
HOSPITAL RAJA PERMAISURI BAINUN IPOH

Pathology Services
Laboratory Handbook

Issue No: 01

01/08/2026

RECORD OF AMENDMENT

No.	Issue No.	Details	Prepared by	Amended/ Reviewed Date
1.	01	<u>Add new test</u> Chemical Pathology Section Osmolality (Urine) Test - pg 4. Microbiology Section EBV IgM IgG Test - pg. 33. Gastrointestinal Multiplex PCR test - pg. 35. HSV IgG test - pg. 38 Chlamydomphila penumoniae - pg. 45 Rubella IgG - pg. 46 Helminth culture for hookworm and <i>Strongyloides stercoralis</i> - pg. 96 Helminth PCR. Multiplex PCR - pg. 96 Flow Cytometry Section Immuno-phenotyping- MRD-B-ALL detection by Flow Cytometry - pg. 58. <u>Add text</u> Heamostasis Section *All samples for coagulation analysis require plasma separation within 4-hour window from time of venipuncture. Delayed processing beyond this limit may compromise factor stability and lead to inaccurate results - Pg 60-64. Molecular Haematology Section BCR:ABL1, Major (p210), Quantitative. pg. 66.	Dr. Hj. Subki bin Ahmad	1.8.2026

		Table 3: Critical Findings in Anatomical Pathology. - Malignancy in critical places - pg 129.		
--	--	--	--	--

CONTENTS

	Page
CONTENTS	vi-viii
FOREWORD HOSPITAL DIRECTOR	ix
FOREWORD HEAD OF DEPARTMENT	x
EDITORIAL COMMITTEE MEMBERS	xi
ORGANIZATION CHART, DEPARTMENT OF PATHOLOGY, HOSPITAL RAJA PERMAISURI BAINUN IPOH	xii
MINISTRY OF HEALTH' S VISION AND MISSION	xiii
DEPARTMENT OF PATHOLOGY' S VISION & MISSION	xiii
DIRECTORY	xiv-xv
GENERAL OPERATING POLICIES, TERM AND SERVICE AGREEMENTS	1
1.0 INTRODUCTION	1
2.0 OBJECTIVES OF THE MANUAL	1
3.0 DESCRIPTION OF ORGANIZATION	1
4.0 GENERAL INFORMATION	2
4.1 LOCATION	2
4.2 ADDRESS	2
4.3 COUNTER	2
5.0 SCOPE OF SERVICES	2-120
6.0 OPERATING HOURS	121
6.1 IN-PATIENTS	121
6.2 DISTRICT/ HEALTH CLINIC	121
7.0 LABORATORY HEALTH & SAFETY POLICY	122
8.0 COMPLAINT OR FEEDBACK	122

9.0	ADDITIONAL INFORMATION		122
10.0	LABORATORY SERVICES AGREEMENT		123–124
GENERAL TEST ORDERING INFORMATION			124
1.0	SPECIMEN/REQUEST FORMS		124
	1.1	SPECIMEN	124
	1.2	REQUEST FORMS	126
2.0	TYPE OF CONTAINERS		126
3.0	TEST ORDERING		126
4.0	TRANSPORTATION OF SPECIMEN		127–128
5.0	INFORMATION OF TESTS & LOCATION TO SEND FOR MEDICO-LEGAL SAMPLES		128
6.0	CRITICAL VALUE NOTIFICATION		129–131
7.0	TYPES OF CONTAINERS AND ORDER OF DRAW		131
	7.1	ORDER OF DRAW	131–132
	7.2	TYPES OF CONTAINERS	133–139
8.0	BLOOD COLLECTION PROCEDURE (WHO GUIDELINES ON DRAWING BLOOD: BEST PRACTICES IN PHLEBOTOMY, 2010)		140–142
9.0	SAMPLE LABELLING		143
10.0	REJECTION OF REQUESTS		144–146
11.0	PROTECTION OF PERSONAL INFORMATION		146
12.0	SUPPLY OF CONTAINERS		146
13.0	REPORTS		146
14.0	CONSENT		147
15.0	KNOWN FACTORS THAT AFFECT THE PERFORMANCE OF THE EXAMINATION / INTERPRETATION OF THE RESULT		147
16.0	ADVISORY SERVICE		147–148

17.0	ORAL REQUEST	148
18.0	LISTS OF URGENT TESTS	148
19.0	SPECIMEN STORAGE & DISPOSAL	149
20.0	TEST ORDERING DURING HIS @KKM OR LIS DOWNTIME (CONTIGENCY PLAN)	150-151

FOREWORD HOSPITAL DIRECTOR

This Laboratory Handbook is to assist all health care providers in patient management. It provides a concise guide to the range of services provided by the Pathology Department, as well as assisting to answer some of the clinical questions that are so often asked.

I' m so proud of the Pathology Department in patient care, education and research leading to the highest quality of services and taking into consideration the needs and requirements of its users.

I would like to congratulate the Pathology Department for their commitment in developing this Laboratory Handbook. I sincerely hope all health care providers will have at hand, an additional resource to essential and updated information on laboratory services and will further improve the quality of HRPB work in Malaysia.

I am confident that this book will remain a valuable reference in our library of knowledge.

Dr. Fakhruddin bin Amran
Director
Hospital Raja Permaisuri Bainun
Perak Darul Ridzuan

FOREWORD HEAD OF DEPARTMENT

This handbook outlines the pathology service offered by Pathology Department, Hospital Raja Permaisuri Bainun, Ipoh, Perak. It is intended to help hospital staff and local general practitioners to make the best use of the laboratory services.

The information provided included the types of specimens required, instructions for collecting specimens with particular emphasis on safety, the range of investigations offered, as well as reference values.

The updated version includes a quick reference to the TAT of routine/urgent tests. This lab handbook is also available in the hospital website: <http://hrpb.moh.gov.my>

I hope that this Handbook will help us improve our service to you. I also hope it will assist you and your staff to achieve the ultimate aim of us to improve the health of our patients and our community.

Dr. Nurul Bahiyah Baharudin
Head Department of Pathology
Hospital Raja Permaisuri Bainun
Perak Darul Ridzuan

EDITORIAL COMMITTEE MEMBERS

Advisor

Dr. Nurul Bahiyah Baharudin
Head of Department

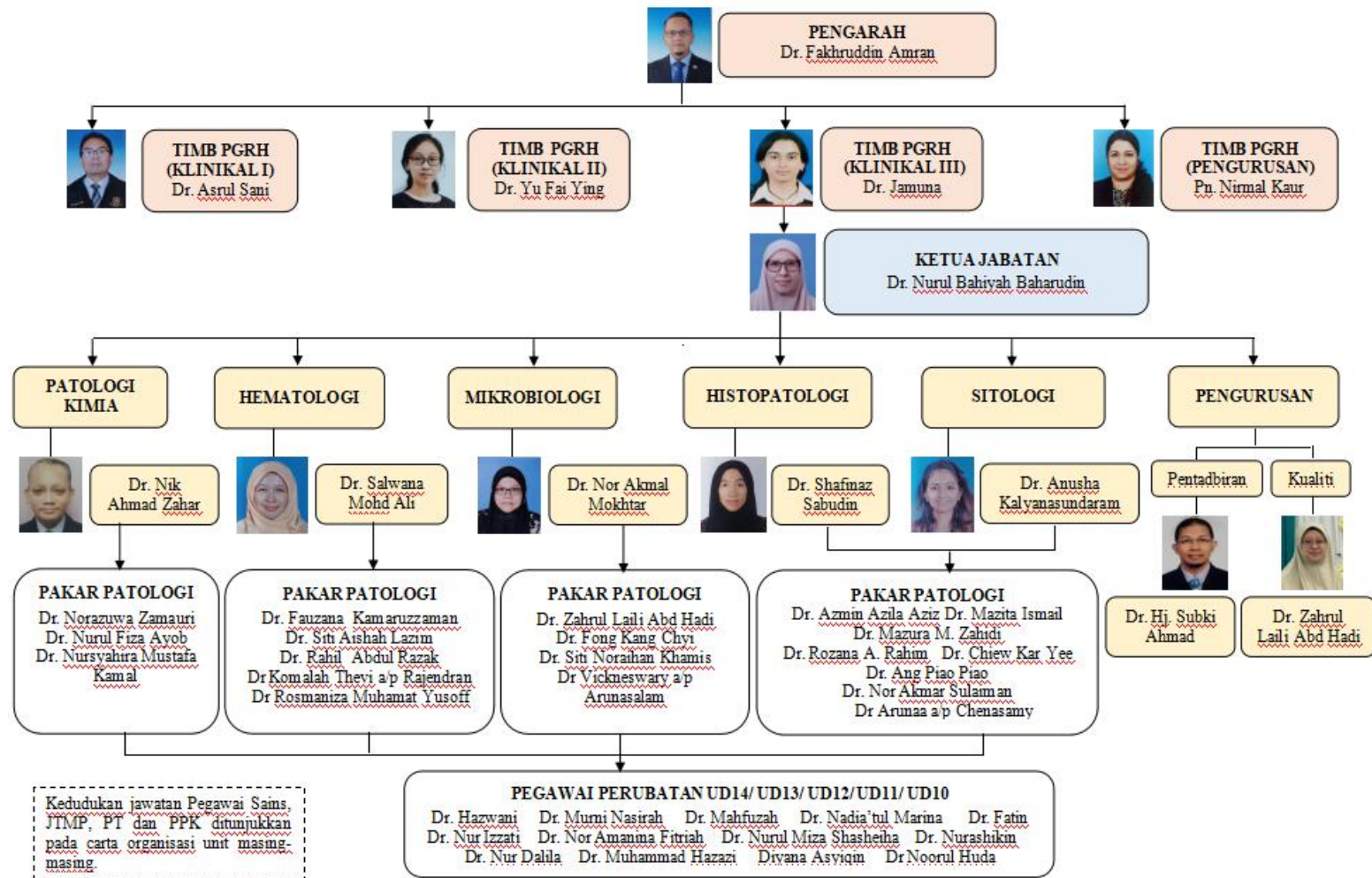
Chairman

Dr. Hj. Subki Ahmad
Lab Manager

Committee

Chemical Pathology	Dr. Norazuwa Zamauri	Pathologist (Chem Path)
	Zamzuria Mat Zainone	Sc Officer (Chem Path)
Medical Microbiology	Dr. Zahrul Laili Abd Hadi	Pathologist (Microbiology)
	Dr. Mahfuzah Mahamud	Medical Officer
	Azura Sadri	Sc Officer (Microbiology)
	Uswatun Bahirah Ahmad Hisham	Sc Officer (Microbiology)
Haematology	Muhammad Fahmi Mehdi	Sc Officer (Biomedical)
Histopathology	Nurul Farhana Mohd Hamedi	Sc Officer (Biomedical)
	Nurul Husna Mohd Zamri	Medical Lab Technologist
Cytology	Mohd Suffian Ab Ghani	Sc Officer (Biomedical)
LIS/ HIS	Dr Fong Kang Chyi	Pathologist (Microbiology)
Rejection	Azlina Yahya	Sc Officer (Microbiology)
Outsource	Mohd Emir Shafiq Suhaimi	Sc Officer (Microbiology)

ORGANIZATION CHART, DEPARTMENT OF PATHOLOGY, HOSPITAL RAJA PERMAISURI BAINUN IPOH



MINISTRY OF HEALTH' S VISION AND MISSION

VISION

Malaysia is to be a nation of healthy individuals, families and communities, through a health system that is equitable, affordable, efficient, technologically appropriate, environmentally adaptable and consumer friendly, with emphasis on quality, innovation, health promotion and respect for human dignity, and which promotes individual responsibility and community participation towards an enhanced quality of life.

MISSION

The mission of the Ministry of Health is to build partnership for health to motivate and facilitate the people to:

- Attain fully their potential in health
- Appreciate health as a valuable asset
- Take positive action to improve further and sustain their health status to enjoy a better quality of life.

DEPARTMENT OF PATHOLOGY' S VISION & MISSION

VISION

To provide efficient, accurate and innovative pathological service based on a quality system that can give full satisfaction to clients

MISSION

The pathology service will become an excellent service that utilizes suitable and up to date technologies, spontaneous service, sensitive towards client' s needs based upon quality and team work combined with professionalism for sake of patient care.

CLIENT CHARTER

The pathology Department shall provide reliable, accurate and timely results in a customer friendly manner

DIRECTORY

Contact Numbers Call the direct line to respective laboratory unit: 05-208 7 xxxx followed by extension number (Ext)

No	Officer	Position	Ext
1	Dr. Nurul Bahiyah Baharudin	Head of Department	5200
2	Dr. Azmin Azila Aziz	Pathologist	5200
3	Dr. Mazita Ismail	Pathologist	5222
4	Dr. Nik Ahmad Zahar Nik Yah	Pathologist	5213
5	Dr. Zahrul Laili binti Abd Hadi	Pathologist	5232
6	Dr. Mazura Mohamed Zahidi	Pathologist	5222
7	Dr. Fauzana Kamaruzzaman	Pathologist	5216
8	Dr. Shafinaz Sabudin	Pathologist	5217
9	Dr. Siti Aishah Lazim	Pathologist	5212
10	Dr. Anusha Kalyanasundaram	Pathologist	5215
11	Dr. Nurul Fiza Ayob	Pathologist	5220
12	Dr. Nursyahira Mustafa Kamal	Pathologist	5214
13	Dr. Salwana Mohd Ali	Pathologist	5215
14	Dr. Norazuwa Zamauri	Pathologist	5216
15	Dr. Fong Kang Chyi	Pathologist	5236
16	Dr. Nor Akmal Mokhtar	Pathologist	5236
17	Dr. Vickneswary a/p Arunasalam	Pathologist	5236
18	–	Pathologist	5236
19	Dr. Hj Subki Ahmad	Lab Manager	5208
20	–	Senior Biochemist	5219
21	–	Senior Microbiologist	5231
22	ePerolehan Room	Scientist/ MLT	5209
23	PA Room	Clerk	5201
24	MO1 Room	Medical Officer	5203
25	MO2 Room	Pathologist	5220
26	Scientific Officers' Room	Microbiologist	5231
27	Scientific Officers' Room	Biochemist & Biomedical	5210/5211
28	Main Counter		5204/5223
29	Integrated Lab (Validation)		5202
30	Drug Lab	Scientist/ MLT	5206
31	Outsource	Scientist/ MLT	5225
32	Cytology Lab	Scientist/ MLT	5207/ 5224
33	Cytology Screening Room	Scientist/ MLT	5224
34	Hematology Lab	Scientist/ MLT	5221
35	Histopathology Lab	Scientist/ MLT	5207
36	Microbiology Lab	Scientist/ MLT	5233
37	Virology Lab	Scientist/ MLT	5234

38	Serology Lab	Scientist/ MLT	5234
39	Media Preparation Room	MLT	5230
40	TB Lab	MLT	5237
41	Molecular Unit	Scientist/ MLT	5238

1.0 INTRODUCTION

Accurate laboratory results of analysis of specimens not only depend upon analytical method and technical skills, but also care taken at all **pre-analytical** stages viz patient preparation, specimen collection, handling and processing prior to analysis. Sometimes the clinical history and management of the patient and the conditions under which the sample is taken may affect the interpretation of the results. Biological fluid is subjected to rapid and significant alterations once removed from the body.

It is the policy of the Pathology Department to provide clinicians with as rapid and as accurate a result as is possible. However, the result of a laboratory test is only accurate and meaningful **if the specimen is properly collected**. It is hoped that clinicians will take heed to the proper collection, handling and transport of specimens as scheduled in this manual.

2.0 OBJECTIVES OF THE MANUAL

To inform users of the laboratory in Hospital Raja Permaisuri Bainun pertaining to:

- the services available and how to request for them.
- the preparations of patient/protocols needed to be taken for specific investigations
- the TAT, schedules of tests and normal or therapeutic range
- procedures and policies such as rejection
- Reporting of results both critical and non-critical
- Mechanisms of customer feedback.

3.0 DESCRIPTION OF ORGANIZATION

The Pathology Department is one of the departments of Hospital Raja Permaisuri Baiunun Ipoh. It is made up of the following units: Histopathology, Cytology, Haematology, Microbiology and Chemical Pathology.

All units are headed by Pathologists.

