blood into the specimen tube/container in the following order to avoid cross contamination and invalid results:

Order of draw

Draw order	Tube/Bottle color	Description	Number of inversion
1		Blood Culture bottles	8 to 10 times
2		Citrate tube	3 to 4 times
3		Plain tube with gel/Serum separator tube (yellow cap)	5 to 6 times

		Plain tube – without gel (red cap)	
4		Lithium heparin tube with/without gel	8 to 10 times
5		EDTA tube	8 to 10 times
6		Fluoride tube	8 to 10 times
* For close system please refer to the supplier's guide*			

- Mix the tube by inverting, 8-10 times for blood culture, heparin, EDTA and glucose tube, 3-4 times for citrate tube and 5 times for plain tube.



- **Label immediately** after filling the specimen into the container.
- Avoid doing labeling and specimen collection for 2 or more patients at the same time to avoid confusion.

6. Label

- The specimen container should be clearly labeled.
  - Name and IC No (or other unique number such as AE No/ Passport No/ Mother IC No/ Mykid No etc). Ensure all information filled is the same as written in the request form.
  - Specimen collection date and time
  - Test requested.
- Specimen containers should not be pre-labeled to avoid mistakes.
- For blood culture bottle,DO NOT put the sticker on top of the bottle's barcode

Instruction for sample transportation

1. The laboratory received samples via the main counter or through the pneumatic tube system.
2. The samples received at the main counter may be submitted by hand from within HTF, from health clinics or from other health facilities through courier services.
3. There are two pneumatic receiving stations from the Emergency department (direct line) and from other locations within HTF.
4. Requestor shall comply to these transportation requirements:

Transportation requirements	Transportation instructions	Examples of tests
Packaging requirements	1. Ensure all primary container cap/lids are securely tightened to prevent spillage, especially urine containers. 2. Use a single layer biohazard plastic bag for general samples. 3. Use **double layer biohazard plastic bags** for transportation of **urine samples via pneumatic tube** to prevent spillage and contamination of the pneumatic tube system. 4. Refer to specific instructions for highly contagious samples or during epidemics.	
Temperature control	1. Maintain samples at the appropriate temperature (e.g., in ice slurry, 2-8C, frozen, or ambient) as required by the sample type and the test being performed. 2. Use suitable temperature-controlled transport containers, such as biohazard plastic with ice slurry, coolers, insulated boxes, or refrigerated vehicles.	ABG, ammonia and lactate samples need to be transported in ice slurry.
Time control	1. Transport unstable samples (prone to degradation, contamination, changes in composition) immediately to the lab for processing to ensure accurate results.	Blood gases, ammonia, lactate, and glucose are unstable analytes. Bilirubin is photosensitive and degrades when exposed to light. Delayed analysis can cause increased potassium due to cell leakage. Urine samples may be

		contaminated with bacterial overgrowth if analysis is delayed.
Transport via pneumatic tube	1. Specimens for general testing can be sent via the pneumatic system. 2. Specimens must be put in the zip-lock portion of the biohazard plastic bag with request form in the outer pocket. 3. **DO NOT** send these samples via pneumatic tube system: - blood gases samples (ABG or VBG) - any specimen on ice - blood culture bottles - glass slides - stool and body fluid specimen - CSF specimen - histocytopathology specimen 4. **DO NOT** use the long pneumatic carrier for transporting patients' samples.	ABG/VBG samples may be affected by pneumatic pressure and any trapped air bubbles will be exaggerated. Blood culture bottles/glass slides may break during pneumatic transportation due to high pressure. Long pneumatic carriers cannot be returned to sender due to limitations in the laboratory send-out station's design. (Note: Long pneumatic carrier is intended for transport of radiological film.)
*Please refer to specific test for more instruction on transportation requirements		

5. Laboratory pneumatic tube stations for sending samples :
   - From Emergency Department : 04 or 33 (New)
   - From other destinations : 05

Special Sample Collection and Transportation Procedure

-Epidemic sample management
(All specimens from "highly infectious disease" patients such as Ebola, COVID-19, MERS-CoV, and others.)

The procedure for sample collection and transportation during an epidemic is as follows:

NO.	ACTIVITY	RESPONSIBILITY
1.1	Identify the Suspected Case/ Person Under Investigation (PUI)/ Confirmed Case patients who need to be tested.	Ward staff
1.2	Notify the laboratory staff. Also inform the type of test to be done. Type of test: 1. Hematology/Chemical Pathology/Microbiology: Notify Pathology Counter. 2. Histocytopathology: Notify Histocytopathology Specialist. Please visit the laboratory to obtain the sampling kit. The kit includes plastic containers (for tests other than confirmation tests), specimen containers, preservative or fixative liquids, and any additional items as required.	Ward staff
1.3	Inform the laboratory staff on duty regarding the specimen delivery. Provide sampling kit, plastic container (for tests other than confirmation tests), specimen container, preservative/fixative liquid, and any other additional materials if required to the requester. Note: 1. Sampling kit for confirmation test. 2. Plastic container other than confirmation test (Blood analysis test such as RP/FBC/blood gas and others/sputum culture/tracheal aspiration culture/blood culture). 3. Preservative/fixative fluid (if necessary) for Histopathology and Cytology tests.	Pathology Counter Staff/ Histocytopathology Unit Staff
1.4	Perform specimen collection in accordance with the policies and procedures of the respective department. Note: 1. Specimens for PCR, Histopathology and Cytology should be sent using” Triple packaging”. 2. Other specimens (Blood tests such as	Ward staff

	RP/FBC/blood gas etc./sputum culture/tracheal aspiration culture/blood culture) are sent using plastic containers. 3. The request form should be separated from the specimen. 4. Use 2 separate polystyrene boxes for tests that need to be sent to 2 different laboratories, e.g. SARI COVID-19 & Respiratory Pathogen. 5. 2 specimens with a secondary container can be shared in a polystyrene box (same test). 6. If the respiratory specimen taken does not use swab & VTM, the ward must return the swab & VTM to the Microbiology Laboratory immediately. 7. **LABEL** as epidemic patient (Example: POSITIVE for COVID-19/MERS-CoV/PUI etc). 8. Put the form in a **DIFFERENT** biohazard bag.	
1.5	Inform Pathology Counter staff or MLT of Histocytopathology Unit (Histopathology Tests and Cytology Tests) before sample delivery.	Ward staff
1.6	Send the samples to the Pathology designated counter during the epidemic. Note: 1. Always wear PPE (at least gloves and plastic apron). 2. Always ensure hands are sanitized with hand sanitizer before and after specimen delivery.	Ward staff

-Medicolegal cases (Rape cases)

1. Specimens for medicolegal cases shall be delivered to the main laboratory counter together with completed form.
2. Details of specimen, sample collection instruction and container are as follows:

No	Specimen Delivery Guide	Container
1	*Trichomonas vaginalis* test Make a smear on a slide and dip immediately into 95% alcohol for 15 minutes or cyto spray. *** All tests should be referred to the Chemistry Department, Pulau Pinang.**	Slide
2	Gonococcus test Make a smear on a slide and leave it air dry.	Slide
3	C&S for gonococcus Take ENDOCERVICAL swab and put into Amies (charcoal) media.	Amies (charcoal)
4	Other C&S tests Put the sample into a designated container or transport media.	Depends on the type of specimen taken
5	HIV/HBV/HCV/RPR tests	Plain gel tube (blood sample)
6	Pregnancy test (UPT)	Urine container
7	Blood grouping **Blood grouping test is done at Transfusion Department*	EDTA

3. Results for medicolegal specimens tested will be delivered to the HTF record office.

-Organ donation

1. All blood samples are to be labeled urgent and for the purpose of organ donation.
2. Blood samples for ABO grouping and infectious diseases screen must be delivered by local TOP team to the HTF Pathology laboratory and Transfusion Department Laboratory. Time, name and contact number of the laboratory technician receiving the blood sample must be documented.
3. For HLA blood samples, the local TOP team will arrange for delivery of blood to IMR in Kuala Lumpur. Name and contact number of personnel delivering the blood to IMR must be informed to NTRC coordinators.
4. The details of investigations required are as follows:

INVESTIGATIONS	**FREQUENCY**	**LABORATORY**	**NOTE**
Infectious diseases screening HIV Ab & Ag Hep Bs Ag Anti-Hep Bs Ab Anti-Hep C Virus Ab CMV IgG Toxoplasma IgG RPR	Once only for all	Department of Pathology, HTF	-Blood samples to be labelled and traced urgently.
Renal Profile	6 hourly	Department of Pathology, HTF	
FBC	Once daily	Department of Pathology, HTF	
LFT	Once daily	Department of Pathology, HTF	
Coagulation profile	Once daily	Department of Pathology, HTF	
Cardiac enzymes	Once daily	Department of Pathology, HTF	-For heart donation only
HLA	Once only	IMR	-Blood collected into 8 Sodium Heparin tubes. -Maximum of 9ml of blood collected in each tube. -Blood sample to be taken before the administration of IV methylprednisolone.
Urine FEME	Once only	Department of Pathology, HTF or urine dipstick kit in the ward	
Frozen section	Once	Department of	Note:

		Pathology, HTF	-For organ donation only. -Appointment basis (at least 1 day before the procedure. Refer ePaT)

-Patient specimen collection for follow up at other Health Facilities

1. When patients are arranged for blood taking at HTF for follow up at other Hospital/Health centers, the HTF primary team (Clinical Department managing the patient) shall inform the patient regarding the following:
    - Patients are required to go to the clinic/Primary team Department for endorsement of laboratory request form if the form is from other Hospital/Health centres.
    - Type of sample to be taken
    - Laboratory turnaround time
    - Blood taking day and time: it should be on working days only and before appointment to see a doctor.
2. Laboratory results can be traced via a web-based system by the primary team (results will not be given to patients directly).
3. Any critical results shall be informed to the primary team in Hospital Tuanku Fauziah.

Urgent and 24-hour testing procedures

1. Urgent test refers to requests of tests that need to be released within stipulated time as it is critical to patient care.
2. Samples requiring Urgent testing shall be clearly labeled:
   - Marked as SEGERA or URGENT in capital letters.
   - Remark as SEGERA or URGENT at the top and center part of the request form.
   - Use red color ink/stamps.
3. Separate sample and request form for urgent test from other routine tests.
4. Transport the sample immediately and without delay to the laboratory.
5. Ensure that an urgent request is genuinely for a test meeting the defined criteria for urgency, rather than for reasons such as facilitating immediate patient discharge, anesthesiologist assessment rounds for elective surgery, or similar situations. Misuse of urgent requests can delay the turnaround time for truly critical tests, potentially compromising other patients' care.
6. Urgent test requests that do not follow the specified procedures may experience avoidable delays.
7. Request for urgent tests are available for the following tests:

Laboratory	**Test available for urgent requests**	**LTAT urgent**
Hematology	Full blood count (FBC) PT/APTT FBP Urgent (subject to discussion with MO Pathology on-call)	≤ 45 min ≤ 1 hour ≤ 48 hours
Chemical Pathology	Blood gases Blood urea & electrolytes (BUSE)/ Renal profile/ Neonatal bilirubin Serum amylase (TRO Acute Pancreatitis)	≤ 1 hour ≤ 1 hour ≤ 90 min
Microbiology	CSF Gram Stain Dengue Serology Leptospira Serology BFMP (subject to discussion with Pathologist (Microbiology))	≤ 1 hour ≤ 1 hour ≤ 1 hour ≤ 2 hours
Histocytopathology	HPE small urgent biopsy FNAC/non-gynae fluid	≤ 3 working days ≤ 3 working days
For tests other than listed above, the requester needs to call a Pathologist at a specific unit or Pathologist On-Call if tests need to be done urgently.		

8. The laboratory accepts all samples/requests sent to the laboratory 24 hours a day regardless of if the test is conducted 24 hours or will be kept in suitable condition for testing later or will be sent out to referral lab according to schedule.
9. The following tables are tests that are conducted 24 hours in the laboratory. The result will be released according to LTAT.

UNIT	**24-HOUR TESTS**
HEMATOLOGY	1. Full Blood Count (FBC) 2. Prothrombin time (PT)/ Activated Partial Thrombin

	Time (APTT) 3. G6PD 4. Retic Count – for hemolysis cases 5. D-Dimer 6. ESR
CHEMICAL PATHOLOGY	1. Amylase 2. Buse (Sodium, Potassium, Urea) 3. Calcium, Magnesium, Phosphate 4. Chloride 5. Creatinine Kinase 6. CSF for Biochemistry (Glucose, Protein) 7. Glucose 8. Iron 9. Lactate 10. Lactate Dehydrogenase (LDH) 11. Lipid Profile 12. Liver Function Test (LFT) 13. Neonatal Bilirubin Venous (SBV) 14. Paracetamol/Acetaminophen 15. Renal Profile (Buse, Creatinine) 16. Serum/Urine Osmolality 17. Troponin I 18. Uric Acid 19. Urine Feme/Biochemistry strip test 20. Urine HB (screening test) 21. Urine Paraquat 22. Urine Pregnancy Test 23. BHCG (If requested urgent for ectopic pregnancy) 24. TDM (if requested urgent for suspected toxicity) 25. Thyroid Function Test (TFT) – (if requested urgent for thyroid storm or myxedema coma cases)
MICROBIOLOGY	1. Dengue – Requested for NS1 Antigen, IgM/IgG or combo (NS1 & IgG/IgM) 2. Blood Film for Malaria Parasite (BFMP) 3. Leptospira serology 4. AFB smear
HISTOCYTOPATHOLOGY	Office hours

Oral requests procedures

1. The Laboratory accepts oral request in the following situations:
   - When an early result/report is required
   - When laboratory approval/consultation is needed before sending the samples
   - Additional test on samples already sent to the laboratory
2. All oral requests must be followed by confirmatory request forms within a specified timeframe.
3. Refer to specific units and test for details on oral requests.

Add-on test procedures

1. Time limits for requesting additional examination or further examination on the same primary sample must be followed. For chemical pathology tests it is within 4 hours from the time of specimen taken. The time limit may vary depending on the test.
2. All additional test requests must be followed by confirmatory request forms.
3. The test will only be done and/or the result validated once the request form is received.
4. Refer to specific unit and test for details on add-on test requests.
5. **No add on test allowed for microbiology sample**.

