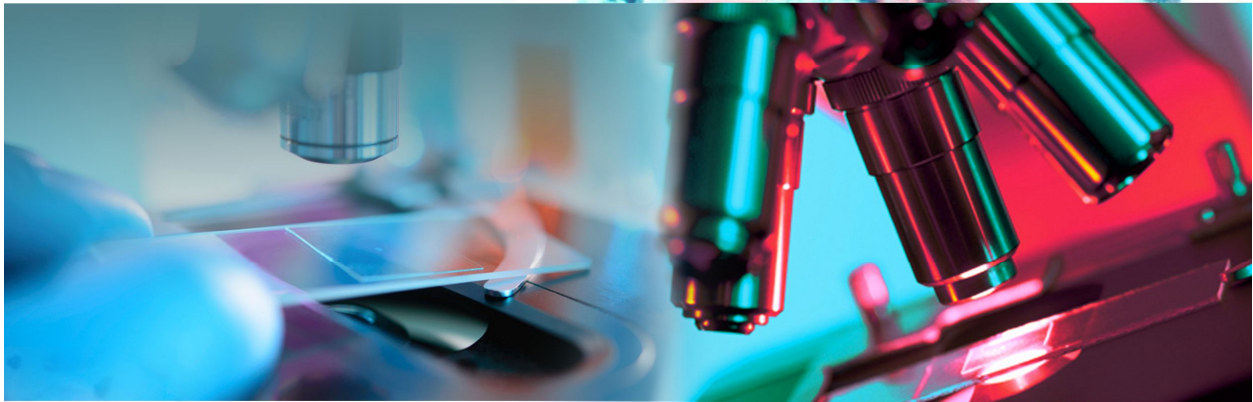


HSAJB **PATHOLOGY SERVICES** **HANDBOOK**

4th Edition 2019



**Ministry of Health
Malaysia**

**Department of Pathology
Hospital Sultanah Aminah Johor Bahru (HSAJB)
Jalan Abu Bakar Sultan
80100 Johor Bahru, Johor.**

FOREWORD



I am jubilant that the Department of Pathology has successfully published the fourth edition of their pathology Services Handbook. This comprehensive handbook has proved to be a crucial tool which focuses on the test schedules and type of tests available across various disciplines of Pathology Department.

I certainly hope that this handbook would be able to propel our medical service towards the betterment of our diagnostic services, which aim to provide quality and accurate results efficiently and thus having a positive impact on patient care, management and prognosis.

I would like to extend my warmest congratulations to the Head of Department of Pathology and the staff upon their successful publication of the updated guidelines. I also hope that this handbook would come in handy for optimal usage of the laboratory in the foreseeable future.

A handwritten signature in black ink, consisting of a large, stylized 'A' followed by a horizontal line.

DR. AMAN BIN RABU
Director
Hospital Sultanah Aminah
Johor Bahru, Johor

FOREWORD

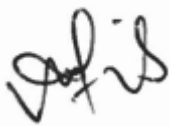


The pathology service handbook is the product of the hardwork and dedication shown by the staff of department of pathology. My congratulations and thanks to all the members of the editorial board and head of their respective units for their tireless effort in completing the 4th edition of 2019 handbook.

The updated contents in this edition include the list of tests offered, specimen collection, specimen transportation and result retrieval at the Department of Pathology Hospital Sultanah Aminah.

Tests that are not available in the department will be outsourced to IMR or other centers under KKM after prior arrangements and approval obtained from the respective heads.

In addition to that, this book will be a significant source of aid for the clinicians and other users including the District Hospitals and Health Centers in the State of Johor. Hopefully we would be able to achieve a new milestone in healthcare services.

A handwritten signature in black ink, appearing to read 'Noraída'.

DR NORAIIDA BINTI KHALID
Senior Consultant Pathologist (Anatomic Pathology) and
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Hospital Sultanah Aminah,
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4TH EDITION 2019
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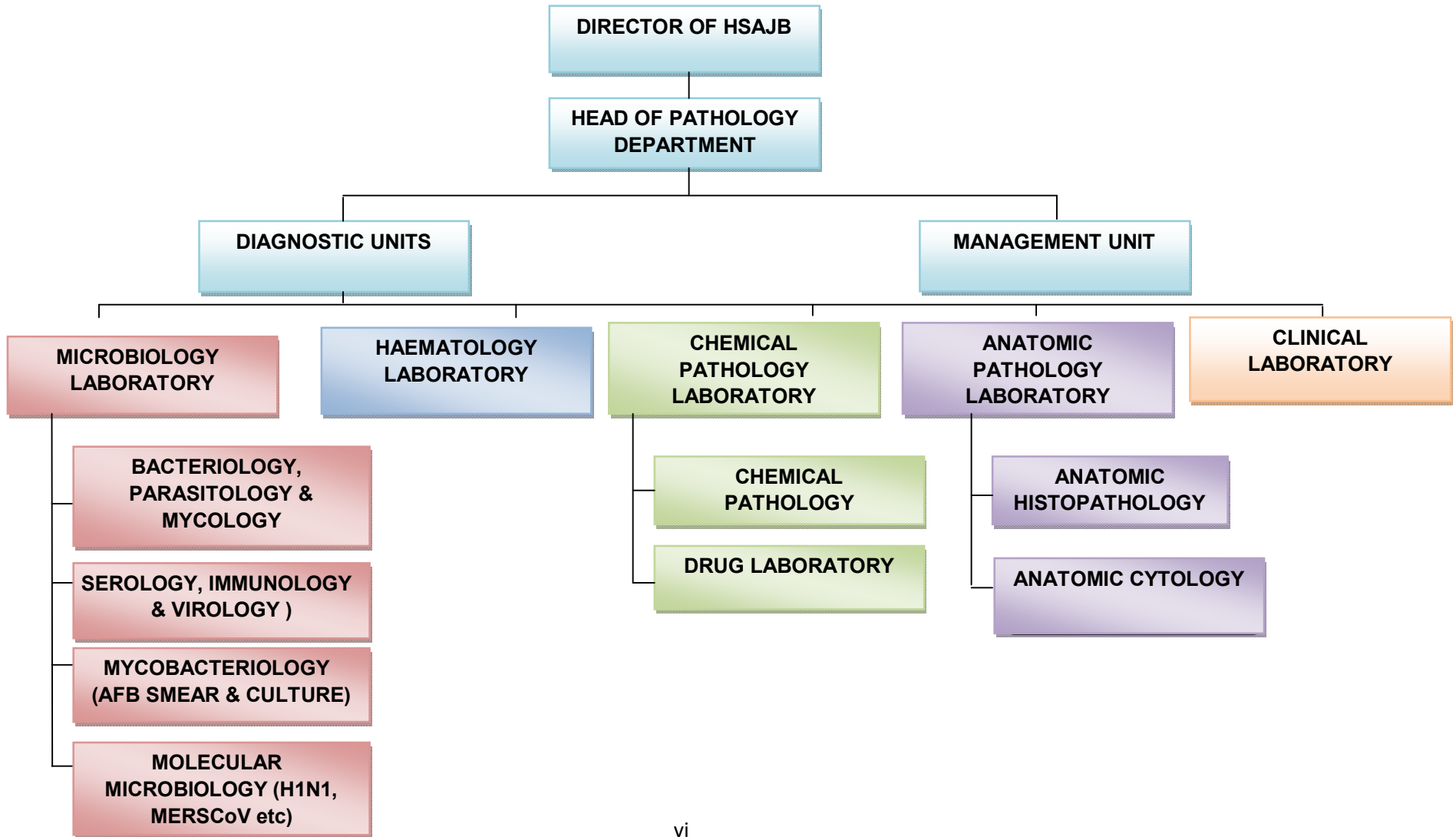
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ORGANISATION CHART

DEPARTMENT OF PATHOLOGY HOSPITAL SULTANAH AMINAH JOHOR BAHRU



INTRODUCTION

The Pathology Department is a clinical support department with the role of performing routine and special laboratory tests, analysis and investigations of specimens from patients and clients with the purpose to aid clinicians and specialists in the diagnosis of diseases and thus giving assistance in the treatment and healing process.

VISION

Providing immediate and accurate clinical service to all clients with regards to patient care management

MISSION

- To provide clinical laboratory service to all clients according to excellent practices by using appropriate laboratory technology.
- To ensure all laboratory tests are done according to documented procedures.
- To assure that all laboratory staff are competent, prompt and adhere to standard laboratory policies and procedures as documented in the laboratory quality manual and all relevant documents at all times.
- To provide laboratory quality management system according to ISO/IEC 17025:1999 and ISO 15189:2014 standards.

OBJECTIVES

- To provide efficient, reliable and accurate diagnostic services for HSAJB and all Clinical and Health Departments in the state of Johor.
- To provide pathology consultancy service for all Clinical Departments and State Health department.
- To provide tertiary consultancy services for available subspecialities at national level.
- To provide excellent pathology services as the State's Laboratory Reference Centre.
- To provide quality training for all medical staff from public hospitals, local and foreign institutions of higher learning.

CLIENT CHARTER

- To provide our clients with clear & complete information on all laboratory tests.
- To process our specimens with recommended test procedures.
- To perform laboratory tests with accuracy, efficiency, reproducibility and utmost care by using approved laboratory methods and state of the art laboratory technology.
- To run STAT/URGENT samples immediately within the stipulated turn-around time.
- To handle client's results and information with strict confidentiality.

SCOPE OF SERVICE

The department of pathology comprised 5 major laboratories which are listed as follows:

- Medical Microbiology Laboratory (Bacteriology, Serology & Immunology, Mycobacteriology and Molecular)
- Anatomic Pathology Laboratory (Histopathology and Cytology)
- Haematology Laboratory
- Chemical Pathology Laboratory & Drug Laboratory
- Clinical Laboratory

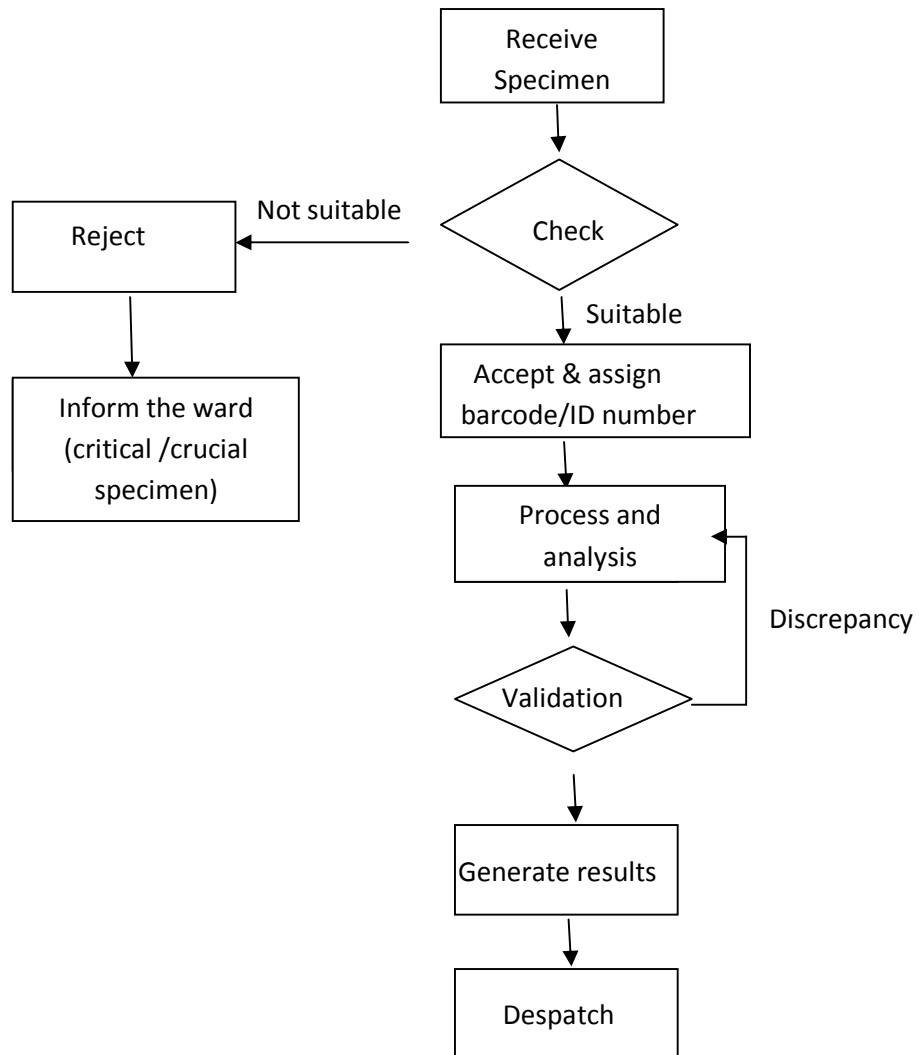
OPERATIONAL POLICY

Office hours :	Sunday – Wednesday	8.00 am – 5.00 pm
	Thursday	8.00 am – 3.30 pm

On call duties	:Sunday – Wednesday	5.00 pm – 8.00 am
	Thursday	3.30 pm - 8.00 am
	Friday - Saturday	8.00 am – 8.00 am
	& Public Holiday	(Next Morning)

(Chemical Pathology, Medical Microbiology and Haematology Laboratories)

GENERAL WORKFLOW FOR HANDLING SPECIMEN IN PATHOLOGY DEPARTMENT



THE LIST OF UNITS/LABORATORIES TELEPHONE NUMBER(S):

NO	UNIT /LABORATORY	EXTENSION NO/SPEED DIAL
1	Head of Department	2678 /6218
2	Pathology administration	2631
3	Quality Manager	2681
4	Head of Chemical Pathology Unit	2633
5	Chemical Pathology Laboratory	2630
6	Drug Laboratory	3522
7	Head of Microbiology Unit	2660
8	Bacteriology Laboratory	2629
9	Serology & Immunology Laboratory	2363
10	Mycobacteriology Laboratory (TB Lab)	2913
11	Molecular Laboratory	2222/2233
12	Head of Haematology Unit	2506/6207
13	Haematology Laboratory	2362/2937
14	Head of Anatomic Pathology Unit	2941/6212
15	Histopathology Laboratory	2364
16	Histopathologist in-charge of Cytology Laboratory	2681
17	Cytology Laboratory	2666/2795
18	Head of Clinical Laboratory Unit	3473/6338
19	Clinical Laboratory	2618

CHEMICAL PATHOLOGY UNIT

**LIST OF TESTS OFFERED AT CHEMICAL PATHOLOGY LABORATORY, HSAJB
(24 HOURS @ 7 DAYS/WEEK)**

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
ROUTINE BIOCHEMISTRY							
1.	Alanine Transaminase (ALT)	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)	5 working days	
2.	Albumin	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent)		
		CSF	Sterile container	2 ml	1 hour (urgent) 5 hours (routine)	1 hour (urgent) 5 hours (routine)	
		Random Urine	Universal container	10 ml	5 hours (routine)	5 working days	
3.	Alkaline Phosphatase (ALP)	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent)		

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
4.	Ammonia	Plasma	EDTA tube Paediatric EDTA tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)	1 hour (urgent)	Must be sent immediately in ice bath
5.	Amylase	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)	5 working days	
		Random Urine	Universal container	5-10 ml	1 hour (urgent) 5 hours (routine)		
6.	Arterial Blood Gases	Whole Blood	Heparinized syringe	1-2 ml	30 Minutes	-	Must be sent immediately in ice bath
7.	Aspartate Transaminase (AST)	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)	5 working days	
8.	Bilirubin (direct)	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)		Protect from light
9.	Bilirubin (total)	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)		Protect from light

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
10.	Calcium, total	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)	5 working days	
		Urine (Random urine / 24 hour urine specimen)	Universal container or 24hour urine container	5 - 10 ml(random urine) or ≥500ml (24 hour urine specimen)	5 hours (routine)		Volume 24 hour urine ≥500ml, except for ESRD and Paediatric case
11.	Chloride	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)	5 working days	
		Urine (Random urine / 24 hour urine specimen)	Universal container or 24hour urine container	5 - 10 ml(random urine) or ≥500ml (24 hour urine specimen)	5 hours (routine)		Volume 24 hour urine ≥500ml, except for ESRD and Paediatric case
12.	Cholesterol, total	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	5 hours (routine)		
13.	Creatine Kinase	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)		

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
14.	Creatinine	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)	5 working days	
		Urine (Random urine / 24 hour urine specimen)	Universal container or 24hour urine container	5 - 10 ml(random urine) or ≥500ml (24 hour urine specimen)	5 hours (routine)		
15.	C Reactive Protein (CRP)	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	5 hours (routine)		
16.	Gamma Glutamyl Transferase	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	5 hours (routine)		
17.	Glucose	Plasma	Sodium Fluoride tube. Paediatric patient: Sodium Flouride tube	5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)		Fasting and 2 hours post prandial sampling in OGTT
		CSF	Sodium Fluoride tube or Sterile container	2 ml	1 hour (urgent) 5 hours (routine)	1 hour (urgent) 5 hours (routine)	If CSF samples collected in sterile container, please send immediately to lab. A blood sample (plasma glucose) should be sent at the same time.