4.0 GENERAL INFORMATION

4.1 Location

The laboratories — including Chemical Pathology, Anatomical Pathology, Hematology, Molecular, and the Pathology Department Administration — are located in Block D. The Microbiology Laboratory is located on the first floor of Block E

4.2 Address

Jabatan Patologi

Hospital Raja Permaisuri Bainun

Jalan Raja Ashman Shah, 30450 Ipoh, Perak

4.3 Counter

- a) **Main Counter** - received specimen for Chemical Pathology, Haematology and Microbiology
- b) **Histopathology/ Cytology/ Medico-legal/ Police Cases Counter** - All medico-legal cases are sent by police officers to Histopathology/ Cytology/ Medico-legal/ police cases specimens receiving counter

5.0 SCOPE OF SERVICES

The department provides diagnostic and consultative services in the following disciplines:

- Chemical Pathology
- Haematology
- Histopathology (including clinical autopsies and frozen sections)
- Cytopathology
- Microbiology & Serology
- Dadah & Toksikologi

The test offered are as below:

No	Test	Type of specimen	Container	Volume	LTAT			TEST CATEGORIES				Forms / Special Requirement	Influence factor (IF)
					U: Urgent	R: Routine	O: Outstation	H: Hours	D: Days	WD: Working Days			
					U	R	O	1	2	3	4		
Chemical Pathology													
1	Cannabis (THC) Confirmation)	Urine	Urine container	30ml		10D		/				UPD -1 Form	NA
2	Morphine (Confirmation)	Urine	Urine container	30ml		10D		/				UPD -1 Form	NA
3	Hemoglobin A1c (HbA1c)	Blood (Whole blood)	EDTA Tube	2 ml		5D	7D			/		1. Requests MUST be accompanied by a PER-PAT 301 form 2. Requests can ONLY be made by SPECIALISTS	Several condition may affect the HbA1c result 1. Haemolytic

												3. Test should be performed for monitoring of patients diagnosed with diabetes mellitus. 4. Repeated testing should be done 6 monthly if stable 5. Repeat testing every 3 months is allowed after consulting a Chemical Pathologist, especially if glycemic control is poor or recent medication adjustments have been made.	anemia, 2. Iron deficiency anemia 3. End Stage Renal failure 4. Hemoglobinopathies
4	Osmolality	Blood (Serum)	Plain Tube	2ml		1D	1D	/					
		Urine	Urine container	5ml		1D	1D	/					

5	Blood Gases and pH	Arterial/Venous Whole Blood	Heparinised Syringe	1 ml		15 min	30 min	/	/		Use a 1 ml disposable heparinised syringe Draw 1 ml of arterial/venous blood, invert the syringe and remove all air bubbles inside the syringe. Replace needle with stopper, so that no blood comes out. Mix well by rotating the syringe to prevent clotting. Put the syringe of blood in the syringe plastic wrapper. This plastic is next placed in a bag of crushed ice. IMPORTANT NOTES (BLOOD
---	--------------------	-----------------------------	---------------------	------	--	--------	--------	---	---	--	--

												GAS The following must be noted strictly as proper collection and preservation of blood is critical for blood gases and acid base studies. After the blood is drawn into the syringe any air space, bubbles must be removed. The specimen must be kept embedded in crushed ice and sent immediately to the laboratory for analysis.	
6	Alanine Transaminase (ALT)	Serum	Plain tube	3 ml		8H	/						

7	Albumin (ALB)	Serum	Plain tube	3 ml		8H		/					
		Urine	Urine container/ 24hr Urine Container	5 ml / 24hrs urine volume collected		8H		/					
8	Alkaline Phosphatase (ALP)	Serum	Plain tube	3 ml		8H		/					
9	Ammonia	Plasma	EDTA tube	3 ml	1H			/	/				
10	Amylase	Serum	Plain tube	3 ml		8H		/					
		Urine	Urine container/ 24hr Urine Container	5 ml / 24hrs urine volume collected	1H			/					
11	Aspartate Aminotransferase (AST)	Serum	Plain tube	3 ml		8H		/					
12	Bilirubin Direct (DBIL)	Serum	Plain tube	3 ml		8H		/					
13	Bilirubin Total	Serum	Plain tube	3 ml		8H		/					

14	Calcium (CA)	Serum	Plain tube	3 ml		8H		/					
		Urine	Urine container/ 24hr Urine Container	5 ml / 24hrs urine volume collected		8H		/					
15	Chloride (Cl)	Serum	Plain tube	3 ml	1H	8H		/	/				
		Urine	Urine container/ 24hr Urine Container	5 ml / 24hrs urine volume collected		8H		/					
16	Cholesterol (CHOL)	Serum	Plain tube	3 ml		8H		/					
17	Cholinesterase	Serum	Plain tube	3 ml		8H		/					
18	Complement - C3	Serum	Plain tube	3 ml		8H		/					
19	Complement - C4	Serum	Plain tube	3 ml		8H		/					
20	C-Reactive Protein	Serum	Plain tube	3 ml		8H		/					

21	Creatine Kinase (CK)	Serum	Plain tube	3 ml		8H		/					
22	Creatinine (CREA)	Serum	Plain tube	3 ml		8H		/					
		Urine	Urine container/ 24hr Urine Container	5 ml / 24hrs urine volume collected		8H		/					
23	Gamma Glutamyl Transaminase	Serum	Plain tube	3 ml		8H		/					
24	Glucose (GLU)	Serum	Plain tube	3 ml		8H		/					
		Urine	Urine container/ 24hr Urine Container	5 ml / 24hrs urine volume collected		8H		/					
25	High Density Lipoprotein (HDL)	Serum	Plain tube	3 ml		8H		/					
26	Iron	Serum	Plain tube	3 ml		8H		/					

27	Lactate	Plasma	Grey tube	3 ml	1H			/	/				
		CSF	Sterile container	5 ml	1H			/	/				
28	Lactate Dehydrogenase (LDH)	Serum	Plain tube	3 ml		8H		/					
29	Magnesium	Serum	Plain tube	3 ml		8H		/					
		Urine	Urine container/ 24hr Urine Container	5 ml / 24hrs urine volume collected		8H		/					
30	Phosphorous (P04)	Serum	Plain tube	3 ml		8H		/					
		Urine	Urine container/ 24hr Urine Container	5 ml / 24hrs urine volume collected		8H		/					
31	Potassium (K)	Serum	Plain tube	3 ml		8H		/	/				
		Urine	Urine container/ 24hr Urine	5 ml / 24hrs urine		8H		/					

			Container	volume collected									
32	Protein Total (TP)	Serum	Plain tube	3 ml		8H		/					
		Urine	Urine container/ 24hr Urine Container	5 ml / 24hrs urine volume collected	1H			/					
		CSF	Sterile container	5 ml		8H		/					
33	Rheumatoid Factor	Serum	Plain tube	3 ml		8H		/					
34	Sodium (Na)	Serum	Plain tube	3 ml		8H		/					
		Urine	Urine container/ 24hr Urine Container	5 ml / 24hrs urine volume collected		8H		/					
35	Triglycerides (TG)	Serum	Plain tube	3 ml		8H		/					

36	Unbound iron binding capacity	Serum	Plain tube	3 ml		8H		/					
37	Blood Urea Nitrogen (BUN)	Serum	Plain tube	3 ml		8H		/	/				
		Urine	Urine container/ 24hr Urine Container	5 ml / 24hrs urine volume collected		8H		/					
38	Uric Acid (UA)	Serum	Plain tube	3 ml		8H		/					
		Urine	Urine container/ 24hr Urine Container	5 ml / 24hrs urine volume collected		8H		/					
39	Alpha Feto Protein	Serum	Plain tube	3 ml		7D				/		Need form PER-Pat 301 with specialist signature	
40	Beta HCG	Serum	Plain tube	3 ml	1H	7D		/	/				
41	CA 125	Serum	Plain tube	3 ml		7D				/		Need form PER-Pat 301 with specialist signature	

42	CA 15-3	Serum	Plain tube	3 ml		7D				/		Need form PER-Pat 301 with specialist signature	
43	CA 19-9	Serum	Plain tube	3 ml		7D				/		Need form PER-Pat 301 with specialist signature	
44	CEA	Serum	Plain tube	3 ml		7D				/		Need form PER-Pat 301 with specialist signature	
45	Cortisol	Serum	Plain tube	3 ml		7D				/		Need form PER-Pat 301 with specialist signature	
		Urine	24 hr urine container (preservative boric acid 10g)	minimum volume 500 ml		7D				/		Need form PER-Pat 301 with specialist signature (preservative Boric acid)	
46	Estradiol	Serum	Plain tube	3 ml		7D				/		Need form PER-Pat 301 with specialist signature	
47	Ferritin	Serum	Plain tube	3 ml		7D		/				Need form PER-Pat 301 with specialist signature	

48	Folate	Serum	Plain tube	3 ml		7D		/				Need form PER-Pat 301 with specialist signature	
49	FSH	Serum	Plain tube	3 ml		7D				/		Need form PER-Pat 301 with specialist signature	
50	iPTH	Plasma	EDTA tube	3 ml		7D				/		Need form PER-Pat 301 with specialist signature	
51	LH	Serum	Plain tube	3 ml		7D				/		Need form PER-Pat 301 with specialist signature	
52	Progesterone	Serum	Plain tube	3 ml		7D				/		Need form PER-Pat 301 with specialist signature	
53	Prolactin	Serum	Plain tube	3 ml		7D				/		Need form PER-Pat 301 with specialist signature	
54	PSA	Serum	Plain tube	3 ml		7D				/		Need form PER-Pat 301 with specialist signature	

55	Testosterone	Serum	Plain tube	3 ml		7D				/		Need form PER-Pat 301 with specialist signature	
56	TSH	Serum	Plain tube	3 ml	1H	7D		/	/			Need form PER-Pat 301 with specialist signature	
57	Thyroxine-free (fT4)	Serum	Plain tube	3 ml	1H	7D		/	/			Need form PER-Pat 301 with specialist signature	
58	Troponin T/I, hs	Serum	Plain tube	3 ml	1H			/	/				
59	Vit. B12	Serum	Plain tube	3 ml		7D		/				Need form PER-Pat 301 with specialist signature	
60	Triiodothyronine free (fT3)	Serum	Plain tube	3 ml		7D				/		Need form PER-Pat 301 with endocrine specialist signature	
61	Vitamin D	Serum	Plain tube	3 ml		7D				/		Need form PER-Pat 301 with endocrine specialist signature	
62	BNP	Plasma	EDTA tube	3 ml	1H	8H		/				Need form PER-Pat 301 with specialist signature	

63	Procalcitonin	Serum	Plain tube	3 ml		8H		/				Need form PER-Pat 301 with specialist signature	
64	Acetaminophen (Paracetamol)	Serum/ Plasma	Plain tube	3 ml	1H	4H		/	/			Send sample to Pharmacy TDM	No significant interference has been found in samples to which 800 mg/dL haemoglobin, 30 mg/dL bilirubin, or 750 mg/dL triglycerides were added to simulate haemolytic, icteric, or lipemic samples

65	Amikacin	Serum/ Plasma	Plain tube	3 ml	1H (tox icity)	4H	/	/				Send sample to Pharmacy TDM	No clinically significant interference has been found in samples to which 800 mg/dL haemoglobin, 1000 mg/dL triglycerides, or 30 mg/dL bilirubin were added to simulate haemolytic, lipemic, or icteric samples.
66	Carbamazepine	Serum/ Plasma	Plain tube	3 ml	1H	3H	/	/				Send sample to Pharmacy TDM	No clinically significant interference has been found in samples to which 800 mg/dL haemoglobin, 750 mg/dL triglycerides,

													or 30 mg/dL
													bilirubin was added to simulate haemolytic, lipemic, or icteric samples
67	Cyclosporin	Whole Blood	EDTA Tube	3 ml		5D				/ (every Thu)		Ref Value: Refer to Guide for Therapeutic Drug Monitoring, Pharmacy Department.	Icterus: No significant interference up to I index of 60 69 (approximate unconjugated bilirubin concentration: 60 mg/dL). Lipemia: No significant interference from triglycerides up to 1000 mg/dL. No significant interference from

													cholesterol up to 300 mg/dL.
													High levels of triglycerides and cholesterol may result in low quantitation. Total Protein: < 10 g/dL does not interfere. High levels of protein may result in low quantitation. Rheumatoid factor: < 100 IU/mL do not interfere. Haematocrit range: 30.5% to 53.5%. Higher haematocrit levels may result in low quantitation.

68	Digoxin	Serum/ Plasma	Plain tube	3 ml	1H	3H		/	/			Send sample to Pharmacy TDM	Icterus: < 5% up to 40 mg/dL or 684 µmol/L bilirubin Haemolysis: < 5% up to 5 g/L haemoglobin Lipemia: < 10% up to 700 mg/dL Intralipid RF: < 5% up to 490 IU/mL RF
69	Gentamicin	Serum/ Plasma	Plain tube	3 ml	1H	3H		/	/			Send sample to Pharmacy TDM	No clinically significant interference has been found in samples to which 800 mg/dL haemoglobin, 750 mg/dL triglyceride s, or 7230 mg/dL bilirubin were added to simulate

												haemolytic, lipemic, or icteric samples.
70	Methotrexate (MTX)	Serum/ Plasma	Plain tube	3 ml	1H	3H		/	/			Send sample to Pharmacy TDM No clinically significant interference has been found in samples to which 800 mg/dL hemoglobin, 1000 mg/dL triglycerides, or 30 mg/dL bilirubin were added to simulate haemolytic, lipemic, or icteric samples
71	Phenobarbitol	Serum/ Plasma	Plain tube	3 ml	1H	3H		/	/			Send sample to Pharmacy TDM No clinically significant interference has been found in samples to which 800

													mg/dL haemoglobin, 750 mg/dL triglycerides, or 30 mg/dL bilirubin were added to simulate haemolytic, lipemic, or icteric samples.
72	Phenytoin	Serum/ Plasma	Plain tube	3 ml	1H	3H	/	/				Send sample to Pharmacy TDM	No clinically significant interference has been found in samples to which 800 mg/dL haemoglobin, 750 mg/dL triglycerides, or 30 mg/dL bilirubin were added to simulate haemolytic, lipemic, or

													icteric samples.
73	Salicylate	Serum/ Plasma	Plain tube	3 ml	1H	3H		/	/			Send sample to Pharmacy TDM	No significant interference has been found in samples to which 800 mg/dL haemoglobin, 30 mg/dL bilirubin, or 750 mg/dL triglycerides were added to simulate haemolytic, icteric, or lipemic samples.
74	Tacrolimus	Whole Blood	EDTA Tube	3 ml		5D				/	(every Tues)	Send sample to Pharmacy TDM	Albumin: 12 g/dL Bilirubin: 60 mg/dL Cholesterol: 500 mg/dL Creatinine: 5 mg/dL Triglyceride:

												1500 mg/dL Uric Acid: 20 mg/dL
												IgG Gamma Globulin: 12 g/dL Rheumatoid Factor: 500 IU/mL HAMA*: 400 ng/mL haematocrit: 12% - 64%
75	Theophylline	Serum/ Plasma	Plain tube	3 ml	1H	3H	/	/			Send sample to Pharmacy TDM	No clinically significant interference has been found in samples to which 800 mg/dL haemoglobin, 750 mg/dL triglycerides, or 30 mg/dL bilirubin were added to

													simulate haemolytic, lipemic, or icteric samples.
76	Valporic Acid	Serum /Plasma	Plain tube	3 ml	1H	3H		/	/			Send sample to Pharmacy TDM	No clinically significant interference has been found in samples to which 800 mg/dL haemoglobin, 30 mg/dL bilirubin, or 750 mg/dL triglycerides were added to simulate haemolytic, icteric, or lipemic samples
77	Vancomycin	Serum/Plasma	Plain tube	3 ml	1H	3H		/	/			Send sample to Pharmacy TDM	No interference has been found in samples to which 20 µg/mL

													vancomycin and either 400 mg/dL (4 g/L) haemoglobin or 30 mg/dL (0.3 g/L) free bilirubin were
													added to simulate haemolytic or icteric samples. Grossly haemolyzed samples should be recollected. No interference has been found in lipemic patient samples containing 750 mg/dL

												(7.5 g/L) triglyceride to which 20 µg/mL vancomycin was added
78	Urine FEME	urine	Urine container	5 ml -10 ml	30 min	1H		/	/			
79	Urine Microscopic	urine	Urine Container	5 ml -10 ml	1H	3H		/	/			Only paediatrics & klinik sejahtera sample will be run.
Microbiology												
80	AFB Direct Smear	All types of specimens except stool	Sterile screw cap container	Min 1 ml		1D		/	/			HIS / Manual PER-PAT 301 form Positive result will be informed by phone Please state the type of specimens in the request form/HIS barcode.
81	Anti- Streptolysin O Titre (ASOT)	Blood	Plain tube with gel separator	3ml		1D		/				HIS / Manual PER-PAT 301 form

82	Blood culture & sensitivity	Blood	Aerobic bottle Anaerobic bottle	Adult: 8-10ml Pediatric : 1-3ml		7D		/	/			HIS / Manual PER-PAT 301 form Send to the lab as soon as possible. If there is a possibility of delay to keep the bottle at room temperature not more than 36 hours. Positive blood culture gram stain will be informed by phone.	
		Bone Marrow Aspirate	Pediatric bottle										
83	Blood Film Malaria Parasite (BFMP)	Blood	Slide	Thick/thin smear	2H			/	/			HIS / Manual PER-PAT 301 form Thick and thin film smear should be prepared in one slide. Positive BFMP will be informed by phone.	Please make sure smear slide is completely dried before send to the lab.
			EDTA tube (if requested by lab)	3 ml	4H			/	/				
84.	Blood Film for Microfilaria	Blood	Slide	Thick smear		1D		/	/			HIS / Manual PER-PAT 301 form Specimen should be collected before treatment is initiated.	Multiple smears might be needed since parasitaemia may fluctuate.