Notification of critical value procedures

1. Critical value is defined as test result or value that falls outside the critical limit or the presence of any abnormal unexpected findings, cells or organisms which may cause imminent danger to the patient and/or require immediate medical attention.
2. The critical value lists are as follows:

HEMATOLOGY CRITICAL VALUE		
Ujian/Analyte	**Lower limit**	**Upper limit**
a. WBC		
Adult	2,000 µL	50,0000 µL
Paed	2,000 µL	30,0000 µL
Neonate	5,000 µL	30,0000 µL
b. Haemoglobin		
Adult	6 g/dl	19 g/dl
Paed	7 g/dl	20 g/dl
Neonate	8 g/dl	22 g/dl
c. Hematocrit		
Adult	20%	60%
Paed	-	40%
Neonate	-	70%
d. Platelet		
Adult	20,000 µL	100,000 µL
Paed	50,000 µL	100,000 µL
Neonate	50,000 µL	100,000 µL
PT/APTT/INR		
a. INR	-	> 5
b. APTT	-	> 80 sec

CHEMICAL PATHOLOGY CRITICAL VALUE		
Ujian/Analyte	**Lower limit**	**Upper limit**
Ammonia	-	≥ 100 µmol/l (paediatric)
Sodium	≤ 125 mmol/l	≥ 155 mmol/l
Potassium	≤ 2.8 mmol/l	≥ 6.0 mmol/l
Total Calcium	≤ 1.5 mmol/l	≥ 3.0 mmol/l
Bilirubin (pediatric)	-	≥ 300 umol/l

MICROBIOLOGY CRITICAL VALUE	
Test	**Clinical Finding**
Kultur dan Sensitiviti	Darah dan cecair badan Positive (Pewarnaan Gram dan kultur) Salmonella Typhi / *Vibrio cholera* / *Shigella* spp CSF-Pewarnaan Gram Alert organism isolate (ESBL/MRSA/VRE/VRSA/MRO/CRE) *Neisseria meningitidis* in CSF/Blood
TB/BFMP/Dengue/Leptospira	Positive
Pernasal	*Bordetella pertussis*
Throat swab	*Corynebacterium diphteriae*

HISTOCYTOPATHOLOGY CRITICAL VALUE	
Test	**Clinical Finding**
Unexpected or Discrepant Findings	Unexpected malignancy Wrong organ removed
Report of Infection	Bacteria in heart valves or bone marrow Organism in an immune compromised patient such as AFB, fungi, viral or protozoa Organism in Cerebrospinal Fluid (CSF) Unusual organisms or organisms in unusual sites
Report on Critically ill Patient Requiring Immediate Therapy	Crescents in greater than 50% of glomeruli in renal biopsy specimen Transplant rejections
Cases that have immediate clinical consequences	Fat in an endometrial curettage Mesothelial cell in a heart biopsy Fat in snare colon biopsy specimen
High Grade Lesion in Pap Smear	HGSIL HGSIL with Suspicious of Invasion Squamous Cell Carcinoma Atypical Glandular, Favours Neoplastic Adenocarcinoma In Situ (AIS) Adenocarcinoma Other type of malignancy

3. Critical values result of hematology and chemical pathology tests will be informed via phone within 30 minutes of result validation.

4. Critical value results of microbiology and histocytopathology tests will be informed via phone within 24 hours of result validation.
5. Critical value results will be informed to the authorized personnel including staff nurses, medical officers, and specialists.
6. In instances where the responsible person cannot be reached at the patient's location, the laboratory will escalate the notification to the next level of responsibility at the requesting site until the CV notification cycle is completed.
7. Critical value in outpatient settings will be informed via an agreed method with the relevant department. This includes official WhatsApp groups and phone calls to medical officers on call on the day.

Result amendment information and procedures

1. Result amendment due to identified errors by laboratory users/requestors:
   - Fill in the Borang HTF/PL/B-38 Permohonan Pembetulan Keputusan (Report Amendment) oleh Pelanggan (Refer to list of request forms to download the form).
   - The form must be signed by a specialist/supervisor (from the requester department).
   - In the interest of effective clinical governance, the requestor is strongly advised to inform the Head of Unit/Department.
2. Amendment of test results due to identified errors by laboratory:
   - The laboratory will follow internal procedure for amendment of test results. Result amendment is done by authorized personnel.
   - Amended result will be clearly identified as amended/revised result.
   - Requester/clinician will be informed of the amendment.
   - The laboratory will investigate the amendment as non-conformities and take further action including applying risk control measures to prevent recurrence.
3. Amendment of test results in special circumstances, not due to errors or omission:
   - The laboratory allows results amendment for patients results in the following circumstances:
     - Newborn identification using mother's/father's/guardian's IC and has their own IC afterwards.
     - Unknown patient identification using temporary A/E or BDM identification after the true identities has been established.
     - Legal change in name (e.g. after change in religion)
   - These amendments are not considered error and not subject to non-conformities procedures.
   - The circumstances for change in patient's identification may be identified by laboratory users or laboratory personnel.
   - The previous results shall be updated using current patient's identification to facilitate traceability of previous patient's results and to avoid confusion.
   - The change in patient's identification shall be verified via the followings:
     - Information verified by Bilik Daftar Masuk officers.
     - Information verified by Jabatan Pendaftaran Negara
     - Information verified by Head of Unit/Head of Department
     - other suitable methods.
   - Laboratory personnel or laboratory users need to fill up Borang HTF/PL/B-118:Request for result amendment not due to non conformities to amend previous patients results. (Refer to list of request forms to download the form).
   - The form received by the laboratory shall be forwarded to all relevant Head of Units in the Pathology Department. The Amendment shall be authorized by the Head of Units.
   - The laboratory shall proceed with the changes required for all previous affected results within 14 days of receipt of the form.
   - By submitting the request, the requester is deemed to be aware of the changes, and no further notification upon completion is required. If the changes are initiated by the laboratory, the involved clinician will be duly notified.
   - Requests for amendment should be made as soon as the changes in patient's identification is recognized.
   - Further requests for laboratory testing shall only use the current patient's identification.

- Laboratory users are advised to disregard the previous results.

Rejection procedures

1. Any request that does not meet the laboratory acceptance criteria will be rejected.
2. List of rejections as follows:

Kod	Peringkat	Jenis Penolakan
1.1	Borang	Tiada Borang
1.2	Borang	Salah Borang
1.3	Borang	Helaian tidak mencukupi
1.4	Borang	Ujian dicampuraduk di dalam 1 borang (mengikut jenis ujian)
1.5	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Nama pesakit
1.6	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Nombor identiti/RN Hospital (Sekurang-kurangnya satu)
1.7	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Jantina
1.8	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Lokasi
1.9	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Umur
1.10	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Diagnosis
1.11	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Sejarah pesakit (mengikut jenis ujian)
1.12	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Permintaan ujian
1.13	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Tarikh dan masa
1.14	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Nama, tandatangan dan cop pemohon
1.17	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Identiti pesakit tidak sama dengan rekod terdahulu
1.18	Borang	Tidak membuat pembetulan borang bagi rejection on hold dalam masa ditetapkan
2.1	Label	Masalah Label - Tiada label
2.2	Label	Masalah Label - Label tidak lengkap (nama, nombor identiti, jenis ujian)
2.3	Label	Masalah Label - Nama pesakit tidak seperti pada borang permohonan
2.4	Label	Masalah Label - Nombor identiti tidak seperti pada borang
2.5	Label	Masalah Label - Jenis ujian tiada/tidak seperti pada borang
3.1	Spesimen	Masalah spesimen - Penggunaan botol salah/fiksatif salah
3.2	Spesimen	Masalah spesimen - Bekas spesimen, slaid specimen

		pecah/bocor etc
3.3	Spesimen	Masalah spesimen - Penyediaan smear yang tidak berkualiti
3.4	Spesimen	Masalah spesimen - Tidak cukup isipadu
3.5	Spesimen	Masalah spesimen - Salah spesimen
3.6	Spesimen	Masalah spesimen - Tiada spesimen
3.7	Spesimen	Masalah spesimen - Clotted/hemolysed/lipaemic/icteric etc
3.8	Spesimen	Masalah spesimen - Spesimen diterima melebihi tempoh stabiliti (mengikut jenis ujian)
3.9	Spesimen	Masalah spesimen - Spesimen diterima dengan tatacara penghantaran yang salah
4.1	Permohonan	Masalah Permohonan Ujian - Ujian tidak perlu/tiada indikasi (mengikut jenis ujian)
4.2	Permohonan	Masalah Permohonan Ujian - Ujian tidak ditawarkan
4.3	Permohonan	Masalah Permohonan Ujian - Ujian diulang semula kurang daripada tempoh (mengikut jenis ujian)
4.4	Permohonan	Masalah Permohonan Ujian - Ujian diterima di luar waktu penerimaan ujian (mengikut jenis ujian)
4.5	Permohonan	Masalah Permohonan Ujian - Ujian dipohon oleh bukan pakar/MO senior (uan khas)
5	Lain lain	Lain-lain

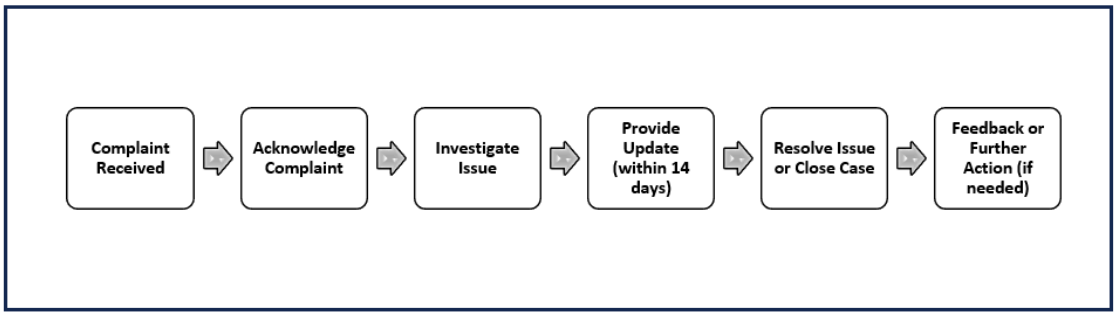
3. Requester is informed if there will be rejection due to issues with request forms that can be corrected. Rejection will be made if there is no further action after this notification.
4. In certain cases, the laboratory may accept compromised samples when it is clinically critical or irreplaceable such as CSF samples, body fluid obtained from invasive procedures, tissue, bone marrow, forensic or pediatric samples. The laboratory will advise caution when interpreting results that can be affected. The result will include comments on sample conditions that are compromised.

LIS users registration and tracing of results procedures

1. The purpose of this system is to allow patient result tracing by the authorized users.
2. This system can only be accessed using an internet connection within government offices (1GovNet). Quick access is available on the Hospital Tuanku Fauziah intranet website (i-Lab: http://10.158.25.121).
3. Users can access this system by applying for a User ID from the Department of Pathology, Hospital Tuanku Fauziah. To apply, please refer to the simple step-by-step process outlined in the Pendaftaran Pengguna Baru Sistem Informasi Jabatan Patologi (https://drive.google.com/file/d/1mFl_LGFob5aW6t9t6vlJDjDSdjeDF4rV/view?usp=drive_link).
4. All requests for special access to the Web-Based iLAB system, including access to VVIP, HIV, or cross-institutional results, must be submitted to the Head of the Pathology Department by the requesting Head of Department via a formal letter. Only after obtaining approval from the relevant authorities (Hospital Director/State Health Director) shall the applicant from the requesting department submit a completed Borang Permohonan Akses Khas Sistem Informasi Makmal (HTF/PL/B-101) for processing. The applicant must have an existing account in the Web-Based iLAB before applying for special access. Approved applicants will receive formal notification via letter or email, specifying their access rights and responsibilities. Please refer to the step-by-step process outlined in the Pendaftaran Pengguna Baru Sistem Informasi Jabatan Patologi (https://drive.google.com/file/d/1mFl_LGFob5aW6t9t6vlJDjDSdjeDF4rV/view?usp=drive_link).
5. Users are responsible for ensuring the confidentiality of all patient-related data and information at all times.
6. Sharing of User IDs and passwords is strictly prohibited.
7. Users must adhere to all relevant codes of professional ethics, legislation, policies, regulations, and circulars, including but not limited to:
    a. The Medical Act 1971
    b. Malaysian Medical Council (MMC) Ethical Codes and Guidelines
    c. Management of Patient Medical Records in Hospitals and Medical Institutions 2010
    d. ICT Security Policy 2019
    e. Personal Data Protection Act 2010
    f. User Access Control Policy and Guidelines 2011
8. Users must read, understand, and comply with the provisions of the ICT Security Policy of the Ministry of Health Malaysia.
9. Failure to comply with the stipulated provisions may result in appropriate action being taken against the user.
10. For any enquiries, email email us at kualitihtf1@gmail.com

Customer complaints procedures

1. **Feedback Submission:** Any feedback (complaints, dissatisfaction, suggestions, or appreciation) can be submitted through the following channels:
   - Head of Department
   - Via phone line extension 8188 (PIC Complaints)
   - Email: nccapahtf@gmail.com
   - Via online form: https://forms.gle/QUJvCXiauzyJmkyz8 or QR code
   - Verbally or in written memo to any pathology staff
2. **Acknowledgment of Feedback:** All submitted feedback will be acknowledged regardless of complaint or non-complaint feedback, and the next steps in handling the feedback (e.g., review, response time) will be outlined.
3. **Confidentiality:** The right to keep personal information confidential will be given, and all information shared will only be known by the Head of the Department of Pathology and the individual responsible for the complaint (PIC NCCAPA/complaint).
4. Response to Feedback:
   - For non-complaint feedback: Acknowledgment of appreciation will be made for customers who submit the feedback. Non-compliant feedback is handled by reviewing it thoroughly, identifying the issues, and working with the concerned parties to address and resolve the concerns in a constructive and respectful manner.
   - For complaint feedback: Officers from different units being complained about will be assigned to investigate, ensuring impartiality. The corrective action will be taken as necessary. The customer will be informed of the actions taken and any improvements made as a result of the feedback (refer to the attached chart).



5. **Feedback Follow-up:** Feedback provided by customers, particularly regarding issues that require attention, may be followed up on. Confirmation of the resolution may be sent, or further comments on the process may be invited.
6. **Continuous Improvement:** Customer feedback will be used as a critical component in the laboratory's continuous quality improvement program. Regular reviews will be conducted to identify areas for improvement in services and operational processes.

UNIT SPECIFIC INFORMATION AND PROCEDURES

HEMATOLOGY UNIT

Introduction

The Hematology unit offers the following services:

1. Diagnostic services – in-house testing of routine hematology tests, special hematology tests including Full blood picture, Bone marrow aspirate, Trephine biopsy, Coagulation factors level, Coagulation inhibitor level, Mixing test, and Hb analysis.
2. POCT testing – the laboratory has a technical and supervisory role for hematology POCT through the HTF POCT committee.
3. Referral services – the laboratory referred special tests to referral laboratories for testing. All special tests that need to be referred and special requirements for sampling are stated in the ePaT online platform.
4. Consultation services – Hematology- Pathologists, scientific officers and Medical laboratory technologists are available for consultation regarding clinical correlation and technical advice by meeting, messaging or calling.
5. Training – The unit received trainees from other learning institutions.
6. Research – The unit collaborates in research activities as required

Test Request

1. All the tests below need to state the relevant clinical history in the request form.
    - D-Dimer
    - Special coagulation tests (Fibrinogen, Factor VIII & IX Level, Factor VIII & IX Inhibitor Level)
    - PT/APTT Mixing Test
    - Full Blood Picture
    - Hb Analysis
    - Bone Marrow Aspirate
    - Trephine Biopsy
    - All referred tests
2. All the tests below need an appointment with the laboratory before any sample is taken.
    - Bone Marrow Aspiration/ Trephine biopsy (BMAT)
    - PT/APTT Mixing Test
    - Factor VIII & IX Level
    - Factor VIII & IX Inhibitor Level
    - Certain referred tests (Please refer to ePaT online platform)
3. Any test request that meets the hematology unit's rejection criteria will be rejected or held for correction. Please refer to Appendix 2 **(Kriteria Penolakan Spesimen Di Unit Hematologi)**
4. Sample of the CD4CD8 test needs to be sent to the Hematology laboratory on Monday only.