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
18.	HDL Cholesterol	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	5 hours (routine)	5 working days	
19.	Lactate	Plasma	Sodium Fluoride tube. Paediatric patient: Sodium Flouride tube	5 ml (adult), 1 ml (paeds)	1 hour (urgent)	1 hour (urgent)	Must be sent immediately in ice bath
		CSF	Sodium Fluoride tube or Sterile container	2 ml	1 hour (urgent)	1 hour (urgent)	
20.	Lactate Dehydrogenase	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)	5 working days	
21.	LDL Cholesterol (calculated)	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	5 hours (routine)	5 working days	Calculated LDL is not valid when TG > 4.5 mmol/L
22.	Magnesium	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)	5 working days	
		Urine (Random urine / 24 hour urine specimen)	Universal container or 24hour urine container	5 - 10 ml(random urine) or ≥500ml (24 hour urine specimen)	5 hours (routine)		Volume 24 hour urine ≥500ml, except for ESRD and Paediatric case

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK	
23.	Osmolality	Serum	Plain tube	3-5 ml (adult), 1 ml(paeds)	5 hours (routine)	5 working days		
		Random Urine	Universal container	10 ml				
24.	Phosphate Inorganic	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)		5 working days	
		Urine (Random urine / 24 hour urine specimen)	Universal container or 24hour urine container	5 - 10 ml(random urine) or ≥500ml (24 hour urine specimen)	5 hours (routine)			Volume 24 hour urine ≥500ml, except for ESRD & Paediatric case
25.	Potassium	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)			5 working days
		Urine (Random urine / 24 hour urine specimen)	Universal container or 24hour urine container	5 - 10 ml(random urine) or ≥500ml (24 hour urine specimen)	5 hours (routine)		Volume 24 hour urine ≥500ml, except for ESRD and Paediatric case	

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
26.	Protein, Total	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)	5 working days	
		CSF	Sterile container	2 ml	1 hour (urgent) 5 hours (routine)	1 hour (urgent) 5 hours (routine)	
		Urine (Random urine / 24 hour urine specimen)	Universal container or 24hour urine container	5 - 10 ml(random urine) or ≥500ml (24 hour urine specimen)	5 hours (routine)	5 working days	Volume 24 hour urine ≥500ml, except for ESRD and Paediatric case
27.	Sodium	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)	5 working days	
		Urine (Random urine / 24 hour urine specimen)	Universal container or 24hour urine container	5 - 10 ml(random urine) or ≥500ml (24 hour urine specimen)	5 hours (routine)		Volume 24 hour urine ≥500ml, except for ESRD and Paediatric case

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
28.	Triglycerides	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	5 hours (routine)	5 working days	
29.	Troponin T (high sensitive)	Plasma	Lithium heparin tube	3-5 ml (adult)	1 hour (urgent)	1 hour (urgent)	Requesting specialist signature is required.
30.	Urea	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	1 hour (urgent) 5 hours (routine)	5 working days	
		Urine (Random urine / 24 hour urine specimen)	Universal container or 24hour urine container	5 - 10 ml(random urine) or ≥500ml (24 hour urine specimen)	5 hours (routine)		Volume 24 hour urine ≥500ml, except for ESRD and Paediatric case
31.	Uric Acid	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	5 hours (routine)		
		Urine (Random urine / 24 hour urine specimen)	Universal container or 24hour urine container	5 - 10 ml(random urine) or ≥500ml (24 hour urine specimen)	5 hours (routine)	Volume 24 hour urine ≥500ml, except for ESRD and Paediatric case	
32.	Urine Pregnancy Test	Random Urine	Universal container	5-10 ml	5 hours (routine)		Fresh morning urine is preferred

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
33.	Microalbumin (quantitative) / Albumin Creatinine Ratio	Random urine	Universal container	5-10 ml	5 hours (routine)	5 working days	First morning urine is preferred
34.	Creatinine Clearance	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	5ml blood and ≥ 500ml (24-Hour urine specimen) 5 - 10 ml or ≥500ml (24 hour urine specimen)			Calculated value. Please refer Laboratory Investigation Guidelines for CKD and utilization of eGFR in Adults 2012.
		Urine (24 hour urine specimen)	Universal container or 24hour urine container				Calculated value - urine sample must be accompanied by serum. Please refer Laboratory Investigation Guidelines for CKD and utilization of eGFR in Adults 2012.
35.	Estimated Glomerular Filtration rate (eGFR)	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)			Volume 24 hour urine ≥500ml, except for ESRD and Paediatric case
36.	Protein Creatinine Index	Random urine	Universal container	10 ml	Calculated value. Please refer Laboratory Investigation Guidelines for CKD and utilization of eGFR in Adults 2012.		

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
METABOLIC							
37.	Iron, Total	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	5 hours (routine)	5 working days	
38.	Iron binding capacity (TIBC, UIBC)	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)			
CLINICAL TOXICOLOGY							
39.	Paraquat	Urine (Random)	Universal container	10 ml	1 hour (urgent)	1 hour (urgent)	
40.	Acetaminophen (Paracetamol)	Serum	Plain tube	3-5 ml (adult), 1 ml (paeds)			
41.	Salicylate	Serum	Plain tube	3-5 ml (adult), 1 ml (paeds)			
42.	Cholinesterase	Serum / Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)			

LIST OF CHEMICAL PATHOLOGY TESTS OFFERED DURING OFFICE HOURS ONLY

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT & HEALTH CLINIC)	REMARK
BIOCHEMISTRY							
1.	Occult Blood (Qualitative)	Stool	Stool Container	1 g	5 hours (routine)	5 working days	
2.	Reducing Sugar	Urine	Universal container	10 ml	5 hours (routine)		
		Stool	Stool Container	1 gram			
3.	Myoglobin Urine (Qualitative)	Random Urine	Universal container	5-10 ml	1 hour (urgent) 5 hours (routine)		Fresh sample. Transport immediately.
ENDOCRINE							
4.	Cortisol	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	3 working days	5 working days	Please consult Chemical Pathologist for urgent request
5.	Follicle Stimulating Hormone (FSH)						Sample taken at day 2-5 of menses is preferable (for fertility test)
6.	Luteinising Hormone (LH)						Sample taken at day 2-5 of menses is preferable (for fertility test)
7.	Macroprolactin				1 month	1 month	

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT & HEALTH CLINIC)	REMARK
8.	Estradiol	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	3 working days	5 working days	
9.	Prolactin						
10.	Progesterone						Sample taken at day 21 of menses is preferable (for fertility test)
11.	Triiodothyroxine, Free (FT3)						Test can only be requested for T3 toxicosis diagnosis and monitoring. Otherwise, it is a reflex testing by performing lab
12.	Thyroxine, Free (FT4)						Please consult Chemical Pathologist for urgent request
13.	Testosterone						

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
14.	Thyroid Stimulating Hormone (TSH)	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	3 working days	5 working days	Please consult Chemical Pathologist for urgent request
15.	ACTH stimulation test / Synacthen test	Refer specific test(cortisol)	Refer specific test	Refer specific test			Indication(s): For diagnosis of primary hypoadrenalism. Test(s) required: cortisol (timed sample collection, pre and post tetracosactrin). Steroid therapy should be withheld for 24 hours before testing.
16.	Dexamethasone Supression test (DST), Low Dose	Refer specific test (Cortisol)	Refer specific test	Refer specific test			Indication(s): For initial testing for Cushing's syndrome. Low Dose DST 2mg/d for 48 Hours is preferable test for suspected Pseudo-Cushing's syndrome. Test(s) required: cortisol (first day and 3rd day post dexamethasone)

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
17.	Dexamethasone Supression test (DST), High Dose	Refer specific test (Cortisol)	Refer specific test	Refer specific test	3 working days	5 working days	Indication(s): Help to distinguish Cushing's disease from ectopic ACTH. Test(s) required: cortisol (first day and 3rd day post dexamethasone)
18.	Dexamethasone Supression test (DST), Overnight Low Dose	Refer specific test (Cortisol)	Refer specific test	Refer specific test			Indication(s): For initial testing for Cushing's syndrome. Test(s) required: cortisol (baseline and post dexamethasone)
19.	Water Deprivation test	Refer specific test (Serum and Urine Osmolality)	Refer specific test	Refer specific test			Indication(s): To establish the underlying cause for polydipsia and polyuria and to distinguish between patients with central diabetes insipidus (DI), nephrogenic DI, and psychogenic polydipsia. Avoid test in clinically dehydrated patient. Test(s) required: Timed collection of serum and urine osmolality.

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
METABOLIC							
20.	B12, Vitamin	Serum /Plasma	Plain tube / Lithium heparin tube Paediatric tube	3-5 ml (adult), 0.5 - 1 ml (paeds)	3 working days	5 working days	
21.	Ferritin	Serum/ Plasma	Plain tube or Lithium heparin tube Paediatric tube				Ferritin is also an acute phase reactant and can be elevated in patients with chronic inflammation, infection and malignancy
22.	Folate	Serum / Plasma	Plain tube or Lithium heparin tube Paediatric tube				Please consult Chemical Pathologist for urgent request
23.	HbA1c	Whole Blood	K2 EDTA tube				

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
TUMOUR MARKERS							
24.	Alpha Feto Protein (AFP)	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	3 working days	5 working days	Requesting specialist's signature is required
25.	Beta Human Chorionic Gonadotropin (BhCG)						Requesting specialist's signature is required Please consult Chemical Pathologist for urgent request
26.	Cancer Antigen 125 (CA125)						Requesting specialist's signature is required
27.	Carcinoembryonic Antigen (CEA)						
28.	Prostate Specific Antigen, Total						

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
PROTEIN AND PROTEOMICS							
29.	Complement (C3)	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	3 working days	5 working days	
30.	Complement (C4)						
31.	Immunoglobulin A (IgA)						
32.	Immunoglobulin G (IgG)						
33.	Immunoglobulin M (IgM)						
34.	Rheumatoid Factor (RF)						

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
THERAPEUTIC DRUG MONITORING							
35.	Amikacin	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	5 hours (office hour)	5 hours (office hour)	Use TDM form
36.	Carbamazepime						
37.	Cyclosporin	Whole Blood	K2 EDTA Tube				
38.	Digoxin	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube				
39.	Gentamicin						
40.	Methotrexate						

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
41.	Phenobarbital	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube	3-5 ml (adult), 1 ml (paeds)	5 hours (office hour)	5 hours (office hour)	Use TDM form
42.	Phenytoin						
43.	Tacrolimus	Whole Blood	K2 EDTA Tube				
44.	Theophylline	Serum or Plasma	Plain tube or Lithium heparin tube Paediatric tube				
45.	Valproic Acid						
46.	Vancomycin						

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT (HSAJB)	LTAT (DISTRICT AND HEALTH CLINIC)	REMARK
DRUG OF ABUSE							
47.	Amphetamine Type Stimulants (ATS), screening & confirmation	Random urine	Sterile Container	30 ml	Not more than 7 working days	Not more than 7 working days	Borang Permintaan Ujian Pengesanan Dadah Dalam Air Kencing
48.	Cannabinoids (screening) & THC (confirmation)						
49.	Codeine						
50.	Opiate (screening) & Morphine (confirmatory)						

LIST OF CHEMICAL PATHOLOGY TESTS OFFERED BY THE REFERENCE LABORATORIES (RL)

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
ROUTINE BIOCHEMISTRY								
1.	Ketone	Serum	Plain tube	5 ml (adult), 1 ml (paeds)	Paediatric Lab, Paediatric Institute HKL	5 working days	Monday and Wednesday	Centrifuge the sample at 3500 RPM at 5 minutes and separate the serum. Transport in dry ice as soon as possible to the lab
2.	Hemoglobin	Random Urine	Universal container	10 ml	Biochemistry unit, IMR			
3.	Bile acid	Serum	Plain tube	5 ml (adult), 1 ml (paediatric)	Hospital Selayang			
ENDOCRINE								
4.	17 Hydroxy Progesterone (17-OHP)	Serum	Plain tube (serum), Paediatric patient: Paediatric tube	2-3 ml (adult), 1 ml (paediatric)	Diabetes and Endocrine Unit (CDNRC), IMR	20 days	Monday and Wednesday	
5.	Adrenocorticotropic Hormone (ACTH)	Plasma	K2 EDTA tube in ice, Paediatric patient: K2 EDTA Paediatric tube in ice	2-3 ml (adult), 1 ml (paediatric)	HKL	5 working days		Send specimen in ice immediately to lab. Cortisol level should be provided with the request.