85	Blood Fungal culture & sensitivity	Blood	Myco/F Lytic bottle	1-5ml		44D		/	/			HIS / Manual PER-PAT 301 form Positive culture gram stain will be informed by phone. Positive culture result might take longer.	
86	Blood TB culture & sensitivity	Blood	Myco/F Lytic bottle	1-5ml		44D		/	/			HIS / Manual PER-PAT 301 form Positive culture gram stain will be informed by phone. Positive culture result might take longer.	
87	Body fluid culture & sensitivity	Pleural fluid	Sterile screw cap container	Min 2ml		5D		/	/			HIS / Manual PER-PAT 301 form Blood culture bottles are not validated for body fluid culture. Samples such as peritoneal fluid (by Nephrology Unit) and synovial fluid (by Joint Replacement Unit) that are sent in blood	
		Pericardial fluid											
		Peritoneal fluid											

		Synovial fluid										culture bottles should be inter-preted in conjunction with clinical and other laboratory findings.	
88	Bronchial aspirate culture & sensitivity	Bronchial washing/Br onchial alveolar lavage (BAL)	ETT container/ Sterile screw cap container	Min 1 ml		5D		/	/			HIS / Manual PER-PAT 301 form	
89	Cell count	CAPD/Peritoneal fluid Pleural fluid Pericardial fluid Synovial fluid	Sterile screw cap container		1D			/	/			HIS / Manual PER-PAT 301 form Samples blood stained, sticky or thick pus are unsuitable to process.	
90	Chlamydia trachomatis/ Neisseria gonorrhoea (CT/NG) Rapid PCR	First catch urine	Sterile screw cap container	10 ml		5D		/				HIS / Manual PER-PAT 301 form Samples must be sent in ice 2-8 ° C For HRPB within 24 hours from sample collection, outside HRPB if there is a	

												possibility of delay to refrigerate at 2-8° C and send within 3 days from sample collection. Request must be accompanied by PER-PAT 301 (HIS) form complete with clear indication and specialist signature. Test can only be requested by Dermatology specialist, OBGYN specialist and Family Medicine specialist.	
91	Clostridium difficile antigen/toxin	Loose stool	Sterile screw cap container			1D		/	/			HIS / Manual Form PER-PAT 301 (Grade 5-7 Bristol) less than 4 hours old for fresh sample and less than 72 hours for refrigerated sample.	
92	CSF culture & sensitivity (Please order separately for microscopy-Gram stain/Cell count/India	CSF	CSF container or Sterile screw cap container	Min 2 ml		5D		/	/			HIS / Manual PER-PAT 301 form Send to microbiology lab immediately upon collection at room temperature.	

	ink)												
93	CSF for Cryptococcal antigen	CSF	CSF container/ Sterile screw cap container	Min 1ml	1H			/	/			HIS / Manual PER-PAT 301 form Result will be informed by phone	
94	CSF Microscopy (Gram stain/ Cell count/India ink)	CSF	CSF container or Sterile screw cap container	Min 1 ml	1H			/	/			HIS / Manual PER-PAT 301 form Result will be informed by phone	
95	COVID-19 Rapid Antigen Test	Nasopharyngeal	Dacron swab in sterile dry container		1H			/	/			HIS / Manual PER-PAT 301 form	
96	Cytomegalovirus IgG	Blood	Plain tube with gel separator	3ml		7D				/		HIS / Manual PER-PAT 301 form	
97	Cytomegalovirus IgM	Blood	Plain tube with gel separator	3ml		7D				/		HIS / Manual PER-PAT 301 form	
98	Dengue Rapid NS1 Ag/IgG/IgM	Blood	Plain tube with gel separator/ EDTA	3ml	1H			/	/			HIS / Manual PER-PAT 301 form	

99	Dengue IgG/IgM (ELISA)	Blood	Plain tube with gel separator/ EDTA	3ml		5D				/		HIS / Manual PER-PAT 301 form	
100	Ear culture & sensitivity	Ear aspirate	Sterile screw cap container	Min 1 ml		5D		/	/			HIS / Manual PER-PAT 301 form	
		Ear swab	Swab in Stuart/ Amies Transport Medium										
101	EBV IgM IgG	Blood	Plain tube with gel separator	3ml		7D				/		HIS / Manual PER-PAT 301 form	
102	Eye culture & sensitivity	Cornea scraping	On plates			5D		/	/			HIS / Manual PER-PAT 301 form	
		Contact lens & Contact lens solution	Sterile screw cap container	Min 1 ml									
		Intraocular fluid	Small sterile screw cap container (1.5cmx1.5 cmx5cm)	Min 1 ml									

		Eye/ Conjunctiv a	Swab in Stuart/ Amies Transport Medium										
103	Fungal culture & sensitivity	Tissue/ Skin biopsy	Sterile screw cap container without preservati ve	A few fragments		44D							
		Skin scraping/ Nail/ Hair	Use small piece of black paper to wrap up the specimen neatly										
		Corneal Scraping	On plates			21D							
		Body fluid	Sterile screw cap container without preservati ve	Min 2ml									

104	Gastrointes- tinal Multiplex PCR	Stool (Bristol 5-7)	Sterile Container			1D						HIS / Manual PER-PAT 301 form Sample must be sent in ice 2-8 ° C Request must be accompanied by PER-PAT 301 (HIS) form. For moderate/severe pneumonia cases Test can only be requested by Infectious Disease Physician, Infectious Disease Paediatrician. and anaesthesiologist Requester should inform and discuss with Medical Microbiologist on call.	
105	Genital swab culture & sensitivity (For Sexually Transmitted Infection and Medicolegal case)	LVS Endocervic al Urethral Rectal	Swab in Stuart/ Amies Transport Medium with Charcoal			5D		/	/			HIS / Manual PER-PAT 301 form	

106	Gram stain	Eye	Slide		1H			/	/			HIS / Manual PER-PAT 301 form	
		Vitreous fluid											
		Body fluid	Sterile screw cap container	Min 1 ml									
107	HBV-DNA PCR Viral Load (Quantitative)	Blood	4 EDTA tube	3 ml		14D				/		HIS / Manual PER-PAT 301 form Samples must be sent in ice 2-8 ° C Blood should be centrifuged and separated into a plain tube immediately by respective district hospitals/health clinics. If there is a possibility of delay to refrigerate at 2-8° C and send within 6 days from sample collection.	
108	HCV RNA PCR Viral Load (Quantitative)	Blood	4 EDTA tube	3 ml		14D				/		HIS / Manual PER-PAT 301 form Samples must be sent in ice 2-8 ° C Blood should be centrifuged and separated into a plain tube	

												immediately by respective district hospitals/health clinics. If there is a possibility of delay to refrigerate at 2-8° C and send within 6 days from sample collection.	
109	HBe Antigen (HBe Ag)	Blood	Plain tube with gel separator	3 ml		5D		/				HIS / Manual PER-PAT 301 form	
110	HBe Antibody (Anti HBe)	Blood	Plain tube with gel separator	3 ml		5D		/				HIS / Manual PER-PAT 301 form	
111	Hepatitis A IgM Antibody	Blood	Plain tube with gel separator	3 ml		5D		/				HIS / Manual PER-PAT 301 form	
112	Hepatitis B core IgM antibody (Anti-HBc IgM)	Blood	Plain tube with gel separator	3 ml		5D		/				HIS / Manual PER-PAT 301 form Request must be spoken with medical microbiologist on call.	
113	Hepatitis B core total antibody (Anti-HBc total)	Blood	Plain tube with gel separator	3 ml		5D		/				HIS / Manual PER-PAT 301 form	

114	Hepatitis B surface Antibody (Anti HBs)	Blood	Plain tube with gel separator	3 ml		5D		/	/			HIS / Manual PER-PAT 301 form After office hour: (NSI/Organ transplant)	
115	Hepatitis B Surface Antigen (HBsAg)	Blood	Plain tube with gel separator	3 ml		5D		/	/			HIS / Manual PER-PAT 301 form After office hour: (NSI/Organ transplant)	
116	Hepatitis C Antibody (Anti-HCV)	Blood	Plain tube with gel separator	3 ml		5D		/	/			HIS / Manual PER-PAT 301 form After office hour: (NSI/Organ transplant)	
117	High Vaginal Swab culture & sensitivity (For GBS and candidiasis)	HVS	Swab in Stuart/Amies Transport Medium			5D		/	/			HIS / Manual PER-PAT 301 form	Lower vagina-rectal swab provides high bacterial yields for GBS.
		Lower vagina and rectal											
118	HSV 1/2 IgM	Blood	Plain tube with gel separator	3ml		7D				/		HIS / Manual PER-PAT 301 form	
119	HSV IgG	Blood	Plain tube with gel separator	3ml		7D				/		HIS / Manual PER-PAT 301 form	

120	HIV Antigen / Antibody	Blood	Plain tube with gel separator	3ml	OD: 4H NSI :1D	5D		/	/			HIS / Manual PER-PAT 301 form After office hour: (NSI/Organ transplant)	
121	HIV-RNA PCR Viral Load (Quantitative)	Blood	4 EDTA tube	3 ml		14D				/		HIS / Manual PER-PAT 301 form Samples must be sent immediately to laboratory in ice 2-8 ° C and sent to Molecular Lab during office hour only. Blood should be centrifuged and separated into plain tube immediately by respective district hospitals/health clinics. If there is possibility of delay to refrigerate at 2-8° C and send within 6 days from sample collection.	
122	Influenza A/B Antigen	Nasopharyn-geal	Dacron swab in sterile dry container			1D		/	/			HIS / Manual PER-PAT 301 form	

123	Influenza A/B PCR	Sputum	Sterile container	Min 1ml		7D					/	HIS / Manual PER-PAT 301 form Request must be accompanied by PER-PAT 301 form Samples must be sent in ice 2-8 ° C	
		Tracheal aspirate											
		Nasopharyn -geal	Dacron swab in Viral Transport Media (VTM)										
124	Intravascular Catheter Tips culture & sensitivity	Catheter tip	Sterile container	5cm of distal segment		5D		/	/			HIS / Manual PER-PAT 301 form Only for the central venous line that suspected CRBSI. To send in pairing with peripheral blood culture. If only catheter tip is received without peripheral blood sample will be rejected. Other tubes: eg. Chemoport, Chest tube, Urinary catheter tube are unsuitable for culture.	

125	Legionella Pneumophila Antigen	Urine	Sterile screw cap container	3-5 ml		3D		/				HIS / Manual PER-PAT 301 form	
126	Leptospira Antibody IgM	Blood	Plain tube with gel separator	3ml		3D				/		HIS / Manual PER-PAT 301 form	
127	Meningitis/ Encephalitis Multiplex PCR 1. Escherichia coli K1 2. Haemophilus influenzae 3. Listeria monocytogenes 4. Neisseria meningitidis 5. Streptococcus agalactiae 6. Streptococcus pneumoniae 7. Streptococcus pyogenes 8. Mycoplasma pneumoniae 9. Herpes simplex virus 1	CSF	CSF container or Sterile screw cap container	Min 1ml		1D		/				HIS / Manual PER-PAT 301 form Send immediately after collection in room temperature. Request must be accompanied by PER-PAT 301 (HIS) form. Test can only be requested by Infectious Disease Physician, Infectious Disease Paediatrician. and Neuromedical Specialist. Requester should inform and discuss with Medical Microbiologist on call.	

	10. Herpes simplex virus 2 11. Human herpes virus 6 Herpesvirus 12. Enterovirus 13. Human parechovirus 14. Varicella-zoster virus Herpesvirus 15. Cryptococcus gattii/ Cryptococcus neoformans												
128	MERS-CoV RT PCR	Sputum Tracheal aspirate Nasopharyngeal	Sterile container Dacron swab in Viral Transport Media (VTM)			1D		/	/			HIS / Manual PER-PAT 301 form Samples must be sent in ice 2-8 ° C	

129	MRSA screening	Nasal	Swab in Stuart/ Amies Transport Medium			5D		/	/			HIS / Manual PER-PAT 301 form	
		Axilla											
		Groin											
130	Mycoplasma Total antibody	Blood	Plain tube with gel separator	3ml		7D				/		HIS / Manual PER-PAT 301 form	
131	Pus culture & sensitivity (Other than ear and eye)	Pus aspirate	Sterile screw cap container	3ml		5D		/	/			HIS / Manual PER-PAT 301 form If anaerobic organism is suspected, put sample in thioglycollate broth (to request from laboratory). Slough sample is unsuitable for culture.	
		Exudate											
		Pus swab	Swab in Stuart/ Amies Transport Medium										
132	Rapid Plasma reagin (RPR) – Syphilis	Blood	Plain tube with gel separator	3ml		3D		/				HIS / Manual PER-PAT 301 form	
133	Rectal swab screening (CRE/VRE)	Rectal	Swab in Stuart/ Amies Transport Medium			5D		/	/			HIS / Manual PER-PAT 301 form Only for contact screening	

134	Respiratory Multiplex PCR 1. Influenza A 2. Influenza A subtype H1N1 3. Influenza A subtype H1 4. Influenza A subtype H3 5. Influenza B 6. Coronavirus 229E 7. Coronavirus HKU1 8. Coronavirus NL63 9. Coronavirus OC43 10. Bocavirus 11. SARS-CoV-2 12. Parainfluenza Virus 1 13. Parainfluenza Virus 2 14. Parainfluenza Virus 3 15. Parainfluen	Nasopharyngeal	Dacron swab in Universal Transport Media (UTM)			1D	/					HIS / Manual PER-PAT 301 form Sample must be sent in ice 2-8 ° C Request must be accompanied by PER-PAT 301 (HIS) form. For moderate/severe pneumonia cases Test can only be requested by Infectious Disease Physician, Infectious Disease Paediatrician. and anaesthesiologist Requester should inform and discuss with Medical Microbiologist on call.	
-----	---	----------------	--	--	--	----	---	--	--	--	--	---	--

	za Virus 4 16. Respiratory Syncytial Virus A/B 17. Human Metapneumovirus A/B 18. Adenovirus 19. Rhinovirus/ Enterovirus 20. Mycoplasma pneumoniae 21. Bordetella pertussis 22. Legionella Pneumophila 23. Chlamydia pneumoniae												
135	Respiratory Virus Antigen Rapid Test (Paediatric)	Naso-pharyngeal	Swab in sterile dry container			1D		/	/			HIS / Manual PER-PAT 301 form Offered for paediatric patient only.	
136	Rickettsia serology	Blood	Plain tube with gel separator	3ml		7D				/		HIS / Manual PER-PAT 301 form	

137	Rotavirus Antigen	Loose stool	Sterile screw cap container			1D		/	/			HIS / Manual PER-PAT 301 form (Grade 5-7 Bristol) less than 4 hours old for fresh sample and less than 72 hours for refrigerated sample.	
138	Rubella IgM	Blood	Plain tube with gel separator	3ml		7D				/		HIS / Manual PER-PAT 301 form	
139	Rubella IgG	Serum / 3ml	Plain Tube	2 ml		5D		/				HIS & Manual PER-PAT 301 form	Virology Lab HRPB
140	Serum for Cryptococcal antigen	Blood	Plain tube with gel separator	3ml		1D						HIS / Manual PER-PAT 301 form	
141	Spore test	Autoclave strip with Attest (Including control)				3D		/				Manual PER-PAT 301 form	
142	Sputum culture & sensitivity	Sputum	Sterile screw cap container	Min 1 ml		5D		/	/			HIS / Manual PER-PAT 301 form	
143	Stool culture & sensitivity	Stool	Swab in Cary-Blair			5D		/	/			HIS / Manual PER-PAT 301 form	Stool in sterile screw cap container

			transport medium										is not suitable because viability of enteric pathogens will be compromised and overgrowth of other bacteria.
144	Stool FEME (Ova & Cyst)	Stool	Sterile crew cap container			1D		/	/			HIS / Manual PER-PAT 301 form Less than 4 hours old for fresh sample and less than 72 hours for refrigerated sample.	
145	Stool for Clostridium difficile culture & sensitivity	Loose stool	Sterile screw cap container			5D		/	/			HIS / Manual PER-PAT 301 form (Grade 5-7 Bristol) less than 4 hours old for fresh sample and less than 72 hours for refrigerated sample.	Stool for Clostridium difficile culture & sensitivity
146	TB Rapid PCR	CSF	CSF container	1-5 ml		2D		/				HIS / Manual PER-PAT 301 form Samples must be sent in	Sputum specimen should not contain any
		All	Sterile										

		samples except urine, tissue, pus, bone, stool	screw cap container									ice 2-8 ° C Request must be accompanied by PER-PAT 301 (HIS) form or TBIS 20C complete with clear indication and ordered by specialist. Positive result will be informed by phone.	food particles or foreign body. Blood-stained sample might influence the result.
147	Throat swab culture & sensitivity	Throat	Swab in Stuart or Amies transport medium			5D		/	/			HIS / Manual PER-PAT 301 form Preliminary positive result (Diphtheria) will be informed and send to IMR for toxin detection.	
148	Tissue culture & sensitivity	Tissue	Sterile screw cap container without preservative			5D		/	/			HIS / Manual PER-PAT 301 form If anaerobic organism is suspected, to put sample in thioglycollate broth (to obtain from laboratory).	
		Biopsy specimen											
149	Tracheal aspirate culture & sensitivity	Tracheal aspirate	ETT container /	Min 1 ml		5D		/	/			HIS / Manual PER-PAT 301 form	
		Endo-tracheal	Sterile screw cap										

		aspirate	container										
150	Treponema Pallidum Particle Agglutination (TPPA)– Syphilis	Blood	Plain tube with gel separator	3 ml		3D		/				HIS / Manual PER-PAT 301 form	
151	Toxoplasma IgM	Blood	Plain tube with gel separator	3 ml		7D				/		HIS / Manual PER-PAT 301 form	
152	Toxoplasma IgG	Blood	Plain tube with gel separator	3 ml		7D				/		HIS / Manual PER-PAT 301 form	
153	Urine culture & sensitivity	Urine (Midstream / Catheter-rized/sterile procedure)	Sterile screw cap container with or without preservative	5–10ml		5D		/	/			HIS / Manual PER-PAT 301 form Send to lab as soon as possible. If there is possibility of delay to refrigerate at 2–8° C. For urology and obstructive uropathy case, request must be accompanied by PER-PAT 301(HIS) form or label collection site at HIS barcode.	For urine in sterile container with preservative, ensure to fill the volume until the designated line and gently mixed. Inadequate volume will influence the

													culture result.
Haematology													
Routine Haematology Section													
154	Full Blood Count (FBC)	Whole Blood	K2/K3 EDTA Tube	2 ml	1H	4H		/	/			2.0 ml of peripheral blood must be received within 6 hrs of collection. Mix the blood thoroughly, gently and immediately after collection	
155	Reticulocyte Count	Whole Blood	K2/K3 EDTA Tube	2 ml	1H	4H		/	/			2.0 ml of peripheral blood must be received within 6 hrs of collection. Mix the blood thoroughly, gently and immediately after collection. Lipaemic samples can affect the performance of test and may delay results	
156	G6PD Screening	Dried blood (Cord blood/heel prick blood spot)	Filter paper for G6PD screening (What-man paper)			1D		/	/	/			

157	Erythrocyte Sedimentation Rate (ESR)	Whole Blood	3.8% trisodium citrate tube			1WD		/	/				
Morphology/ Special Haematology Section													
158	Full Blood Picture (FBP)	Whole Blood	K2/K3 EDTA Tube	2 ml	1D	7WD		/	/			2.0 ml of peripheral blood must be received within 4 hrs of collection. Mix the blood thoroughly, gently and immediately after collection. Attach PER-PAT-301 form with full clinical history. Urgent FBP need to be requested through Pathologist (Haematology) On-Call	
159	Bone marrow aspirate	Bone marrow	Direct unfixed smear on glass slide		2D	7WD		/			/	Air Dry Transport in slides Holder Direct unfixed bone marrow By appointment	