Criteria of specimen acceptance in the hematology unit

Please refer to **KRITERIA PENERIMAAN SPESIMEN DI UNIT HEMATOLOGI**

CHEMICAL PATHOLOGY UNIT

Introduction

The chemical pathology unit offers the following services:

1. Diagnostic services – in house testing of general chemistry tests, special chemistry tests including endocrine, metabolic, tumor markers, therapeutic drug monitoring (TDM), toxicology, special protein, CSF and body fluids, and Drug of Abuse tests.
2. POCT testing – the laboratory has technical and supervisory role for chemical pathology POCT through the HTF POCT committee.
3. Referral services – the laboratory referred special tests to referral laboratories for testing.
4. Consultation services – Chemical Pathologist and scientific officers are available for consultation regarding clinical correlation and technical advice.
5. Training – The unit received trainees from other learning institutions.
6. Research – The unit collaborates in research activities as required.

Request form instructions

General instructions

1. Use PER-PAT 301 request form for all in-house testing except for cord blood TSH screening and Drug of abuse testing. Send only 1 copy of the request form.
2. Request form for the referred out test is according to the specific referral laboratory requirements. Please refer to the online platform e-PAT test list for more information.
3. Ensure all writing is legible to avoid transcription errors, especially when using carbon-copy paper.
4. Ensure the forms are filled up completely to avoid delay and/or rejection.

Profile testing and reflex testing

1. The following table showed available profile test and reflex testing information:

Profile Test Name	Tests included	Reflex testing
ABG/VBG (Arterial Blood Gas/ Venous Blood Gas)	pH PCO2 pO2 HCO3	-
BUSE (Blood urea and serum electrolytes)	Sodium Potassium Urea	-
IS (Iron studies)	Ferritin Iron Transferrin Transferrin saturation*	-
LFT (Liver Function test)	Total protein Albumin Globulin A/G ratio Total Bilirubin	Direct Bilirubin and Indirect Bilirubin test automatically added if Total Bilirubin is high.

	Alanine transaminase (ALT) Alkaline phosphatase (ALP) Note: LFT for neonates patient will include Conjugated and Unconjugated bilirubin	Aspartate transaminase (AST) test is automatically added if ALT is high
Lipid profile (FLP) Fasting Lipid Profile	Total cholesterol LDL-cholesterol* HDL-cholesterol NonHDL-cholesterol* Triglycerides Note: LDL-C calculation using Friedewald equation is not valid when Triglyceride level >4.5 mmol/L	-
PE profile (Pre-eclampsia profile)	RP LFT Uric acid	-
RP (Renal profile)	Sodium Potassium Urea Creatinine	-
SBV (Neonatal Bilirubin)	Total bilirubin* Conjugated bilirubin Unconjugated bilirubin	-
TFT (Thyroid function test)	TSH Free T4	Free T3 is automatically added if TSH is suppressed (<0.1mU/L) and Free T4 within normal range
Body Fluid Biochemistry	pH Total protein Glucose LDH	-
Body Fluid Lipid	Total Cholesterol Triglycerides	-
CSF Biochemistry	CSF appearance CSF Total Protein CSF glucose	-
Urine Biochemistry (Test Strip)	Glucose Protein Bilirubin Urobilinogen pH Specific Gravity	-

	Blood Ketone Nitrate Leucocytes	
Synovial Fluid Biochemistry	Total Protein Glucose Uric acid	-
*Calculated tests		

2. Requests for unlisted profile tests may cause delay in testing and/or rejection. The laboratory may contact the requester for further clarification of any unlisted test profile.

Specialist authorization test list

1. Some special tests will require specialist authorization as follows:

No	Tests	Authorization level
1	Tumor markers (CEA, CA125, CA-19-9, AFP and PSA) – more than 1 test requested for the same sample.	Request by specialist only
2	Hormones: LH, FSH, Prolactin, Estradiol, Testosterone, and Progesterone	Request by specialist only
3	CKMB Must have clear indication	Request by specialist only
4	C3/C4	Request by specialist only
5	Procalcitonin	Request by ID specialist or anesthesiologist only
6	Urine metanephrine	Request by endocrinologist only
7	All referral tests	Request by specialist only
8	Referral test for Molecular testing	Request by specialist only. Require consultation with geneticists.

2. Other in-house testing can be requested by house officers, medical officers, and specialists.

Retesting intervals

1. Check the date for the last request and LTAT for these following tests. Testing will not be conducted within the minimum retesting intervals.
2. Consult the laboratory personnel if repeated testing is still required.
3. List of retesting intervals for selected tests is as follows:

No	Tests	Minimum retesting intervals
1	TSH	3 days
2	HbA1c	3 months
3	Vitamin D	6 months
4	Thyroglobulin	For malignancy – 6 months
5	Anti-thyroglobulin	For autoimmune disease – once at diagnosis For malignancy – 6 months
6	Anti-Thyroid Peroxidase	For autoimmune disease – once at diagnosis

Requirements for special tests

<u>Urine Metanephrine Tests</u>

Test Indication:
Suggested candidates to screen for Pheochromocytoma or Sympathetic Paraganglioma:

1. Paroxysmal signs or symptoms suggesting catecholamine excess
2. Paradoxical BP response to drugs, surgery, or anaesthesia
3. Resistant hypertension
4. Incidentally discovered adrenal mass (with or without hypertension)
5. Previous diagnosis of pheochromocytoma or paraganglioma
6. Hereditary predisposition for pheochromocytoma or paraganglioma
7. Syndromic feature indicating a pheochromocytoma-related hereditary syndrome

Note:
Requests without clear indication will be rejected.

Reference: Makluman Panduan Justifikasi Klinikal Ujian Endokrin Khas yang ditawarkan oleh Jabatan Patologi Hospital Putrajaya (9 Oct 2023 Bil 91 dlm HPJ 700/14/1 Jld 57)

Patient's preparation:

1. Avoid this food 24 hour prior to, and during the urine collection period:
   Coffee - Tea - Chocolate - Cocoa - Vanilla - Banana - Pineapple - Nuts - Watermelon - Eggplant - Avocado - Tomato - Kiwi - Fruit juices - Chilli, pepper
2. Drugs to avoid (Please avoid at least one (1) week before specimen collection) :
   - Tricyclic antidepressants eg. Amitriptyline, imipramine
   - Antipsychotics eg. clozapine, olanzapine, risperidone, chlorpromazine
   - Alpha-2 blockers eg. phenoxybenzamine, phentolamine
   - Beta blockers eg. labetalol, atenolol, metoprolol, propranolol
   - Monoamine oxidase inhibitors (MAOI) eg. moclobemide, phenelzine
   - Sympathomimetic drugs eg. pseudoephedrine, phenylephrine, dobutamine
   - Recreational drug eg. amphetamines, cocaine

- Others, paracetamol, levodopa

3. Avoid stress and vigorous exercise

Salivary cortisol

Test Indications:

1. To establish a diagnosis of Cushing's syndrome when other commonly available screening tests (overnight dexamethasone suppression test (ODST) or 24-hour urinary free cortisol) are equivocal and clinical suspicion is high.
2. Useful in the following special population (e.g pregnancy, patients on anti-epileptic drugs etc) whereby salivary cortisol is recommended by Endocrine society guideline.
3. Suspected Cyclical Cushing's syndrome.

Note:
Request must be through HTF endocrinologist.
Requests without clear indication will be rejected.

Patient's preparation:

1. Do not use any steroid inhalers for 24 hours before collecting your saliva sample.
2. Do not use any creams or lotions that contain steroids such as hydrocortisone.
3. Do not collect a sample if your gums or the inside of your mouth is bleeding.
4. Do not brush teeth or floss your teeth before collecting specimens.
5. Do not eat or drink for 15 minutes prior to specimen collection.
6. Collect specimens between 11.00 pm and 12.00 midnight.
7. Make sure your name, identification card number, date and time of sample collection written on the tubes' label.

Aldosterone renin ratio

Indication for testing:
Screening for primary hyperaldosteronism (PA) in patients with:

1. Hypertension (BP >140/90mmHg) resistant to three conventional antihypertensive drugs (including diuretics).
2. Hypertension with controlled BP (BP<140/90mmHg) on 4 or more antihypertensive drugs.
3. Hypertension and spontaneous or diuretics induced hypokalemia.
4. Hypertension and adrenal incidentaloma.
5. Hypertension and sleep apnea.
6. Hypertension and a family history of early onset hypertension or cerebrovascular incident at a young age (<40 years).
7. All hypertensive first degree relatives of patients with PA.
8. Sustained blood pressure above 150/100 mmHg on each of three measurements obtained on different days.

Note:
Requests without clear indication will be rejected.

Reference: Makluman Panduan Justifikasi Klinikal Ujian Endokrin Khas yang ditawarkan oleh Jabatan Patologi Hospital Putrajaya (9 Oct 2023 Bil 91 dlm HPJ 700/14/1 Jld 57)

IGF-1

Indication for testing:

1. Acromegaly for diagnosis and follow up.

2. Evaluation of pediatric patients with short stature.
3. Patients on growth hormone replacement.
4. Dynamic test.

Note:
Requests without clear indication will be rejected.

Reference: Makluman Panduan Justifikasi Klinikal Ujian Endokrin Khas yang ditawarkan oleh Jabatan Patologi Hospital Putrajaya (9 Oct 2023 Bil 91 dlm HPJ 700/14/1 Jld 57)

Vitamin D

Indication for testing:
Indicated for testing patient with planned treatment for:
1. Osteoporosis or osteomalacia.
2. Malabsorption (e.g. cystic fibrosis, short bowel syndrome, inflammatory bowel disease, untreated coeliac disease, bariatric surgery).
3. Chronic renal failure or renal transplant recipient.
4. Rickets.
5. Exclusively breastfed babies in combination with at least one other risk factor.
6. Siblings of infants or children with vitamin D deficiency.

Note:
Requests without clear indication will be rejected.

Reference: Makluman Panduan Justifikasi Klinikal Ujian Endokrin Khas yang ditawarkan oleh Jabatan Patologi Hospital Putrajaya (9 Oct 2023 Bil 91 dlm HPJ 700/14/1 Jld 57)

Sample collection and transportation Instructions

General

1. Most chemical pathology tests are performed using serum and plasma heparin samples. Proper collection is essential to provide accurate results for patient management and care. The quality of specimens provided will determine the quality, reliability, and accuracy of the laboratory result.
2. For collection of specimens, minimum tourniquet pressure should be applied during venipuncture in order to avoid forcing of free fluid from capillaries which may result in hemoconcentration and spurious elevations of protein and protein bound substance e.g.: total protein, calcium. If possible, a tourniquet should be released after no more than 1 minute from the initial placement.
3. Hemolysis, icteric or lipemic samples can affect clinical chemistry tests by interfering with the photometric determination of the analyte concentration in the sample leading to erroneous results. If sample integrity checks for hemolysis, icterus and lipemia exceed the threshold for the particular tests, comments will be added to the test reports or results may be rejected.
4. Avoid mixing or transferring blood from different tubes as certain tubes may contain anticoagulant substances which will falsely elevate the concentration of certain analytes in the sample. Follow the order of draw during blood collection.
5. Avoid collection of blood from limbs being infused with intravenous solution. This will lead to hemodilution and measurements on these samples produces erroneous results which is not the actual presentation of the analyte concentration in the specimen.
6. For any tests with paired samples required, (e.g. SAAG, CSF oligoclonal bands) both samples must be taken on the same day.
7. Some samples require transportation in ice e.g. ammonia, lactate, ABG/VBG. Please refer to specific tests for details. DO NOT transport sample in ice in pneumatic tube.

Time-specific samples

Some chemical pathology tests require specific timing for sample collection as follows:

No	Tests	Instruction for sample collection time
1	Fasting Blood Sugar	After minimum of 8 hours overnight fasting
2	Morning Cortisol	between 8 to 10 am
3	Midnight Cortisol	between 10 to 12 midnight
4	Progesterone (for fertility test)	Day 21 of menstrual cycle
5	Estradiol, FSH, LH (for fertility tests)	Day 2 to 5 of menstrual cycle

Fasting Serum Lipid

Both fasting and non-fasting samples may be used for lipid measurement.

Fasting lipid profile should be considered or preferred:

- if the non-fasting TG is > 2.3 mmol/L

- in cases of familial hyperlipidaemia/hypertriglyceridemia
- following recovery from hypertriglyceridemic pancreatitis
- when initiating medication(s) that may cause hypertriglyceridemia (e.g. steroids, anti- retroviral therapy)
- when other tests that are requested require fasting or morning samples (e.g. fasting glucose)

eGFR test

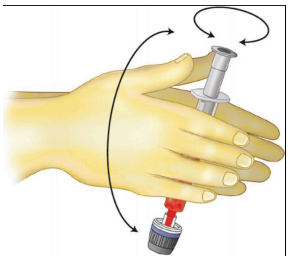
Information needed:
- Relevant clinical history
- Age in years
- Gender
- Previous calculated eGFR result, if available

Only serum or plasma creatinine samples sent along PER.PAT 301 forms shall have its eGFR calculated.

Calculation of EGFR using previous creatinine results shall not be allowed. This is because previous eGFR results could lead to misinterpretation of the test correlating to the current patient status.

Arterial Blood Gas/Venous Blood Gas sample collection and transportation instructions

1. Use a 1 ml disposable syringe for sample collection.
2. Flush the syringe with heparin solution. Use of 1,000 IU/ml heparin is recommended. It is also recommended to use balanced pre-heparinized syringe if available.
3. Expel nearly all the heparin from the ABG syringe, leaving only a thin film inside. This step prevents dilution of the blood sample, which could alter results.
4. Draw 1 ml of arterial/venous blood.
5. Invert the syringe and remove all air bubbles inside the syringe.
6. Discard the needle to prevent needle stick injury incidence and recap with a special stopper provided to avoid specimen exposure to air. DO NOT use loose stopper or stopper with holes that are not designed for ABG syringes.
   (Note: Sample using unsuitable stopper or send with needle still attached will be rejected)
7. Mix well by rolling the syringe between palms to prevent clotting.



8. Indicate time of sample collection in the request form.
9. Put the specimen in a specimen plastic bag and keep the specimen in a container with a mixture of crushed ice and water or other suitable coolant, large enough to permit immersion of the entire barrel of the syringe. No direct contact of specimens with ice should be allowed.

10. Send the specimen immediately to the laboratory for analysis (within 30 minutes). DO NOT send via pneumatic tube.
    Note: ABG/VBG sample received via pneumatic tube will be rejected.

24-hour urine collection instruction

Procedure of collection:
1. On the day of collection, Discard the first voided urine and note the start date and time (eg: 22/05/2024, 8.00am). This is the start of the timing for the 24 hours collection.
2. Collect the second and subsequent voided urine for 24 hours from the time start.
3. DO NOT void the urine directly into the 24-hours urine bottle. This is to avoid possible chemical burns.
4. For the best result, refrigerate all urine samples collected during the 24-hour collection.
5. At the end of the period, add the last voided sample to the container by emptying the bladder and note the finishing date and time (23/05/2024, 8.00am).
6. Send urine samples to the laboratory without delay after completed collection.

Note:
1. Some special 24-urine tests (e.g. Urine metanephrine) requires an acid preservative added into the bottle. The 24-hour container with acid is only available from the laboratory. Please collect the container if testing is needed.
2. Minimum 24-hour urine volume is 750ml for adults. Urine samples less than minimum volume may be rejected, released with comments, or changed to alternative tests (e.g. 24-hour urine protein changed to UPCR).