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
6.	Aldosterone	Plasma	K2 EDTA tube, Paediatric patient : K2 EDTA Paediatric tube	3 ml (adult), 1 ml (paediatric)	Hospital Putrajaya	1 month	Monday and Wednesday	Hypokalemia and certain drugs need to be avoided. Clinical history and drug history are MANDATORY. Test should be requested by Specialist or Endocrine Specialist only.
7.	Calcitonin	Serum	Plain tube , Paediatric patient: Paediatric tube	2-3 ml (adult), 1 ml (paediatric)	IKN, Putrajaya	3 working days		Fasting sample is preferable.
8.	C-Peptide	Serum	Plain tube , Paediatric patient: Paediatric tube	2-3 ml (adult), 1 ml (paediatric)	HKL	5 working days		Glucose result should be provided with the request.
9.	Dehydroepi- androsterone Sulphate (DHEAS)	Serum	Plain tube , Paediatric patient: Paediatric tube	2-3 ml (adult), 1 ml (paediatric)	HKL	20 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
10.	Growth Hormone (Somatotrophin)	Serum	Plain tube , Paediatric patient: Paediatric tube	2-3 ml (adult), 1 ml (paediatric)	Hospital Putrajaya	20 days	Monday and Wednesday	
11.	Insulin-like Growth Factor 1 (IGF-1)	Serum	Plain tube , Paediatric patient: Paediatric tube	2-3 ml (adult), 1 ml (paediatric)	Diabetes and Endocrine Unit (CDNRC), IMR	20 days		Fasting sample is preferable
12.	Insulin	Serum	Plain tube , Paediatric patient: Paediatric tube	2-3 ml (adult), 1 ml (paediatric)	HKL	10 working days		Glucose level should be provided with the request
13.	Parathyroid Hormone, Intact (iPTH)	Plasma	K2 EDTA tube in ice, Paediatric sample: K2 EDTA Paediatric tube in ice	2-3 ml (adult), 1 ml (paediatric)	HKL and Endocrine Unit (CDNRC), IMR (3 rd gen iPTH)	20 days		Send sample immediately to the lab. Fasting sample is preferable.

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
14.	Procalcitonin	Serum	Plain tube, Paediatric patient: Paediatric tube	2-3 ml (adult), 1 ml (paediatric)	IKN , Putrajaya	3 working days	Monday and Wednesday	Please consult Chemical Pathologist at National Cancer Institute for the request.
15.	Renin	Plasma	K2 EDTA tube, Paediatric patient:K2 EDTA Paediatric tube	2-3 ml (adult), 1 ml (paediatric)	Hospital Putrajaya	1 month		Hypokalemia and certain drugs need to be avoided. Clinical history and drug history are MANDATORY. Test should be requested by Specialist or Endocrine Specialist only
16.	Sex Hormone Binding Globulins (SHBG)	Serum	Plain tube, Paediatric patient: Paediatric tube	2-3 ml (adult), 1 ml (paediatric)	Hospital Putrajaya	15 days		Testosterone result needs to be provided if Free Androgen Index (FAI) report is required.
17.	Thyroglobulin	Serum	Plain tube, Paediatric patient: Paediatric tube	2-3 ml (adult), 1 ml (paediatric)	Diabetes and Endocrine Unit (CDNRC), IMR	20 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
18.	Catecholamines, Urine	24-hour urine specimen	24-hour urine container with 10 mls of 25% HCL	Minimum urine volume: 500 mls (adult)	Hospital Putrajaya	1 month	Monday and Wednesday	<p>1. Instruct patient to abstain from eating banana, coffee, pineapple and walnut one day prior to and during the 24 hour urine collection.</p> <p>2. Certain drug such as Alpha-2-agonist, calcium channel blockers, ACE inhibitors, Bromocriptine, Methyldopa, Monoamine oxidase inhibitors, Alpha blockers and beta blockers, phenothiazines and tricyclic anti depressants alter metabolism of catecholamine. It is advisable to stop these medications at least 48 hours prior to urine sampling.</p> <p>3. Advise patient to avoid stress, exercise and smoking prior to and during urine collection.</p> <p>4. Incomplete 24 hours urine collection may affect validity of the results</p> <p>Rejection criteria:</p> <p>i) inadequate urine collection (Adult < 500 ml)</p> <p>ii) Urine pH >5.</p> <p>iii) No specialists' signature and stamp - the test can be requested only by Specialist.</p>

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
19.	Cortisol, Free, Urine	24-hour urine specimen	24-hour urine container without preservative	Minimum urine volume: 500 mls (adult)	Hospital Putrajaya	7 days	Monday and Wednesday	<p>1. Incomplete 24 hours urine collection may affect validity of the results</p> <p>2. Patients' hydration status and renal disease also influence urine cortisol excretion.</p> <p>3. Cortisol production and therefore urinary excretion may increase during stress, surgery, acute illness and trauma.</p> <p>4. The use of any glucocorticoid preparation should be avoided during the collection of urine.</p>
METABOLIC								
20.	Anti-Glutamic acid decarboxylase (GAD)	Serum	Plain tube, Paediatric patient: Paediatric tube	5 ml (adult), 3 ml (paediatric)	AIRC, IMR	14 days	Monday and Wednesday	Anti-Glutamic acid decarboxylase (GAD) is part of Diabetes antibody panel
21.	Anti islet cells (ICA)	Serum	Plain tube, Paediatric patient: Paediatric tube	5 ml (adult), 3 ml (paediatric)	AIRC, IMR	14 days		Anti islet cells (ICA) is part of Diabetes antibody panel

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
METABOLIC								
22.	Anti-insulin G	Serum	Plain tube, Paediatric patient: Paediatric tube	5 ml (adult), 3 ml (paediatric)	AIRC, IMR	14 days	Monday and Wednesday	Anti-insulin G is part of Diabetes antibody panel
23.	Anti-Insulinoma-Associated Antigen 2 (IA2)	Serum	Plain tube, Paediatric patient: Paediatric tube	5 ml (adult), 3 ml (paediatric)	AIRC, IMR	14 days		Anti-insulinoma associated antigen 2 (IA2) is part of Diabetes antibody panel
24.	Vitamin D, Total (25-OH Vitamin D)	Serum	Plain tube, Paediatric patient: Paediatric tube	4 ml (adult), 1 ml (paediatric)	Hospital Putrajaya	1 month		
25.	Fructosamine	Serum or Plasma	Plain tube or Lithium heparin tube, Paediatric patient: Paediatric tube	2-3 ml (adult)	Hospital Ampang	7 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
26.	Transferrin	Serum or Plasma	Plain tube or Lithium heparin tube, Paediatric patient: Paediatric tube	2-3 ml (adult), 1 ml (paediatric)	UMDP, IMR	5 days	Monday and Wednesday	
TUMOUR MARKER								
27.	Cancer Antigen 15-3 (CA 15-3)	Serum or Plasma	Plain Tube or Lithium Heparin Tube	3 ml	HKL	2 working days	Monday and Wednesday	
28.	Cancer Antigen 19-9 (CA 19-9)	Serum or Plasma	Plain Tube or Lithium Heparin Tube	3 ml	HKL	2 working days		
29.	Prostate Specific Antigen (PSA), Free	Serum or Plasma	Plain Tube or Lithium Heparin Tube	3 ml	HKL	2 working days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
PROTEIN AND PROTEOMICS								
30.	Alpha-1-Antitrypsin (Quantitation)	Serum	Plain tube. Paediatric patient: Paediatric plain tube	3 ml (adult), 1 ml (paediatric)	UMDP, IMR ,	5 days	Monday and Wednesday	
31.	Alpha-1-Antitrypsin- (Phenotyping)	Serum	Plain tube. Paediatric patient: Paediatric plain tube	3 ml (adult), 1 ml (paediatric)	UMDP, IMR	10 days		
32.	Beta-2 Microglobulin	Serum	Plain Tube	3ml	UMDP, IMR	5 days		
33.	Caeruloplasmin	Serum	Plain tube. Paediatric patient: Paediatric plain tube	3 ml (adult), 1 ml (paediatric)	HKL and Hospital Selayang	5 working days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
34.	Free Kappa Light Chain	Serum	Plain Tube	5ml	UMDP, IMR	5 days	Monday and Wednesday	
35.	Free light chain Quantitation	Serum	Plain Tube	5ml	UMDP, IMR	5 days		
36.	Free Lambda Light Chain	Serum	Plain Tube	5ml	UMDP, IMR	5 days		
37.	G6PD quantitation	Whole Blood	K2 EDTA Tube, Paediatric patient: K2 EDTA Paediatric tube	3ml	Hospital Ampang	14 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
38.	Haptoglobin	Serum	Plain tube. Paediatric patient: Paediatric plain tube	3 ml (adult), 1 ml (paediatric)	HKL	5 working days	Monday and Wednesday	
39.	Lipoprotein (a) Electrophoresis	Serum	Plain Tube	3ml	UMDP, IMR	10 days		
40.	Transferrin (Quantitation)	Serum	Plain Tube	3ml	UMDP, IMR	5 days		
41.	Transferrin (Phenotyping)	Serum	Plain Tube	3ml	UMDP, IMR	15 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
42.	Protein Electrophoresis	Serum	Plain Tube	5ml	UMDP, IMR & HKL	30 days	Monday and Wednesday	
43.	Protein Electrophoresis, Urine	Random Urine (preferred early morning)	Sterile Container	20ml	UMDP, IMR	30 days		Sample urine must be paired with serum. Sample must reach within 7 days of collection at 2-8 C
44.	CSF Oligoclonal band	CSF and Serum	Sterile Bijou bottle (CSF) and Plain tube (Serum)	3ml (CSF) and 5ml (Serum)	UMDP, IMR	10 days		CSF sample must be paired with serum sample within 4hours of collection. CSF must be frozen immediately after collection.
THERAPEUTIC DRUG MONITORING								
45.	Everolimus	Whole Blood	K2 EDTA tube	2 ml	HKL	1 working day	Monday and Wednesday	Use TDM form. .
46.	Lithium	Serum	Plain Tube without gel	3 ml	H. Permai, Johor Bahru.	2 working day		Use TDM form. <u>Please refer to TDM Sampling Guide</u>

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
47.	Mycophenolic Acid (MPA)	Plasma	K2 EDTA tube	3 ml	HKL	1 working day	Monday and Wednesday	Use TDM form. Please refer to TDM Sampling Guide
48.	Sirolimus	Whole Blood	K2 EDTA tube	2 ml	HKL	1 working day		Use TDM form. Please refer to TDM Sampling Guide
49.	Fluconazole	Plasma	Lithium heparin tube	3 ml	Hospital Ampang	7 days		Use TDM form
50.	Alcohol (Ethanol)	Serum or Plasma	Plain Tube without gel (serum) or Sodium Fluoride tube (plasma)	3 ml	HKL	1 working day		
51.	Benzodiazepines	Serum	Plain Tube without gel	3 ml	HKL	1 working day		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
DRUG OF ABUSE								
52.	Benzodiazepines	Random urine	Sterile Container	30 ml	HKL	14 - 30 working days	Monday and Wednesday	Borang Permintaan Ujian Pengesanan Dadah Dalam Air Kencing
53.	Dextromethorphan	Random urine	Sterile Container	30 ml	HKL	14 - 30 working days		
54.	Ephedrine	Random urine	Sterile Container	30 ml	HKL	14 - 30 working days		
55.	Ketamine	Random urine	Sterile Container	30 ml	HKL	14 - 30 working days		
56.	Methadone	Serum	Plain Tube without gel	3 ml	HKL	14 - 30 working days		
		Random urine	Sterile Container	30 ml	HKL	14 - 30 working days		
57.	Monoacetylmorphine	Random urine	Sterile Container	30 ml	HKL	14 - 30 working days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
58.	Nimetazepam	Random urine	Sterile Container	30 ml	HKL	14 - 30 working days	Monday and Wednesday	Borang Permintaan Ujian Pengesanan Dadah Dalam Air Kencing
59.	Nitrazepam	Random urine	Sterile Container	30 ml	HKL	14 - 30 working days		
60.	<i>N</i> -methyl-1,3-benzodioxolylbut anamine (MBDB)	Random urine	Sterile Container	30 ml	HKL	14 - 30 working days		
61.	Norketamine	Random urine	Sterile Container	30 ml	HKL	14 - 30 working days		
62.	Phentermine	Random urine	Sterile Container	30 ml	HKL	14 - 30 working days		
TRACE ELEMENT								
63.	Copper	Serum	Plain Tube without gel	3 ml	Toxicology Unit, IMR	14 days	Monday and Wednesday	
64.	Copper, urine	Random urine	Sterile Container	20 ml	Toxicology Unit, IMR	14 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
65.	Lead	Plasma or Whole Blood	Lithium heparin tube (Plasma)	3 ml	Toxicology Unit, IMR	14 days	Monday and Wednesday	
66.	Mercury	Random urine	Sterile Container	20 ml	Toxicology Unit, IMR	14 days		
BIOCHEMICAL GENETICS								
67.	Acid Alpha Glucosidase	Dried Blood Spot	Special filter paper.eg: Whatman 903	3 circles of dried blood spot	Biochemistry Unit IMR	10 days	Monday and Wednesday	Properly dried at room temperature for 4 hours before putting in sealed plastic bag. Transport at room temperature Indication : Suspected Pompe: hypotonia, myopathy, cardiomyopathy, hepatomegaly, respiratory problem.
68.	Acid Amino	Plasma or serum	Lithium heparin tube (plasma) or Plain tube (serum)	2 ml	Biochemistry Unit IMR	15 days		Collect 4 hours after meals. Centrifuge and freeze immediately. Transport frozen in ice if delayed. Indication : Selective screening hyperammonemia, amino acid disorder, epileptic encephalopathy

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
69.	Acid Amino, CSF	CSF	Sterile container	1 ml	Biochemistry Unit IMR	15 days	Monday and Wednesday	MUST send together with plasma. Freeze immediately. Transport frozen in ice. Indication: Epileptic encephalopathy.
70.	Acid Amino, Urine	Early morning urine	Sterile container	2 ml	Biochemistry Unit IMR	15 days		Early morning urine. Transport frozen in ice. Indication: Renal transport disorder. Hyperammonemia.
71.	Acid Organic, Urine	Urine	Sterile container	2 ml	Biochemistry Unit IMR	5 days		Collect during urine crisis, freeze immediately and transport frozen in ice. Indication: Selective screening: unexplained metabolic crisis, organic aciduria, amino aciduria, FAOD, mitochondria disorder, neurological/ neuro muscular disorder, epileptic encephalopathy, multisystem disorder, unexplained mental retardation.

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
72.	Acid Orotic, Urine	Random urine	Sterile container	2 ml	Biochemistry Unit IMR	5 days	Monday and Wednesday	Transport frozen in ice. Indication: Suspected Urea Cycle Defect, hyperammonemia, purine and pyrimidine disorder, suspected OTC carrier and allopurinol test.
73.	Acylcarnitines	Dried Blood Spot	Special filter paper.eg: Whatman 903	3 circles of dried blood spot	Biochemistry Unit IMR	3 days		Properly dried at room temperature for 4 hours before putting in sealed plastic bag. Transport at room temperature. Indication: Neonatal screening of IEM diseases : amino acid disorder, organic acid disorder and FAOD, hypoglycemia and SIDS.
74.	Biogenic Amines, Urine	Random urine	Sterile container	2 ml	Biochemistry Unit IMR	15 days		Protect from light. Transport frozen in ice. Indication: Suspected neurotransmitter disorder.
75.	Biogenic Amines, CSF	CSF	Sterile container	1.0 ml	Biochemistry Unit IMR	15 days		Protect from light. Freeze immediately. Transport frozen in ice. Indication: Suspected neurotransmitter disorder.