160	Iron stain by Perl' s Prussian Blue staining	Blood or Bone Marrow Aspirate (BMA)	Direct unfixed bone marrow / Blood on glass slide			7D					/	By Appointment only	
161	Esterase Stain	Blood or Bone Marrow Aspirate (BMA)	Direct unfixed bone marrow / Blood on glass slide										
162	Osmotic Fragility Test	Whole Blood	Lithium Heparin Tube * Invert tube 8-10 times after collec- tion	4 tubes (4 ml each) (2 patient samples, 2 normal controls)		3WD						Mix the blood thoroughly, gently and immediately send after collection. By appointment.	
163	Periodic Acid Schiff (PAS) stain	Blood or Bone Marrow Aspirate (BMA)	Direct unfixed bone marrow / Blood on		2D	7WD							

			glass slide										
164	Peroxidase (POX) stain	Blood or Bone Marrow Aspirate (BMA)	Direct unfixed bone marrow / Blood on glass slide		2D	7WD							
165	Leishman' s stain	Blood or Bone Marrow Aspirate (BMA)	Direct unfixed bone marrow / Blood on glass slide		2D	7WD							
166	May-Grunwald Giemsa stain	Blood or Bone Marrow Aspirate (BMA)	Direct unfixed bone marrow / Blood on glass slide		2D	7WD							
167	Kleihauer test	Whole Blood	K2/K3 EDTA Tube	2.0 ml		1D						Must be requested through Pathologist (Hematology) On-Call. By Appointment only	

168	Leukocyte Alkaline Phosphatase (L. A. P) score	Whole Blood	K2/K3 EDTA Tube									
169	Sickling test	Whole Blood	K2/K3 EDTA Tube	2.0 ml				/				Mix the blood thoroughly, gently and immediately send after collection
170	H Inclusion test	Whole Blood	K2/K3 EDTA Tube	2.0 ml								Reflex testing Hb Analysis
Flow Cytometry Section												
171	Immunophenotyping for Leukemia / Lymphoma	Peripheral Blood / Bone Marrow Aspirate (BMA) / Cerebro-spinal fluid (CSF)	K2/K3 EDTA Tube, Invert several times to mix Sterile Container for CSF sample	2.0 ml x 2 tubes (Blood/BMA) 1-2 ml (minimal volume for CSF)		7D		/			/	<u>Indication:</u> *Diagnostic for Suspected Leukaemia, Lymphoproliferative neoplasms and Plasma Cells Myeloma *For Internal case only. External cases are required to be discussed with haematopathologist <u>Sample Requirements:</u> i. Samples for flow

												cytometry immunophenotyping is encouraged to be the first draw for the bone marrow aspirate sample. ii. Samples should reach the laboratory within <4 hours of draw internally and within 24 hours of draw for external samples. This is due to the atypical cells are usually highly proliferative and this may lead to premature apoptosis. iii. However for external samples, there is a time allowance of up to; *48 hours for irreplaceable specimens. *Note: Suboptimal sample may be indicated in the final report. iv. Cerebrospinal Fluid (CSF) / Body	
--	--	--	--	--	--	--	--	--	--	--	--	---	--

												Fluid: *Samples must be sent immediately and reach the lab within < 4 hours of sampling to ensure viability of the cells. *Samples should reach lab by 2 PM (Monday-Thursday). For delayed samples, contact to inform haematopathologist. <u>Sample Labelling:</u> i. Specimens should be labelled using dipatched HIS Barcode with at least 2 Unique patient identifiers (e.g: Patient' s Full Name (Surname, First name), Patient identification number) ii. The specimen label should include the collection date and time, as well as the origin (source)	
--	--	--	--	--	--	--	--	--	--	--	--	---	--

												of the specimen, when relevant. The details on the specimen label must align with those on the lab requisition form; otherwise, the sample will be rejected. iii. Clinical history, reason for referral, prior therapy and transplant history should be written on the form. iv. For external cases, please provide referring Doctor's name and contact number for further queries if needed. <u>Storage and Transportation:</u> i. All external samples should be transported in 2-8° C to avoid apoptosis. Use cold pack for transport.	
--	--	--	--	--	--	--	--	--	--	--	--	---	--

											Ensure cold pack is not in direct contact with specimen during transport. ii. The specimen should arrive at the lab no more than 24 hours after collection. <u>Result reporting:</u> *Within 2 Days for Urgent case (verbal report for acute leukemia cases) *7 Days for official report	
172	Immuno-phenotyping-MRD-B-ALL detection by Flow Cytometry *For B-Acute Lymphoblastic Leukemia (B-ALL) case	Bone Marrow Aspirate (BMA)	EDTA Tube	2 tubes x 2ml			7D	/		/	* By appointment only First pull of bone marrow aspirate (BMA) sample (COMPULSORY) (Obtaining first pull bone marrow aspiration is important for MRD assessment in B-ALL, as it helps ensure sample quality and sensitivity	Immuno-phenotyping-MRD-B-ALL detection by Flow Cytometry *Untuk kes B-Acute Lymphoblastic Leukemia (B-ALL)

												of MRD detection) * Please label 1st Pull / 2nd Pull...on sample tube * Other than B-ALL, sample is outsourced to HTA	
173	CD4 / CD8 Enumeration	Whole Blood	K2/K3 EDTA Tube	2.0 ml		7WD		/		/		Mix the blood thoroughly, gently and immediately after collection Test run by batch Samples should reach lab by 2 PM (Monday-Thursday).	
174	Immunopheno- typing CD20 Enumeration	Whole Blood	K2/K3 EDTA Tube	2.0 ml		7WD		/		/	/	*Send immediately at room temperature. Avoid direct contact with ice. Specimen kept more than 48 hours are not suitable for analysis. *Must be requested through Pathologist (Haematology) On-	

												Call	
												*Samples should reach lab by 2 PM. Test run on Wednesday only	
Haemostasis Section													
175	PT/INR	Blood (Plasma)	3.2% sodium citrate	Collect until indicated mark x 1 tubes	1H	4H		/	/			Mix the blood thoroughly, gently and immediately send after collection. *All samples for coagulation analysis require plasma separation within 4-hour window from time of venipuncture. Delayed processing beyond this limit may compromise factor stability and lead to inaccurate results.	
176	APTT	Blood (Plasma)	3.2% sodium citrate	Collect until indicated mark x 1 tubes	1H	4H		/	/			Mix the blood thoroughly, gently and immediately send after collection. *All samples for coagulation analysis require plasma separation within 4-hour window from	

											time of venipuncture. Delayed processing beyond this limit may compromise factor stability and lead to inaccurate results. *All samples for coagulation analysis require plasma separation within 4-hour window from time of venipuncture. Delayed processing beyond this limit may compromise factor stability and lead to inaccurate results.	
177	Fibrinogen	Blood (Plasma)	3.2% sodium citrate	Collect until indicated mark x 1 tubes	1H	4H		/	/		Mix the blood thoroughly, gently and immediately send after collection. *All samples for coagulation analysis require plasma separation within 4-hour window from time of venipuncture.	

												Delayed processing beyond this limit may compromise factor stability and lead to inaccurate results.	
178	D-Dimer	Blood (Plasma)	3.2% sodium citrate	Collect until indicated mark x 1 tubes		4H		/	/			Mix the blood thoroughly, gently and immediately send after collection. *All samples for coagulation analysis require plasma separation within 4-hour window from time of venipuncture. Delayed processing beyond this limit may compromise factor stability and lead to inaccurate results.	
179	Lupus Anticoagulant	Blood (Plasma)	3.2% sodium citrate	Collect until indicated mark x Minimum 2 tubes		30WD		/	/			*Must attach Lupus Anticoagulant Testing Checklist (Attach with PER-PAT 301 form). For proper indication checking of test, download checklist from HRPB website. Scan	

												barcode to open page.  *For district hospitals/ KK referring to HRPB, separate and aliquot ≥ 500 μL plasma from cells into secondary tube (e.g polyphylene tube (PPT)) as soon as possible Store frozen at -40°C and transport frozen plasma on dried ice. *All samples for coagulation analysis require plasma separation within 4-hour window from time of venipuncture. Delayed processing beyond this limit may compromise factor stability and lead to inaccurate results.	
--	--	--	--	--	--	--	--	--	--	--	--	--	--

180	Factor VIII Assay	Blood (Plasma)	3.2% sodium citrate	Collect until indicated mark x 3 tubes		7WD		/		/		Deliver tubes immediately to the laboratory at room temperature. OR	
181	Factor VIII Inhibitor	Blood (Plasma)	3.2% sodium citrate	Collect until indicated mark x 3 tubes								Separate and aliquot ≥ 500 μ L plasma from cells into secondary tube (e.g polyphylene tube (PPT)) as soon as possible Store frozen at -40°C and transport frozen plasma on dried ice.	
182	Factor IX Assay	Blood (Plasma)	3.2% sodium citrate	Collect until indicated mark x 3 tubes		7WD		/		/		*All samples for coagulation analysis require plasma separation within 4-hour window from time of venipuncture. Delayed processing beyond this limit may compromise factor stability and lead to inaccurate results.	
183	Factor IX Inhibitor	Blood (Plasma)	3.2% sodium citrate	Collect until indicated mark x 3 tubes									

Haemoglobin Analysis												
184	Haemoglobin (Hb) Analysis	Whole Blood	K2/K3 EDTA Tube	2 ml, 2 tubes are required if patient is anemic		28D		/		/		• Attach PER-PAT 301 form with complete clinical history. (samples without form will be rejected). • Order test through the system and attach Patient requisition form. • Attach latest FBC test results (< 3 months ago) (samples without FBC test results will be rejected). • For samples from external hospitals/clinics, include 1 stained slide and 1 unstained slide. Samples without slides will be rejected).

Molecular Haematology												
185	BCR:ABL1, Major (p210), Quantitative	Whole Blood	K2/K3 EDTA Tube	2.0 ml x 2 tubes		14D		/		/	/	Indication: To monitor response of TKI therapy in CML patient Patient Criteria: Patient that has been diagnosed with CML with p210 BCR-ABL1 mutation and received TKI therapy *No p190 dan p230 fusion protein test was done Form: Borang PER PAT 301 (1 salinan) Check List BCR-ABL HRPB (muat turun dari HRPB website) *Appointment by Google Sheet

Histopathology													
186	HPE Biopsy	Small Biopsy Tissue	Disposable container for surgical specimen	in 10% Neutral Buffered Formalin 1:10	3D			/					
187	HPE Biopsy	Small Biopsy Tissue	Disposable container for surgical specimen	in 10% Neutral Buffered Formalin 1:10		7D		/					
188	HPE Big Specimen	Big Tissue	Disposable container for surgical specimen	in 10% Neutral Buffered Formalin 1:10	7D			/					
189	HPE Big Specimen	Big Tissue	Disposable container for surgical specimen	in 10% Neutral Buffered Formalin 1:10		14D		/					
190	Frozen section	Tissue	Urine Bottle	No preservative		1/2H					/	Booking at least 1 day before.	Specimen must be not in preservative

191	EGFR/KRAS	Tissue Block	NA	NA				/				PER PATH Form	
192	DISH	Tissue Block	NA	NA		5D		/				PER Path Form	
Cytology													
193	Pap Smear	Conventional	Slaid	NA	7	14		/				Thin smear prepared on frosted glass slide. Smear to be fixed immediately (While wet) in 95% Ethanol	
		Liquid Based	Vial	10ml	7	14		/				Send vial containing brush head	
194	Non Gynae	Bronchial brushing	Slaid	NA	3	5		/					
		Bronchial washing	Plain universal sterile container	Min 20ml	3	5		/					
		Broncho-alveolar lavage	Plain universal sterile container	Min 20ml	3	5		/					
		CSF	Plain universal sterile container	As collected	3							Dispatch immediately.	

		Nipple Discharge	Wet & Dry smear	Slaid	3	5		/					
		Pericardial fluid	Plain universal sterile container	Min 20ml	3	5		/					
		Peritoneal fluid	Plain universal sterile container	Min 20ml	3	5		/					
		Pleural fluid	Plain universal sterile container	Min 20ml	3	5		/					
		Sputum	Plain universal sterile container	As collected	3	5		/				Fresh early morning specimen produced from a deep cough (minimum of 3 samples over 3 consecutive days). Dispatch fresh sample immediately to the laboratory	
		Tzank Smear	Air dried smear	Slaid	3	5		/					
		Urine	Plain universal sterile	As collected	3	5		/				2nd morning specimen after hydration of patient. Dispatch	

			container									immediately.	
		Others	Plain universal sterile container	As collected	3	5		/					
195	FNAC	Palpable & non-palpable masses	Wet & Dry smear	Slaid	3	5		/					
Outsource													
					U	R	0	1	2	3	4		
1	17 Hydroxy Progesterone (17-OH Progesterone)	Serum	Plain gel tube	3 ml			45D	/				HIS & Manual PER-PAT 301 form	Putrajaya Hospital
2	24 Hrs Metanephrene	24h urine	24h Urine Container with acid	total urine volume: > 800 ml for testing: > 4 ml			45D	/				HIS & Manual PER-PAT 301 form	Putrajaya Hospital

3	30 Common Translocation /Leukemia Translocation Studies for Leukaemia (IMR SETIA ALAM)	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	EDTA tube	2.5-5 ml			7WD	/				Molecular Analysis for Haemato-oncology request form Transport samples without delay preferably within 24 hours at room temperature. DO NOT freeze specimens."	Haematology Unit, Cancer Research Centre, Institute for Medical Research, National Institutes of Health (NIH), Setia Alam
4	5-Hydroxy-Indol-Acetic (5-HIAA) Acid (5-HIA	24-hour Urine	24-hour urine bottle with 10ml 25% HCl	2ml of 24-hour urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
5	Acanthamoeba sp. /Naegleria sp. Culture (*Note: this technique is used for Acanthamoeba/ Naegleria spp. Diagnosis Protozoa culture)	Infection in eyes / brain / nerve system / 24 hour prior notification of the lab is necessary / Corneal scrapping / Contact Lens / Contact lens suspension, spinal					18D	/				HIS & Manual PER-PAT 301 form	IMR

		fluid											
6	Acid alpha - Glucosidase (POMPE), blood spot	Dried blood spot	What-mann 903 Filter paper	3 circles of dried blood spot (~ 70 microlitre of blood per circle)			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
7	Activated Protein C Resistance (APCR)	Blood (Plasma)	Trisodium Citrate 3.2%	Adult: 8-10 tubes Paeds 1-12 y.o: 4 tubes Paeds <1 y.o: 2 tubes ~Min 1.8 ml (paediatric) ~2.7 ml (adult)			30D	/				PER.PAT 301 form (Chop & Sign Clinician) REQUIRE discussion with pathologist prior to sample collection Spin and separate plasma. Store patient plasma at -30°C to -70°C. All specimens should be transported in dry ice.	Haematology Unit, Pathology Department, Tunku Azizah Hospital
8	Acute Flaccid Paralysis 1st & 2nd sample (Polio)	Stool	Sterile container	Stool: >5 g (Thumb size)			29D	/	/			HIS & Manual PER-PAT 301 form	IMR

9	Acute Myeloid Leukaemia Mutation Studies – FLT3-ITD Mutation Analysis (IMR SETIA ALAM)	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	EDTA tube	2.5-5 ml			14 WD IMR TAT 30D HRPB	/				Molecular Analysis for Haemato-oncology request form Transport samples without delay preferably within 24 hours at room temperature. DO NOT freeze specimens."	Haematology Unit, Cancer Research Centre, Institute for Medical Research, National Institutes of Health (NIH), Setia Alam
10	ADAM TS 13 level (offered to Haematologist only)	Blood (plasma)	Trisodium Citrate 3.2%	Collect until indicated mark x 2 tubes			42D	/				HOSPITAL AMPANG SPECIAL HAEMATOLOGY REQUISITION FORM Separate plasma from cells as soon as possible (double spin) Platelet count must be $<10 \times 10^9$ /L in plasma prior to freezing. Store frozen at -40° C and transport frozen plasma on dried ice	Red Cell Haemostasis Unit, Makmal Rujukan Klinik Hospital (MRKH) Ampang Hospital
11	Adenocortico-trophic hormone (ACTH)	Plasma	EDTA	2.5 ml			15D	/				HIS & Manual PER-PAT 301 form	HKL
12	Adenosine Deaminase (ADA)	Plural Fluid	Plain sterile urine container	3 ml			5D	/				HIS & MKAK-BPU-U01 Form.	MKAI Ipoh

13	Adenovirus F41 qRT-PCR	Blood, Liver Biopsy, Tissue	EDTA Tube, Sterile container	2 ml			20D	/				HIS & Manual PER-PAT 301 form	Virology NIH
14	AFB C&S	Fluid/ Serum/ Sputum/ Tissue/ CSF	Sterile container				47D	/				HIS & Manual PER-PAT 301 form	MKAI Ipoh
15	Alcohol (Ethanol)	Blood/urine	Flouride Oxalate tube	2 ml blood/2ml urine			20D	/				Kimia 15-Pin. 3/2020 Form.	Jabatan Kimia
16	Aldosterone	Plasma	EDTA	2.5 ml			45D	/				HIS & Manual PER-PAT 301 form	Putrajaya Hospital
17	Alpha-1- Antitrypsin- Phenotyping	Serum	Plain gel tube	3 ml			20D	/				HIS & Manual PER-PAT 301 form	Ampang Hospital
18	Alpha-1- Antitrypsin- Quantitation	Serum	Plain gel tube	3 ml			20D	/				HIS & Manual PER-PAT 301 form	Ampang Hospital
19	Amino Acid, urine	Random Urine	Clean Universal bottle	10 ml			30D	/				HIS & HTA 03 Borang permohonan ujian IEM HTA.	HTA
20	Amino Acid, plasma	Plasma	1) Heparin Tube	2ml plasma			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
21	Amino Acids, (CSF)	Cerebro spinal fluid	Clean Universal bottle	1ml			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
22	Amino Acids (Urine) (by CONSULTA-TION ONLY with SPOKEN TO.....:)	Random Urine	Sterile Urine container	2ml			45D	/			/	HIS & Request Form for Biochemical Genetic Tests	IMR