Salivary Cortisol

Sample: Minimum 2 salivary sample on different days
Container: SARSTEDT Salivette

Instruction for collection:
1. Wash your hands with soap and warm water, dry well with a clean towel.
2. Remove the blue cap of the tube.
3. Place white swab directly into the mouth by tipping the tube so the swab falls into the mouth. (Note: Swab is the white sponge in the tube).
   Do not let fingers touch the swab to prevent contamination.
4. Keep the swab in the mouth for approximately 2 minutes. Roll the swab in the mouth. Do not chew the swab.
5. Spit the swab back into the tube. Do not let fingers touch the swab.
6. Replace the blue cap. Make sure the cap is pushed/closed on tightly.
7. Write your name, IC, the date and time the sample was collected on the label.

8. Please store the collected sample in your home refrigerator (2-8 ° C).
9. Repeat step 1 to 8 for the second sample collection.
10. Return both samples to the Pathology Department counter the next day after the 2nd sample collection.

Testing informations

Batch testing schedule

1. Chemical Pathology laboratory run its in-house tests daily, except for some special tests which are analyzed by batch as follows:

No	Tests	Schedule
1	Special Proteins: Rheumatoid Factors, C3/C4	Monday, Wednesday, and Friday
2	Tumor markers: AFP, CA 125, CA 19-9, CEA, PSA	Monday, Wednesday, and Friday
3	Hormones: FSH, LH, estradiol, progesterone, prolactin, testosterone	Monday, Wednesday, and Friday
4	Procalcitonin	Monday, Wednesday, and Friday Urgent tests will be run on other days if required

2. Schedule is subjected to changes during public holidays (LTAT of the tests will be taken into consideration) or if there is indication for urgent testing. Please contact the laboratory staff for further information if required.
3. Samples pending testing will be kept in suitable condition (e.g. fridge or freezers) to maintain the sample integrity.

Referred out schedule

1. Tests that are not available in-house will be sent out to referral laboratories according to transportation arrangements (via Poslaju and Hospital Transport) scheduled every Tuesday and Thursday.
2. Schedule is subjected to changes during public holidays (LTAT of the tests will be taken into consideration) or if there is indication for urgent testing.
3. Urgent samples received before 9 a.m. may be referred out on the same day. Laboratory will send the sample on the next transportation schedule for samples received later due to time required for processing and packing. Please contact the laboratory staff for urgent sample arrangement or further information if required.
4. Samples pending referral will be kept in suitable condition (e.g. fridge or freezers) to maintain the sample integrity

Results information

Rejection rules for chemical pathology tests

1. General rejection of the Pathology Department is applicable to the Chemical Pathology Unit.
2. Rejection due to incomplete request form will be put on hold, and requester (if identifiable) or staff from requesting location will be informed.

3. The testing and/or result validation will be put on hold until the request form is completed..
4. The request will be rejected after 7 days of notification and no action taken.

Refer to Appendix 3 for rejection criteria for Chemical Pathology testings.

Measurement of uncertainties

Measurement of uncertainties for quantitative tests will be provided to laboratory users upon request. Please contact chemical laboratory staff for details.

MICROBIOLOGY UNIT

1. Service hour

- Weekdays (Monday-Friday) : 8am - 5pm, EXCEPT URGENT test (24 hours)
- Weekends/Public holiday : 8am - 3pm, EXCEPT URGENT test (24 hours)

2. Procedure on test request

- Please use specific form allocated for specific test
- Request form must be completed:
  - For CRBSI case, **DATE** and **TIME MUST be written.**
  - For pre-exchange transfusion (PRE ET) for infants with prolonged jaundice, **PRE ET MUST be written** in the clinical summary. Screening tests are HBsAg, HCV and HIV only. There is no indication for screening to be done for POST ET cases.

3. Rejection of test request

Any request that does not meet the criteria will be rejected. Please refer to Appendix 4 (Microbiology Unit Rejection Criteria).

4. Microbiology specimen collection guides

- Collection of pus/wound specimens using swab is not recommended due to the risk of contamination. It is encouraged to send pus aspirate or tissue taken aseptically.
- DO NOT put any biopsy specimen for C&S test in formalin solution.For biopsy specimens for culture, ensure that the specimen is NOT placed in formalin solution.

Refer to Appendix 6 for collection guide for mid stream urine and sputum C&S

5. General guidelines for C&S test request

- Samples should be taken based on the diagnosis made and not as a package.
- Samples should be taken before starting antibiotic treatment.
- The sample must be sent to the laboratory immediately (within 30 minutes after the sample is taken).
- Ensure the use of the correct transport media for each type of sample taken.
- Ensure sufficient sample volume or size before sending.
- If the sample is insufficient, prioritize the culture test.
- For samples from dry wounds or ulcers, make sure the swab is moistened with sterile saline before taking the sample. The swab must be taken from the middle of the wound to avoid contamination from the surrounding skin.
- DO NOT USE FORMALIN FOR TISSUE SAMPLES.
- For cases of suspected anaerobic infection (deep seated abscess, brain abscess, osteomyelitis, empyema, intra-abdominal infections, septicaemia) it is necessary to use anaerobic transport media:
  - Anaerobic blood culture bottle for septicaemia case
  - Robertson's Cooked Meat media for other samples - please notify the Microbiology Unit one hour before the media is taken.
- Make sure the form is completed with correct patient information along with an accurate clinical summary including history of antibiotic treatment.
- Blood culture collection for CRBSI:
  - Collect 2 sets of paired blood culture samples, one through the catheter and one from the peripheral blood vessel.

- Peripheral line and catheter blood samples must be obtained within 15 minutes of each other.
- DO NOT DISCARD the first drawn blood from the catheter, in fact this is the best source for determining whether a microorganism is present.
- Bottles must be clearly labeled according to the site of blood collection (peripheral line and type of catheter and port used).
- **Central & Peripheral Blood Culture MUST be sent using separate laboratory request forms. If more than one Central Blood Culture sent, each bottle of blood culture MUST be accompanied by laboratory request form (DO NOT send all Central Blood Culture using only one laboratory form)**

Indication For Infectious Disease Screening

Priority	HBsAg	Anti-HCV	HIV Ab	Anti HBs	RPR/VDRL
Urgent (result to be ready within 6 hours)	Organ/Tissue transplant	Organ/Tissue transplant	Organ/Tissue transplant	Organ/Tissue transplant	Organ/Tissue transplant
Urgent (result to be ready within 24 hours)	Needle stick injury/splash injury (HCW & source)	Needle stick injury/splash injury (HCW & source)	Needle stick injury/splash injury (HCW & source)	Needle stick injury/splash injury (HCW only if never screened before)	
Routine	- Antenatal screening - Patient admitted or attended clinic with risk factor (**IVDU, sexual promiscuity, history of blood transfusion, tattoos**) - Individual with high risk partner. - Screening for positive partner. - Pre-ET sample for baby - End stage renal failure for HD - Thalassaemia - HIV positive - Patient with suspected	- Patient admitted or attended clinic with risk factor (**IVDU, sexual promiscuity, history of blood transfusion, tattoos, intranasal drug abuse**) - Individual with high risk partner. - Screening for positive partner. - Pre-ET sample for baby - End stage renal failure for HD - Thalassaemia - HIV positive - Patient with suspected nephritis/persistent proteinuria	- Antenatal screening - TB positive - Patient admitted or attended clinic with risk factor (**IVDU, sexual promiscuity, history of blood transfusion, tattoos**) - Individual with high risk partner. - Screening for positive partner. - Pre-ET sample for baby - End stage renal failure for HD - Thalassaemia - Patient with suspected nephritis/persistent proteinuria - Young stroke*	- HCW after completed 3rd dose vaccination/booster (stop if level >10 mIU/ml) - ESRF on HD - Thalassaemia - Family history of Hepatitis B carrier. - HIV patient (6 monthly) - Hemophilia	- Antenatal screening - Patient suspect STD (signs & symptoms) - Individual with high risk partner - Screening for positive partner - Neurosyphilis - Dermatology condition suspicious of syphilis (gummatous lesion, rashes) - PID

	nephritis/persistent proteinuria - Patient planned for cardiothoracic surgery - Family history of Hepatitis B carrier - Patient with jaundice for investigation (**make sure give LFT result in form**)* - Medicolegal cases (**sexual abuse, prison inmate**) - Sensory neural hearing loss (SNHL)* - Elevated transaminases (ALT & AST) >**250** U/L - Progressive increase ALT & AST (> 3x from baseline) - Chronic/recurrent urticarial* - Cirrhosis - Liver cancer - Blood donor screening - Medical check-up - Pre-Chemo/immunosuppressive drug - Procedure in vitro Fertilization (IVF) - Hemophilia	- Patient planned for cardiothoracic surgery - Patient with jaundice for investigation (**make sure give LFT result in form**)* - Medicolegal cases (**sexual abuse, prison inmate**) - Sensory neural hearing loss (SNHL)* - Elevated transaminases (ALT & AST) >**250** U/L - Progressive increase ALT & AST (> 3x from baseline) - Chronic/recurrent urticarial* - Cirrhosis - Liver cancer - Blood donor screening - Medical check-up - Pre-Chemo/immunosuppressive drug - Procedure in vitro Fertilization (IVF) - Hemophilia - STD/PID - Persistent thrombocytopenia	- Ophthalmology diseases: retinitis, viral keratitis* - Patient planned for cardiothoracic surgery - Medicolegal cases - (**sexual abuse, prison inmate**) - Sensory neural hearing loss (SNHL) - Pyrexia of unknown origin (fever >3 weeks with unknown cause) - Septicaemic shock admitted to ICU/HDW – resistant to treatment & progressively worsen - Severe & progressive headache with unknown cause (can be Cryptococcus infection)* - HIV dermatological manifestations (rashes/vesicles/herpes zoster) - Unresolved pneumonia & suspicious of PCP(exclude TB)* - Chronic/persistent diarrhea* - Persistent worsening pancytopaenia(thrombocytopenia/leukopaenia/anaemia)* - Blood donor screening		

	- STD/PID - Persistent thrombocytopenia		- Medical check-up - Pre-Chemo/immunosuppressive drug - Procedure (IVF) - Hemophilia - STD/PID		

*STD : Sexually Transmitted Disease, PID : Pelvic Inflammatory Disease

Interval For Infectious Screening In Specific Condition

Cases	HBsAg	Anti HCV	HIV Ab	Anti HBs
ESRF on HD	- 0 (baseline) - 6 monthly	- 0 (baseline) - 6 monthly	- 0 (baseline) - 6 monthly	- 0 (baseline) - Yearly
Thalassaemia	- 0 (baseline) - 6 monthly	- 0 (baseline) - 6 monthly	- 0 (baseline) - 6 monthly	- 0 (baseline) - 6 monthly
Needle stick injury/splash injury. (repeat screening referred to baseline date)	- 0 (baseline) - 6 weeks - 3 months - 6 months	- 0 (baseline) - 6 weeks - 3 months - 6 months	- 0 (baseline) - 6 weeks - 3 months - 6 months	- 0 (baseline) - After completed vaccination/booster
HCW taking vaccination for Hepatitis B	- Only do if Anti HBs level <10 mIU/ml after booster given	NA	NA	- 1 month after completed 3rd dose vaccine - 1 month after taken booster

*High risk patient (not from the group above) screening interval (if last result non-reactive): 3 monthly to detect early seroconversion

Tracing results for Hepatitis B, Hepatitis C, HIV & VDRL/RPR via phone is NOT ALLOWED. If result is needed urgently, staff from the ward / clinic MUST come to the microbiology lab to retrieve the result.

CRITERIA FOR REJECTION

1. No risk factor mentioned in lab form for patient admitted to ward or attended clinic (all cases with * mentioned above).
2. No clinical findings mentioned in lab form suggesting patient is high risk (all cases with * mentioned above).
3. Specimen sent before the expected time interval.
4. Patient already known case of infection before.
5. Post ET sample
6. Specimen post recent (< 1 month) blood/product transfusion /Hepatitis B vaccination (if order HBs Ag – may cause false positive HBsAg)

7. Neonate specimen <18 months (to check for anti HIV/anti HCV/Anti Hbs Ab) without screening from mother (except Pre-ET/transplant case)
8. Elderly patient (≥ 65 years old) without obvious risk factor (elderly people : immune system weaker and susceptible to infection)

*To consult clinical microbiologist if there is justification to perform the test in case the patient does not fulfill criteria above.

Clinical Criteria For Autoimmune Diseases
(Justification For Laboratory Testing)

Autoimmune Disease	Clinical Criteria
Systemic Lupus Erythematosus (SLE) - At least **1 or more criteria** are subjected to testing (according to EULAR/ACR 2019 entry criterion testing for ANA) - If patient had undergone renal biopsy and result: **lupus nephritis** □ this criteria subjected for testing. - Neonatal lupus : need to screen **mother's autoantibodies.** - **For arthritis symptoms: please rule out rheumatoid arthritis first (include RF result)** - **Test : ANA, AntiDsDNA, ENA**	1. **Acute cutaneous lupus** – malar rash or generalized maculopapular rash 2. **Subacute cutaneous lupus** – annular or papulosquamous cutaneous eruption usually photodistributed. 3. **Discoid lupus –** erythematous violaceous cutaneous lesion with secondary changes leading to scarring alopecia of the scalp. 4. **Oral ulcers** – at palate, buccal, tongue (exclude vasculitis, infection, Behcet's disease, Inflammatory bowel disease) 5. **Non scarring alopecia** – diffuse thinning or hair fragility with broken hair (exclude alopecia areata, drugs, iron deficiency, androgenic alopecia) 6. **Synovitis ≥ 2 joints** – swelling/effusion/tenderness of joints 7. **Joint tenderness in ≥ 2 joints & at least 30 mins of morning stiffness** 8. **Pleural or pericardial effusion –** demonstrated by imaging 9. **Acute pericarditis** - ≥2 of either pericardial chest pain/pericardial rub/ECG changes :widespread ST elevation of PR depression/worsened effusion on imaging 10. **Renal manifestation** – proteinuria of 0.5 g/24 hour urine protein 11. **Neurological manifestations** – seizures/epilepsy, delirium,psychosis, mononeuritis complex(exclude vasculitis/DM), myelitis, peripheral/cranial neuropathy (exclude vasculitis, infection, DM), acute confusional state (exclude toxic, metabolic, alcohol, uraemia, drugs) **12. Autoimmune hemolysis** – reticulocytosis, low haptoglobin, elevated indirect bilirubin, elevated LDH & positive Coomb's test 13. **Leukopaenia** – WBC < 4000 mm^3 (at least once), exclude : infection, steroids, portal HPT (possible to include serial reading) 14. **Thrombocytopaenia** – platelet < 100,000mm^3 (at least once), exclude : drugs, infection, portal HPT, Thrombotic

	thrombocytopaenic purpura(TTP) (possible to include serial reading) 15. **Pyrexia of unknown origin** – fever ≥38°C for ≥ 2 weeks with undetermined cause 16. **Low complement C3/C4** 17. **Positive Antiphospholipid Antibody –** positive lupus anticoagulant, medium-high titre Anticardiolipin antibody or β 2 Glycoprotein 1 antibody 18. **As investigation for young Hypertension (less than 40 years old)**
Sjogren Syndrome - At least **1 or more criteria** are subjected for testing. - Exclude : radiation, hepatitis C, HIV, sarcoidosis, amyloidosis. **- Test : ANA, ENA**	1. Eye dryness – feeling of 'sand' inside eyes for ≥3 months - Frequent usage of artificial tears (> 3 times/day) ≥3 months 2. Oral dryness ≥3 months
Systemic sclerosis/scleroderma - At least **2 or more criteria** are subjected for testing - However if patient presented with criteria no. 1 alone and highly suspect – subjected for testing **- Test : ANA, ENA**	1. Skin thickening of fingers of both hands – extending proximal to MCP joints with "puffy" fingers & non pitting swelling (exclude trauma) 2. Telangiectasia (visible macular dilated superficial blood vessel that blanches on pressure) , round, well demarcated at hands, lips & oral cavity. 3. Fingertip lesions – digital tip ulcer, fingertip pitting scar (exclude trauma) 4. Abnormal nail fold capillaries. 5. Pulmonary arterial hypertension. 6. Interstitial lung diseases Raynaud's Phenomenon at fingers & toes in response to cold & emotion (pallor, cyanosis, hyperaemia)
Myositis	1. Progressive, symmetrical muscle weakness of Proximal upper or lower extremities:

- At least **2 or more criteria** are subjected to testing - **To provide full muscular examination in request form.** - **Test : ANA, ENA**	- Leg : Proximal muscles weaker than distal - Neck : flexor weaker than extensor 2. Purplish/erythematous patches over periorbital area (Heliotrope rash), oedema might present. 3. Erythematous papular lesions (sometimes with scaling) at finger joint, elbow, knee, malleoli & toes. (Gottron's papule) 4. Erythematous to violaceous macular lesion over extensor surface of joints (Gottron's sign) 5. Dysphagia/ odynophagia 6. Elevated CK, LDH, ALT or AST
Autoimmune hepatitis - Exclude : drugs, toxins & infections - **To provide result for viral marker** - **Radiological finding (if available**) - **ANA/ASMA/AMA/LKM (to assist in scoring system)**	1. Any features of hepatitis (abnormal LFT – possible to include serial reading for abnormal result) but negative for viral markers. 2. Radiological findings showed features of hepatitis
Primary Biliary Cirrhosis - At least **2 or more criteria** are subjected to testing - Exclude : drugs, toxins & infections - **To provide result for viral marker** - **Radiological finding (if available)** - **Test : ANA**	1. Extreme, progressive fatigue 2. Generalized pruritus (exclude dermatological/allergic condition) 3. Sign & symptoms of portal hypertension (hematemesis, ascites, hepatic encephalopathy) 4. Abnormal LFT (possible to include serial reading for abnormal result) 5. Radiological findings: cirrhotic liver.
Vasculitis - At least **2 or more criteria** are subjected for testing. - Any biopsy of small vessels performed & suggestive of vasculitis subjected for testing - **ANCA associated vasculitis** : Granulomatosis with polyangitis	1. Progressive, intermittent numbness/weakness of hand & foot 2. Presence of purpura, lumps, nodules or ulcers at hand & foot 3. Severe shortness of breath & cough (exclude infection, cancer, heart disease, chronic lung diseases) 4. Lung nodules, cavitation, hilar lymphadenopathy, pleural effusion on imaging. 5. Nasal crusting, saddle nose, stridor, hoarseness of voice, deafness.

(Wegener's Granulomatosis), Microscopic polyangitis, eosinophilic granulomatosis with polyangitis (Churg Strauss Syndrome) - **Test : ANCA**	6. Uveitis, scleritis, optic neuropathy, retinal vasculitis or retro-orbital pseudotumour (must be assessed by ophthalmologist) 7. Hematuria, proteinuria or rapidly rising creatinine with hematuria. 8. Cranial nerve abnormalities or CNS mass lesion
Pernicious anaemia - At least **2 or more criteria** are subjected for testing - Exclude: infection (HIV), surgery, coeliac disease, inflammatory bowel disease, vegetarian diet, alcohol abuse, medicines (oral hypoglycaemic agent, antibiotics, antiseizures), tapeworm infestation. - **Test : LKM**	1. Patients having signs & symptoms of anaemia with FBP showed Macrocytic/Megaloblastic anaemia. 2. Sign & symptoms of Vitamin B12 deficiency : neurological symptoms; smooth, red & thick tongue 3. Serum B12 level : Low

*Tests requested by Rheumatologist/Gastroenterologist/Hepatologist/Nephrologist/Endocrinologist are given priority for testing.

*To consult clinical microbiologist if there is justification to perform the test in case the patient does not fulfill criteria above.

Notes: for **Psoriasis**, **ANA** test indicated prior to biologic treatment by dermatologist

False positive ANA testing could be due to:

1. Normal people may have 20-30% (titre 1:40) & 10-12% (titre 1:80) positive results.
2. Elderly women (>65 years old)
3. Infection – EBV, TB infection, Hepatitis C
4. Medication (antibiotic, antimalarial, antihypertensive, antiarrhythmic)

HISTOCYTOPATHOLOGY UNIT

General Policy Of The Histocytopathology Unit:
Delivery Of Tissue For Histopathological Examination / Cytology Tests

1. Generally, cases requiring a histopatological diagnosis the tissue or organ removed from the body during surgery, or other procedures shall be sent in whole to the Department of Pathology, Tuanku Fauziah Hospital. The exceptions to the above are as below:
   A. Limb cutting (amputation) for tumours that have been diagnosed, only partial/whole tumors and surgical margins should be examined.
   B. Placenta following normal delivery.
2. Cases such as recurrent tumour are required to be sent for histopatological examination even if a diagnosis has been done before.

Histopathology Laboratory Handbook

1. List of Service
   a. General Histopathological Examination (HPE)
   b. Intraoperative Frozen Section (IFS)
   c. Histochemistry (Special Stain)
   d. Immunohistochemistry (IHC)
   e. Clinical Autopsy

2. Service Hour
   a. Laboratory:
      i. Operating Hour:
         i) Monday to Friday: 8.00am-5.00pm
            (Specimen reception after working hours will be at the Main Counter)
         ii) Closed: Saturday, Sunday, and public holiday
   b. Clinical Postmortem:
      i. 24 hours service
      ii. An Anatomic Pathologist will be rostered for 24 hours call for clinical autopsy as well as other surgical pathology consultation including intraoperative frozen section (IFS). He/she can be contacted through the hospital operator.
   c. Intraoperative Frozen Section:
      i. Working hours only. Requests after working hours are not advisable, unless indicated.
      ii. Appointment basis. Preferably at least 1 day before the procedure.

3. Request Form
   a. General Histopathological Examination (HPE)
      i. The laboratory requires only 1 copy of the request form for each case. A request with more than 1 specimen from a patient will only require 1 copy of the request form.
      ii. All request form should be filled legibly, complete with relevant clinical history and finding and must have at least below:
         i) Name of the patient
         ii) Patient identity card (I/C) number or/and hospital register number (RN) or/and any unique identity number.
         iii) Gender.
         iv) Age.
         v) Ward/Clinic.
         vi) Clinical history.
         vii) Requested test.
         viii) Time and date specimens were taken.
         ix) Filled up HTF/PL/Histo/B-35 Renal Biopsy Checklist (renal biopsy tissue for HPE with IF test for referred out to HSBAS)
      iii. The clinician shall have his/her name, designation and department clearly written on the request form.
      iv. Rejection criteria is a per listed in **Appendix 5**
   b. Clinical Postmortem
      i. Clinical Postmortem
         i) Clinical postmortems are conducted to confirm the cause of death, the effects of an illness or injury and for learning and research

purposes. These death cases are not related to Police cases such as cases of communicable diseases or deaths in the ward. Government Medical Officers need to obtain written permission from the next of kin before performing a postmortem. Without the written consent of the next of kin, a postmortem examination cannot be carried out except for cases involving public interest such as infectious disease cases which are subject to the Infectious Disease Prevention and Control Act 1988 (Act 342).

ii) The death situations that may require clinical postmortem include but not limited to:
   - Death due to infectious diseases such as Severe Acute Respiratory Syndrome (SARS), AIDS, Anthrax, Japanese Encephalitis (JE) and the like.
   - Death in the ward whose cause is almost known but requires more information on the cause of death.
   - Death of the mother during pregnancy (maternal death) if the cause of death is unknown.

iii) This service is only provided for patients who died in Hospital Tuanku Fauziah.

iv) All cases for clinical postmortem must be discussed first with Anatomic Pathologist in-charge. Refer to the Department of Pathology on call duty roster for the in-charge person.

v) The requesting doctor shall obtain permission and a written consent from the next of kin before the procedure.

vi) Clinical postmortem shall be performed by a Government Medical Officer, preferably an Anatomic Pathologist.

vii) When the postmortem is performed by an Anatomic Pathologist, the clinician who requested for the clinical postmortem must always be present during the procedure and assisting the anatomic pathologist.

viii) Postmortem examination is usually performed during office hours, but requests can be made after office hours. However, postmortem examination after office hours can be done on an individual case basis.

ix) In view of competency issues, the person who is performing the full body postmortem may request for forensic team assistance.

x) The government medical officer/s who performed the postmortem shall bear all the responsibility in preparing the postmortem report.

xi) If an Anatomic Pathologist is the performing person or one of the assistants, the postmortem report shall be prepared, released, and approved by him/her. This is only applicable for clinical postmortem.

xii) In summary, the procedure is as below:
   - The requesting doctor shall first obtain written consent from the next of kin.
   - The clinician who is requesting for a postmortem shall communicate directly to the Anatomic Pathologist on call.
   - Postmortem examination is usually performed during office hours, but requests can be made after office hours if needed.

- A clinical summary together with the case notes and consent form shall be sent to the Anatomic Pathologist on call.
- The requesting specialist from the clinical department is required to present during the postmortem process.
- The main objective of clinical postmortem is to study and identify the main reasons that lead to death of an individual after appropriate treatments and interventions that have been given fail to recover or save the individual. There are also situations where a postmortem examination will be carried out even if the cause of death is known. This is mainly due to the requirement of further research on the characteristics of the disease to increase knowledge and understanding of the medical field toward the disease.
- Any medico-legal postmortem and potential medico-legal postmortem including suspicious death or sudden death shall not be under clinical postmortem.
- All clinical postmortem reports should be ready within 12 weeks and are dispatched to Jabatan Rekod HTF for archiving. No report shall be sent to the next of kin or clinical department by the laboratory.

c. Referral
    i. Referrals or cases for expert opinion are welcome.
    ii. For consultation
        i) The client (clinician etc) can communicate with the respective anatomic pathologist if needed.
    iii. Referral for expert or second opinion
        i) For internal or HTF patients that need an expert or second opinion, the requesting doctor (clinician etc) is required to fill up a request form as per routine cases and submit to Histopathology laboratory together with the specimen (paraffin embedded tissue, stained and/or unstained slides). Paraffin embedded tissue is preferred in cases further ancillary studies or staining are needed.
        ii) For external or non-HTF cases, the material together with a referral letter should be sent to the Histopathology laboratory. The contact number or email address where the report needs to be sent to should be provided by the requesting doctor.
        iii) If the case has been reported elsewhere, a copy of the report should be provided.
d. Intraoperative Frozen Section
    i. The client should request an intraoperative frozen section from a respective Anatomic Pathologist, at least 1 day before the procedure. The needs for the procedure shall be made by a specialist/surgeon.
    ii. If accepted, he/she will need to fill out a google form. The link of the online form will be provided by the respective Anatomic Pathologist.
    iii. Intraoperative frozen section should be done during office hours, unless otherwise indicated such as in a case of organ transplant. In this situation, certain terms and conditions are applied.
    iv. The request form will be sent together with the specimen during the procedure.

v. A liaison officer among the clinician (at least a medical officer) is a must to improve communication and transportation.

4. Specimen Collection and Container
   a. All specimens for routine histological examination are to be fixed in 10% neutral buffered formalin (NBF) in a suitable clean leak-proof container.
   b. The container should have a wide opening and if possible, with screw cap to prevent leakage.
   c. The volume of formalin used must be at least 10 times the volume of the specimen to be fixed. Do not put large specimens in small containers as this would prevent proper fixation of tissue and distort the specimen.
   d. All specimen containers should have the same identification details as that written on the request forms.
   e. Multiple small specimens such as gastrointestinal biopsies should ideally be mounted on a piece of filter paper (e.g lens paper) and immediately put in formalin.
   f. Specimens from different anatomical sites should be sent in separate containers, properly labeled, and must be clearly itemized in the request form.
   g. For cases that require confirmation of the adequacy of surgical excision, the margin of the specimen must be marked or tagged accordingly by sutures or diagrammatic representation of excised specimens.
   h. The specimen for the intraoperative frozen section shall be placed in a plain container without fixative at room temperature. The specimen must always dry, and it should not be wrapped in gauze. Any suture, staple or sharp structure should be removed from the tissue sample.

5. Specimen's Labeling
   a. All request specimen's bottle should be filled legibly, completely.
   b. Use permanent ink when writing the information.

6. Dispatch and Transportation of Histopathology Specimen
   a. Specimens for routine histopathological examination should be sent directly to Histopathology Laboratory during working hours. After working hours, the specimen should be sent to the Main Counter.
   b. All specimens should be sent to Histopathology Laboratory after resection, as soon as possible. However, in the case of delay, the specimen is stable in fixative (10% formalin solution) at room temperature.
   c. Fresh tissue specimens for immunofluorescence staining or intraoperative frozen section shall be sent immediately to Histopathology Laboratory without delay. If delay is suspected of immunofluorescence staining, the specimen should be transported in phosphate buffered solution (2-8^{o}C) or Michel's solution (room temperature).
   d. Inform/notify the Histopathology Laboratory when specimen for intraoperative frozen section is ready for transportation to the laboratory.

7. Histopathology Reports
   a. Reports of biopsies for histopathological examination which are labeled 'urgent' will be available within 3 working days after reception of specimen (unless the specimen is a large, resected specimen (more than 2cm), needs additional tests, second opinion etc)
   b. Please leave the requesting doctor's name (preferably medical officer and specialist) and contact number on the request form for early flagging of results.

c. The result following an intraoperative frozen section will be notified to the surgeon promptly and followed with a report. A supplementary report will be released when the final section is completely examined.
d. Report enquiry:
    i. Report enquiry can be made via extension 8188 (pathologist room). The accession number of the specimen (HPE number) can be obtained from the Histopathology laboratory and iLAB system. The requesting doctors are welcome to discuss the cases with the reporting pathologist or medical officer.
e. Collection of report
    i. All histopathology reports shall be collected from histopathology laboratory or through the iLAB system by respective clinics/ wards/ departments personnel.
    ii. Request for second copy shall be made through Histopathology laboratory or iLAB system by an authorized requestor.
    iii. Report summary list of completed cases are provided via email to the customer upon request.

8. After Office Hours Specimen
    a. All histopathological examination specimens that are taken after office hours should be fixed in the usual manner (in 10% formalin solution) in the respective OT/ clinic or ward and kept at room temperature. The specimen can be dispatched to the Histopathology Laboratory during the next working hours, or even immediately to the Pathology Main Counter. The option selection should be based on the risk assessment of the locality.

9. Interdepartmental Clinicopathology Conference
    a. The Histocytopathology Unit, in conjunction with the Radiology Department, conducts a clinicopathology conference (CPC) with the major clinical department in HTF. The schedule is issued every month.

10. Taking out Paraffin Blocks/Slides/Image from Histopathology Unit
    a. Patients' paraffin blocks and slides are archived in the laboratory.
    b. For certain valid reasons, the laboratory allows the clinician to take diagnostic material (paraffin block/slide/image) away from the laboratory. The following procedures must be followed:
        i. The request to get the diagnostic material must be made by at least a medical officer.
        ii. The requestor needs to fill up form 'Borang Pengeluaran Blok Tisu, Slide dan Gambar Morfologi' HTF/PL/Histo/B-8. Hospital director's approval is needed for a request from outside HTF. Request letter is a must for the latter.
        iii. Form or letter should be submitted to Histopathology laboratory.
        iv. The paraffin block and stained slides must be returned to the Histopathology laboratory within 1 month.