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
76.	Biotinidase Enzyme Activity	Dried Blood Spot	Special filter paper.eg: Whatman 903	3 circles of dried blood spot	Biochemistry Unit IMR	10 days	Monday and Wednesday	Properly dried at room temperature for 4 hours before putting in sealed plastic bag. Transport at room temperature. Indication: Suspected biotinidase deficiency.
77.	Carnitine (Total & Free plasma)	Plasma	Lithium heparin tube	2 ml	Biochemistry Unit IMR	5 days		Freeze immediately. Transport frozen in ice. Indication: Carnitine deficiency (Primary or secondary), Fatty acid oxidation defect, organic aciduria.
78.	Creatine and Guanidinoacetate, Urine	Random urine	sterile container	2 ml	Biochemistry Unit IMR	15 days		Transport frozen in ice. Indication: Suspected for creatine deficiency (Creatine Transport Defect, guanidinoacetate methyltransferase deficiency and Arginine: glycine amidinotransferase deficiency.
79.	Cystine, Urine	Random urine	sterile container	2 ml	Pediatric Institute HKL	14 working days (REF. LAB)		Transport frozen in ice. Indication: Suspected for cystinuria, screening for potential kidney donor.

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
80.	Delta-aminolevulinic acid (ALA), Urine	Random urine or 24-Hour urine specimen	Sterile container (Random urine) or 24-Hour urine container without preservative.	5 ml	Biochemistry Unit IMR	15 days	Monday and Wednesday	Protect from light. Transport frozen in ice. Record 24 hour urine volume on the request form. Indication: Suspected Tyrosinemia type I , porphyrias.
81.	Galactose Total	Dried Blood Spot	Special filter paper.eg: Whatman 903	3 circles of dried blood spot	Biochemistry Unit IMR	5 days		Properly dried at room temperature for 4 hours before putting in sealed plastic bag. Transport at room temperature. Indication: Suspected disorder of galactose metabolism, acute liver failure, cataract, prolonged jaundiced.
82.	Galactose-1-Uridyl Transferase (GALT)	Dried Blood Spot	Special filter paper.eg: Whatman 904	4 circles of dried blood spot	Biochemistry Unit IMR	5 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
83.	Homocysteine	Plasma	EDTA tube	2 ml	Biochemistry Unit IMR	10 days	Monday and Wednesday	Freeze immediately. Transport frozen in ice. Indication: Suspected Homocystinuria, Marfan like syndrome, Cobalamine disorder, sulphur amino acid disorder.
84.	Homocysteine, Urine	Random urine	Sterile container	2 ml	IEM Lab Paediatric Institute HKL	10 days		Transport frozen in ice. Indication: Suspected Homocystinuria, Marfan like syndrome, Cobalamine disorder, sulphur amino acid disorder.
85.	5-Hydroxyindoleacetic Acid (5-HIAA), Urine	24-Hour urine specimen	24-Hour urine container with 10 ml of 25% HCL	5 ml of 24 hour urine specimen	Biochemistry Unit IMR	15 days		Record 24 hour urine volume on the request form. Transport frozen in ice. Indication: Carcinoid tumour.
86.	Lysosomal Storage Disease (LSD) Screening	Dried Blood Spot	Special filter paper.eg: Whatman 903	3 circles of dried blood spot	Biochemistry Unit IMR	10 days		Properly dried at room temperature for 4 hours before putting in sealed plastic bag. Transport at room temperature. Indication: Screening for 5 LSD(Pompe, Fabry, Gaucher, Krabbe, Niemann Pick).

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
87.	Lysosomal Storage Disease (LSD) Confirmation-Enzyme assay	Whole Blood	EDTA tube	6 ml	Biochemistry Unit IMR		Monday and Wednesday	Do not separate whole blood. Do not freeze. Transport in ice. Must arrive to the lab within 3 days. Indication: Positive from LSD/Oligosaccharide screening or strongly suspected for LSD
88.	Metabolic Screening, Urine	Random urine	Sterile container	2 ml	Biochemistry Unit IMR	3 days		Transport frozen in ice. Indication: Screening for organic acid disorder and amino acid disorder
89.	Mucopolysaccharides (MPS)- Screening	First morning urine	Sterile container	5 ml	Biochemistry Unit IMR	10 days		First morning urine. Transport frozen in ice. Indication: Suspected MPS- Coarse facies, hepatosplenomegaly, dystosis multiplex, scoliosis, soft tissue and joint problem, mental retardation, corneal cloudy, short stature .

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
90.	Mucopolysaccharides(MPS)-Confirmation(Enzyme assay)	Whole Blood	EDTA tube	6 ml	Biochemistry Unit IMR	15 days	Monday and Wednesday	Do not separate whole blood. Do not freeze. Transport in ice. Must arrive to the lab within 3 days. Indication: Positive from MPS screening or strongly suspected for MPS
91.	Oligosaccharide / tetrasaccharide, Urine	First morning urine	Sterile container	5 ml	Biochemistry Unit IMR	15 days		First morning urine. Transport frozen in ice. Indication: Suspected LSD (Fucosidosis, Gangliosidosis, Mannosidosis, Aspartylglycosaminuria, Schindler): dysmorphism, seizure, neurological regression, cherry red spot, mental retardation, cerebral atrophy.
92.	Pipecolic Acid	Plasma	Lithium heparin tube	2 ml	Biochemistry Unit IMR	15 days		Collect 4 hours after meals. Centrifuge and freeze immediately. Transport frozen in ice. Indication: To differentiate between peroxisomal biogenesis disorder and peroxisomal beta oxidation

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
93.	Porphyrin/ Porphobilinogen, Urine	Random urine	Sterile container	5 ml	Biochemistry Unit IMR	15 days	Monday and Wednesday	Protect from light. Transport frozen in ice. Indication: Suspected porphyrias.
94.	Pterins, Urine	Random urine	Sterile container	2 ml	Biochemistry Unit IMR	15 days		Protect from light. Transport frozen in ice. Indication: Suspected neurotransmitter disorders, BH4 deficiencies(GTPCH,PTPS,DH PR and PCD deficiency)
95.	Pterins, CSF	CSF	Special microtube with preservative(K 2 EDTA and DTE) provided by IMR	0.5 ml	Biochemistry Unit IMR	15 days		Protect from light, freeze immediately. Transport frozen in ice. Indication: Suspected neurotransmitter disorders, BH4 deficiencies(GTPCH,PTPS,DH PR and PCD deficiency)
96.	Purine & Pyrimidine, Urine	Random urine	Sterile container	2 ml	IEM Lab Paediatric Institute HKL	14 working days		Transport frozen in ice. Indication: Purine & Pyrimidine disorder.
97.	Sialic Acid (Total & Free), Urine	Random urine	Sterile container	2 ml	Biochemistry Unit IMR	15 days		Freeze immediately. Transport frozen in ice. Indication: Sialic acid storage disease.

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
98.	Succinylacetone, Urine	Random urine	sterile container	1 ml	Biochemistry Unit IMR	15 days	Monday and Wednesday	Transport frozen in ice. Indication: Tyrosinemia type I.
99.	Sulfocysteine, Urine	Random urine	Sterile container	1 ml	Biochemistry Unit IMR	15 days		Transport frozen in ice. Indication: Suspected Sulphite Oxidase or molybdenum co- factor deficiency, dystonia, seizure
100.	Sugar and Polyol, Urine	Random urine	Sterile container	2 ml	Biochemistry Unit IMR	15 days		Transport frozen in ice. Indication: Suspected for sugar and carbohydrate disorder
101.	Sulphite, Urine	Random urine	Sterile container	2 ml	IEM Lab Paediatric Institute HKL	Within 2-3 days		Transport frozen in ice. Indication: Suspected Sulphite oxidase or molybdenum co factor deficiency, dystonia, seizure
102.	Sweat Test	Sweat	Sweat collector	15ul	Paed Lab Paediatric Institute HKL	24 hours		Indication: Suspected Cystic Fibrosis - recurrent chest infection, malabsorption syndrome. Can only be requested by Respiratory Paeditrician. By appointment only.

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
103.	Very Long Chain Free Fatty Acid (VLCFA) and Phytanic acid	Plasma	K2 EDTA tube	2 ml	Biochemistry Unit IMR	10 days	Monday and Wednesday	Freeze immediately. Transport frozen in ice. Indication: Suspected peroxisomal disorder, mental retardation, developmental delay, neuroregression
104.	Acute Intermittent Porphyria (HMBS) Sequencing	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube.	Unit of Molecular Diagnostics and Protein (UMDP), IMR	30 days		Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/ Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form.
105.	Acute Intermittent Porphyria (HMBS) MLPA	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
106.	Alagille Syndrome	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
107.	Alexander Disease (GFAP)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
108.	Alpha 1-Antitrypsin Deficiency (SERPINA1)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form.
109.	Angelman Syndrome	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
110.	Arginino-succinate Lyase Deficiency (ASL)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
111.	Argininosuccinate Synthase Deficiency (ASS1)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
112.	Aromatic Amino Acid Decarboxylase Deficiency (DDC)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
113.	Berardinelli Congenital Lipodystrophy	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
114.	Biotinidase Deficiency (BTD)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form.
115.	CADASIL (NOTCH3) - hotspots	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
116.	Canavan Disease (ASPA)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
117.	Carbamoylphosphate Synthetase 1 Deficiency (CPS1)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	60 days		
118.	Carnitine Update Deficiency (OCTN2)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
119.	Carnitine-Acylcarnitine Translocase Deficiency (SLC25A20)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
120.	Carnitine Palmitoyltransferase 1A (CPT1) Deficiency (CPT1A)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/ Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form.
121.	Carnitine Palmitoyltransferase II (CPT 2) Deficiency (CPT2)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
122.	Citrin Deficiency (SLC25A13)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
123.	Classical Homocystinuria (CBS)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
124.	Dihydropyrimidinase (DHP) Deficiency (DPYS)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
125.	DNA Extraction & Storage	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	2 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/ Paediatrician using IMR / UMDP/02 form and accompanied by consent form.
126.	Ethylmalonic Encephalopathy (ETHE1)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
127.	Fragile X Syndrome (FRAXA)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
128.	Fructose-1,6-Bisphosphatase Deficiency (FBP1)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
129.	Fucosidosis (FUCA1)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
130.	Floating-Harbor Syndrome (FHS) (SRCAP)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
131.	Galactokinase Deficiency (GALK1)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form.
132.	Galactose Epimerase Deficiency (GALE)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
133.	Gaucher Disease (GBA)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
134.	Glutaric Aciduria Type 1 (GCDH)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
135.	Glycogen Storage Disease Type Ia (GSDI) (G6P6)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
136.	Glycogen Storage Disease Type Ib (GSDI) (SLC37A4)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
137.	Glycogen Storage Disease Type III (GSDIII) (AGL)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form
138.	Hereditary Orotic Aciduria (UMPS)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
139.	Hypophosphatemia (ALPL)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
140.	Isolated Methyl Malonic Aciduria (MMA) (MUT)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR			
141.	Leber's hereditary optic neuropathy (LHON)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR			

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
142.	Leigh Syndrome (SURF1)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form
143.	Leopard Syndrome (PTPN11)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
144.	Lesch-Nyhan Syndrome (HPRT)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
145.	Lissencephaly (LIS1)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
146.	Long-Chain 3-Hydroxyacyl-CoA Dehydrogenase (HADHA)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
147.	Lysinuric Protein Intolerance (SLC7A7)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
148.	Maple Syrup Urine Disease (BCKDHA)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form.
149.	Maroteaux-Lamy Syndrome, MPS VI (ARSB)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
150.	MCT8-Specific Thyroid Hormone Cell Transporter Deficiency (SLC16A2)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
151.	Medium Chain Acyl-CoA Dehydrogenase (MCAD) Deficiency (ACADM)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
152.	Metachromatic Leukodystrophy (MLD) (ARSA)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
153.	Methylenetetrahydrofolate Reductase Deficiency (MTHFR)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form
154.	Methylmalonic Aciduria and Homocystinuria, cbIC Type (MMACHC)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
155.	Methylmalonic Aciduria and Homocystinuria Type D (MMADHC)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
156.	Methylmalonyl-CoA Epimerase Deficiency (MCEE)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
157.	mtDNA Deletion Syndromes - Kearns-Sayre Syndrome (KSS) MLPA	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form.
158.	mtDNA Deletion Syndromes - Pearson Syndrome MLPA	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
159.	mtDNA Deletion Syndromes Chronic Progressive External Ophthalmoplegia (CPEO) MLPA	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
160.	mtDNA Depletion Syndrome (MDS) Panel - ANT1	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
161.	mtDNA Depletion Syndrome (MDS) Panel - DGUOK	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form.
162.	mtDNA Depletion Syndrome (MDS) Panel - MPV17	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
163.	mtDNA Depletion Syndrome (MDS) Panel - POLG	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
164.	mtDNA Depletion Syndrome (MDS) Panel - RRM2B	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
165.	mtDNA Depletion Syndrome (MDS) Panel SUCLA2	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
166.	mtDNA Depletion Syndrome (MDS) Panel SUCLG1	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form.
167.	mtDNA Depletion Syndrome (MDS) Panel TWINKLE	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
168.	mtDNA Depletion Syndrome (MDS) Panel TYMP	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
169.	Mitochondrial Encephalomyopathy, Lactic Acidosis, and Stroke-Like Episodes (MELAS) Syndrome (3243 hotspot)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	14 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
170.	Mitochondrial Encephalomyopathy, Lactic Acidosis, and Stroke-Like Episodes (MELAS) Syndrome (full panel)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form.
171.	Mitochondrial Short-Chain Enoyl-CoA Hydratase 1 Deficiency (ECHS1)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
172.	Morquio A Disease (MPS IVA) - GALNS	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
173.	Multiple Respiratory Chain Deficiencies (Mitochondrial Translation Defect) (GFM1)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
174.	Myoclonic Epilepsy with Ragged-Red Fibers (MERRF) Syndrome	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	14 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form.
175.	N-Acetylglutamate Synthase (NAGS) Deficiency (NAGS)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
176.	Neuropathy, Ataxia and Retinitis Pigmentosa (NARP) Syndrome	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	14 days		
177.	Non Ketotic Hyperglycinemia (NKH)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
178.	Noonan Syndrome (PTPN11)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
179.	Ornithine Transcarbamylase (OTC) Deficiency (OTC)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
180.	Phosphomannomutase 2 Deficiency (PMM2-CDG) (PMM2)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form.
181.	POLG-Related Disorders	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
182.	Pompe Disease (GAA)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
183.	Prader-Willi Syndrome (SNRPN) MS-PCR	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
184.	Primary Dystonia	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
185.	Pseudorheumatoid Dysplasia (WISP3)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
186.	PTEN-associated Diseases (PTEN) Sequencing	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form.
187.	Purine Nucleoside Phosphorylase Deficiency (PNP)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
188.	Pyruvate Dehydrogenase Deficiency (PDHA1)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
189.	Retinoblastoma (RB1) Sequencing	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
190.	Retinoblastoma (RB1) MLPA	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
191.	Schinzel Giedion Syndrome (SETBP1)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
192.	SCN1A-Related Seizure Disorders (SCN1A)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form.
193.	Severe Congenital Neutropenia (ELANE)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
194.	Short-Chain 3-Hydroxyacyl-CoA Dehydrogenase (SCHAD) Deficiency (HADH)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
195.	Spinal Muscular Atrophy (SMA) Sequencing	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
196.	Sulfite Oxidase (SUOX) Deficiency (SUOX)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
197.	Tyrosine Hydroxylase Deficiency (TH)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days	Monday and Wednesday	Keep sample chilled at all time. All Molecular testing can only be requested by Clinical geneticist/Neurologist/Physician/Paediatrician using IMR / UMDP/02 form and accompanied by consent form.
198.	Very Long Chain Acyl-CoA Dehydrogenase (VLCAD) Deficiency (ACADVL)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
199.	Whole mitochondrial DNA	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
200.	X-Chromosome Inactivation	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		
201.	X-linked Adrenoleukodystrophy (ABCD1)	Whole Blood	K2 EDTA tubes(1-2 tubes)	2.5 ml blood for each tube	UMDP, IMR	30 days		