23	AML Mutation Panel by Next Generation Sequencing (NGS) (IMR SETIA ALAM)	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	EDTA tube	2.5-5 ml			30 WD	/				Molecular Analysis for Haemato-oncology request form Transport samples without delay preferably within 24 hours at room 24temperature. DO NOT freeze specimens."	Haematology Unit, Cancer Research Centre, Institute for Medical Research, National Institutes of Health (NIH), Setia Alam
24	Amoebiasis serology	Serum	Plain Tube	2 ml			20D	/				HIS & Manual PER-PAT 301 form	IMR
25	ANA	Serum 2 ml	Plain Tube	2 ml			29D	/				HIS & Manual PER-PAT 301 form	Taiping Hospital
26	Anti-Aquaporin 4	Serum, CSF	Plain Tube, Sterile screw capped container	2 ml			25D	/				HIS & Manual PER-PAT 301 form	IMR
27	Anti Beta-2 Glycoprotein	Serum	Plain Tube	2 ml			29D	/				HIS & Manual PER-PAT 301 form	Taiping Hospital
28	Anti Cardiolipin IgM and IgG	Serum	Plain Tube	2 ml			29D	/				HIS & Manual PER-PAT 301 form	Taiping Hospital
29	Anti Cyclic Citrullinated Peptides (CCP)	Serum	Plain Tube	2 ml			29D	/				HIS & Manual PER-PAT 301 form	Taiping Hospital

30	Anti Glomerular Basement Membrane (GBM)	Serum	Plain Tube	2 ml			25D	/				HIS & Manual PER-PAT 301 form	IMR
31	Antifungal (TDM) • Itraconazole • Posaconazole • Voriconazole • Flucytosine • Fluconazole • Isavuconazole	Serum	Plain Tube	3 ml (each test)			7D	/				HIS & Manual PER-PAT 301 form	HKL
32	Anti islet cells (ICA)	Serum	Plain gel tube	3 ml			20D	/				HIS & Manual PER-PAT 301 form	HKL
33	Anti Mullerian Hormone (AMH)	Serum	Plain tube	3 ml			20D	/				HIS & Manual PER-PAT 301 form	HKL
34	Anti Neutrophil Cytoplasmic antibodies (ANCA), P-ANCA, C-ANCA, Myeloperoxidase (MPO), Proteinase 3 (PR3)	Serum	Plain Tube	2 ml			36D	/				HIS & Manual PER-PAT 301 form	Taiping Hospital

35	Anti Thyroid Stimulating Hormone Receptor	Serum	Plain gel tube	3 ml			7D	/				HIS & Manual PER-PAT 301 form	HKL
36	Anti Xa (Please contact Coagulation lab staff prior to sample collection) – H. Ampang	Blood (Plasma)	Trisodium Citrate 3.2%	Collect until indicated mark x 2 tubes			30D	/				HOSPITAL AMPANG SPECIAL HAEMATOLOGY REQUISITION FORM Deliver tubes immediately to the laboratory at room temperature. OR	Red Cell Haemostasis Unit, Makmal Rujukan Klinik Hospital (MRKH) Ampang Hospital
												Separate plasma from cells as soon as possible, ideally within one hour of specimen collection (double spin) Platelet count must be $<10 \times 10^9/L$ in plasma prior to freezing. Store frozen at $-40^{\circ}C$ and transport frozen plasma on dried ice	
37	Anti- N-methyl-D-aspartate receptor (Anti-NMDAR)	Serum, CSF	Plain Tube, Sterile screw capped container	2 ml			22D	/				HIS & Manual PER-PAT 301 form	IMR

38	Anti-Acetylcholine Receptor Antibody (ACR)	Serum	Plain Tube	2 ml			36D	/				HIS & Manual PER-PAT 301 form	IMR
39	Anti-DsDNA	Serum 2 ml	Plain Tube	2 ml			29D	/				HIS & Manual PER-PAT 301 form	Taiiping Hospital
40	Anti-Glutamic acid decarboxylase (GAD)	Serum	Plain gel tube	3 ml			20D	/				HIS & Manual PER-PAT 301 form	HKL
41	Anti-Insulinoma-Associated Antigen 2 (IA2)	Serum	Plain gel tube	3 ml			20D	/				HIS & Manual PER-PAT 301 form	HKL
42	Anti-Phospholipase A2 Receptor (Anti-PLA2R)	Serum	Plain Tube	2 ml			36D	/				HIS & Manual PER-PAT 301 form	IMR
43	Antibodies Specific liver- Anti-AMA, M2, M2-3E/BPO, Sp100, PML, gp210, LKM1, LC-1, SLA/LP, Ro-52	Serum	Plain Tube	2 ml			29D	/				HIS & Manual PER-PAT 301 form	IMR
44	Argininosuccinic Acid (ASA)	Random Urine	Sterile Urine container	2ml			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR

45	BCR-ABL1 Kinase Domain Mutation (IMR SETIA ALAM)	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	EDTA tube	2.5-5 ml			30 WD	/				Molecular Analysis for Haemato-oncology request form (Version 3.0). Keep the sample cooled. Sample must be refrigerated (2-8° C) after collection and kept chilled during transportation. DO NOT FREEZE.	Haematology Unit, Cancer Research Centre, Institute for Medical Research, National Institutes of Health (NIH), Setia Alam
46	BCR-ABL1 Qualitative Diagnostic Analysis (IMR SETIA ALAM)	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	EDTA tube	2.5-5 ml			7WD IMR TAT 30D HRPB	/				Molecular Analysis for Haemato-oncology request form Transport samples without delay preferably within 24 hours at room temperature. DO NOT freeze specimens."	Haematology Unit, Cancer Research Centre, Institute for Medical Research, National Institutes of Health (NIH), Setia Alam
47	Beta-2 Microglobulin	Serum	Plain gel tube	3 ml			20D	/				HIS & Manual PER-PAT 301 form	Ampang Hospital
48	Beta-D-Glucan Antigen	Blood	Plain Tube	3 ml			20 D	/				HIS & Manual PER-PAT 301 form	Sg Buloh Hospital
49	Bile acid	Serum	Plain tube	5 ml			30D	/				HIS & Manual PER-PAT 301 form	Selayang Hospital

50	Biogenic Amines (Csf/urine)	Cerebro-spinal fluid/ Urine	Sterile fluid container /sterile urine container	2ml CSF/urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
51	Biotinidase Enzyme Activity	Dried blood spot	Whatmann 903 filter paper	3 circles of dried blood spot (~ 70 microlitre of blood per circle)			20D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
52	BK Virus PCR	Plasma, CSF, Urine	EDTA Tube, Sterile container	2 ml			20D	/				HIS & Manual PER-PAT 301 form	Sg Buloh Hospital
53	Bordetella pertussis PCR	Nasopharyngeal Aspirates 2ml, Nasopharyngeal Swab	Sterile container	2 ml			18D	/				HIS & Manual PER-PAT 301 form	IMR
54	Brucella PCR	Blood	EDTA Tube	5 ml			25D	/				HIS & Manual PER-PAT 301 form	IMR
55	Brucella Serology	Serum	Plain Tube	2 ml			25D	/				HIS & Manual PER-PAT 301 form	IMR
56	C-Peptide	Serum	plain gel tube	3 ml			20D	/				HIS & Manual PER-PAT 301 form	HKL
57	Carnitine Total & Free	Plasma/ serum	Heparin/ Plain tube	2ml plasma/ serum			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR

58	Carnitine, 24Hrs urine	24-hour Urine	24-hour urine bottle	total urine volume: > 500 ml for testing: 5ml of 24-hour urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
59	Ceruloplasmin	Serum	Plain gel tube	3 ml			7D	/				HIS & Manual PER-PAT 301 form	HKL
60	Chikugunya RT PCR	Serum	Plain Tube	2 ml			18D	/				HIS & Manual PER-PAT 301 form	MKAI Ipoh
61	Chimerism Studies (IMR SETIA ALAM)	Bone Marrow Aspirate (BMA) or Peri-pheral Blood (PB)	EDTA tube	10-20 ml			30D	/				Chimerism Request form VER 3 120624 Specimen must be: a) collected under sterile conditions b) packed in ice during transport c) protected from extreme heat and freeze IMPORTANT: The recipient pre-HSCT sample and donor sample are required for this analysis. The recipient sample should be collected prior to conditioning. Keep the sample cooled. Sample must be refrigerated (2-8° C) after	Haematology Unit, Cancer Research Centre, Institute for Medical Research, National Institutes of Health (NIH), Setia Alam

												collection and kept chilled during transportation. DO NOT FREEZE.	
62	Chromogenic Assay for Inhibitor Study	Blood (Plasma)	Trisodium Citrate 3.2%	Minimum 2 tubes			30D				/	Ampang Hospital: Special Haematology Requisition Form	Red Cell Haemostasis Unit, Makmal Rujukan Klinik Hospital (MRKH) Ampang Hospital
63	Chromosome Breakage	Peripheral Blood (PB)	Sodium Heparin tube	5-10 ml			30D	/					Human Genome Centre, Kubang Kerian, Kelantan
64	Chromosome Study / Conventional Cytogenetics /Molecular Cytogenetics (FISH) (Genetic Lab HTA)	Bone Marrow Aspirate (BMA) or Peri-pheral Blood (PB)	For BMA sample: Sodium heparin tube For PB sample: Lithium Heparin (without gel)	3-5ml	14D		R: 180D FISH : Addi - tio- nal 30D from refl ex test -ing	/				Borang Permohonan Ujian Sitogenetik / Cytogenetics Request Form Effective date: 6 Dec 2022 Samples should be delivered to the HTA Genetics Laboratory within 48 hours of collection to prevent haemolysis If sample delivery exceeds 24 hours,	Genetic Lab Pathology Department Tunku Azizah Hospital

												ensure samples are initially stored at 2-8° C and then shipped with ice packs	
65	CMV DNA PCR Viral Load (Quantitative)	Plasma, Urine	EDTA Tube, Sterile container	2 ml			20D	/				HIS & Manual PER-PAT 301 form	Sg Buloh Hospital
66	Coeliac Antibodies (Anti-Gliadin, Anti-Tissue Transglutaminase, Anti-Endomysium)	Serum	Plain Tube	2 ml			36D	/				HIS & Manual PER-PAT 301 form	IMR
67	Coxiella Serology	Serum 2 ml	Plain Tube	2 ml			20D	/				HIS & Manual PER-PAT 301 form	MKAK Sg Buloh
68	Creatine & Guanidino-acetic Acid (blood spoot /urine/plasma)	Dried blood spot/ plasma/ Urine	What-mann 903 Filter paper/ EDTA/ urine container	3 circles of dried blood spot (~ 70 microlitre of blood per circle)/ 1ml plasma/ 2ml urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR

69	CSF Flow Cytometry (HTA/HWKKKL)	Cerebro-spinal Fluid	Universal container	1-2 ml			3D	/				REQUIRE discussion with pathologist prior to sample collection Send immediately. Please state time of collection Sample needs to be processed within 2-4 hours of sample collection Transfix added if needed, 1 unstained slide	Haematologi Unit, Ptahology Department Tunku Azizah Hospital
70	CSF VDRL	CSF	container				20D	/				HIS & Manual PER-PAT 301 form	Sultanah Bahiyah Hospital, Alor Setar
71	Cystine & Homocystine (urine)	Random Urine	Clean Universal bottle	2ml urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
72	Cytogenetics - FISH (Balik Pulau Hospital/ Penang Hospital / HTA/ Ampang Hospital)	Bone Marrow Aspirate (BMA) or Peri-pherel Blood (PB)	Sodium Heparin tube (Balik Pulau Hospital / Ampang Hospital) Tunku	BMA: Minimum 1-2 ml, if CLL case: 5 ml Periphera 1 blood: 5 ml, if CLL case:			30D	/				Balik Pulau Hospital: Bone Marrow Cytogenetics Form Tunku Azizah Hospital: Borang Permohonan Ujian Sitogenetik / Cytogenetics Request Form	Cytogenetic Lab, Pathology Department, Balik Pulau Hospital Cytogenetic Lab, Pathology Department, Tunku Azizah

			Azizah Hospital: For Constitutional Conventional Cyto-genetics, PB Sample: Use Lithium Heparin Tube For Haemato-Oncology Conventional Cyto-genetics, BMA Sample: Use Sodium Heparin Tube For Haemato-Oncology Conventional	10 ml									Ampang Hospital Special Haematology Requisition Form	Hospital Cytogenetics (Leukemia) Unit, Makmal Rujukan Klinikal Hospital (MRKH), Haematology Department , Ampang Hospital
--	--	--	---	-------	--	--	--	--	--	--	--	--	---	---

			tional Cyto- genetics (CLL Only), PB Sample: Use Lithium Heparin Tube										
73	Cytogenetics – Karyotype (Balik Pulau Hospital/ Penang Hospital / HTA/ Ampang Hospital)	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	Sodium Heparin tube Hospital / Ampang Hospital) Tunku Azizah Hospital: For Consti- tutional Conven- tional Cyto- genetics, PB Sample: Use Lithium Heparin Tube	BMA: Minimum 1-2 ml, if CLL case: 5 ml Periphera l blood: 5 ml, if CLL case: 10 ml			30D	/				Balik Pulau Hospital: Bone Marrow Cytogenetics Form Tunku Azizah Hospital: Borang Permohonan Ujian Sitogenetik / Cytogenetics Request Form Ampang Hospital: Special Haematology Requisition Form	Cytogenetic Lab, Pathology Department, Balik Pulau Hospital Cytogenetic Lab, Pathology Department, Tunku Azizah Hospital Cytogenetics (Leukemia) Unit, MRKH, Haematology Department , Ampang Hospital

			For Haemato- Oncology Conven- tional Cyto- genetics, BMA Sample: Use Sodium Heparin Tube For Haemato- Oncology Conven- tional Cyto- genetics (CLL Only), PB Sample: Use Lithium Heparin Tube										
74	Dehydroepian- drosterone Sulphate (DHEA-S)	Serum	Plain gel tube	3 ml			20D	/				HIS & Manual PER-PAT 301 form	HKL

75	Delta-Amino Levulinic Acids (Delta-ALA) Urine	Random Urine	Sterile Universal bottle AND protect from light.	2ml urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
76	Dengue RT PCR	Serum, CSF	Plain Tube, Sterile screw capped container	2 ml			18D	/				HIS & Manual PER-PAT 301 form	MKAI Ipoh
77	Detection of Aspergillus Galacto-mannan Ag (EIA)	Serum	Plain Tube	2 ml			18D	/				HIS & Manual PER-PAT 301 form	Seberang Jaya Hospital
78	Detection of Borellia Burgdorferi Ab	Serum	Plain Tube	2 ml			25D	/				HIS & Manual PER-PAT 301 form	HKL
79	Detection of Pneumocystis Jirovecii Oocyst	Induced sputum, Broncho-alveolar lavage / 5-10 ml	Sterile container				20D	/				HIS & Manual PER-PAT 301 form	Sg Buloh Hospital
80	Dihydrorhodamine (DHR) test, (An appointment is required)	Whole blood	EDTA Tube	2.5 ml			25D	/				HIS & Manual PER-PAT 301 form	IMR

81	DNA Analysis (Alpha / Beta Thalasemia) – HKL	Peripheral Blood (PB)	EDTA tube	Minimum 500µL (paediatric) 2.5mL (adult)			90D – 120 D	/				PER.PAT 301 form (Chop & Sign Clinician) A copy of recent FBC (<3 months) result, A copy of Hb Analysis result, All paediatrics ($\leq$ 12 y.o.) sample to be referred to IMR, must be accompanied by both parents’ FBC and Hb analysis results A copy of DNA analysis for thalassaemia syndromes/ haemoglobinopathy result of INDEX case	Molecular Haematology Laboratory Haematology Unit, Pathology Department HKL
82	DNA Analysis (Beta Globin/ Further Testing Alpha or Beta Globin / Complicated Alpha thalasemia/ Variants) (IMR SETIA ALAM)	Peripheral Blood (PB)	EDTA tube	Minimum 500µL (paediatric) 2.5mL (adult)			120D	/				PER.PAT 301 form (Chop & Sign Clinician) A copy of recent FBC (<3 months) result, A copy of Hb Analysis result, All paediatrics ($\leq$ 12 y.o.) sample to be referred to IMR, must be accompanied by both parents’ FBC and Hb analysis results A copy of DNA analysis for thalassaemia	Molecular Genetics Laboratory Haematology Unit, Cancer Research Centre IMR National Institutes of Health (NIH), Setia Alam

												syndromes/ haemoglobinopathy result of INDEX case	
83	Double Negative T- Lymphocyte Subset (DNT) (Must spoken to Hemato- pathologist in HTA before sending)	Blood	EDTA Tube	3 EDTA tubes			30D	/				PER.PAT 301 form (Chop & Sign Clinician) REQUIRE discussion with pathologist prior to sample collection	Haematologi Unit, Pathology Department Tunku Azizah Hospital
84	Dried Blood Spot (DBS) Galactosemia Screening (TG & GALT)	Random Urine	Sterile Universal bottle AND protect from light.	2ml urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
85	Echino- coccosis Serology	Serum	Plain Tube	2 ml			20D	/				HIS & Manual PER-PAT 301 form	IMR
86	Epstein Barr Virus (EBV) DNA Genome Detection (Qualitative/ Quantitative)	Plasma/ 2ml, CSF	EDTA Tube, Screw capped container	2 ml			20D	/				HIS & Manual PER-PAT 301 form	Sg Buloh Hospital
87	Epstein Barr Virus IgG/IgM	Serum	Plain Tube	2 ml			22D	/				HIS & Manual PER-PAT 301 form	HKL