11. Taking out Tissue from Histopathology Unit
    a. All specimens (tissue) sent to and officially received by Histopathology laboratory will be kept in the laboratory up to at least 3 months, with few exceptions.
    b. The Histopathology Unit allows the patient to take their tissue, organ, or limb back upon request. Please follow this procedure.

i. The patient or next of kin must make a formal request through an authorized requestor. On behalf of the patient or next of kin, the authorized requestor must make a formal request by filling up a form 'Borang Tuntutan Spesimen HPE' HTF/PL/Histo/B-07. This form is available at the Histopathology laboratory.
ii. The filled-up form should be submitted to the Histopathology laboratory. The form should be submitted within 3 months of specimen reception. **If there is no request after 3 months**, the tissue will be disposed.
iii. The tissue is released only after the specimen is being examined by pathologist **and** adequate sampling has been taken for reporting **and** has been kept for 3 months (in case there is a need for a second look).
iv. The tissue will be given to the authorized requestor on behalf of the patient or next of kin. The patient or next of kin is not allowed to take the tissue from the laboratory directly.

12. Request to Obtain Microscopic Image from Histopathology Unit
    a. Microscopic images are not archived as routine, but images can be provided upon request.
    b. A request shall be made or endorsed by the head of the unit.
    c. For presentation:
        i. The requesting doctor should communicate with the respective pathologist.
        ii. A request shall be made by filling up a form 'Borang Pengeluaran Blok Tisu, Slide dan Gambar Morfologi' HTF/PL/Histo/B-8 which is available at the Histopathology laboratory. The filled-up form should be submitted to the Histopathology laboratory.
    d. For publication:
        i. The requesting doctor shall communicate with the respective pathologist followed by filling up the request form 'Borang Pengeluaran Blok Tisu, Slide dan Gambar Morfologi' hb
        ii. The abstract of the publication should be provided, and the respective pathologist who reported the case should be included as co-author if possible.
    e. The microscopic histopathology images will be available within 2 weeks upon submission of the form. Only soft copy of the images is provided, and the requester should provide a CD/ email address/ pendrive before collecting the images from the unit.

13. Research
    a. The Histopathology laboratory welcomes research projects or studies to be done in collaboration with us.
    b. All research projects shall be registered under the National Medical Research Register (NMRR).
    c. All collaboration studies or research projects must have approval from the Head of Pathology Department.
    d. A copy of the research proposal must be provided.
    e. One pathologist from the laboratory shall be appointed as collaborator or co-researcher if possible.
    f. The researcher will be assisted by the appointed Pathologist to retrieve the materials required if the research project requires archival material from this laboratory.
    g. All archival slides can be borrowed for review in the unit only.

h. If paraffin blocks are required for further testing, sections should be done at the allocated station in this laboratory.
i. No archival material should be taken out from the Histopathology laboratory.

14. Laboratory Turn Around Time

Test	**LTAT**	**LTAT (Urgent)**
Small biopsy	14 days	3 working days*
Other HPE specimen	14 days	NA
Intraoperative Frozen Section	1 hour	NA

*Apply only for small biopsies less than 20mm in diameter without any additional test or requiring second opinion.

Cytology Laboratory Handbook

1. List of Service
    a. Exfoliative Cytology
        i. Gynaecological Cytology (Cervical Pap Smear)
            1. Conventional pap smear
            2. Non-Gynaecological Cytology –body fluid, CSF, urine, sputum, brushing etc
    b. Aspiration Cytology
        i. Fine Needle Aspiration Cytology
    c. Seminal Fluid Analysis

2. Service Hour
    a. Monday to Friday: 8.00am-5.00pm (Reception of seminal fluid analysis will be until 11am. Specimen reception after working hours and SFA specimens are done at the Main Counter)
    b. Closed: Saturday, Sunday, and public holiday

3. Request Form
    a. One copy of PER-PAT 301 form for routine cytological examination (Non-Gynaecological Cytology, Fine Needle Aspiration and Seminal Fluid Analysis).
    b. One copy of PS 1/98 form for gynaecological cytology examination.
    c. All request form should be filled legibly, complete with relevant clinical history and finding and must have at least below:
        i. Name of the patient
        ii. Patient identity card (I/C) number or/and hospital register number (RN) or/and any unique identity number.
        iii. Gender
        iv. Age
        v. Ward/Clinic
        vi. Test requested.
        vii. Time and date specimen taken.
    d. The clinician shall have his/her name, designation and department clearly written on the request form.
    e. If an urgent result is required, please indicate so by marking ‘URGENT’ over the upper and centre of the form with red ink. Seminal fluid analysis and gynaecological cytology are not considered as an urgent request.
    f. Rejection criteria is listed in **Appendix 5**

4. Specimen Collection
    a. Gynaecological Cytology
        i. Conventional
            1. Label a clean glass slide with the patient's name and IC number with pencil on the frosted end.
            2. **DO NOT** use lubricant on the speculum.
            3. Place cervical spatula at the external os and rotate through 360^{o} degree, lightly scraping the squamo-columnar junction.
            4. Smear the material onto the labeled glass slide about as thick as a blood film.
            5. Fix the slide immediately, either by immersing it in a coplin jar containing 95% alcohol for at least 30 minutes or use a spray fixative at an angle of 45^{o} and at a distance of 6 inches.
            6. Air dry the fixed slide.

7. Place the slide in a slide mailer and dispatch to the cytology laboratory.

b. Sputum
   i. Specimens must be collected on three consecutive days.
   ii. Instruct the patient to empty the mouth of all saliva immediately after he wakes up in the morning.
   iii. The patient should then cough deeply and collect the resulting sputum in a container.
   iv. The specimen must be sent immediately to the Cytology laboratory.
   v. **DO NOT** forget to collect a similar specimen on the next two days.
   vi. The specimen container should be labelled according to the day the specimen is collected.
   vii. For sputum specimen submitted as smears:
      1. Label two clean glass slides for each patient with name and IC number.
      2. Fix the slide immediately, either by immersing it in a coplin jar containing 95% alcohol for at least 30 minutes or use a spray fixative at an angle of 45^{o} and at a distance of 6 inches.
      3. Air-dry the smears.
      4. Ensure the slides are not placed face to face in the slide mailer.

c. Urine
   i. The patient should avoid and discard the first morning urine specimen.
   ii. Collect the next voided urine and sent immediately to the Cytology laboratory (minimum 20mL).

d. Body Fluid (Pleural fluid, peritoneal fluid, pericardial fluid, CSF, synovial fluid, cyst fluid etc)
   i. Specimens are collected in clean containers and dispatched immediately to the Cytology laboratory.
   ii. If delay is anticipated (>12 hours), refrigerate at 4^{o}C.

e. Brushing (Bronchial brushing, CBD brushing, etc)
   i. Label one to three clean glass slides with the patient's name and IC number.
   ii. Smear the material about as thick as a blood film.
   iii. Immediately place the slides in 95% alcohol for at least 30 minutes or use a spray fixative at an angle of 45^{o} and at a distance of 6 inches.
   iv. If more than one slide is to be placed in the same slide mailer, ensure that they are not placed face to face.

f. Bronchoalveolar lavage (BAL) and bronchial washing
   i. Specimens are collected in clean containers (minimum 20mL) and dispatched immediately to the cytology laboratory.
   ii. If delay is anticipated (>12 hours), refrigerate at 4^{o}C.

g. Fine Needle Aspiration Cytology (FNAC)
   i. The FNAC clinic is conducted three times a week at the Surgical Outpatient Department (SOPD) (Tuesday and Thursday at 3pm) and ENT Department (Friday at 11am), HTF for palpable lesions on appointment basis. This is applied to in-patient as well as out-patient except for critically ill patients. Please get an appointment from the Surgical Department or ENT Department in accordance with their policy and procedure.
   ii. FNAC for deep seated lesions are conducted at Radiology Department by respective radiologist/clinician in accordance with Radiology Department policy and procedure.

iii. FNAC shall be:
1. Requested by a specialist or medical officer under specialist supervision.
2. The request form should be filled legibly, complete with relevant clinical history and findings. Whenever there is more than lump or swelling present, the clinician should indicate which lump or swelling is to be aspirated.
3. A signed consent from the patient shall be obtained by the aspirator. The aspirator shall explain to the patient regarding the procedure including limitation and alternative etc. The procedure to obtain written consent shall follow the policy and procedure of the respective department.

iv. Urgent FNAC
1. If you have any request for urgent FNAC, please contact anatomic pathologist in-charge/cytology technician in-charge.

v. Please note that:
1. Breast and thyroid cyst may be aspirated by the aspirator and material sent for cytology examination.
2. Indication of thyroid FNAC will follow American Thyroid Association
3. Vascular lesions or those of vascular origin are not suitable for FNAC.
4. FNAC for deep seated lesions are performed by radiologists under image guided on appointment basis. Please refer to the Radiology Department policy and procedure.
5. All thyroid swelling shall undergo ultrasound scan before posted for FNAC.

h. Seminal Fluid Analysis
i. Patients are instructed not to have sexual intercourse/ masturbation at least 3 days prior to the checkup.
ii. If the semen sample was collected at home, it must be brought to the lab within ½ hour of collection.
iii. Ensure that the collection bottle is clean, dry and sterile. It can be obtained from the clinic or laboratory.
iv. Patients are advised to empty their bladder first before collecting semen.
v. Patients must wash their penis with soap and water prior to collection.
vi. Collection is by masturbation without the use of aids like condoms.
vii. Ensure that all the semen produced is deposited in the specimen bottle.
viii. The full semen analysis requires time. Patients are advised to deliver the semen sample as early as possible to the laboratory to ensure that a complete analysis can be done.
ix. The request is on an appointment basis. Please fill out google form at the link https://forms.gle/x2z7Scbyjv8Zqj259.

5. Specimen's Labeling
a. All request specimen's bottle should be filled legibly, completely.
b. Use permanent ink when writing the information.

6. Laboratory Turnaround Time

Test	**LTAT**	**LTAT (Urgent)**
Pap Smear	14 days	NA
Non Gynae	7 days (CSF: 3 working days)	3 working days (routine only) (CSF: No urgent/NA)

FNAC	7 days	3 working days (routine only)
Seminal Fluid Analysis	2 working days	NA

TEST STABILITY

Test Name	Type of Specimen	Container	Transportation Method	Transportation Time (Collection to Receiving)	Stability	Stability Time (Collection to Examination)	LTAT
Histopathological Examination (HPE)	Fresh Tissue *Require consultation with Anatomic Pathologist.	Plain container without fixative (depending on specimen size)	-Room temperature -Moist with isotonic solution such as Phosphate Buffer Solution (PBS), if possible. *Require consultation with Anatomic Pathologist.	As soon as possible (ASAP)	-Process tissue ASAP before place in proper fixation (such as 10% NBF). Place it as soon as possible.	<20 minutes (to fixation)	-14 calendar days (routine) -3 working days (Urgent small biopsy)
					-Place in proper fixation (such as 10% NBF) as soon as possible.	<20 minutes (to fixation)	

Test Name	Type of Specimen	Container	Transportation Method	Transportation Time (Collection to Receiving)	Stability	Stability Time (Collection to Examination)	LTAT
	Tissue in formalin	Plain container containing 10% NBF (depending on the specimen size)	RT	On working day only	-Place in proper fixation (such as 10% NBF) after resection or sampling ASAP.	At least 6 hours in fixative solution and process within 48-72 hours. *Notify in the report if specimen processing is performed after 72 hours.	
	Paraffin embedded tissue block	Dry box	RT	NA	Keep the blocks at RT	NA	
	Paraffin section of tissue slide	Slaid mailer	RT	NA	Keep the slides at RT	NA	

Test Name	Type of Specimen	Container	Transportation Method	Transportation Time (Collection to Receiving)	Stability	Stability Time (Collection to Examination)	LTAT
Fresh Tissue for Intraoperative Frozen Section (IFS)	Tissue (Fresh)	Plain container without fixative	-RT -Dry and it should not be wrapped in gauze. -Any suture, staple, or sharp hard structure should be removed from the tissue sample. piece.	ASAP	-Process tissue ASAP before place in proper fixation (such as 10% NBF). Place it as soon as possible.	ASAP	1 hours
HPE with IF	Tissue	1. Plain container containing PBS 2. Plain container containing 10% NBF	Ice/cold box at 4-8°C	ASAP	-Process tissue ASAP before place in proper fixation (such as 10% NBF). Place it as soon as possible.	1. Tissue in PBS = 1 day 2. Tissue in Formalin = At least 6 hours in fixative solution and process within 48-72 hours. *Notify in the report if specimen processing is performed after 72 hours.	14 calendar days

Test Name	Type of Specimen	Container	Transportation Method	Transportation Time (Collection to Receiving)	Stability	Stability Time (Collection to Examination)	LTAT
HPE with IF	Tissue	1. Plain container containing Michel's solution 2. Plain container containing 10% NBF	RT	ASAP	-Process tissue ASAP before place in proper fixation (such as 10% NBF). Place it as soon as possible.	1. Tissue in Michel's solution (RT) = 5 day 2. Formalin = At least 6 hours in fixative solution and process within 48-72 hours. *Notify in the report if specimen processing is performed after 72 hours.	14 calendar days
Gynae Cytology (Conventional)	Smeared slide fixed with 95% alcohol	Slide mailer	RT	ASAP	-Process the sample ASAP	NA	14 calendar days

Test Name	Type of Specimen	Container	Transportation Method	Transportation Time (Collection to Receiving)	Stability	Stability Time (Collection to Examination)	LTAT
Non-Gynae Cytology	Body fluid (Peritoneal, pleural, pericardial, Broncho-alveolar lavage)	Universal container, urine bag etc (depending on the specimen's volume)	-RT if within 12 hours. - Refrigerated at 4°C if delay is suspected.	ASAP	-Process the sample ASAP	-Samples can remain up to 72 hours if kept refrigerated at 4°C. -When a longer delay is anticipated, addition of an equal volume of 50-95% ethanol or Saccomanno fixative (50% ethanol and 2% carbowax) is recommended.	-7 calendar days -3 working days
	Smeared slide fixed with 95% alcohol. (Nipple discharge)	Slide mailer	RT	ASAP	-Process the sample ASAP	NA	
	Air dried smeared slide (Tzanck's smear)	Slide mailer	RT	ASAP	-Process the sample ASAP	NA	

Test Name	Type of Specimen	Container	Transportation Method	Transportation Time (Collection to Receiving)	Stability	Stability Time (Collection to Examination)	LTAT
	Urine	Universal container, urine bag etc. (depending on the specimen's volume)	-RT if within 12 hours. - Refrigerated at 4°C if delay is suspected.	ASAP	-Process the sample ASAP	-Samples can remain 12 to 24 hours if kept refrigerated at 4°C. -If a longer delay in specimen processing is anticipated, urine samples should be mixed with an equal volume of 50% ethanol or Saccomanno fixative (50% ethanol and 2% carbowax).	