- More details are available at:
 - IMR Laboratory Diagnostic service at http://www.imr.gov.my/images/handbook/imr_handbook_2017.pdf
 - HKL Pathology Services Handbook 2016 at <http://www.hkl.gov.my/content/patologi/pathology%20handbook.pdf>

MICROBIOLOGY UNIT

LIST OF TESTS OFFERED AT MICROBIOLOGY LABORATORIES HSAJB

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
THE LIST OF BACTERIOLOGY TESTS						
1.	Air sampling	Agar plate from dedicated places	Culture media/agar plate	NA	3 days	
2.	Attest test	Attest tube	NA	NA	48 hours	Test for sterilizer performance
3.	Blood C&S: Aerobic	Blood	Aerobic blood culture bottle	8-10 ml	5 days	Send immediately to lab
4.	Blood C&S: Anaerobic	Blood	Anaerobic blood culture bottle	8-10 ml	5 days	
5.	Blood C&S: Paediatric patient	Blood	Paediatrics blood culture bottle	1-2 ml	5 days	
6.	Blood C&S: fungal	Blood	Myco/F lytic culture bottle	8-10 ml	14 days	
7.	Blood film for Malaria	Blood	EDTA	5 mL	4 hour upon sample received	
8.	Blood film for microfilariae	Blood	EDTA	5 mL	24 hour	

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
9.	Body fluid culture & sensitivity (C&S):	Bile fluid	Sterile screw cap container	Bacteria: >2ml Fungi: >3ml	Bacteria: 3-5 days Fungi : 14 days	Send immediately to lab
		Gastric fluid	Sterile screw cap container			
		Joint fluid	Sterile screw cap container			
		Peritoneal fluid	Sterile screw cap container			
		Pleural fluid	Sterile screw cap container			
		Synovial fluid	Sterile screw cap container			
		Abdominal ascites	Sterile screw cap container			
		Pericardial fluid	Sterile screw cap container			
10.	Bone C&S	Bone	Sterile screw cap container	As much as possible		Room Temperature : 4 hours 2-8°C: 24 hours

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
11.	<i>Bordetella pertussis</i> C&S	Nasopharyngeal swab	Charcoal swab	NA	3-5 days	Send immediately to lab
		Direct cough on Plate	Plate (charcoal agar)	NA		
		Nasopharyngeal aspirate	Sterile container	3-5 ml		
12.	Central venous catheter (CVC) tip C&S (Not recommended for other catheter)	CVC Tip	Sterile screw cap container	5 cm	3-5 days	Send immediately to lab Or Keep at 2-8°C: 24 hours
13.	Cerebrospinal fluid (CSF) C&S	CSF	Sterile Bijou bottle	Bacteria: >2ml Fungi: >3ml	Bacteria 3-5 days Fungal 14 days	Send immediately to the lab. (within 1 hour after collection)
14.	<i>Clostridium difficile</i> Toxin A&B	watery, soft, or semi-formed fecal samples (preferably contain blood or mucus)	Sterile screw cap container	About 5ml	Same working day	Send immediately to the lab.

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
15.	Fungal C&S	Epilated Hair	Sterile screw cap container or Sterile petri dish	>5 strands of affected hair	30 days	Send immediately to lab
		Nail scrapings		As much as possible		
		Skin scrapings		As much as possible		
		Tissue biopsy	Sterile screw cap container	5-10mm ³	14 days	
		Mid stream Urine (MSU)	Sterile screw cap container (yellow cap)	5-10 mL		
		Mid stream Urine (MSU)	Boric acid bottle	20-25 mL		
16.	Eye specimen C&S: Corneal scrapings	Corneal scrapings	-Direct Plating onto: Blood agar, Chocolate agar & Sabouraud agar	N/A	3-5 days	
			Smear on slide x 2		Fungal 14 days	
					Same working day	

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
17.	Eye specimen C&S: Conjunctiva	Conjunctiva swab	Swab in Amies Transport medium	NA	Bacteria 3-5 days Fungal 14 days	Send immediately to the lab.
		Discharge from eye	Smear on slide x 2		Same working day	
		Direct plating on agar media	Streaking on agar (Blood agar & Choc Agar & SDA)		Bacteria 3-5 days Fungal 14 days	
		Vitreous tapping	Sterile container	As collected	Bacteria 3-5 days Fungal 14 days	
18.	Genital specimen C&S	Endocervical swab	Smear on glass slide	NA	Same working day	
			High vaginal swab		Swab in Amies Transport medium	
		Direct plating on Thayer-Martin media	Z streaking on agar plate	3-5 days		

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
19.	Genital specimen C&S	Genital Discharge/ Urethral discharge	Smear on glass slide	N/A	Same working day	
			Swab in Amies Transport medium		Bacteria 3-5 days Fungal 14 days	
			Direct plating on Thayer-Martin media	Z streaking on agar plate	3-5 days	
20.	Microscopy: Opportunistic parasite	semi solid or liquid stool	Sterile screw cap container	About 1 g	3 days	
21.	Microscopy: Ova & Cyst	semi solid or liquid stool	Sterile screw cap container	>5g for semi solid stool, >5ml for liquid stool	Same working day	Send immediately to the lab.
22.	Milk C&S	Milk	Sterile screw cap container	5-10 mL	2 days	
23.	Pus C&S	Pus aspirate	Sterile container	3-5 ml	3-5 days	
		Pus Swab	Swab in Amies transport medium	NA		
24.	Rectal swab C&S	Rectal Swab	Cary Blair	NA		

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
25.	Respiratory tract specimen C&S	Blind Bronchial aspirate (BBA)	Sterile screw cap container	>1 mL	3-5 days	Send immediately to the lab
		Bronchio-alveolar Lavage (BAL)	Sterile screw cap container	>1 mL		
		Nasal swab	Amies Transport medium	N/A		
		Nasopharyngeal swab	Amies Transport medium	N/A		
		Sputum expectorate	Sterile screw cap container	>1 mL		
		induced Sputum	Sterile screw cap container	>1 mL		
		Throat swab	Amies Transport medium	N/A		
		Tracheal aspirate	Sterile screw cap container	>1 mL		
26.	Reverse Osmosis (RO) water: Endotoxin test	RO water	Sterile screw cap container	2-5 mL	Same working day	Room temperature: 4 hours. 2-8°C: 24-48 hours.
27.	Reverse Osmosis (RO) water C&S	RO water	Sterile screw cap container	50-100 mL	2 days	Send immediately to the lab.

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
28.	Stool: Rotavirus	Fresh stool	Sterile screw cap container	About 1 g	Same working day	Patient ≤ 5 years
29.	Stool C&S	Fresh stool	Sterile screw cap container	About 5-10 gram	3-5 days	Send immediately to the lab.
30.	Tissue C&S	Tissue biopsy	Sterile screw cap container	5-10mm ³	Bacteria: 3-5 days Fungal : 14 days	
31.	Tissue C&S (Anaerobes)	Tissue biopsy	Sterile screw cap container OR Anaerobic transport medium	5-10mm ³	3-5 working days	Send immediately to the lab.
32.	Tissue C&S <i>Helicobacter pylori</i>	Gastric biopsy	Sterile screw cap container	5-10mm ³		
33.	Total Parenteral Nutrition (TPN) C&S	TPN	Sterile screw cap container	5-10 mL	7 working days	
34.	Urine C&S	Mid stream Urine (MSU)	Sterile screw cap container (yellow cap)	5-10 mL	Bacteria : 3-5days Fungi: 14 days	
		Mid stream Urine (MSU)	Boric acid bottle	20-25 mL		
35.	Urine FEME	Urine	Sterile screw cap container (yellow cap)	5-10 mL	Same working day	Middle stream preferred

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
LIST OF SEROLOGY TESTS						
44.	Chlamydia IgM antibody	Serum	Plain Tube	5 ml	5 working days	<i>Chlamydia pneumoniae</i> , <i>psittaci</i> and <i>trachomatis</i>
45.	<i>Chlamydia trachomatis</i> IF	Genital discharge/ Eye discharge	Glass slide (Frosted end slides is preferred)	Not applicable	1-3 working days	Labeled the slide and circle the smear area.
46.	<i>Legionella pneumophila</i> Ag	Fresh urine	Sterile urine container	5 ml	1-3 working days	first void preferred
47.	Leptospira Antibody IgM	Serum	Plain Tube	5 ml	24 hours (working days)	
48.	<i>Mycoplasma pneumoniae</i> Ab	Serum	Plain Tube	5 ml	1-3 working days	
49.	<i>Pneumocystis jirovecii</i> pneumonia Serology - IF	Induced Sputum	Sterile container	2-5 ml	5 working days	Previously known as <i>Pneumocystis carinii</i>
		BAL				
50.	Rickettsia-Indirect Immuno Peroxidase	Serum	Plain Tube	5 ml	5 working days	
51.	Rapid plasma reagin (RPR) test	Serum	Plain Tube	5 ml	1-3 working days	

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
52.	<i>Treponema pallidum</i> Particle Agglutination	Serum	Plain Tube	5 ml	1-3 working days	
53.	Toxoplasma IgG/ IgM	Serum	Plain Tube	5 ml	1-3 working days	
THE LIST OF IMMUNOLOGY TESTS						
54.	Anti Streptolysin-O Titer (ASOT)	Serum	Plain Tube	5 ml	1-3 working days	
55.	Anti-Neutrophil Cytoplasmic Antibody (ANCA)	Serum	Plain Tube	5 ml	3-5 working days	
56.	Anti Nuclear Antibody IF	Serum	Plain Tube	5 ml		
57.	Anti Thyroglobulin (ATG) Antibody	Serum	Plain Tube	5 ml		
58.	Double Stranded DNA (dsDNA) Test	Serum	Plain Tube	5 ml		A reflex test for positive ANA Homogenous pattern
59.	Extractable Nuclear Ag (ENA)	Serum	Plain Tube	5 ml		For positive ANA sample
60.	Anti Thyroid Peroxidase (TPO)	Serum	Plain Tube	5 ml		

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
THE LIST OF VIROLOGY TESTS						
61.	Cytomegalovirus (CMV) IgG/ IgM	Serum	Plain Tube	5 ml	1-3 working days	
62.	Dengue virus serology (IgG/IgM)	Serum	Plain Tube	5 ml	1-3 working days	
63.	Dengue virus NS1 protein (rapid test)	Serum	Plain Tube	5 ml	1 hour	After office hour, test will be performed at bacteriology laboratory.
64.	<i>Epstein Barr</i> virus (EBV) IgG/ IgM	Serum	Plain Tube	5 ml	1-3 working days	
65.	Hepatitis A virus IgM	Serum	Plain Tube	5 ml		
66.	Hepatitis B virus envelope Antigen (HBeAg)	Serum	Plain Tube	5 ml		Will be performed for Hepatitis B virus surface Antigen reactive sample
67.	Hepatitis B virus Core IgM	Serum	Plain Tube	5 ml		Will be performed for Hepatitis B virus surface Antigen reactive sample
68.	Hepatitis B virus envelope Antibody (HBeAb)	Serum	Plain Tube	5 ml		Will be performed for Hepatitis B virus surface Antigen reactive sample
69.	Hepatitis B virus Total Core (HBcAb)	Serum	Plain Tube	5 ml		

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
70.	Hepatitis B virus surface Ag (HBsAg)	Serum	Plain Tube	5 ml	1-3 working days	
71.	Hepatitis B virus surface Ab (HBsAb)	Serum	Plain Tube	5 ml		
72.	Hepatitis C virus antibody screening	Serum	Plain Tube	5 ml		
73.	Hepatitis C Ag	Serum	Plain Tube	5 ml		reflex test for HCV antibody positive
74.	HIV Ag/Ab screening	Serum	Plain Tube	5 ml		
75.	HIV Auto-LIA (HIV Ab confirmation)	Serum	Plain Tube	5 ml	3-5 working days	
76.	HIV 1&2 Mix Particle agglutination (PA)	Serum	Plain Tube	5 ml		
77.	Herpes Simplex Virus IgG & IgM	Serum	Plain Tube	5 ml		
78.	Herpes Simplex Virus I & II (IF)	Lesion	Smear on slide	Not applicable	1-3 working days	

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
79.	Measles IgG/IgM	Serum	Plain Tube	5 ml	3-5 working days	
80.	Mumps IgG/ IgM	Serum	Plain Tube	5 ml		
81.	Parvovirus IgG/ IgM	Serum	Plain Tube	5 ml		
82.	Respiratory specimen for Viruses detection – Immunoflourescence	Nasopharyngeal aspirate/BAL	Sterile container (Preferred in sterile tube)	2 ml	1-3 working days	Screening and detection of influenza viruses: <i>Influenza A & B, Parainfluenza 1,2 & 3, Adenovirus , Respiratory syntical virus (RSV) and metapneumo virus</i>
83.	Rubella virus IgG/ IgM	Serum	Plain Tube	5 ml		
84.	Varicella zoster virus IgG/ IgM	Serum	Plain Tube	5 ml	3-5 working days	
THE LIST OF MOLECULAR TESTS						
86.	HIV Viral Load PCR	Plasma (EDTA)	EDTA	5-10mL Blood (EDTA) / 1.5mL plasma	2-4 weeks	Packed with ice (2 – 8°C) Lysed sample / Heparinized sample will be rejected

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
87.	Respiratory specimen for Influenza (A,B)/H1N1 viruses (PCR)	Nasopharyngeal aspirate	Sterile container	2-3 ml	1- 3 working days	Packed with ice (2 – 8°C)
		Nasopharyngeal swab	Dacron Swab in VTM	NA		
		Throat swab				
		Nasal Swab				
88.	Respiratory specimen for MERSCoV (PCR)	Sputum or lower respiratory tract sample	Sterile container	2-3 ml	24-48 hours working days	Packed with ice (2 – 8°C)
89.	ZIKA Virus PCR	Blood / serum	Plain tube	Blood: 2-5ml, Serum: 1-2ml,	1-3 Working days	Blood sample must be sent together with urine sample.
		Urine (together with blood sample)	Sterile screw cap container	5-10 ml		For other samples: please consult the Pathologist (Medical Microbiology)
		CSF		1-2 ml		Packed with ice (2 – 8°C)
90.	Mycobacterium tuberculosis (PCR)- Genexpert	Sputum	Sterile screw cap container	2-3ml	24 hours working day	Request by Chest Specialist /Consultant
		Blind Bronchial Aspirate (BBA)				
		Body fluid				

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
THE LIST OF MYCOBACTERIOLOGY TESTS						
91.	Acid Fast Bacilli (AFB) Direct smear	Sputum	Sterile screw capped container	3-5 ml	24 hours	
		gastric lavage	Sterile screw capped container			
		Bronchial washing	Sterile screw capped container			
		body fluid	Sterile screw capped container			
		urine	Sterile screw capped container			
		swab	Sterile screw capped container			
		pus	Sterile screw capped container			
		CSF	Bijou bottle	~ 1.0 ml		
		Tissue	Sterile screw capped container	As much as collected		

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
92.	Mycobacteria C&S (MTB and NTM)	Sputum	Sterile screw capped container	3-5 ml	Liquid media culture MGIT Myco f lytic – 42 days solid media –LJ -8 weeks	Send to the lab immediately Positive culture will be sent to MKAK for Identification and antibiotic sensitivity NTM- only for ID Antibiotic sensitivity test will only be performed by request.
		Gastric lavage		Minimum 5ml		
		Bronchial washing		Minimum 5ml		
		body fluid		2-5ml		
		Urine		3-5 ml		
		Pus		3-5 ml		
		Swab		-		
		CSF		Preferable ~ 1ml		
		Tissue		As much as collected		
		Blood / Bone marrow	Myco F lytic bottle	Adult : 5-10ml Pediatric : 3-5 ml		
93.	<i>Mycobacterium leprae</i> (Leprosy)	Slit Skin Smear (SST)	Smear from lesions : Minimum: 3 sites Maximum 6 sites	2 slides - air-dried fixed smear. NEVER heat fixed.	1-3 days	SST usually taken from earlobes, elbows, and knees sites.