88	Erythropoietin (H. Ampang)	Blood (Serum)	Plain Tube	Collect 3 tubes Spin & separate the serum; minimum 1.5 ml			90D	/				Ampang Hospital: Special Haematology Requisition Form Separate serum from cells as soon as possible. Store frozen at - 40° C and transport frozen serum on dried ice. Must attach FBC result with request form.	Red Cell Haemostasis Unit, Makmal Rujukan Klinik Hospital (MRKH) Ampang Hospital
89	Everolimus	Plasma	EDTA	2.5 ML			10D	/				HIS & Manual PER-PAT 301 form	HKL
90	Extractable nuclear antigen (ENA), Anti-Sm, Anti-U1 RNP, Anti-SSA/Ro, Anti-SSB/La, Anti-Jo 1, Anti-Scl -70, Anti-RNP 70, Anti-Centromere	Serum	Plain Tube	2 ml			29D	/				HIS & Manual PER-PAT 301 form	Taiping Hospital
91	Factor II Assay (Referral to HTA)	Blood (Plasma)	Trisodium Citrate 3.2%	Minimum 1.8 ml (paediatric) 2.7 ml (adult)			30D	/				PER. PAT 301 form (Chop & Sign Clinician) REQUIRE discussion with pathologist prior to sample collection	Haematology Unit, Pathology Department Tunku Azizah Hospital

												Spin and separate plasma. Store patient plasma at -30°C to -70°C. All specimens should be transported in dry ice.	
92	Factor V Assay (Referral to HTA)	Blood (Plasma)	Trisodium Citrate 3.2%	Minimum 1.8 ml (paediatric) 2.7 ml (adult)			30D	/				PER.PAT 301 form (Chop & Sign Clinician) REQUIRE discussion with pathologist prior to sample collection Spin and separate plasma. Store patient plasma at -30°C to -70°C. All specimens should be transported in dry ice.	Haematology Unit, Pathology Department Tunku Azizah Hospital
93	Factor VII Assay (Referral to HTA)	Blood (Plasma)	Trisodium Citrate 3.2%	Minimum 1.8 ml (paediatric) 2.7 ml (adult)			30D	/				PER.PAT 301 form (Chop & Sign Clinician) REQUIRE discussion with pathologist prior to sample collection Spin and separate plasma. Store patient plasma at -30°C to -70°C. All specimens should be transported in dry ice.	Haematology Unit, Pathology Department Tunku Azizah Hospital Spin and separate plasma. Store patient plasma at -30°C to -70°C. All

													specimens should be transported in dry ice.
94	Factor X Assay (Referral to HTA)	Blood (Plasma)	Trisodium Citrate 3.2%	Minimum 1.8 ml (paediatric) 2.7 ml (adult)			30D	/				PER.PAT 301 form (Chop & Sign Clinician) REQUIRE discussion with pathologist prior to sample collection Spin and separate plasma. Store patient plasma at -30°C to -70°C. All specimens should be transported in dry ice.	Haematology Unit, Pathology Department Tunku Azizah Hospital
95	Factor XI Assay (Referral to HTA)	Blood (Plasma)	Trisodium Citrate 3.2%	Minimum 1.8 ml (paediatric) 2.7 ml (adult)			30D	/				PER.PAT 301 form (Chop & Sign Clinician) REQUIRE discussion with pathologist prior to sample collection Spin and separate plasma. Store patient plasma at -30°C to -70°C. All specimens should be transported in dry ice.	Haematology Unit, Pathology Department Tunku Azizah Hospital Spin and separate plasma. Store patient plasma at -30°C to -70°C. All specimens should be transported in dry ice.

96	Factor XII Assay (Referral to HTA)	Blood (Plasma)	Trisodium Citrate 3.2%	Minimum 1.8 ml (paediatric) 2.7 ml (adult)			30D	/				PER.PAT 301 form (Chop & Sign Clinician) REQUIRE discussion with pathologist prior to sample collection Spin and separate plasma. Store patient plasma at -30°C to -70°C. All specimens should be transported in dry ice.	Haematology Unit, Pathology Department Tunku Azizah Hospital Spin and separate plasma. Store patient plasma at -30°C to -70°C. All specimens should be transported in dry ice.
97	Factor XIII Assay (Referral to HTA)	Blood (Plasma)	Trisodium Citrate 3.2%	Minimum 1.8 ml (paediatric) 2.7 ml (adult)			30D	/				PER.PAT 301 form (Chop & Sign Clinician) REQUIRE discussion with pathologist prior to sample collection Spin and separate plasma. Store patient plasma at -30°C to -70°C. All specimens should be transported in dry ice.	Haematology Unit, Pathology Department Tunku Azizah Hospital

98	Filariasis Microscopy	Giemsa stain slide/ Whole blood 2.5 ml	EDTA Tube / Slide mailer	2.5 ml			18D	/				HIS & Manual PER-PAT 301 form	IMR
99	Filariasis PCR	Whole blood	EDTA Tube	2.5 ml			22D	/				HIS & Manual PER-PAT 301 form	IMR
100	Filariasis Serology	Serum, Anti Coagulated blood	Plain Tube, EDTA Tube	2 ml			16D	/				HIS & Manual PER-PAT 301 form	IMR
101	Free Light Chain, Kappa & Lambda	Serum	Plain gel tube	5 ml			10D	/				HIS & Manual PER-PAT 301 form	Penang Hospital
102	Fructosamine	Serum	Plain gel tube	3 ml			15D	/				HIS & Manual PER-PAT 301 form	Ampang Hospital
103	G6PD Assay Confirmation (referral to Malacca Hospital)	Blood	EDTA Tube	Minimum 500µL (paediatric) 2mL (adult)			7D	/				PER.PAT 301 form (Chop & Sign Clinician) Sample delivery (by post): Mon – Wed Patient Criteria: 1. Normal Reticulocyte count: – Neonate < 5% – Paediatric & adult < 2.5% 2. Specimen: – 3 month after blood transfusion – 2 month after acute haemolytic crisis	Haematology Lab, Pathology Department, Malacca Hospital

104	Growth Hormone	Serum	Plain gel tube	3 ml			45D	/				HIS & Manual PER-PAT 301 form	Putrajaya Hospital
105	Haptoglobin	serum	Plain gel tube	3 ml			20D	/				HIS & Manual PER-PAT 301 form	Ampang Hospital
106	HCV Genotype	Plasma	EDTA Tube	2 ml			45D	/				HIS & Manual PER-PAT 301 form	HKL
107	Helminth culture for hookworm and <i>Strongyloides stercoralis</i>	Fresh stool	Sterile container without preservative	Stool: >5 g (Thumb size)			14D	/				HIS & Manual PER-PAT 301 form. Indicated for patient with chronic diarrhea and gastroenteritis	IMR
108	Heminth Macroscopy/ Microscopy	Fresh stool	Sterile container	Stool: >5 g (Thumb size)			20D	/				HIS & Manual PER-PAT 301 form	IMR
109	Helminth PCR. Multiplex PCR for: 1. Ancylostoma spp 2. Ascaris spp. 3. Enterobius vermicularis 4. Enterocytozoon spp./Encephalitozoon spp 5. Hymenia spp. Necator americanus 6. Strongyloides	Stool	Sterile container	10 mL			5D	/				Indicated for patient with chronic diarrhea and gastroentiritis. HIS & Manual PER-PAT 301 form	IKN

	spp. 7. Taenia spp. 9. Trichuris trichiura												
110	Hepatitis A IgG	Serum	Plain Tube	2 ml			20D	/				HIS & Manual PER-PAT 301 form	HKL
111	Hepatitis E Virus IgM Antibody	Serum, Plasma	Plain Tube, EDTA Tube	2 ml			25D	/				HIS & Manual PER-PAT 301 form	IMR
112	HLA Antibody (PRA/DSA) (An appointment is not required.)	Blood	Plain Tube	2 ml			35D	/				HIS & Manual PER-PAT 301 form	IMR
113	HLA Cross matching (Complement Dependent Cytotoxicity) (An appointment is required.)	Donor: 18 ml blood/Patie nt: 6 ml blood	EDTA Tube	2 ml			25D				/	Appointment with Unit Tranplantation Immunology IMR (NIH Setia Alam)	IMR
114	HLA Cross matching (Flow Cytometry) (An appointment is required.)	Donor: 18 ml blood/Patie nt: 6 ml blood	EDTA Tube	2 ml			25D				/	Appointment with Unit Tranplantation Immunology IMR (NIH Setia Alam)	IMR

115	HLA typing (Disease Association)	Whole Blood	EDTA Tube	6 ml			25D				/	Appointment with Unit Tranplantation Immunology IMR (NIH Setia Alam)	IMR
116	HLA typing (Molecular Class I and II) for Bone marrow and solid organ transplan-tation	Whole Blood	EDTA Tube	6 ml			25D				/	Appointment with Unit Tranplantation Immunology IMR (NIH Setia Alam)	IMR
117	Homocysteine Total (plasma)	Plasma	EDTA	2ml plasma			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
118	HSV I & II - IgG ELISA	Serum	Plain Tube	2 ml			22D	/				HIS & Manual PER-PAT 301 form	HKL
119	HSV I & II DNA Genome Detection	Plasma, CSF, Urine	EDTA Tube, Sterile container	2 ml			20D	/				HIS & Manual PER-PAT 301 form	Sg Buloh Hospital
120	HTLV I & II	Serum	Plain Tube	2 ml			22D	/				HIS & Manual PER-PAT 301 form	HKL
121	Hypereosino-philias (Must Consult with Hematologists before sending)	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	EDTA Tube	BMA (2 ml) PB (Minimum 5 ml)			30D	/				Ampang Hospital: Special Haematology Requisition Form REQUIRE discussion with pathologist prior to sample collection	Molecular Diagnostics, Haematology Unit, Ampang Hospital

122	IEM screening (Amino acids & acylcarnitine s)	Blood spot	What-mann 903 Filter paper	3 circles of dried blood spot (~ 70 microlitre of blood per circle)			45D	/				HIS & HTA 03 Borang permohonan ujian IEM HTA.	HTA
123	Immuno-globulin A (IgA) serum	Serum	Plain gel tube	3 ml			15D	/				HIS & Manual PER-PAT 301 form	Ampang Hospital
124	Immuno-globulin G (IgG) serum	Serum	Plain gel tube	3 ml			15D	/				HIS & Manual PER-PAT 301 form	Ampang Hospital
125	Immuno-globulin M (IgM) serum	P	plain gel tube	3 ml			15D	/				HIS & Manual PER-PAT 301 form	Ampang Hospital
126	Immuno-phenotyping (MRD) (HUKM / HWKKKL)	Bone Marrow Aspirate (BMA)	EDTA Tube	2 tubes x 2ml			21D	/				"Hospital Pakar Kanak-Kanak UKM (HPKK) Form: Flow Cytometry Immunophenotyping Analysis Tunku Azizah Hospital: PER. PAT 301 Form (Chop & Sign Clinician) First pull of bone marrow aspirate (BMA) sample (COMPULSORY) (Obtaining first pull	Haematologi Unit, Pathology Department, Tunku Azizah Hospital

												bone marrow aspiration is important for MRD assessment in B-ALL, as it helps ensure sample quality and sensitivity of MRD detection) MRD B-ALL Only (for HPKK HUKM), send with 1 unstained slide Other than B-ALL, send to HTA	
127	Insulin	Serum	Plain gel tube	3 ml			25D	/				HIS & Manual PER-PAT 301 form	HKL
128	Insulin autoantibodies (IAA)	Serum	Plain gel tube	3 ml			20D	/				HIS & Manual PER-PAT 301 form	HKL
129	Insulin like Growth Factor I (IGF I)	Serum	plain gel tube	3 ml			45D	/				HIS & Manual PER-PAT 301 form	Putrajaya Hospital
130	Inter-reference Study (Endocrine & Metabolic)	Serum/ plasma	Plain tube/ EDTA	5ml/2.5ml			45D	/				HIS & Manual PER-PAT 301 form	Penang Hospital
131	Intrinsic Factor Antibody	Serum	Plain Tube	2 ml			22D	/				HIS & Manual PER-PAT 301 form	Selayang Hospital

132	Japanese Encephalitis PCR	Serum 3ml, CSF	Plain Tube, Sterile screw capped container	3 ml			18D	/				HIS & Manual PER-PAT 301 form	MKAK Sg Buloh
133	Japanese Encephalitis Serology	Serum / 3ml	Plain Tube	3 ml			22D	/				HIS & Manual PER-PAT 301 form	MKAK Sg Buloh
134	Leishmaniasis Microscopy	Whole Blood	EDTA Tube	2.5 ml			18D	/				HIS & Manual PER-PAT 301 form	IMR
135	Leishmaniasis PCR	Whole blood, Tissue scrapping	EDTA Tube, Sterile container	2.5 ml			22D	/				HIS & Manual PER-PAT 301 form	IMR
136	Leishmaniasis Serology	Serum/ 2ml, Whole Blood/2ml	Plain Tube, EDTA Tube	2 ml			20D	/				HIS & Manual PER-PAT 301 form	IMR
137	Leptospiral PCR	Whole Blood	EDTA Tube	2.5 ml			21D	/				HIS & Manual PER-PAT 301 form	IMR
138	Leukaemia Immunophenotyping (Referral HKL/HTA/Gribbles)	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	EDTA tube	BMA (Minimum 1-2 ml) or PB (Minimum 2 ml)			With -in 3D for Verbal Report -rt Formal report with	/				PER. PAT 301 form (Chop & Sign Clinician) Transfix added if needed, 1 unstained slide	Haematology Unit, Pathology Department, Tunku Azizah Hospital

							-in 21D						
--	--	--	--	--	--	--	------------	--	--	--	--	--	--

139	Lithium	Serum	Plain tube	3 ml			7D	/				HIS & Manual PER-PAT 301 form	HBUK, Ipoh
140	Lysine Metabolism Profile, urine	Random Urine	Clean Universal bottle	2ml urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
141	Lysosomal Storage Disease (LSD) Enzyme Assays (ONLY 2 diseases of enzyme per request) (by CONSULTATION ONLY with SPOKEN TO.....:)	Whole blood	EDTA	6 ml whole blood			45D	/			/	HIS & Request Form for Biochemical Genetic Tests	IMR
142	Macroprolactin	Serum	Plain tube	3 ml			20D	/				HIS & Manual PER-PAT 301 form	Penang Hospital
143	Malaria PCR	Sample type: Geimsa stain thick/thin blood film, Blood sample on filter paper; Blood/2.5ml / Failure to identify species					22D	/				HIS & Manual PER-PAT 301 form	IMR

		through blood film in customer' s lab											
144	Measles RT-PCR	Nasopharyngeal Secretion, Tracheal aspirates, Urine, Throat swab / 2.5 ml in VTM,	Sterile container	2 ml			22D	/				HIS & Manual PER-PAT 301 form	MKAI Ipoh
145	Measles Serology	Serum / 2ml	Plain Tube	2 ml			19D	/				HIS & Manual PER-PAT 301 form	MKAI Ipoh
146	Melioidosis (Burkholderia Pseudomallei Ab IgM)	Serum	Plain Tube	2 ml			20D	/				HIS & Manual PER-PAT 301 form	IMR
147	Methanol	Blood /urine	Fluoride tube	2 ml blood/2ml urine			7D	/				HIS & MKAK-BPU-U01 Form.	MKAK Sg Buloh
148	Molecular Analysis- c-KIT D816V Mutation Analysis (IMR SETIA ALAM)	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	EDTA tube	2.5-5 ml			14 WD	/				Molecular Analysis for Haemato-oncology request form Transport samples without delay preferably within 24 hours at room temperature. DO NOT freeze specimens."	Haematology Unit, Cancer Research Centre, Institute for Medical Research, National Institutes of Health (NIH), Setia Alam

149	Molecular Hemophilia A (IMR SETIA ALAM)	Blood	EDTA Tube	2.5 ml			60 WD	/				Use Haemophilia Genetic Testing Request Form Patient's blood sample must be accompanied with a complete request form and factor assay report. Family member's blood sample must be accompanied with index specimen and complete clinical data. Keep the sample cooled. Sample must be refrigerated (2-8° C) after collection and kept chilled during transportation. DO NOT FREEZE.	Haematology Unit, Cancer Research Centre, Institute for Medical Research, National Institutes of Health, Setia Alam
150	Molecular study - CALRETICULIN (By Appointment Ampang Hospital)	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	EDTA Tube	BMA (2 ml) PB (Minimum 10 ml)			60D	/				Ampang Hospital: Special Haematology Requisition Form Transport samples without delay preferably within 24 hours at room temperature. DO NOT freeze specimens.	Molecular Diagnostics, Haematology Unit, Rujukan Klinik Hospital (MRKH), Hospital Ampang

151	Molecular Study - JAK2 (Ampang Hospital)	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	EDTA tube	BMA (Minimum 1-2 ml) or PB (Minimum 10 ml)			60D	/			Ampang Hospital: Special Haematology Requisition Form Transport samples without delay preferably within 24 hours at room temperature. DO NOT freeze specimens.	Molecular Diagnostics, Haematology Unit, Rujukan Klinikal Hospital (MRKH), Hospital Ampang
152	Molecular Study- AML Mutation Panel (Outsource to Ampang Hospital/ IMR)	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	EDTA Tube	BMA (2 ml) or PB (Minimum 5 ml)			30D	/			Ampang Hospital: Special Haematology Requisition Form Transport samples without delay preferably within 24 hours at room temperature. DO NOT freeze specimens	Molecular Diagnostics, Haematology Unit, Rujukan Klinikal Hospital (MRKH), Hospital Ampang
153	Molecular Study- BCR-ABL1 (TFR / ALL / BLAST CRISIS case ONLY-until further notice) - Ampang Hospital	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	EDTA tube	PB, Minimum 5.0 ml, BMA, 1-2ml			42D	/			Ampang Hospital: Special Haematology Requisition Form Qualitative PCR (*for suspected CML case only) Quantitative RT-PCR: if for Follow-up: BMA (Ph+ ALL/AML) , Minimum 1-2ml if CML case, PB is	Molecular Diagnostics Haematology Unit, Makmal Rujukan Klinikal Hospital (MRKH), Ampang Hospital

												preferred, Minimum 10 ml if Minor BCR-ABL1, for Follow-up send BMA Minimum 1-2 ml	
154	Molecular Study- CBF Beta- MYH11 (By Appointment Ampang Hospital)	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	EDTA tube	BMA (2ml) PB (5ml)			42D	/				Ampang Hospital: Special Haematology Requisition Form	Molecular Diagnostics Haematology Unit, Makmal Rujukan Klinik Hospital (MRKH), Ampang Hospital
155	Molecular Study- FLT3-ITD / NPM1 (By Appointment Ampang Hospital)	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	EDTA Tube	BMA (2 ml) PB (Minimum 5 ml)			30D	/				Ampang Hospital: Special Haematology Requisition Form Transport samples without delay preferably within 24 hours at room temperature. DO NOT freeze specimens	Molecular Diagnostics Haematology Unit, Makmal Rujukan Klinik Hospital (MRKH), Ampang Hospital
156	Molecular Study- PML-RARA (Ampang Hospital)	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	EDTA tube	BMA (2ml) PB (5ml)			42D	/				Ampang Hospital: Special Haematology Requisition Form	Molecular Diagnostics Haematology Unit, Makmal Rujukan Klinik Hospital (MRKH), Ampang Hospital