Test Name	Type of Specimen	Container	Transportation Method	Transportation Time (Collection to Receiving)	Stability	Stability Time (Collection to Examination)	LTAT
	CSF	CSF bottle, urine container	Room temperature within 30 minutes of procurement	ASAP	-Process the CSF ASAP	Refrigeration at 4°C may preserve cell details for up to 48 hours. -If a delay in processing CSF is anticipated, the addition of an equal amount of 50% ethanol is recommended.	-3 working days
Fine Needle Aspiration Cytology (FNAC)	Smeared slide fixed with 95% alcohol.	Slide mailer	RT	ASAP	-Process the sample ASAP	NA	-7 calendar days -3 working days
	Air dried smeared slide.	Slide mailer	RT	ASAP	-Process the sample ASAP	NA	

Test Name	Type of Specimen	Container	Transportation Method	Transportation Time (Collection to Receiving)	Stability	Stability Time (Collection to Examination)	LTAT
	Body fluid	Universal container, urine bag etc (depending on the specimen's volume)	-RT if within 12 hours. - Refrigerated at 4°C if delay is suspected.	ASAP	-Process the sample ASAP	-Samples can remain up to 72 hours if kept refrigerated at 4°C. -When a longer delay is anticipated, addition of an equal volume of 50-95% ethanol or Saccomanno fixative (50% ethanol and 2% carbowax) is recommended.	
Seminal Fluid Analysis (SFA)	Seminal fluid	Universal container	20-37°C	Within 30 minutes to 1 hour after collection	Fresh sample must be processed within 1 hour after collection	Within 1 hour from collection time.	-1 working days

POLICY FOR HANDLING OF ANATOMIC PATHOLOGY (AP) SPECIMEN OF A HIGHLY CONTAGIOUS DISEASE

1. This policy is applicable for handling of specimens from a highly contagious disease or suspected of having highly contagious disease or any condition that needs similar treatment as instructed by the top management.
2. The clinician should identify those patients described in 1 and do risk management in relation to staff safety. Discussion with the respective anatomic pathologists is compulsory. The anatomic pathologist will give instruction on specimen handling procedures to avoid specimen rejection and risk of exposure to the staff.
3. The laboratory will accept all specimen and test except:
    a. Fresh specimen
    b. Cytology test from respiratory system (sputum, Bronchial Aspiration/Washing, Tracheal Aspirate etc)
4. Kindly contact anatomic pathology in charge should request other than 3 is indicated.
5. Collect specimens according to national and local policy. Triple packaging is mandatory. Make sure the requested form is inserted in a different biohazard plastic.
6. Despatch the request form and specimen to “Kaunter Khas Jabatan Patologi”. Transportation procedures shall follow national and local policy especially on personnel protective equipment (PPE). Notify Histocytopathology Unit’s staff before sending the request form and specimen.

POLICY FOR HANDLING OF ANATOMIC PATHOLOGY (AP) SPECIMEN IN OPERATION THEATRE (OT), ENDOSCOPIC ROOM ETC

1. Surgical team should coordinate the information concerning the specimen and procedure:
    a. Type of specimen e.g. frozen section, culture, specimen to be placed in preservatives.
    b. Require special tests e.g. gram stain, acid fast or mycology.
    c. Type and size of needed container and whether it needs to be clean or sterile.
    d. Type of preservative
2. Specimen identification begins at the time the specimen is removed from the patient and identified by the surgeon.
3. The scrub nurse verifies (shouts out) the specimen, what tests are to be performed by pathology, and if they may pass the specimen to the circulating nurse.
4. The specimen should be passed off the sterile field **as soon as possible**. Should the specimen need to be held on a sterile field the scrub nurse will have a designated area and label the specimen description. Write down/read back verification between the scrub nurse and the surgeon. Specimens held on the sterile field must be maintained in a manner to preserve the specimen.
5. The circulating nurse will verbally verify back (shout out) the type of specimen and what test are to be performed by pathology to the surgeon and the scrub nurse.
6. The specimen must be placed into an appropriate container with appropriate fixative (10x the specimen volume **as soon as possible**. If this cannot be completed in a timely manner, the specimen should be placed in a sterile basin and kept moist with sterile saline or wrapped in saline-soaked sponges until the specimen can be passed off the sterile field to the circulator and placed in the container with fixative.
7. The scrub nurse/circulating nurse must request time to complete specimen handling prior to going to the next part of a procedure if it is a “multiple part” procedure.
8. The following information should be **immediately** written on the label in **the operating room by the circulating nurse.**
    a. Type of specimen
    b. The site of the specimen includes right and left.
    c. Two unique identifier e.g. patient name and hospital number
    d. Date and time specimen removed.
9. Label on the container not the lid to avoid loss of label when the lid is removed.
10. Used permanent ink when writing the information.
11. Label biohazard if indicated to alert health care workers.
12. The surgeon **or** the medical officer who assisted the procedure will check back and verify the labeled specimen. Make sure that the labeling is correct:
    a. Type of specimen
    b. The site of the specimen includes right and left.
    c. Two unique identifier eg patient name and hospital number
    d. Date and time specimen received.
13. Fill up Pathology Request Form (electronic or non-electronic). Make sure the patient’s name and IC/RN number is absolutely the same as on the specimen label. Follow procedure to fill up a request form published by the laboratory.
14. Authorized the request by putting a signature on the form.
15. Transporting of specimens with documentation of chain of custody for all specimens.

LIST OF IN-HOUSE AND OUTSOURCE (REFERRAL LABORATORY) TESTS IN THE DEPARTMENT OF PATHOLOGY, HOSPITAL TUANKU FAUZIAH, KANGAR, PERLIS

Scan or click the QR code

https://perlis.moh.gov.my/intrajknpls/elabhtf/web/site/utama

LAMPIRAN/APPENDICES

APPENDIX 1 : SPECIMEN CONTAINER GUIDES

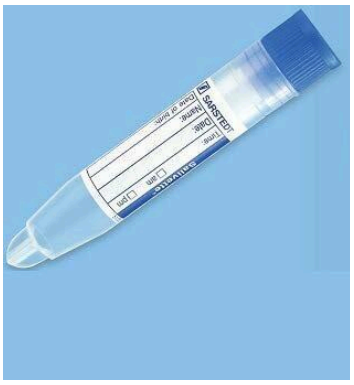
CAP COLOR/ CONTAINER	ADDITIVES	DRAW VOLUME	COMMON TESTS	UNIT/ EXT
Lavendar Vacutainer tube (Adult) Microtainer tube (Paed)	K2 EDTA 	3ml (Adult) 0.5ml (Paed)	FBC, Reticulocytes count, FBP, Hb Analysis,G6PD Assay, CD4, CD4/CD8, Immunophenotyping, Molecular studies	HM/ 8189
		3ml	HbA1c, Ammonia(Transport with Ice, send urgent)	CP/ 8190
		3ml	HIV PCR, HIV Viral Load, HBV Viral Load, HCV Viral Load, HIV Genotyping Drug Resistance Test, HSV PCR, Fungal PCR, BFMP	MK/ 8182
Light blue Vacutainer tube (Adult) Microtainer tube (Paed)	Sodium Citrate 	1.8ml (Adult) 1ml (Paed)	PT/INR, APTT, Fibrinogen, D-Dimer, Inherited Thrombophilia, Lupus anticoagulant, Factor Assay/Inhibitor, Mixing test, Platelet count.	HM/ 8189
Yellow Vacutainer tube (Adult) Microtainer tube (Paed)	Gel with Clot Activator 	5ml (Adult) 1ml (Paed)	GGT, Congenital Hypothyroid Screening (Cord blood TSH), Vitamin B12, Folate, Immunoglobulin (IgG,IgM,IgA)	CP/ 8190
		3.5ml	Serology/Virology Tests: ASOT, VDRL, HBV, HCV, HIV, CMV, Rubella, Toxoplasma, HSV IgM/IgG, Leptospira, Dengue, Tissue antibody, ANA, dsDNA, ENA etc	MK/ 8182
		6ml	Serum Erythropoietin	HM/

CAP COLOR/ CONTAINER	ADDITIVES	DRAW VOLUME	COMMON TESTS	UNIT/ EXT
				8189
Green Vacutainer tube (Adult) Microtainer tube (Paed)	Lithium Heparin 	6ml (without Gel)	Chromosome Study	HM/ 8189
		6ml (Adult) 0.4 - 0.6ml (Paed)	Electrolytes (Na, K, Chloride), renal Profile (Urea, Creatinine), LFT (Total Protein, Albumin, ALP,ALT,AST, Bilirubin), FSL (Total Cholesterol, HDL, LDL,Non-HDL, Triglycerides,), CK, LDH, Creatinine Kinase-MB,Troponin I, Uric Acid, Calcium, Magnesium,Phosphate, CRP,Ferritin, Iron, Transferrin, Transferrin Saturation, TSH, Free T4, Free T3 (*send two microtainer tube for TFT)	CP/ 8190
		2ml	Primary Immunodeficiency (PID)-Dihydrorhodamine Assay (DHR)	MK/ 8182
Green Vacutainer tube (Adult)	Sodium Heparin 	Peripheral blood 10ml or BMA sample 2ml	BMA/Peripheral Blood Cytogenetic	HM/ 8189

CAP COLOR/ CONTAINER	ADDITIVES	DRAW VOLUME	COMMON TESTS	UNIT/ EXT
Grey Vacutainer tube (Adult) Microtainer tube (Paed)	Sodium Floride/ Potassium Oxalate 	6ml (Adult) 0.5ml (Paed)	Glucose, Lactate (transport with ice)	CP/ 8190
Black Vacutainer tube (Adult/Paed)	3.2% Sodium Citrate 	1.2ml	ESR	HM/ 8189
Blue cap bottle (Adult) Gold cap bottle (Anaerobe) Pink cap bottle (Paed) Red cap bottle (Fungal/MTB)	Blood culture medium 	Adult/ Anaerobe :8-10ml; Paed: 1-3ml Funga/ MTB: 1-5ml	Blood C&S	MK/ 8182
Microscope glass slide		NA	BFMP, Microfilaria, Wet smear,	MK/ 8182
		NA	PAP smear	HS/ 8187
Stool container with spoon		NA	FOBT (Fecal Occult Blood Test)	CP/ 8190
		2-3ml	Stool ova and cyst, Stool C&S	MK/ 8182

CAP COLOR/ CONTAINER	ADDITIVES	DRAW VOLUME	COMMON TESTS	UNIT/ EXT
CSF container		2ml	Glucose, Protein, Lactate	CP/ 8190
		2ml/ 10 drops	CSF Cell Count, CSF C&S, Gram Stain, Indian Ink, AFB smear	MK/ 8182
Amies/ Amies with charcoal transport media	Amies gel 	NA	HVS/LVS C&S, Pus swab C&S, Eye swab C&S, Ear swab C&S, Throat swab etc *Amies in charcoal - preferable to be used for *N.gonorrhea* isolation	MK/ 8182
Cary-Blair transport media	Cary-Blair gel 	NA	Swab C&S, Rectal swab C&S	MK/ 8182
Universal container (sterile)		25ml	Urine Drug of Abuse (Morphine, Delta-9-THC, ATS),Urine Chemistry, Urine Sodium, Urine Urea, Urine Chloride, Urine Potassium, Urine Protein, Urine Creatinine, Urine Magnesium, Urine Amylase, Urine Uric Acid, Urine Calcium, Urine Phosphate, Urine Microalbumin, Urine Protein Creatinine Ratio (UPCR)	CP/ 8190
		>5ml	Body Fluid for Biochemistry	CP/ 8190
		15ml	Urine C&S	MK/ 8182
		NA	C&S other than Blood C&S, CSF C&S etc	MK/ 8182
		60ml	Biopsy HPE (with Buffered Formaline 10:1) Fluid for Cytology	HS/ 8186/ 8187

CAP COLOR/ CONTAINER	ADDITIVES	DRAW VOLUME	COMMON TESTS	UNIT/ EXT
Robertson's Cooked Meat (RCM) Media	RCM media 	NA	Anaerobic culture (Tissue, Bone, Pus aspirate, Body fluid) Swabs specimen are not allowed to be transported in RCMM	MK/ 8182
Viral Transport Media (VTM)	VTM solution 	NA	Viral PCR	MK/ 8182
Universal Transport Media (UTM)	UTM solution 	NA	Respiratory Pathogen Rapid Molecular (QIASTAT)	MK/ 8182
Nasopharyngeal/ Oropharyngeal Swab		NA	COVID RTK/ PCR, Respiratory ICT,Influenza Surveillance (SARI)	MK/ 8182

CAP COLOR/ CONTAINER	ADDITIVES	DRAW VOLUME	COMMON TESTS	UNIT/ EXT
SARSTEDT Salivette		NA	Salivary cortisol	CP/ 8190

UNIT/EXT:Providing unit/Extension number; HM:Hematology Unit; CP:Chemical Pathology Unit; MK:Microbiology Unit; HS:Histositopathology Unit

APPENDIX 2 : KRITERIA PENOLAKAN SPESIMEN UNIT HEMATOLOGI

Kod	Peringkat	Jenis Penolakan	Tolak	Tolak dan Dibenarkan Pembetulan
1.1	Borang	Tiada Borang	√	
1.2	Borang	Salah Borang		√
1.5	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Nama pesakit	√	
1.6	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Nombor identiti/RN Hospital (Sekurang-kurangnya satu)	√	
1.7	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Jantina		√
1.8	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Lokasi		√
1.9	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Umur		√
1.10	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Diagnosis		√
1.11	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Sejarah pesakit (mengikut jenis ujian)		√
1.12	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Permintaan ujian		√
1.13	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Tarikh dan masa		√
1.14	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Nama, tandatangan dan cop pemohon		√
1.17	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - identiti tidak sama dengan rekod terdahulu	√	
1.18	Borang	Tidak membuat pembetulan borang bagi rejection on hold dalam masa ditetapkan		√
2.1	Label	Masalah Label - Tiada label	√	
2.2	Label	Masalah Label - Label tidak lengkap (nama, nombor identiti, jenis ujian)	√	
2.3	Label	Masalah Label - Nama pesakit tidak seperti pada borang permohonan	√	
2.4	Label	Masalah Label - Nombor identiti tidak seperti pada borang	√	
2.5	Label	Masalah Label - Jenis ujian tiada/tidak seperti pada borang		√
3.1	Spesimen	Masalah spesimen - Penggunaan botol salah/fiksatif salah	√	
3.2	Spesimen	Masalah spesimen - Bekas spesimen, slaid specimen pecah/bocor etc	√	
3.3	Spesimen	Masalah spesimen - Penyediaan smear yang tidak berkualiti	√	

3.4	Spesimen	Masalah spesimen - Tidak cukup isipadu	√	
3.4.1	Spesimen	Masalah spesimen - Melebihi isipadu yang ditetapkan	√	
3.6	Spesimen	Masalah spesimen - Tiada spesimen	√	
3.7	Spesimen	Masalah spesimen - Clotted/hemolysed/lipaemic/icteric etc	√	
3.7.1	Spesimen	Masalah spesimen - Clotted	√	
3.7.2	Spesimen	Masalah spesimen - Hemolysed	√	
3.7.3	Spesimen	Masalah spesimen - Lipaemic/icteric	√	
3.8	Spesimen	Masalah spesimen - Spesimen diterima melebihi tempoh stabiliti (mengikut jenis ujian)	√	
3.8.1	Spesimen	Masalah spesimen – Spesimen diterima melebihi tempoh stabiliti-Ujian koagulasi yang tempoh 4 jam sebelum terima oleh pihak makmal.	√	
3.9	Spesimen	Masalah spesimen - Spesimen diterima dengan tatacara penghantaran yang salah	√	
4.1	Permohonan	Masalah Permohonan Ujian - Ujian tidak perlu/tiada indikasi (mengikut jenis ujian)	√	
4.2	Permohonan	Masalah Permohonan Ujian - Ujian tidak ditawarkan	√	
4.3	Permohonan	Masalah Permohonan Ujian - Ujian diulang semula kurang daripada tempoh (mengikut jenis ujian)	√	
4.4	Permohonan	Masalah Permohonan Ujian - Ujian diterima di luar waktu penerimaan ujian (mengikut jenis ujian)	√	
4.4.1	Permohonan	Masalah Permohonan Ujian - Ujian diterima di luar waktu penerimaan ujian- ujian IPT, molekular dan cytogenetic study	√	
4.5	Permohonan	Masalah Permohonan Ujian - Ujian dipohon oleh bukan pakar/MO senior (ujian khas)		√
4.5.1	Permohonan	Masalah Permohonan Ujian - Ujian dipohon oleh bukan pakar/MO senior- Perlu tandatangan/ notis telah merujuk Pakar Perubatan Keluarga bagi ujian HB analisis kes antenatal di KK.		√
5	Lain-lain	Lain-lain		

Nota:

- Bagi permohonan ujian yang ditolak dan dibenarkan pembetulan dilakukan untuk Ujian Hematologi dalam “in house” ; spesimen disimpan untuk tempoh seminggu kecuali ujian yang akan dihantar ke makmal rujukan,sila rujuk Pathology Laboratory Handbook Hospital Tuanku Fauziah HTF/PL/BP-5.