LIST OF MICROBIOLOGY TESTS OFFERED BY THE REFERENCE LABORATORIES

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
THE LIST OF BACTERIOLOGY TESTS								
1.	Fungal identification	Pure fungal isolate	Culture media	-	IDRC, IMR.	14-40 days	Monday and Wednesday	Packed in ice
2.	Bacteria identification	Pure bacteria isolate	Appropriate culture slant	-		14-28 days		Preliminary test must be perform and send the results together with pure isolates and clinical history
3.	<i>Bordetella pertusis</i> (DNA) PCR	Nasopharyngeal aspirate	Sterile container	-		5 working days		Packed in ice
		Nasopharyngeal swab	Dacron Swab in Stuart's transport medium (without charcoal)	-				Do not use calcium alginate or cotton swab Packed in ice
4.	<i>Brucella sp</i> DNA (PCR)	Blood	EDTA tube	5 ml		4 working days		Laboratory must be informed prior to sending Packed in ice
		Pure isolate	Culture media	-				
5.	Antibiotic resistant Verification	Pure isolate	Nutrient agar slant	-	14-28 working days			
6.	<i>Salmonella spp</i> & <i>Vibrio cholera</i> Serotyping	Pure isolate	Nutrient agar slant	-	14 working days			

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK				
7.	<i>Streptococcus pneumoniae</i> & <i>Hemophilus influenza</i> serotyping	Pure isolate	Amies' transport swab	-	IDRC, IMR	7 Working days	Monday and Wednesday					
8.	Malaria PCR	A. Giemsa thick blood film B. Giemsa thin blood film	Slide mailer	-								
		Blood sample on filter paper	Sealed plastic bag									
		Blood	EDTA tube	2 ml								
9.	Ova & cysts for protozoa microscopy	Pus	Sterile container	2-3 ml								
		Stool		~2 Gram								
10.	Helminth/worm identification	Fresh stool	Sterile container	~2 Gram								
		Worm	Worm: add 10% formalin	Full body specimen								
THE LIST OF SEROLOGY TESTS												
11.	Amoebiasis Serology	Serum	Plain tube	3 ml					IDRC, IMR	5 working days	Monday and Wednesday	

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
13.	Anti-Filarial Antibody IgG	Serum	Plain tube	3 ml	IDRC, IMR		Monday and Wednesday	Packed with ice (2 – 8°C)
14.	Brucellosis Serology	Serum	Plain tube	3 ml		5 working days		
15.	<i>Bordetella pertussis</i> PCR	Serum	Plain tube	3 ml		5 working days		
16.	Borrelia serology	Serum	Plain tube	3 ml		9 working days		
17.	<i>Coxiella burnetti</i> Antibody	Serum	Plain tube	3 ml		5 working days		
18.	Cysticercosis Serology	Serum or plasma	Plain tube or EDTA	3 ml		5 working days		
19.	Galactomannan Antigen	Serum	Plain tube	3 ml		5 working days		
20.	Leptospiral MAT (LMAT)	Serum	Plain tube	3 ml	MKAJB	5 working days	Every day	
21.	Leptospiral PCR (LPCR)	Blood	EDTA	3 ml	IDRC, IMR	5 working days	Monday and Wednesday	Packed with ice (2 – 8°C)
		Body fluid	Sterile container			5 working days		
		CSF		1-2 ml				
		Broncho alveolar lavage		3 ml				

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
24.	Leptospiral PCR (LPCR)	Tissue biopsy	Sterile container	As collected	IDRC, IMR	5 working days	Monday and Wednesday	Packed with ice (2 – 8°C)
25.	Toxocara Serology	Serum	Plain tube	3 ml		5 working days		
THE LIST OF IMMUNOLOGY TEST								
26.	Anti Acetylcholine Receptor Antibody	Serum	Plain tube	3 ml	AIRC, IMR	10 working days	Monday and Wednesday	Packed with ice (2 – 8°C)
27.	Anti Aquaporine 4 Antibody	Serum						
		CSF	Plain tube	3 ml				
		Serum						
28.	Anti Beta 2 Glycoprotein I antibody (Ig G/Ig M)	Serum	Plain tube	3 ml				
29.	Anti Cardiolipin (ACL)	Serum	Plain tube	3 ml				

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
30.	Anti Centromere Antibody	Serum	Plain tube	3 ml	AIRC, IMR	5 working days	Monday and Wednesday	Packed with ice (2 – 8°C)
31.	Anti Cyclic Citrulinated Peptide	Serum	Plain tube	3 ml				
32.	Anti Desmoglein 1 , 2 , 3	Serum	Plain tube	3 ml				
33.	Anti Endomysial Antibody	Serum	Plain tube	3 ml				
34.	Anti Gastric Parietal Cell Antibodies	Serum	Plain tube	3 ml				
35.	Anti Gliden Antibody	Serum	Plain tube	3 ml				
36.	Anti Glomerular Basement Membrane (GBM)	Serum	Plain tube	3 ml				
37.	Anti Liver Kidney Microsomal (LKM)	Serum	Plain tube	3 ml				

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
38.	Anti Mitochondrial Antibodies	Serum	Plain tube	3 ml	AIRC, IMR	10 working days	Monday and Wednesday	Packed with ice (2 – 8°C)
39.	Anti N Methyl D Aspartate Receptor (NMDAR)	Serum CSF	Plain tube	3 ml				
40.	Anti Neuronal Ab	Serum	Plain tube	3 ml				
41.	Anti Phospholipid (Apo)	Serum	Plain tube	3 ml				
42.	Anti RRNP Antibodies	Serum	Plain tube	3 ml				
43.	Anti Smooth Muscle Antibodies	Serum	Plain tube	3 ml				
44.	Anti Thyroid microsomal	Serum	Plain tube	3 ml				
45.	Anti Transglutaminase Antibody	Serum	Plain tube	3 ml				

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
46.	Anti Trypsin (Atry)	Serum	Plain tube	3 ml	AIRC, IMR	10 working days	Monday and Wednesday	Packed in ice
47.	Anti U1 RRNP Antibodies	Serum	Plain tube	3 ml				Packed in ice
48.	Coeliac Anti Endomysium	Serum	Plain tube	3 ml				Packed in ice
49.	Coeliac Anti Tissue Transglutaminase (TTG)	Serum	Plain tube	3 ml				Packed in ice
50.	Coeliac Antibody	Serum	Plain tube	3 ml				Packed in ice
51.	HLA typing test : B*27 B*57:01 B*15:02 Others	Blood	EDTA	6 ml		1 month		i. Transport the samples in room temperature ii. Test done only by appointment with IMR iii. Request form: "BMT HLA-Molecular Typing-PCR"

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
52.	Paraneoplastic Neurological Antibodies (Anti Hu, Anti Ri, Anti Yo, Anti Ma, Anticv2.1 & Anti Phiphysin)	Serum	Plain tube	3 ml	AIRC, IMR	10 working days	Monday and Wednesday	Packed in ice
53.	Lymphocyte Transformation Test	Blood	Sodium heparin	5 ml		5 working days		Primary & secondary Immunodeficiency (PID).: Proliferation of T cells to mitogens Request by appointment & consultation only
54.	T & B Cell Subset Enumeration	Blood	EDTA	2 ml		5 working days		PID: TBNK cell quantification (T: CD4, CD8; B: CD19; NK: CD16+, CD56) Request by appointment only
55.	Bruton Tyrosine Kinase(BTK) protein detection	Blood	EDTA	2 ml		14 working days		X-Linked Agammaglobulinemia

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
56.	Radio Allergo Sorbent Test (Rast)/ Total Ig E (Immunoglobulin E)	Serum	Plain tube	3 ml	AIRC, IMR	14 working days	Monday and Wednesday	Packed in ice
57.	Specific Liver Antibodies (ANTI AMA,M2,M2-3E/BPO,SP100 ,PML,Gp210,LKM1,LC1,SLA/LP, Ro 52)	Serum	Plain tube	3 ml				Packed in ice
THE LIST OF VIROLOGY TESTS								
56.	Chikungunya Serology	Serum	Plain tube	3 ml	MKAK	7 working days	Monday and Wednesday	Packed in ice
57.	Coxsackie Serology (Cox)	SERUM	PLAIN TUBE	-	IDRC, IMR	7 working days		Packed in ice
58.	Cytomegalovirus Viral Load	Plasma	EDTA tube	3 ml	HSB	5-7 working days		Packed in ice

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
59.	Cytomegalovirus PCR (CMV PCR) -Detection	CSF/ Bal/ Plasma	Sterile container/ EDTA tube	3-5 ml	HSB	7 working days	Monday and Wednesday	Packed in ice
60.	Cytomegalovirus virus isolation for urine	Urine	Sterile container	5 -10 ml	IDRC, IMR	14 - 35 working days		
61.	Dengue Liver Tissue PCR	Tissue	Sterile container	~3 Gram		14-28 days		
62.	Dengue Serotyping	Serum	Plain tube	3 ml	MKAJB	7 working days	Wednesday	
63.	Enterovirus culture and isolation	Rectal swab	VTM	NA	IDRC, IMR	14 - 35 working days	Monday and Wednesday	
64.	Enterovirus culture and isolation	Stool	Sterile container	~3 Gram		14 - 35 working days		
65.	Enterovirus culture and isolation	CSF	Sterile container	5 ml		14 - 35 working days		
66.	Enterovirus EV71	Stool	Sterile container	~3 Gram		14 - 35 working days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
67.	Epstein Barr (EBV) Viral Load	Plasma	EDTA tube	3 ml	HSB	3-5 working days	Monday and Wednesday	Packed in ice 2-8° C
68.	H5N1 Study (H5N1)	Throat swab	VTM	NA	IDRC, IMR	1-3 working days		Packed in ice 2-8° C
69.	Hep C Genotyping - qualitative	Serum	Plain tube	3 ml	HKL			Attached the result of HCV Viral Load(>500 IUML) Request by gastroenterologist
70.	Hepatitis B Virus DNA (HBVd) PCR viral load	PLASMA	EDTA tube	5 ml	HKL			Packed in ice 2-8° C
71.	Hepatitis C Virus RNA viral load	plasma	EDTA	5 ml	HKL			
72.	Herpes Simplex Virus PCR	CSF	Sterile container	5 ml	HSB			
73.	Herpes Simplex Virus PCR	Plasma	EDTA tube	3 ml	HSB			
74.	HIV RNA (HIV RNA)	plasma	EDTA	5 ml	IDRC, IMR			

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
75.	HIV P24 Antigen (HP24)	Serum	Plain tube	3 ml	HKL	7 working days	Monday and Wednesday	Packed in ice
76.	Human immunodeficiency virus (HIV) Drug Resistance Test	Blood /plasma	EDTA	5-10 ML	IDRC, IMR	40 working days		Please fill in IMR/Viro/ HIV/24 form . Patient's viral load must be >1000, Transport in DRY ICE
77.	Human Herpes Virus - 6	PLASMA	EDTA	3 ml	HSB	7 working days		Packed in ice
78.	Influenza Like Illness (Ili) Surveillance	Serum	Plain tube		IDRC, IMR	5 working days		Packed in ice
79.	Japanese Encephalitis Serology (Je)	Serum	Plain tube	3 ml		5 working days		Packed in ice
80.	Measles Virus Isolation	Serum	Plain tube	3 ml	MKAK	14-35 working days	Monday to Thursday before 12 noon	Packed in ice
81.	Measles PCR	URINE	Sterile container	3-5 ml		7 working days		Packed in ice
		Serum	Plain tube	3 ml				
Throat Swab		VTM						

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
82.	Rectal Swab For Coxsackie Virus (Recox)	Rectal swab	VTM	NA	IDRC, IMR	14-35 working days	Monday and Wednesday	
83.	SARS virus	Throat swab	VTM	NA				
84.	Poliovirus	Stool	Sterile container	2 GRAM				For Acute flaccid paralysis: 1.Stool (2x interval time 24-48 hours) within 14 days of onset of paralysis 2.IMR Form For AFP 2. Packed in ice
85.	Poliovirus	Rectal swab	VTM	NA				
86.	Coxsackie Virus (Thrcox)	Throat swab	VTM	NA			Packed in ice	
87.	Varicella Zoster PCR	Serum	Plain tube	3 ml	HSB			

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
THE LIST OF MYCOBACTERIOLOGY (TB) TESTS								
88.	Identification and sensitivity of <i>M.tuberculosis</i> Complex	Mycobacterium isolates	Bijou/Universal bottle containing LJ slant media /MGIT tube	Visible growth on the egg based slope (>20 colonies)	MKAK	Identification - 3 working days Antibiotic Sensitivity test: 31 working days	Monday to Thursday before 12 noon	Drug sensitivity test only by request.
89.	Identification of Non tuberculosis Mycobacterium (NTM)	Mycobacterium isolates	LJ/ MGIT tube	Visible growth on the egg based slope (>20 colonies)		ID: Slow growing: 21 working days Fast growing: 7 days DST: Rapid growing NTM: 7 working days Slow growing NTM: 18 working days		

NO	TEST	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	REFERRAL LAB	RLTAT	DAY OF DESPATCH	REMARK
90.	IGRA test for <i>Mycobacterium tuberculosis</i> infection screening	Blood	IGRA collection tubes (3-4 tubes per set)	1 ml per tubes	MKAK		Upon request	1. Consult pathologist (Medical Microbiologist) at MKAK prior collection. 2. Request by physician/specialist ONLY
91.	Mycobacterium for PCR test	Sputum	Sterile screw cap container	3-5 ml		7 working days	Upon request	
		Gastric lavage		1-2 ml				
		Bronchial washing		1-2 ml				
		Pus swab		-				
		Body fluid		1-2 ml				
		Urine		1-2 ml				
		Tissue biopsy		As collected				
		Blood	Plain tube (without clot activator), Heparin tube	Adult: 5 ml Paediatric: 1-3 ml				
Bone Marrow aspiration	Sterile container without preservative	1-2 ml						

- More details are available at:
 - IMR Laboratory Diagnostic service at http://www.imr.gov.my/images/handbook/imr_handbook_2017.pdf
 - HKL Pathology Services Handbook 2016 at <http://www.hkl.gov.my/content/patologi/pathology%20handbook.pdf>
 - National Public Health Laboratory Services handbook 2018 at <http://fliphtml5.com/yjpuz/xhaf/basic>