157	Molecular Study- RUNX1- RUNX1 T1 (By Appointment Ampang Hospital)	Bone Marrow Aspirate (BMA) or Peripheral Blood (PB)	EDTA tube	BMA (2ml) PB (5ml)			42D	/				Ampang Hospital: Special Haematology Requisition Form	Molecular Diagnostics Haematology Unit, Makmal Rujukan Klinik Hospital (MRKH), Ampang Hospital
158	Monkeypox qRT-PCR	i) Lesion Fluid Aspirate ii) Lesion Fluid Swab iii) Lesion Roof iv) Scab/Crust v) Tonsillar Tissue Swab vi) Nasopharyngeal Swab	Sterile container	2 ml			20D	/				HIS & Manual PER-PAT 301 form	Virology NIH
159	Mucopolysaccharides (GAGs/HRE)	First Morning Urine	Clean Universal bottle	5ml urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR

160	Mucopoly-saccharidoses (MPS) Enzyme Assays (ONLY 2 diseases of enzyme per request) (by CONSULTATION ONLY with SPOKEN TO..... :)	Whole blood	EDTA	6 ml whole blood			45D	/			/	HIS & Request Form for Biochemical Genetic Tests	IMR
161	Mumps RT-PCR (for outbreak cases only)	Oral or buccal swab	Sterile container				18D	/				HIS & Manual PER-PAT 301 form	MKAK Sg Buloh
162	Mumps Serology IgM/IgG	Serum	Plain Tube	2 ml			18D	/				HIS & Manual PER-PAT 301 form	Sg Buloh Hospital
163	Mycobacterium Leprae PCR	Skin Biopsy	Sterile container				22D	/				HIS & Manual PER-PAT 301 form	MKAK Sg Buloh
164	Mycophenolic Acid	Plasma	EDTA	2.5 ML			10D	/				HIS & Manual PER-PAT 301 form	HKL
165	Myoglobin, Urine	Urine	Urine Universal Container	10 ml			20D	/				HIS & please state pH urine on PER-PAT 301 form	Ampang Hospital
166	Oestradiol	Serum	plain gel tube	3 ml			20D	/				HIS & Manual PER-PAT 301 form	HKL
167	Organic acids (plasma/ Vitreous Humor for FORENSIC KES ONLY	plasma/Vitreous Humor	EDTA/ Sterile container	1 ml plasma/ 2 ml vitreous Humor			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR

168	Organic Acids, urine	Random Urine	Clean Universal bottle	2ml urine		45D	/	/				HIS & Request Form for Biochemical Genetic Tests	IMR
169	Orotic Acid	Random Urine	Clean Universal bottle	2ml urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
170	Panel Anti-Ganglioside Antibodies, (Sulfatide, Anti-GM1, Anti-GM2, Anti-GM3, Anti-GM4, Anti-GD1a, Anti-GD1b, Anti-GD2, Anti-GD3, Anti-GT1a, Anti-GT1b, Anti-GQ1b)	CSF	Screw capped container	2 ml			29D	/				HIS & Manual PER-PAT 301 form	IMR
171	Panel Skin Antibodies: Anti-BP 180, Anti BP-230, Anti-Desmoglein 1 & Anti-Desmoglein 3	Serum 3ml	Plain Tube	3 ml			29D	/				HIS & Manual PER-PAT 301 form	IMR

	Parainfluenza I, II and III (for outbreak case only)	Throat Swab, Nasopharyngeal swab	Sterile container	2 ml			36D	/				HIS & Manual PER-PAT 301 form	MKAK Sg Buloh
172	Paraneoplastic Antibodies (Anti-Ma, Anti-Yo, Anti-Ri, Anti-Hu, Anti-Amphiphysin, Anti-CV2)	Serum 2 ml	Plain Tube	2 ml			29D	/				HIS & Manual PER-PAT 301 form	IMR
173	Paroxysmal Nocturnal Hemoglobinuria (PNH) (Ampang Hosp / HTA)	Blood	EDTA Tube	2 ml			7 WD (Hosp Ampang) 21D (HTA)	/				Ampang Hospital: Special Haematology Requisition Form Tunku Azizah Hospital: Per.Pat 301 Form (Chop & Sign Clinician)	Flow Cytometry Unit, Haematology Unit, Ampang Hospital or Haematology Unit, Pathology Department Tunku Azizah Hospital
174	Parvovirus B19 PCR	Serum / 2ml / CSF	Plain Tube, Sterile screw capped container	2 ml			18D	/				HIS & Manual PER-PAT 301 form	MKAK Sg Buloh

175	Parvovirus IgM IgG	Serum	Plain Tube	2 ml			22D	/				HIS & Manual PER-PAT 301 form	HKL
176	PCR for Mycobacterium tuberculosis /MTbc/ Mott DNA	Abscess/ as much as possible. Scap-ping of the wall of the abscess.	Sterile container	2 ml			25D	/				HIS & Manual PER-PAT 301 form	IMR
177	Peroxisomal Disorder Profile (VLCFA, Phytanic & Pristanic Acid)	Plasma/	EDTA/ Heparin	1ml plasma			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
178	Pipecolic Acid, Plasma	Plasma	1) Heparin tube	2ml plasma			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
179	Platelet Factor 4 Antibody (PF4-Ab) (Ampang Hospital) (tick Others and write on form)	Blood (Serum)	Plain Tube	Collect 3 tubes Spin & separate the serum; minimum 1.5 ml			120 D (12-16 WK)	/				Ampang Hospital: Special Haematology Requisition Form Samples must be fresh; and allowed to clot for 30 mins Centrifuge for 10 mins at 3000g Separate serum and store at -20 to -80 degrees. Send frozen	Haemostasis Unit, Ampang Hospital

180	Plumbum	Whole blood	EDTA	2.5 ml			45D	/				HIS & Manual PER-PAT 301 form	Selayang Hospital
181	Pneumocystis Carinii (IF) (PCP)	Sputum	Sterile container	Min 1 ml			20D	/				HIS & Manual PER-PAT 301 form	Sg Buloh Hospital
182	Porphyria Profile	Random Urine	Clean Universal bottle	2ml urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
183	Post-Salivary Cortisol	Salivary	Special salivary tube	2 ml			10D	/				HIS & Manual PER-PAT 301 form	Penang Hospital
184	Pre-Salivary Cortisol	Salivary	Special salivary tube	2 ml			10D	/				HIS & Manual PER-PAT 301 form	Penang Hospital
185	Prostate Specific Antigen (PSA), Total/Free	Serum	Plain gel tube	3 ml			10D	/				HIS & Manual PER-PAT 301 form	HKL
186	Protein C, Protein S, Antithrombin Activity	Blood (Plasma)	Trisodium Citrate 3.2%	Adult: 8-10 tubes Paeds 1-12 y.o: 4 tubes Paeds <1 y.o: 2 tubes ~Min1.8 ml (paedia- tric)			30D	/				Separate plasma from cells as soon as possible (double spin) Platelet count must be <10x10 ⁹ /L in plasma prior to freezing. Store frozen at -40° C and transport frozen plasma on dried ice	Haematologi Unit, Pathology Department Tunku Azizah Hospital

				~2.7 ml (adult)									
187	Protein Electrophoresis & (CSF) Oligoclonal band	Serum & CSF	Plain gel tube & sterile bijou bottle	3ml serum & 2ml CSF			45D	/				HIS & Manual PER-PAT 301 form MUST be sent in pair. (serum & CSF) Blood and CSF from the same patient must be collected at the same occasion within 4 hours and sent to the lab for analyses in pair (serum & CSF).	Ampang Hospital
188	Protein Electrophoresis Urine	Urine	Urine universal container	20 ml			20D	/				HIS & Manual PER-PAT 301 form	Ampang Hospital
189	Pterins, Urine	Random Urine	Clean Universal bottle	2ml urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
190	Pterins, CSF	CSF	Special tube (with preservative DTE & EDTA) provided by Biochemistry Unit, IMR	0.5ml CSF			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR

191	Renin	Plasma	EDTA	2.5 ml			45D	/				HIS & Manual PER-PAT 301 form	Putrajaya Hospital
192	Rubella IgG	Serum / 2ml	Plain Tube	2 ml			22D	/				HIS & Manual PER-PAT 301 form	HKL
193	Rubella RT PCR	Nasopharyngeal Secretion, Throat swab / 2.5 ml, Urine	Sterile container	2 ml			29D	/				HIS & Manual PER-PAT 301 form	MKAK Sg Buloh
194	S-Sulphocysteine, Urine	Random Urine	Clean Universal bottle	2ml urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
195	Schistosomiasis Serology	Serum, Anti Coagulated blood	Plain Tube, EDTA Tube	2 ml			20D	/				HIS & Manual PER-PAT 301 form	IMR
196	Serum Copper	Serum	Plain tube without gel	5 ml			45D	/				HIS & Manual PER-PAT 301 form	Selayang Hospital
197	Serum Protein Electrophoresis	Serum	Plain gel tube	5 ml			10D	/				HIS & Manual PER-PAT 301 form+	Penang Hospital
198	Sex Hormone Globulin Binding	Serum	Plain gel tube	3 ml			45D	/				HIS & Manual PER-PAT 301 form	Putrajaya Hospital
199	Sialic Acid, Total & Free, Urine	First Morning Urine	Clean Universal bottle	2ml urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
200	Sirolimus	Blood Plasma	2 EDTA tube	2.5 ml			20D	/				HIS / Manual PER-PAT 301 form	HTA
201	Specific IgE Test	Serum	Plain Tube	3 ml			25D	/				HIS & Manual PER-PAT 301 form	IMR

202	Stool for Cryptosporidium spp., Cyclospora spp. and Isospora spp. (DMSO stain) and microsporidium spp. (Gram Chromotrope stain)	Stool	Sterile container	Stool: >5 g (Thumb size)			20D	/				HIS & Manual PER-PAT 301 form	IMR
203	Stool Virology (HFMD)	Stool	Sterile container	Stool: >5 g (Thumb size)			18D	/				HIS & Manual PER-PAT 301 form	MKAI Ipoh
204	Succinylacetone, urine	Random Urine	Clean Universal bottle	2ml urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
205	Sugar & Polyols, Urine	Random Urine	Clean Universal bottle	2ml urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
206	T & B cell Subset Enumeration (An appointment is required.)	Blood	EDTA Tube	2.5 ml			20D				/	Appointment with Unit PID IMR (NIH Setia Alam)	PID NIH
207	Taeniasis Serology	Serum/ 2ml	Plain Tube	2 ml			20D	/				HIS & Manual PER-PAT 301 form	IMR

208	TB PCR	Blood/Fluid / Serum/ Sputum/ Tissue/ CSF	Sterile container				22D	/				HIS & Manual PER-PAT 301 form	MKAI Ipoh
209	Thiamine (Vitamin B1)	plasma	EDTA	2.5 ml			20D	/				HIS & MKAK-BPU-U01 Form.	MKAK Sg Buloh
210	Thyroglobulin	Serum	Plain tube	5 ml			10D	/				HIS & Manual PER-PAT 301 form	Penang Hospital
211	Thyroglobulin Antibody	Serum	Plain tube	5 ml			10D	/				HIS & Manual PER-PAT 301 form	Penang Hospital
212	Thyroid Peroxidase /Microsomal Antibody	Serum	Plain tube	5 ml			10D	/				HIS & Manual PER-PAT 301 form	Penang Hospital
213	Tissue Antibody Test Anti- Gastric Parietal, anti- smooth Muscle, Anti- Mitochondrial, Anti- Liver Kidney Microsome antibodies)	Serum 2ml	Plain Tube	2 ml			36D	/				HIS & Manual PER-PAT 301 form	Taiping Hospital
214	Total IgE Test	Adult: Serum: 5 ml / Infant: Serum: 1 ml	Plain Tube	5 ml, 1 ml			25D	/				HIS & Manual PER-PAT 301 form	IMR

215	Toxicology (blood/urine)	Blood/ urine	Flouride Oxalate tube / Universal Container (urine)	2ml blood/ 10ml urine			20D	/				Kimia 15-Pin. 3/2020 Form.	Jabatan Kimia
216	Toxocariasis Serology	Serum, anti- coagulated blood	Plain Tube, EDTA Tube	2 ml			20D	/				HIS & Manual PER-PAT 301 form	IMR
217	Transferin Isoform, CDG Type I & II, Serum	Serum	Plain gel tube	3 ml			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
218	Trichinellosis Serology	Serum, anti- coagulated blood	Plain Tube, EDTA Tube	2 ml			20D	/				HIS & Manual PER-PAT 301 form	IMR
219	Trypanosomiasis Microscopy	Whole blood in EDTA/ Thick blood film/ Lymph node film	EDTA tube/ Slide Mailer	2.5 ml			18D	/				HIS & Manual PER-PAT 301 form	IMR
220	Tryptase Test	Serum: 3 ml	Plain Tube	3 ml			29D	/				HIS & Manual PER-PAT 301 form	IMR
221	Type of fixative for stool sample use for Protozoa and Helminth microscopy	Stool	Sterile container	Stool: >5 g (Thumb size)			20D	/				HIS & Manual PER-PAT 301 form	IMR

222	Urine 24H Copper	24hrs Urine	24h Urine Container	Total urine volume: > 500 ml for testing: > 3 ml			45D	/				HIS & Manual PER-PAT 301 form	Selayang Hospital
223	Urine Oligosaccharide	Random Urine	Clean Universal bottle	2ml urine			45D	/				HIS & Request Form for Biochemical Genetic Tests	IMR
224	Urine Purine & Pyrimidine	Random Urine	clean Universal bottle	10 ml			30D	/				HIS & HTA 03 Borang permohonan ujian IEM HTA.	HTA
225	Varicella Zoster IgG/IgM	Serum	Plain Tube	2 ml			22D	/				HIS & Manual PER-PAT 301 form	HKL
226	Varicella Zoster RT-PCR	Throat swab, Vesicle swab, Oral swab / 2.5 ml sterile VTM /Plasma	Sterile container	2 ml			20D	/				HIS & Manual PER-PAT 301 form	Sg Buloh Hospital
227	Von Willebrand Factor Assay (VWF)	Blood (plasma)	Trisodium Citrate 3.2%	Collect until indicated mark x 3 tubes			30D	/				Ampang Hospital: Special Haematology Requisition Form Tunku Azizah Hospital: Per.Pat 301 Form (Chop & Sign Clinician) Deliver tubes immediately to the laboratory at room	Haemostasis Unit, Haematology Laboratory, Ampang Hospital or Haematology Unit, Pathology Department

												temperature. OR Separate and aliquot ≥ 500 μL plasma from cells into secondary tube (e.g polypropylene tube (PPT)) as soon as possible. Store frozen at -40°C and transport frozen plasma on dried ice.	Tunku Azizah Hospital
For all Molecular Diagnostics tests, at IMR, please contact Outsource Chemical Pathology Unit (Ext: 5225) for REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM)													

6.0 OPERATING HOURS

6.1 IN-PATIENTS

- a) All laboratories in this department operate during normal working hours.
- b) Department of Pathology provides 24 hours service. However, only certain tests in Chemical Pathology, Haematology and Microbiology are offered after office hours (including weekend and public holiday)
- c) Pathologists are available for clinical and technical assistance after office hours and are contactable via mobile phone.
- d) Specimens which need to send to other testing laboratories such as Institute Medical Research (IMR), National Blood Centre (NBC/PDN) and Hospital Kuala Lumpur (HKL) are sent out every working day at 9.00 am. The specimens should be last received at the counter by 8.45 am to facilitate the delivery.

6.2 DISTRICT / HEALTH CLINIC

- a) Operating Hours for Specimen Submission

Monday to Thursday:

- Morning Session: 8:00 AM - 12:45 PM
- Afternoon Session: 2:00 PM - 4:30 PM

Friday:

- Morning Session: 8:00 AM - 12:15 PM
- Afternoon Session: 2:45 PM - 4:30 PM

Note:

- The counters are **closed during lunch breaks:**
 - Monday to Thursday: 12:45 PM - 2:00 PM
 - Friday: 12:15 PM - 2:45 PM
- **Specimens will not be accepted after 4:30 PM.**

- b) **Transportation Arrangements-** District hospitals and health clinics are responsible for arranging the transportation of specimens to the laboratory.

- c) Pathologists are available for clinical and technical assistance after office hours and are contactable via mobile phone.

7.0 LABORATORY HEALTH & SAFETY POLICY

The Pathology Department at Hospital Raja Permaisuri Bainun, Ipoh, is dedicated to ensuring a safe and healthy environment for all employees and visitors. To uphold this commitment and comply with occupational safety regulations, the department has established comprehensive policies and terms of reference, detailed in the Laboratory Safety Manual.