- Borang permohonan bagi ujian yang perlu dihantar ke makmal rujukan pada hari yang sama/segera perlu dilengkapkan dan dihantar ke Makmal Hematologi pada/sebelum jam 12.00 tengahari kecuali sampel untuk ujian DNA Analysis dan ujian khas Hemostasis.
- Sampel untuk ujian DNA Analysis dan ujian khas Hemostasis rujukan hanya akan disimpan untuk tempoh masa 2 minggu sahaja sebelum ditolak sekiranya borang tidak lengkap.
- Bagi ujian yang dijalankan daripada sampel yang ditolak dan dibenarkan pembetulan, satu notis makluman pada keputusan perlu dinyatakan: Disclaimer- This result/report was analyzed from rejected sample which the related rejection-criterion/criteria has been corrected by the test requester. Caution interpretation is advised.

APPENDIX 3 : KRITERIA PENOLAKAN SPESIMEN UNIT PATOLOGI KIMIA

Kod	Peringkat	Jenis Penolakan	Tolak	Tolak dan Dibenarkan Pembetulan
1.1	Borang	Tiada Borang	√	
1.2	Borang	Salah Borang		√
1.5	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Nama pesakit	√	
1.5.1	Borang	Borang kosong -tiada sebarang maklumat	√	
1.6	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Nombor identiti/RN Hospital (Sekurang-kurangnya satu)	√	
1.7	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Jantina		√
1.8	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Lokasi		√
1.9	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Umur		√
1.10	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Diagnosis		√
1.11	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Sejarah pesakit (mengikut jenis ujian)		√
1.12	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Permintaan ujian		√
1.13	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Tarikh dan masa		√
1.14	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Nama, tandatangan dan cop pemohon		√
1.17	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - identiti tidak sama dengan rekod terdahulu	√	
1.18	Borang	Tidak membuat pembetulan borang bagi rejection on hold dalam masa ditetapkan		√
2.1	Label	Masalah Label - Tiada label	√	
2.2	Label	Masalah Label - Label tidak lengkap (nama, nombor identiti, jenis ujian)	√	
2.3	Label	Masalah Label - Nama pesakit tidak seperti pada borang permohonan	√	
2.4	Label	Masalah Label - Nombor identiti tidak seperti pada borang	√	
2.5	Label	Masalah Label - Jenis ujian tiada/tidak seperti pada borang		√
3.1	Spesimen	Masalah spesimen - Penggunaan	√	

		botol salah/fiksatif salah		
3.2	Spesimen	Masalah spesimen - Bekas specimen/slaid specimen pecah/bocor etc	√	
3.4	Spesimen	Masalah spesimen - Tidak cukup isipadu	√	
3.4.1	Spesimen	Masalah spesimen - Melebihi isipadu yang ditetapkan	√	
3.6	Spesimen	Masalah spesimen - Tiada spesimen	√	
3.7	Spesimen	Masalah spesimen - Clotted/hemolysed/lipaemic/icteric etc	√	
3.7.1	Spesimen	Masalah spesimen - Clotted	√	
3.7.2	Spesimen	Masalah spesimen – Grossly hemolysed	√	
3.7.3	Spesimen	Masalah spesimen – Spesimen tercemar *(contaminated)*	√	
3.7.4	Spesimen	Masalah spesimen - Mucoid/Jelly	√	
3.8	Spesimen	Masalah spesimen – Spesimen diterima melebihi tempoh stabiliti (mengikut jenis ujian)	√	
3.9	Spesimen	Masalah spesimen - Spesimen diterima dengan tatacara penghantaran yang salah	√	
3.9.1	Spesimen	Masalah spesimen – Spesimen *blood gas* diterima bersama jarum	√	
3.9.2	Spesimen	Masalah spesimen – Spesimen tidak diletakkan bersama ais (bagi ujian blood gas, lactate, ammonia)	√	
4.1	Permohonan	Masalah Permohonan Ujian - Ujian tidak perlu/tiada indikasi (mengikut jenis ujian)	√	
4.2	Permohonan	Masalah Permohonan Ujian - Ujian tidak ditawarkan	√	
4.3	Permohonan	Masalah Permohonan Ujian - Ujian diulang semula kurang daripada tempoh (mengikut jenis ujian)	√	
4.5	Permohonan	Masalah Permohonan Ujian - Ujian dipohon oleh bukan pakar/Pegawai Perubatan yang dibenarkan (Rujuk Lampiran 2)		√
5	Lain-lain	Lain-lain		

APPENDIX 4 : KRITERIA PENOLAKAN SPESIMEN UNIT MIKROBIOLOGI

KOD	PERINGKAT	KRITERIA	TINDAKAN	
			TOLAK	TERIMA & DIBENARKAN PEMBETULAN
1.1	Borang	Tiada Borang	√	
1.2	Borang	Salah Borang		√
1.2.1M	Borang	Salah Borang:TBIS		
1.2.2M	Borang	Salah Borang:Autoimune Request Form		
1.2.3M	Borang	Salah Borang:Primary Immunodeficiency (PID) Request Form		
1.2.4M	Borang	Salah Borang:HLA Request Form		
1.2.5M	Borang	Salah Borang : Bacteriology/Leptospirosis/Brucellosis/Rickettsiosis/Tuberculosis/Mycology		
1.2.6M	Borang	Salah Borang : Virology		
1.2.7M	Borang	Salah Borang : Parasitology		
1.3	Borang	Helaian tidak mencukupi		
1.4	Borang	Ujian dicampuraduk di dalam 1 borang (mengikut jenis ujian)		
1.4.1M	Borang	Ujian dicampuraduk di dalam 1 borang : RPR		
1.5	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Nama pesakit	√	
1.5.1	Borang	Borang kosong -tiada sebarang maklumat	√	

1.6	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Nombor identiti/RN Hospital (Sekurang-kurangnya satu)	√	
1.7	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Jantina		√
1.8	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Lokasi		√
1.9	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Umur		√
1.10	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Diagnosis		√
1.11	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Sejarah pesakit (mengikut jenis ujian)		√
1.12	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Permintaan ujian	√	
1.13	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Tarikh dan masa		√
1.14	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - Nama, tandatangan dan cop pemohon		√
1.17	Borang	Borang tidak lengkap/tidak jelas/tidak tepat - identiti tidak sama dengan rekod terdahulu	√	
1.18	Borang	Tidak membuat pembetulan borang bagi rejection on hold dalam masa ditetapkan		√
2.1	Label	Masalah Label - Tiada label	√	
2.2	Label	Masalah Label - Label tidak lengkap (nama, nombor identiti, jenis ujian)	√	

2.3	Label	Masalah Label - Nama pesakit tidak seperti pada borang permohonan	√	
2.4	Label	Masalah Label - Nombor identiti tidak seperti pada borang	√	
2.5	Label	Masalah Label - Jenis ujian tiada/tidak seperti pada borang	√	
3.1	Spesimen	Masalah spesimen - Penggunaan botol salah/fiksatif salah	√	
3.2	Spesimen	Masalah spesimen - Bekas specimen/slaid specimen pecah/bocor etc	√	
3.2.1M	Spesimen	Masalah spesimen - Spesimen tumpah	√	
3.2.2M	Spesimen	Masalah spesimen - Slaid (smear) pecah	√	
3.3	Spesimen	Masalah spesimen - Penyediaan smear yang tidak berkualiti	√	
3.4	Spesimen	Masalah spesimen - Tidak cukup isipadu	√	
3.5	Spesimen	Masalah spesimen - Salah spesimen	√	
3.6	Spesimen	Masalah spesimen - Tiada spesimen	√	
3.7	Spesimen	Masalah spesimen - Clotted/hemolysed/lipaemic/icteric etc	√	
3.7.1M	Spesimen	Masalah spesimen - Clotted	√	
3.7.2M	Spesimen	Masalah spesimen – Grossly hemolysed	√	
3.7.3M	Spesimen	Masalah spesimen – Bloody	√	
3.7.4M	Spesimen	Masalah specimen – Mucoid/Jelly-like	√	

3.8	Spesimen	Masalah spesimen – Spesimen diterima melebihi tempoh stabiliti (mengikut jenis ujian)	√	
3.9	Spesimen	Masalah spesimen - Spesimen diterima dengan tatacara penghantaran yang salah	√	
4.1	Permohonan	Masalah Permohonan Ujian - Ujian tidak perlu/tiada indikasi (mengikut jenis ujian)	√	
4.2	Permohonan	Masalah Permohonan Ujian - Ujian tidak ditawarkan	√	
4.3	Permohonan	Masalah Permohonan Ujian - Ujian diulang semula kurang daripada tempoh (mengikut jenis ujian)	√	
4.5	Permohonan	Masalah Permohonan Ujian - Ujian dipohon oleh bukan pakar/MO senior (ujian khas)		√
5	Lain-lain	Lain-lain		

Jenis permohonan yang diterima dan dibenarkan pembetulan

1. CSF (TRO meningitis)-ujian diteruskan tetapi keputusan hanya boleh dikeluarkan setelah borang pembetulan diterima.
2. Semua pembetulan perlulah dibuat dalam tempoh 24 jam selepas spesimen diterima dalam makmal.

Jenis permohonan yang perlu dirujuk kepada Pakar Mikrobiologi /Pegawai Sains

1. Sampel kanak-kanak (<2 tahun)
2. Sampel kritikal (contoh : CSF ,tissue dari OT)

APPENDIX 5 : KRITERIA PENOLAKAN SPESIMEN UNIT HISTOSITOPATOLOGI

Senarai ini adalah tambahan kepada senarai kriteria penolakan spesimen yang dinyatakan di dalam QP-HTF/PL/09 (Prosedur Pengendalian Spesimen) dan HTF/PL/BP-5 Buku Panduan Makmal Patologi Hospital Tuanku Fauziah.

1. Penghantaran Borang Yang Salah/Tidak Mencukupi/Tidak Jelas/Tiada Borang/Tatacara yang Salah
    a. Borang ujian Urgent/STAT digunasamakan dengan ujian lain.

2. Borang Tidak Lengkap/Tidak Jelas (dengan sekurang-kurangnya perkara dibawah wajib ada)
    a. Maklumat pesakit
        i. Nama penuh pesakit
        ii. Nombor identiti (nombor kad pengenalan, passport atau setaraf dengannya. Jika tiada nyatakan tiada/non available (NA))
        iii. Nombor RN Hospital (jika Pesakit Dalaman. Nyatakan tiada/non available (NA) jika pesakit luar atau pesakit dari jabatan kecemasan. Salah satu, sama ada nombor kad pengenalan, nombor passport, nombor RN atau apa sahaja nombor pengenalan yang setaraf dengannya mesti ada. Jika tiada nyatakan sebab kenapa tiada nombor pengenalan diri pada ruangan ‘History’.
        iv. Jantina
        v. Umur atau apa-apa secara tidak langsung menunjukkan umur pesakit di dalam borang.
        vi. Nama Wad/Klinik
    b. Diagnosis dan sejarah pesakit di ruangan ‘Diagnosis’ dan di ruangan ‘History’.
    c. Permintaan ujian di ruangan ‘Jenis Ujian’.
    d. Butiran tarikh dan masa pengambilan spesimen diambil di ruangan ‘Tarikh’ dan ‘Masa’.
    e. Maklumat pemohon
        i. Nama pegawai perubatan dinyatakan dengan jelas
        ii. Tandatangan dan cop rasmi pegawai perubatan yang memohon

3. Label Pada Botol/Tiub/Slide Spesimen yang Tidak Lengkap/Tidak Sama Pada Borang (Sekurang-kurangnya perkara dibawah mesti ada)
    a. Nama pesakit seperti pada borang permohonan. Namun begitu, bagi spesimen yang ruang menulisnya terhad seperti slaid Pap Smear, Tzanck’z smear dan sebagainya, nama pendek pesakit dibolehkan dengan syarat kebanyakan dan keunikkan nama pesakit dinyatakan.
    b. Nombor RN/Nombor identiti pesakit seperti pada borang permohonan. Jika tiada, nyatakan tiada/non available (NA).
    c. Jenis Ujian seperti pada borang permohonan. Maklumat ini dibolehkan berbeza dengan yang tertulis pada borang asalkan ia bermaksud ujian HPE dan/atau tidak bercanggah dengan maksud/perkara/benda yang tertulis pada borang permohonan.

4. Bagi kod 5 Lain-lain, sebab penolakan perlu ditambah atau dijelaskan untuk tujuan rekod. Contoh di bawah kod Lain-lain adalah tiada pembetulan dilakukan di dalam tempoh 24 jam, tiada/kehabisan reagen, peralatan rosak dan sebagainya.

APPENDIX 6 : ARAHAN PENGAMBILAN SPESIMEN MSU DAN KAHAK UNTUK C&S KEPADA PESAKIT

SPESIMEN AIR KENCING (MSU)

- SPESIMEN YANG TERBAIK ADALAH SPESIMEN DI AWAL PAGI
- BASUH BAHAGIAN SULIT DENGAN SABUN, KEMUDIAN LAPKAN DENGAN TISU ATAU KAIN BERSIH SEHINGGA KERING.
- KUMPULKAN AIR KENCING DI PERTENGAHAN SEMASA MEMBUANG AIR KECIL KE DALAM BEKAS YANG TELAH DIBERI (MID STREAM URINE).
- TUTUP BEKAS DENGAN RAPAT DAN CATATKAN MASA AIR KENCING DIKUMPUL.
- MASUKKAN KE DALAM BEKAS PLASTIK.
- HANTAR SPESIMEN KE MAKMAL DALAM MASA 1 JAM.
- JIKA TEMPOH DIJANGKAKAN > 1 JAM, LETAKKAN SPESIMEN KE DALAM BEKAS MENGANDUNGI AIS.

KAHAK UNTUK C& S

1. SPESIMEN YANG TERBAIK ADALAH YANG DIAMBIL DI AWAL PAGI.
2. BATUK DENGAN KUAT UNTUK DAPATKAN KAHAK (BUKAN AIR LIUR)
3. MASUKKAN KE DALAM BEKAS DAN TUTUP DENGAN RAPAT.

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