HAEMATOLOGY UNIT

LIST OF TESTS OFFERED AT THE HAEMATOLOGY LABORATORY, HSAJB – 24 HOURS SERVICES

NO	TESTS	SPECIMEN TYPE	CONTAINER	VOLUME	LTAT	REMARK
LIST OF HAEMATOLOGY TESTS OFFERED FOR 24 HOURS SERVICES						
1.	Full Blood Count (FBC)	Whole Blood	EDTA	3ML	Urgent: 45 Minute Routine: 4 hours	Transport samples within 4 hours at room temperature
2.	Full Blood Picture (FBP)	Whole Blood	EDTA	3ML	Urgent: 1 Working Day Routine: 3 Working Days	1. Transport samples within 4 hours at room temperature 2. For Urgent FBP, please contact Medical Officer/Haematologist On-Call
3.	PT/APTT/ Fibrinogen/ Thrombin Time	Blood (Plasma)	3.2% Trisodium Citrate	Collect until indicated mark x1 tube	Urgent: 60 Minutes Routine: 4 hours	Transport samples within 4 hours at room temperature
4.	D-Dimer	Blood (Plasma)	3.2% Trisodium Citrate	Collect until indicated mark x1 tube	Urgent: 60 Minutes Routine: 4 hours	
5.	ESR	Whole Blood	EDTA	3ML	Routine: 90 Minutes	
6.	DIVC	Blood (Plasma)	3.2% Trisodium Citrate	Collect until indicated mark x2 tubes	Routine: 4 hours	

NO	TESTS	SPECIMEN TYPE	CONTAINER	VOLUME	LTAT	REMARK
ROUTINE HAEMATOLOGY TESTS						
7.	G6PD	Blood smeared on Whatman's Filter Paper	-	-	Routine: 1 Working Day	Transport samples within 4 hours at room temperature
8.	LAP Score	Whole Blood	EDTA	3ML	Routine: 1 Working Day	
SPECIALISED HAEMATOLOGY TESTS						
9.	Hb Analysis	Whole Blood, Slide	EDTA	3ML	Routine : 4 Weeks of Working Days	<ol style="list-style-type: none"> 1. Transport samples within 4 hours at room temperature. 2. For Hospital District, required to send in PBF slide with latest <i>FBC indices</i>.
10.	CD4 / CD8 Enumeration	Whole Blood	EDTA	3ML	Routine: 5 Working Days	<ol style="list-style-type: none"> 1. Transport samples within 4 hours at room temperature. 2. CD4/CD8 test is available from Sunday-Wednesday only. Request form requires Specialist's signature.
11.	Bone Marrow Aspirate (BMA)	Bone Marrow	EDTA, SODIUM HEPARIN	9ML	Urgent: 1 Working Day Routine: 5 Working Days	<ol style="list-style-type: none"> 1. Transport samples within 4 hours at room temperature 2. Please call 2362 for BMA appointment.
12.	Immuno-phenotyping (IPT)	Bone Marrow/ Peripheral Blood	EDTA	6ML	Urgent for Acute Leukaemia: 24 hours (Verbal Report) Routine: 2 Weeks of Working Days	<ol style="list-style-type: none"> 1. CSF samples must be sent immediately and reach the lab within 4 hours of sampling to ensure viability of the cells. 2. For Urgent IPT Case, please contact the Haematologist On-Call.
13.		CSF	Bijou bottle	1-2 ml		

NO	TESTS	SPECIMEN TYPE	CONTAINER	VOLUME	LTAT	REMARK
14.	Kleihauer	Fresh Whole Blood and Cord Blood Samples	EDTA	3ML	Routine: 5 Working Days	<p>Transport samples within 4 hours at room temperature</p> <p>Requirement :</p> <ul style="list-style-type: none"> a. Baby's Cord Blood (As Positive Control)- 1 Tube EDTA b. Adult's Cord Blood (As Negative Control)- 1 Tube EDTA c. Mother's Blood (As sample) <p><i>* Please contact Haematologist On-Call for appointment.</i></p> <p>Specimen Rejection:</p> <ul style="list-style-type: none"> a. Sample received after 4 hours of blood collection b. Exceed 72 hours after delivery.
15.	Factor Assays (VIII, IX)	Blood (Plasma)	3.2% Trisodium Citrate	Collect until indicated mark x1 tube	Routine: 4 Weeks	<ol style="list-style-type: none"> 1. Transport samples within 4 hours at room temperature OR Separate plasma from cells as soon as possible. Freeze the plasma at -40°C and transport frozen plasma on dried ice. 2. For Urgent case, please contact Haematologist On-Call.

NO	TESTS	SPECIMEN TYPE	CONTAINER	VOLUME	LTAT	REMARK
16.	Lupus Anticoagulant	Blood (Plasma)	3.2% Trisodium Citrate	Collect until indicated mark x2 tubes	Routine: 4 Weeks	<ol style="list-style-type: none"> 1. Transport samples within 4 hours at room temperature OR Separate plasma from cells as soon as possible. Freeze the plasma at -40°C and transport frozen plasma in dried ice. 2. For Urgent case, please contact Haematologist On-Call.
17.	Osmotic Fragility Test (OFT)	Fresh Whole blood	EDTA, Lithium Heparin	4ML	Routine: 4 Weeks	<ol style="list-style-type: none"> 1. Deliver tube immediately to the laboratory at room temperature. 2. Please contact Haematologist On-Call for an appointment.
18.	Mixing Test	Blood (Plasma)	3.2% Trisodium Citrate	Collect until indicated mark x3 tubes	Routine: 4 Weeks	<ol style="list-style-type: none"> 1. Transport samples within 4 hours at room temperature OR Separate plasma from cells as soon as possible. Freeze the plasma at -40°C and transport frozen plasma on dried ice. 2. For Urgent case, please contact Haematologist On-Call.
19.	Inhibitor Assay	Blood (Plasma)	3.2% Trisodium Citrate	Collect until indicated mark x2 tubes	Routine: 4 Weeks	
20.	Factor VIII Inhibitor Screening	Blood (Plasma)	3.2% Trisodium Citrate	Collect until indicated mark x2 tubes	Routine: 4 Weeks	

LIST OF HAEMATOLOGY TESTS OFFERED BY THE REFERENCE LABORATORIES

NO	TESTS	SPECIMEN TYPE	CONTAINER	VOLUME	REFERRED HOSPITAL	RLTAT	DAY OF DESPATCH	REMARKS
LIST OF HAEMATOLOGY TESTS OFFERED IN HOSPITAL AMPANG								
1.	Paroxysmal Nocturnal Haemoglobinuria (PNH)	Whole Blood	EDTA	3ML	Hospital Ampang	Hosp. Ampang: 7 Working Days Results Delivered to HSAJB : 1 Month	Monday & Wednesday Only	*Transport Samples Without Delay Within 24 Hours At Room Temperature *Never Freeze Specimens
2.	BCR-ABL I (CML Case Only) (By Qualitative PCR)	Bone Marrow Aspirate / Peripheral Blood	EDTA	4ML	Hospital Ampang	Hosp. Ampang: 4 Weeks Results Delivered to HSAJB : 2 Months	Monday & Wednesday Only	*Transport Samples Without Delay Within 24 Hours At Room Temperature *Never Freeze Specimens
3.	BCR-ABL I (CML Case Only) (By Quantitative RT-PCR)	Bone Marrow Aspirate (BMA) / Peripheral Blood(PB)	EDTA	BMA (4ML) PB (10ML)	Hospital Ampang	Hosp. Ampang: 8 Weeks Results Delivered to HSAJB : 3 Months	Monday & Wednesday Only	*Transport Samples Without Delay Within 24 Hours At Room Temperature *Never Freeze Specimens
4.	JAK2 (By Qualitative PCR)	Bone Marrow Aspirate / Peripheral Blood	EDTA	4ML	Hospital Ampang	Hosp. Ampang: 8 Weeks Results Delivered to HSAJB : 3 Months	Monday & Wednesday Only	*Transport Samples Without Delay Within 24 Hours At Room Temperature *Never Freeze Specimens

NO	TESTS	SPECIMEN TYPE	CONTAINER	VOLUME	REFERRED HOSPITAL	RLTAT	DAYS OF SPECIMEN COLLECTION	REMARKS
5.	RUNX1-RUNX1 T1 (By Qualitative PCR)	Bone Marrow Aspirate / Peripheral Blood	EDTA	4ML	Hospital Ampang	Hosp. Ampang: 4 Weeks Results Delivered to HSAJB :2 Months	Monday & Wednesday Only	*Transport Samples Without Delay Within 24 Hours At Room Temperature *Never Freeze Specimens
6.	RUNX1-RUNX1 T1 (By Quantitative RT-PCR)	Bone Marrow Aspirate	EDTA	4ML	Hospital Ampang	Hosp. Ampang: 10 Weeks Results Delivered to HSAJB :4 Months	Monday & Wednesday Only	*Transport Samples Without Delay Within 24 Hours At Room Temperature *Never Freeze Specimens
7.	Cbfβ -MYH11A (By Qualitative PCR)	Bone Marrow Aspirate / Peripheral Blood	EDTA	4ML	Hospital Ampang	Hosp. Ampang: 4 Weeks Results Delivered to HSAJB :2 Months	Monday & Wednesday Only	*Transport Samples Without Delay Within 24 Hours At Room Temperature *Never Freeze Specimens
8.	Cbfβ -MYH11A (By Quantitative RT-PCR)	Bone Marrow Aspirate	EDTA	4ML	Hospital Ampang	Hosp. Ampang: 10 Weeks Results Delivered to HSAJB :4 Months	Monday & Wednesday Only	*Transport Samples Without Delay Within 24 Hours At Room Temperature *Never Freeze Specimens

NO	TESTS	SPECIMEN TYPE	CONTAINER	VOLUME	REFERRED HOSPITAL	RLTAT	DAYS OF SPECIMEN COLLECTION	REMARKS
9.	Leukemia FISH Analysis	Bone Marrow Aspirate / Peripheral Blood	Sodium Heparin	BMA (2ML) PB (5ML)	Hospital Ampang	Hosp. Ampang: 10 Days Results Delivered to HSAJB : 1 Month	Monday & Wednesday Only	*Transport Samples Without Delay Within 24 Hours At Room Temperature *Never Freeze Specimens
10.	ADAMTS 13	Blood (Plasma)	3.2% Trisodium Citrate	3ML	Hospital Ampang	Hosp. Ampang: (Batch Test): 4-8 Weeks Results Delivered to HSAJB : 3 Months	Sunday-Thursday	*Deliver Tubes Immediately To Haematology Lab.
11.	Serum Erythropoietin (EPO)	Blood (Serum)	Plain Tube	1.5ML Serum	Hospital Ampang	Hosp. Ampang: (Batch Test) MDS : 3 Months MPN&PRV: 4 Months Results Delivered to HSAJB : MDS : 5 Months MPN&PRV: 6 Months	Sunday-Thursday	*Deliver Tubes Immediately To Haematology Lab.

NO	TESTS	SPECIMEN TYPE	CONTAINER	VOLUME	REFERRED HOSPITAL	RLTAT	DAYS OF SPECIMEN COLLECTION	REMARKS
LIST OF HAEMATOLOGY TESTS OFFERED IN HOSPITAL KUALA LUMPUR (HKL)								
12.	DNA Analysis (Alpha Thalassaemia)	Whole Blood	EDTA	3ML	Hospital Kuala Lumpur (Molecular Haematology Laboratory)	HKL: 90 Working Days Results Delivered to HSAJB :4 Months	Sunday-Thursday	*Attach With HB Analysis Result, And Latest FBC Indices Result (3 months validity)
13.	Chromosome Studies (Paediatric Sample)	Whole Blood	Lithium Heparin	4ML	Hospital Kuala Lumpur (Genetic Laboratory)	HKL: 10 Working Days Results Delivered to HSAJB :1 Month	Sunday-Thursday	*Chromosome Study Form *Parents' Sample Needed For Confirmative Cases *Fix appointment with HKL Genetics Lab
14.	DNA Extraction	Whole Blood	EDTA	3ML	Hospital Kuala Lumpur (Genetic Laboratory)	HKL: 7 days	Sunday-Thursday	*For storage purpose
15.	Chromosome Microarray	Whole Blood	EDTA	3ML	Hospital Kuala Lumpur (Genetic Laboratory)	HKL: 3-6 Months Results Delivered to HSAJB :5-8 months	Sunday-Thursday	

NO	TESTS	SPECIMEN TYPE	CONTAINER	VOLUME	REFERRED HOSPITAL	RLTAT	DAYS OF SPECIMEN COLLECTION	REMARKS
THE LIST OF TESTS HAEMATOLOGY OFFERED AT INSTITUTE OF MEDICAL RESEARCH (IMR)								
16.	Bone Marrow Chromosome Analysis For Hematological Malignancies	Bone Marrow Aspirate	Sodium Heparin	FIRST 2.0-3.0ML Of BMA	Institute Medical Research	IMR: 18 Working Days Results Delivered to HSAJB : 2 Months	Monday & Wednesday Only	*Bone Marrow Cytogenetics Form
17.	FISH For BCR-ABL 1	Bone Marrow Aspirate / Peripheral Blood	Sodium Heparin	2.0-3.0ML	Institute Medical Research	IMR: 7 Working Days Results Delivered to HSAJB : 1 Month	Monday & Wednesday Only	*Bone Marrow Cytogenetics Form
18.	FISH For PML-RARA	Bone Marrow Aspirate / Peripheral Blood	Sodium Heparin	2.0-3.0ML	Institute Medical Research	IMR: 7 Working Days Results Delivered to HSAJB : 1 Month	Monday & Wednesday Only	*Bone Marrow Cytogenetics Form
19.	Chromosome Breakage Study For Fanconi's Anemia	PB	Lithium Heparin	10ML	Institute Medical Research	IMR: 18 Working Days Results Delivered to HSAJB : 2 Months	Monday & Wednesday Only	*Bone Marrow Cytogenetics Form *Fix Appointment With IMR Genetics Lab *A Control Sample, Matched For Age And Sex Is Required *Patient Must Not Be On Any Antibiotic for 2 Weeks Preceding Blood Collection.

NO	TESTS	SPECIMEN TYPE	CONTAINER	VOLUME	REFERRED HOSPITAL	RLTAT	DAYS OF SPECIMEN COLLECTION	REMARKS
20.	Acute Myeloid Leukaemia Study (FLT3 Gene)	Bone Marrow Aspirate / Peripheral Blood	EDTA	2.5-5.0ML	Institute Medical Research	IMR: 30 Working Days Results Delivered to HSAJB :3 Months	Monday & Wednesday Only	*Molecular Analysis For Leukaemia Form
21.	Acute Myeloid Leukaemia Study (NPM1 Gene)	Bone Marrow Aspirate / Peripheral Blood	EDTA	2.5-5.0ML	Institute Medical Research	IMR: 30 Working Days Results Delivered to HSAJB :3 Months	Monday & Wednesday Only	*Molecular Analysis For Leukaemia Form
22.	Acute Myeloid Leukaemia Study (CEBPA Gene)	Bone Marrow Aspirate / Peripheral Blood	EDTA	2.5-5.0ML	Institute Medical Research	IMR: 30 Working Days Results Delivered to HSAJB :3 Months	Monday & Wednesday Only	*Molecular Analysis For Leukaemia Form
23.	Acute Myeloid Leukaemia Study (c-KIT Gene)	Bone Marrow Aspirate / Peripheral Blood	EDTA	2.5-5.0ML	Institute Medical Research	IMR: 30 Working Days Results Delivered to HSAJB :3 Months	Monday & Wednesday Only	*Molecular Analysis For Leukaemia Form
24.	Chronic Myeloid Leukaemia Mutation (T315I GENE)	Bone Marrow Aspirate / Peripheral Blood	EDTA	2.5-5.0ML	Institute Medical Research	IMR: 30 Working Days Results Delivered to HSAJB :3 Months	Monday & Wednesday Only	*Molecular Analysis For Leukaemia Form

NO	TESTS	SPECIMEN TYPE	CONTAINER	VOLUME	REFERRED HOSPITAL	RLTAT	DAYS OF SPECIMEN COLLECTION	REMARKS
25.	Chimerism Studies	Bone Marrow Aspirate / Peripheral Blood	EDTA	10-20ML	Institute Medical Research	IMR: 10 Working Days Results Delivered to HSAJB : 1 Month	Monday & Wednesday Only	*Chimerism Analysis Form *The Recipient Pre-HSCT Sample And Donor Sample Are Required.
26.	DNA Analysis For Thalassemia Syndromes	Blood	EDTA	3ML	Institute Medical Research	IMR: 14-30 Working Days Results Delivered to HSAJB : 3 Months	Sunday-Thursday	*Thalassemia Testing Form *For Pediatric Samples, Must Be Accompanied With Parents' Sample.(Include Parent's Hb Analysis Result)
27.	Chromosomal Microarray For Genetic Diseases	Blood	EDTA	10ML	Institute Medical Research	IMR: 90 Working Days Results Delivered to HSAJB : 6 Months	Monday & Wednesday Only	*For Pediatric Samples, must be accompanied with Parents' Sample. *IMR Consultation Is Required Before Sending Samples
28.	Floating-Harbor Syndrome	Blood	EDTA	3ML	Institute Medical Research	IMR: 30 Working Days Results Delivered to HSAJB : 3 Months	Sunday-Thursday	

NO	TESTS	SPECIMEN TYPE	CONTAINER	VOLUME	REFERRED HOSPITAL	RLTAT	DAYS OF SPECIMEN COLLECTION	REMARKS
THE LIST OF HAEMATOLOGY TESTS OFFERED AT PUSAT DARAH NEGARA (PDN)								
29.	Thrombophilia Screening: Lupus Anticoagulant Activated Protein C Resistance Test Antiphospholipid Antibodies Protein C/S Activity Antithrombin Activity Factor V Leiden Prothrombin 20210A	Plasma	3.2% Trisodium Citrate	15ML	Pusat Darah Negara	PDN: 30 Working Days Results Delivered to HSAJB :3 Months	Sunday-Thursday	
30.	VWF : AG VWF : CB VWF : Rcof	Plasma	3.2% Trisodium Citrate	10ML	Pusat Darah Negara	PDN: 10 Working Days Results Delivered to HSAJB :1 Month	Sunday-Thursday	
31.	Molecular Analysis For Hemophilia	Blood	3.2% Trisodium Citrate	9ML	Pusat Darah Negara	PDN: 80 Working Days Results Delivered to HSAJB :5 Months	Monday & Wednesday Only	*Molecular Analysis For Hemophilia Form *Per-Pat 301 Form With Complete Family Tree History *Consent PDN Form

- More details are available at:

- IMR Laboratory Diagnostic service at http://www.imr.gov.my/images/handbook/imr_handbook_2017.pdf
- HKL Pathology Services Handbook 2016 at <http://www.hkl.gov.my/content/patologi/pathology%20handbook.pdf>
- Hosp. Ampang Handbook : <http://hampg.moh.gov.my/images/DokumenJabatan/Hematologi/FIRST-EDITION-MRKH-HANDBOOK.pdf>

**ANATOMIC PATHOLOGY UNIT
(OFFICE HOURS ONLY)**

LIST OF TESTS OFFERED AT HISTOPATHOLOGY LABORATORY, HSAJB

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
1	Routine HPE	Small biopsy	Yellow screw-cap container / 10% neutral buffered formalin (NBF)	Minimum ratio of 10:1 10%NBF:tissue	Urgent:3 working days Non-urgent: 14 working days	Without further ancillary tests
2		Surgical resection	Disposable plastic specimen container (Robust) / 10% neutral buffered formalin (NBF)	Minimum ratio of 10:1 10%NBF:tissue	Urgent: 14 working days Non-urgent: 28 working days	Without further ancillary tests
3	Immunofluorescence (IF)	Fresh tissue	Yellow screw-cap container / Petri dish	-	2 weeks	-Inform laboratory before sending the specimen and send immediately. - If delay is anticipated, put few drops of normal saline to prevent drying and send in 2-8°C.
4	Frozen section (FS)	Fresh tissue	Yellow screw-cap container	-	30 minutes (depend on the size and quantity of specimens)	-Contact MO for appointment at least one day before. Emergency FS should be discussed between surgeon and pathologist. -Send immediately to Histopathology laboratory.
5	Referred case for 2 nd opinion	Block and/or slide	-	-	2-6 weeks	-Include referral letter/PER-PAT 301 form and previous HPE Report

LIST OF TESTS OFFERED AT THE CYTOLOGY LABORATORY, HSAJB

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
1	Gynae	Conventional	Smear on glass slide and fix with 95% alcohol	-	4 weeks	Fix slide immediately in 95% alcohol or spray fixative
		Liquid based cytology	Sample collected in vial containing fixative	-	2 weeks	Vial supplied by the cytology laboratory
2	Non-Gynae	Body fluids	Yellow screw-cap container	As collected	Urgent: 3 days Non-urgent: 2 weeks	Send immediately to Cytology Laboratory for processing. If delay anticipated refrigerate specimen at 2°C-8°C
		Cerebrospinal fluids (CSF)	Bijou bottle	As collected	3 days	Send immediately to Cytology Laboratory for urgent processing
		Bronchial Brushing	Glass slide	-	Urgent: 3 days Non-urgent: 2 weeks	Fix slide immediately in 95% alcohol or spray fixative
		Bronchial Washing / Bronchial Alveolar Lavage	Plain tube	As collected	Urgent: 3 days Non-urgent: 2 weeks	Send immediately to Cytology Laboratory for processing. If delay anticipated refrigerate specimen at 2°C-8°C

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
	Non-Gynae	Sputum	Yellow screw-cap container	As collected	Urgent: 3 days Non-urgent: 2 weeks	Send immediately to Cytology Laboratory for processing. If delay anticipated refrigerate specimen at 2°C-8°C
		Urine	Yellow screw-cap container	As collected	Urgent: 3 days Non-urgent: 2 weeks	Send immediately to Cytology Laboratory for processing. If delay anticipated refrigerate specimen at 2°C-8°C
		Urine for Decoy Cell	Yellow screw-cap container	As collected	3 days	1)1 st Early morning urine 2)Send the specimen to the lab within one hour (upon collection)
		Nipple discharge	Yellow screw-cap container/ Glass slide	As collected	Urgent: 3 days Non-urgent: 2 weeks	1) Send immediately to Cytology Laboratory for processing. If delay anticipated refrigerate specimen at 2°C-8°C 2) For wet smear fix slide immediately in 95% alcohol or spray fixative
		Gastric Lavage	Yellow screw-cap container/ Plain tube	As collected	Urgent: 3 days Non-urgent: 2 weeks	Send immediately to Cytology Laboratory for processing. If delay anticipated refrigerate specimen at 2°C-8°C

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
3	Fine Needle Aspiration (FNAC)	FNAC from various organs	1) 2 wet smears(glass slide)– soak in 95% alcohol immediately after collection for 30 minutes 2)2 dry smears – let the smear (on glass slide) dry at room temperature	-	Urgent: 3 days Non-urgent: 2 weeks	For wet smear fix slide immediately in 95% alcohol or spray fixative
4	Cell Block	Body fluid from various organs	Collect the fluid in cell block solution.	As collected	2 weeks	
		FNAC specimens	Collect the fluids in cell block solution.	As collected	2 weeks	

LIST OF ANATOMIC PATHOLOGY TESTS OFFERED BY REFERENCE LABORATORIES

NO	TESTS	SPECIMEN TYPE	CONTAINER	VOLUME/ SIZE	REFERRED HOSPITAL	RLTAT	DAY OF DESPATCH	REMARKS
1	HER-2 Dual Probe In Situ Hybridization (ISH)	Paraffin block	-	-	Histopathology Lab, Pathology Dept HKL	1 month	Upon request	-
2	EGFR Mutation Test	Unstained slide	-	-	Molecular Genetic Lab, Genetic Dept HKL	According to referral lab	Upon request	-
3	Rearrangement involving ALK gene via Fluorescence In Situ Hybridization (FISH)	Unstained slide	-	-	Cytogenetic Lab, Genetic Dept HKL	According to referral lab	Upon request	-
4	KRAS Mutation Test	Unstained slide	-	-	Molecular Genetic Lab, Genetic Dept HKL	According to referral lab	Upon request	-
5	Chromosome 1p/19q deletion/IDH Testing	Unstained slide	-	-	Cytogenetic Lab, Genetic Dept HKL	According to referral lab	Upon request	-

CLINICAL LABORATORY
LIST OF TESTS OFFERED AT THE CLINICAL LABORATORY (OFFICE HOURS ONLY)

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
CHEMICAL PATHOLOGY TESTS						
1.	Alanine Transaminase (ALT)	Blood	Lithium Heparin	4mls	1 hour (STAT) 6 hours (routine)	Samples should reach the laboratory within two hours of sample collection. For specimens requiring bilirubin quantitation please protect from light source.
2.	Albumin	Blood	Lithium Heparin	4mls		
3.	Aspartate Transaminase (AST)	Blood	Lithium Heparin	4mls		
4.	Alkaline Phosphatase (ALP)	Blood	Lithium Heparin	4mls		
5.	Bilirubin, Total	Blood	Lithium Heparin	4mls		
6.	Bilirubin, Direct	Blood	Lithium Heparin	4mls		
7.	Bilirubin, Indirect	Blood	Lithium Heparin	4mls		
8.	Cardiac enzymes (CE) a. CK b. AST c. LDH	Blood	Lithium Heparin	4mls		
9.	Calcium	Blood	Lithium Heparin	4mls		
10.	Chloride	Blood	Lithium Heparin	4mls		

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
11.	Creatinine	Blood	Lithium Heparin	4mls	1 hour (STAT) 6 hours (routine)	Samples should reach the laboratory within two hours of sample collection.
12.	Glucose	Blood	Sodium fluoride	4mls		
13.	Lactate Dehydrogenase (LDH)	Blood	Lithium Heparin	4mls		
14.	Lipid Profile:	Blood	Lithium Heparin	4mls		
	a. Total Cholesterol,(TC)					
	b. HDL -Cholesterol					
	c. LDL -Cholesterol					
	d. Triglycerides (TG)					
15.	Liver Function Test:	Blood	Lithium Heparin	4mls		
	a. Total Protein					
	b. Albumin					
	c. Globulin					
	d. Total Bilirubin					
	e. ALP					
f. ALT						
16.	Magnesium (Mg)	Blood	Lithium Heparin	4mls		

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
17.	Phosphate	Blood	Lithium Heparin	4mls	1 hour (STAT) 6 hours (routine)	Samples should reach the laboratory within two hours of sample collection. For specimens requiring bilirubin quantitation please protect from light source.
18.	Potassium	Blood	Lithium Heparin	4mls		
19.	Renal Profile: a. Sodium b. Potassium c. Chloride d. Urea e. Creatinine	Blood	Lithium Heparin	4mls		
20.	Total Protein	Blood	Lithium Heparin	4mls		
21.	Total Serum Bilirubin (TSB) a. Total bilirubin b. Direct Bilirubin	Blood	Lithium Heparin	4mls		
22.	Urea	Blood	Lithium Heparin	4mls		
23.	Uric Acid	Blood	Lithium Heparin	4mls		
24.	Urine Pregnancy Test	Urine	Sterile screw-cap container	10 mls		
25.	Stool Occult Blood	Stool	Sterile screw-cap container	3mls	1 hour	

NO	TESTS	TYPE OF SPECIMEN	SPECIMEN CONTAINER	VOLUME OF SPECIMEN	LTAT	REMARK
HAEMATOLOGY TESTS						
26.	Full Blood Count (FBC)	Blood	EDTA	2-3 mls	1 hour (STAT) 4 hours (routine)	Transport samples within 4 hours at room temperature
27.	Erythrocyte Sedimentation Rate (ESR)	Blood	Sodium Citrate	2 mls	1 hour 10 minutes (STAT) 4 hours (routine)	
28.	Prothrombin Time (PT)/INR	Blood	Sodium Citrate	2 mls	1 hour (STAT) 4 hours (routine)	
29.	Activated Partial Thrombin Time (APTT)	Blood	Sodium Citrate	2 mls		
URINALYSIS TESTS						
30.	Urine Full Chemistry And Microscopic Examination (UFEME)	Urine	Sterile screw-cap container	10mls	1 hour (STAT) 4 hours (routine)	
MISCELLANEOUS TESTS						
31.	Stool : Ova & Cyst	Fresh Stool	Sterile screw-cap container	>5g for semi-solid stool > 5mls for liquid stool	1 hour (STAT) 4 hours (routine)	

THE LIST OF OFFICERS CONTACT NUMBER(S)

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ABBREVIATION

ACTH	Adrenocorticotrophic Hormone
AIRC	Allergy And Immunology Research Centre
ALP	Alkaline Phosphatase
ALT	Alanine Transaminase
APTT	Activated Partial Thrombin Time
ASOT	Anti Streptolysin-O Titer
BAL	Bronchio-Alveolar Lavage
BBA	Blind Bronchial Aspirate
C&S	Culture And Sensitivity
CK	Creatine Kinase
CMV	Cytomegalovirus
CRP	C-Reactive Protein
CSF	Cerebrospinal Fluid
DIVC	Disseminated Intravascular Coagulation
EBV	Epstein Barr (Ebv)
ESR	Erythrocytic Sedimentation Rate
FBC	Full Blood Count
FBP	Full Blood Picture
FISH	Fluorescence In Situ Hybridization
FNAC	Fine Needle Aspiration Cytology
HKL	Hospital Kuala Lumpur
HLA	Human Leukocyte Antigen
HSV	Herpes Simples Virus
ID	Identification

IF	Immunofluorescence
IMR	Institute Of Medical Research
ISH	In Situ Hybridization
LAB	Laboratory
LTAT	Laboratory Turn Around Time
MKAJB	Makmal Kesihatan Awam Johor Bahru
MKAK	Makmal Kesihatan Awam Kebangsaan
NMDAR	Anti N Methyl D Aspartate Receptor (Nmdar)
PCR	Polymerase Chain Reaction
PDN	Pusat Darah Negara
PT	Protrombin Time
RF	Rheumatoid Factor
RLTAT	Reference Laboratory Turn Around Time
TAT	Turn Around Time
UMDP	Unit Of Molecular Diagnostics And Protein
VTM	Virus Transport Media