8.0 COMPLAINT OR FEEDBACK

General comments, complaint or feedback should be addressed to:



Scan QR code as above. This QR Code is also available at the Main Counter, Department of Pathology.

9.0 ADDITIONAL INFORMATION

This Laboratory Handbook is available at the Hospital Raja Permaisuri Bainun Ipoh website:

<https://hrpb.moh.gov.my/v3/muat-turun-dokumen-borang/5-k/44-patologi>

10.0 LABORATORY SERVICES AGREEMENT

This agreement outlines the terms and conditions under which the Pathology Department at Hospital Raja Permaisuri Bainun, Ipoh, provides laboratory testing services as specified in the "List of Tests" section.

- a) **Service Provision:** The Pathology Department shall perform examinations as detailed in the "List of Tests," adhering to established protocols and quality standards.
- b) **Acceptance of Requests:** Each laboratory request accepted for examination constitutes an agreement encompassing the request, the examination process, and the resulting report.
- c) **Request Information Requirements:** All requests must include necessary information to ensure accurate examination and interpretation of results.
- d) **Authorization:** Clinical staff must provide signatures and/or initials on the requisition forms as indicated.
- e) **Personnel Competency:** All laboratory personnel shall possess the necessary skills, training, and qualifications to perform the intended examinations.
- f) **Testing Procedure Requirements:** The requirements for each testing procedure shall be appropriate and relevant to the intended use of the examination.
- g) **Confidentiality:** Pathologists and associated parties shall not disclose, use, copy, or permit the copying of confidential information without prior written consent, except as permitted or required by applicable laws and regulations.
- h) **Service Changes:** Any changes in services shall be reflected in explanatory information and laboratory reports.
- i) **Amendments to the Agreement:** Any amendments to this service agreement shall be communicated to all affected parties.
- j) **Deviation Notifications:** Users shall be informed of any deviations from the agreement that impact examination results.

- k) **Referral References:** References shall be made to any work referred by the laboratory to a referral laboratory or consultant.
- l) **Patient Notification:** The laboratory must notify patients when legally required to share confidential information, unless prohibited by law. All patient-related information from external sources shall be kept confidential, and their anonymity shall be ensured unless otherwise agreed.
- m) **Impartiality:**
- a. All lab activities and management will be committed to impartiality.
 - b. The lab will not allow any commercial, financial or other pressures to compromise its impartiality.
 - c. All activities within the lab and its relationships will be monitored to identify threats to its impartiality.
 - d. If any threat to impartiality is identified, the effect will be eliminated or minimized so that the impartiality is not compromised.

GENERAL TEST ORDERING INFORMATION

1.0 SPECIMEN/REQUEST FORMS

To Ensure That Requests Are Dealt with Effectively, It Is Essential To Comply With The Following Guidelines

1.1 SPECIMEN

All specimens must be placed in securely fastened and appropriate containers. Only small pre-printed labels (38 x 20 mm) are permitted on specimen containers, as larger labels may interfere with automated processing equipment and cause delays in result turnaround. **Unlabelled specimens will be rejected.**

Each specimen must be clearly labelled with **two patient identifiers:**

- Full patient name
- Identification Card (IC) number

Additionally, the following information must be provided:

- Date and time of sample collection
- Location or ward

Specimen containers must be sealed and placed into a specimen transport bag. The **PER-PAT 301 request form** should accompany the specimen—either enclosed in the bag or placed in the sleeve provided on the outside of a clear plastic transport bag.

Specimens should be delivered to the laboratory **as promptly as possible** to maintain sample integrity. If mailing is required, packaging must comply with all relevant **postal and transportation regulations**. Please refer to the specific **storage and transportation guidelines** applicable to each specialized laboratory unit.

Biohazardous specimens must be **double-bagged** to ensure safe handling during transport.

Specimens that are not dispatched through HIS@KKM, as well as those with poorly printed barcodes—such as uneven ink distribution resulting in white spots within the barcode elements that may compromise scanner readability—will not be accepted and will be discarded immediately. It is essential that requesters from wards and clinics ensure all specimens are properly managed prior to submission to the laboratory.



1.2 REQUEST FORMS

All request from HRPB is through HIS while District Hospital and Health Clinics should be written on the appropriate PER-PAT 301 pathology request form or online order through web-based system.

In all cases the request form must provide the following information:

- full name of patient
- I/C number or hospital registration number
- patient sex
- patient location (ward or clinic)
- destination for report
- requesting medical officer's name and signature
- test requested
- relevant clinical details including medication, fasting or non-fasting etc
- time and date of collection

Identify sample type and test requirements fully, especially for anatomical pathology and microbiology eg. 'Abscess right leg' rather than 'wound swab'.

When ordering tests, note that the following are not tests: MSU (it is a type of urine collection): DNA (it is only part of a test request).

Please ensure the forms are placed in the plastic sleeve of the biohazard bag folded with **patient particulars and tests required** visible.

2.0 TYPE OF CONTAINERS

The specimen should be sent to laboratory in appropriate containers (please see list of tests under each unit for specification).

3.0 TEST ORDERING

3.1 In-Patients: All tests can be requested through Hospital Information System (HIS). Clinical summary and diagnosis in the clinical comment must be clearly entered and abbreviations are discouraged.

3.2 District Hospital and Health clinic: All tests can be requested through LIS web-based system

4.0 TRANSPORTATION OF SPECIMEN

4.1 The specimens should be transported to the laboratory as specified for the type of test requested within appropriate time frame and according to transport requirements for that test. All specimens should be sent to the laboratory together with a request form and receive acknowledgement from the laboratory staff.

4.2 Transportation Schedule to Referral Centres

NO.	TRANSPORTATION DAY	LOCATION
1.	Monday – Friday	Hospital Bahagia Ulu Kinta, MKA Ipoh & Jabatan Kimia, Ipoh
Outside from Perak, Referral cases handle by Hospital Raja Permaisuri Bainun, Ipoh		
2.	Monday and Thursday	HKL, Tunku Azizah Hospital, NIH, IMR, Ampang Hospital, Pusat Darah Negara, HUKM
3.	Tuesday	Penang Hospital & Seberang Jaya Hospital
4.	Wednesday	Putrajaya Hospital, Institut Kanser Negara, MKA Sg. Buloh, Sg. Buloh Hospital & Selayang Hospital

4.3 Clean Up Spills of Blood or Body Fluids During Transportation

If blood spillage has occurred (e.g. because of a laboratory sample breaking in the phlebotomy area or during transportation, or excessive bleeding during the procedure), clean it up. An example of a safe procedure is given below.

- Put on gloves and a gown or apron if contamination or bleaching of a uniform is likely in a large spill.
- Mop up liquid from large spills using paper towels, and place them into the infectious waste.
- Remove as much blood as possible with wet cloths before disinfecting.
- Assess the surface to see whether it will be damaged by a bleach and water solution.
- For cement, metal and other surfaces that can tolerate a stronger bleach solution, flood the area with an approximately 5000 parts per million (ppm) solution of sodium hypochlorite (1:10 dilution of a 5.25% chlorine bleach to water). This is

the preferred concentration for large spills. Leave the area wet for 10 minutes. Use blood spillage kit.

- For surfaces that may be corroded or discoloured by a strong bleach, clean carefully to remove all visible stains. Make a weaker solution and leave it in contact for a longer period of time. For example, an approximately 525 ppm solution (1:100 dilution of 5.25% bleach) is effective.
- Prepare bleach solution fresh daily and keep it in a closed container because it degrades over time and in contact with the sun.

5.0 INFORMATION OF TESTS & LOCATION TO SEND FOR MEDICO-LEGAL SAMPLES

No	Location	Test
1	Jabatan Kimia, Ipoh	Smear posterior fornix for spermatozoa
		Smear introitus for spermatozoa
		Rectal smear/swab for spermatozoa
2	Jabatan Perubatan Transfusi, Hospital Raja Permaisuri Bainun Ipoh	Blood ABO & Rh Grouping
3	Jabatan Patologi, Hospital Raja Permaisuri Bainun Ipoh	Ujian VDRL/TPHA
		Ujian Anti-HIV
		Ujian Hepatitis B Antigen
		Ujian Gonococcal (Smear posterior fornix)
		Ujian Gonococcal (Smear introitus)
		Ujian High Virginia Swab C & S (Transport media amies charcoal)
		Urine Pregnancy Test

6.0 CRITICAL VALUE NOTIFICATION

- 6.1** Inpatient (all wards & Emergency Department)
Critical results will be notified through Critical Value Notification dashboard at HIS@KKM
- 6.2** Outpatients (all clinics & Haemodialysis Unit)
Critical results will be notified within 1 hour. Results obtained after office hours will be notified to the test requestor or on call Medical Officer.
- 6.3** If the telephone line is engaged/not answered (tried 3x within 30 minutes, tried again after 5-10 minutes from the first call, or any other issues, note will be entered in LIS.
- 6.4** Apart from that, some additional procedures as follows need to be emphasized according to the Improving Notification of Critical Laboratory Results in MOH Hospitals, February 2010 guide:
- Recipients of critical decision notifications are only doctors, MA and nurses and the recipients need to read back the critical value.
 - Critical results will be notified according to the location specified in the test application form. The one who receives the notification needs to inform the attending doctor if the patient has been transferred to another location.
 - The one who receives the phone call needs to receive notification of critical results even if the patient is not under care.

Table 1: Critical Limit in Chemical Pathology

Notification method:

- Through Critical Value Notification dashboard at HIS@KKM to Ward/Clinic/Requesting doctor.
- TSH Cord Blood Through WhatsApp' s

TEST	UNIT	NEONATES (Less than 28 days)		PEDIATRIC (1 mth-12 year)		ADULT (13 year and above)	
		LOWER LIMIT	UPPER LIMIT	LOWER LIMIT	UPPER LIMIT	LOWER LIMIT	UPPER LIMIT
Sodium	mmol/L	–	–	125	155	125	155
Potassium	mmol/L	–	–	2.8	6.0	2.8	6.0
Calcium	mmol/L	–	–	1.7	3.1		
Ammonia	µmol/L	–	–	–	100	–	–
T. Bilirubin	µmol/L	–	300	–	–	–	–
TSH Cord Blood	mIU/L	–	>20	–	–	–	–

Table 2: Critical Limits in Haematology

Notification method:

Through Critical Value Notification dashboard at HIS@KKM to Ward/Clinic/Requesting doctor

TEST	UNIT	NEONATES (Less than 28 days)		PEDIATRIC (1 mth-12 year)		ADULT (13 year and above)	
		LOWER LIMIT	UPPER LIMIT	LOWER LIMIT	UPPER LIMIT	LOWER LIMIT	UPPER LIMIT
Hemoglobin (Hb)	g/L	8.0	22.0	7.0	20.0	6.0	19.0
Hematocrit (HCT)	%	25	70	20	60	–	–
Platelet	/L	50 x 10 ⁹ /L	1000 x 10 ⁹ /L	50 x 10 ⁹ /L	1000 x 10 ⁹ /L	20 x 10 ⁹ /L	1000 x 10 ⁹ /L
TWBC	/L	2.0 x 10 ⁹ /L	50.0 x 10 ⁹ /L	2.0 x 10 ⁹ /L	50.0 x 10 ⁹ /L	–	–
INR	Ratio	–	>5	–	>5	–	>5
PT	Sec	–	–	–	–	–	36.0 sec or >2.5 upper limit
APTT	Sec	–	–	–	–	–	80 sec or > 2x upper limit

Table 3: Critical Findings in Anatomical Pathology

Notification method:

Through telephone call to Ward/Clinic & *WhatsApp* Surgeons

TEST	CRITICAL FINDING
Unexpected or discrepant findings	Unexpected malignancy, wrong organ removed. Malignancy in critical places.
Reports of infection	Bacteria in heart valves or bone marrow. Organism in an immune-compromised patient such as AFB, fungi, viral, protozoa. Organisms in Cerebrospinal fluid (CSF) Unusual organism or organism in unusual sites e.g., amoeba in the eye.
Report in critically ill patients requiring immediate therapy	Crescents is greater than 50% of glomeruli in renal biopsy specimen Transplant rejection.
Cases than have immediate clinical consequences	Fat in endometrial curettage Mesothelial cells in a heart biopsy Fat in a snare colon biopsy specimen

Table 4: Critical Findings in Microbiology

Notification method: Through telephone call to Ward/Clinic & *WhatsApp* group

TEST	CRITICAL FINDING
Cerebrospinal fluid Culture & Sensitivity	Microscopy result (normal or abnormal)
Blood Culture & Sensitivity	Gram stain for positive culture
Sterile body fluids Culture & Sensitivity	Gram stain for positive culture
Acid Fast Bacilli	Positive smear result
Malaria Parasite on blood film	Presence of malaria parasite
Stool culture	<i>Salmonella Typhi</i> , <i>Vibrio cholerae</i> , <i>Shigella</i>
Any type culture	MRSA, VRE, ESBL, MDR, CRE
Throat swab Culture & Sensitivity	<i>Corynebacterium diphtheria</i>
Pernasal swab	<i>Bordetella pertussis</i>

Reference:

1. Minute of meeting regarding critical value notification & rejection rate done with Hospital Director done 5th March 2025
2. A quick guide for improving notification of critical lab results in MOH hospitals - A project for improving patient safety 2010.

7.0 TYPES OF CONTAINERS AND ORDER OF DRAW

7.1 ORDER OF DRAW

- a) Blood sample must be drawn by phlebotomist in a specific order to avoid cross contamination of the sample by additives found in different collection tubes.
- b) Let the vacuum in the tube fill the blood up to its level.
- c) Do not press the syringe plunger as this will lead to hemolysis.
- d) Gently invert according to the instruction and be sure that the entire inner surface of the blood collection tube is coated with blood while mixing.

Order of Draw



Blood Culture tubes



**Coagulation tubes
(sodium citrate)**



Non-additive tubes



Serum-separating tubes



**Heparin tubes
Plasma-separating tubes**



EDTA tubes



Oxalate tubes

7.2 TYPES OF CONTAINERS

Specimen Bottles	Additives	Specimen	Tests
 Cary Blair Swab transport media	NA	Stool	Stool culture
 CSF bottle	NA	CSF	CSF culture, CSF VDRL, CSF PCR, CSF viral isolation, CSF biochemistry, CSF for cytology
 Charcoal Transport media and dacron swab	Charcoal	Nasopharyngeal aspiration culture for Bordetella pertussis	Bordetella pertussis culture
 Cytobrush and bottle	NA	Pap smear	Liquid Base Pap Test

 Dacron swab with sterile empty container	NA	Nasopharyngeal swab / Nasopharyngeal aspirate	Nasopharyngeal swab for culture and Bordetella pertussis PCR
 Disposable container for surgical specimen	NA	Big specimens	Surgical specimen for routine histological examination. ADD 10% FORMALIN (volume is 10 times the specimen to be fixed).
 <i>Nasal swab in Amies or Stuart Transport media and swab</i>	NA	Nasal swab	Nasal screening for MRSA, nasal culture.
 <i>Amies or Stuart Transport media and swab</i>	NA	Endocervical swab High vaginal swab, Pus swab.	High vaginal culture, pus culture.

 <i>Sterile universal container</i>	NA	Sterile body fluid, tissue, pus, sputum, stool, urine culture, urine FEME, Urine for cytology.	Sterile body fluid culture and biochemistry, tissue culture and pus culture, sputum culture and AFB, stool ova and cyst, Urine for cytology DO NOT ADD FORMALIN FOR CULTURE SPECIMEN
 <i>Sterile container with 10% formalin</i>	10% formalin	Small specimen	Histopathology specimen ADD 10% FORMALIN (Volume 10 times the specimen to be fixed)
 <i>Viral transport media with dacron swab</i>	NA	Specimen from vesicular-lesion swab, rectal swab, conjunctival scrapings, eye swab, throat, nasopharyngeal swab	Viral transport media (VTM) for viral isolation. Dacron swab used for respiratory virus isolation and PCR. Put the swab into VTM and send to the lab in ice immediately. Keep specimen in the refrigerator if want to send next day.

 <i>24 hours urine container</i>	Additives are added depend on the test requested . Lab staff will add the additives	Urine	Urine protein, urine cathecolamine, urine sodium.
--	--	--------------	--

Specimen Bottles	Additives	Blood Specimen	Tests	No. of Inversion
 <i>Aerobic and Anaerobic bottle</i>	NA	Adult: 8-10 ml	Blood and bone marrow aspiration for culture	Mix with swirling method
 <i>Paediatric bottle</i>	NA	Paediatric: 3-5ml	Blood culture	Mix with swirling method
 <i>Myco-F-Lytic bottle</i>	NA	1-5ml	Fungal and TB culture	Mix with swirling method
 <i>Blue cap bottle</i>	Vacutainer Na Citrate 9NC 3.8% (0.129M)	1.8 ml	PT/INR, APTT, Coagulation Study, Special Tests LA, Protein C, Protein S, AT111	3 - 4

 <i>Gold cap bottle</i>	Vacutainer Plain with Gel Separator + Clot Activator (13 x 75mm)	3.5 ml	Clinical Chemistry (LFT, RP, FSL, CE, etc), ImmunoChemistry (Anemia, Fertility hormones, TFT, Tumor Markers, Cardiac Markers) and Serology testing and etc.	6-8
 <i>Lavender cap bottle</i>	Vacutainer EDTA K2	2.0 ml	FBP, FBC, BFMP, DNA analysis for Thalassaemia Hb Analysis/ Electrophoresis CD4, CD8 IPTH, ACTH, Renin, HbA _{1c} TDM-Cyclosporin, Tacrolimus, Ammonia	6-8
 <i>Gray cap bottle</i>	<i>Vacutainer</i> <i>K Fluoride</i> <i>+ Na₂ EDTA</i>	2.0 ml	Blood for Glucose, lactate	6-8
 <i>Lavender cap paediatric bottle</i>	<i>Microtainer</i> <i>EDTA</i> <i>(K₂ EDTA)</i>	0.5 ml	Pediatric Haematology test (FBC and etc), Ammonia	8-10

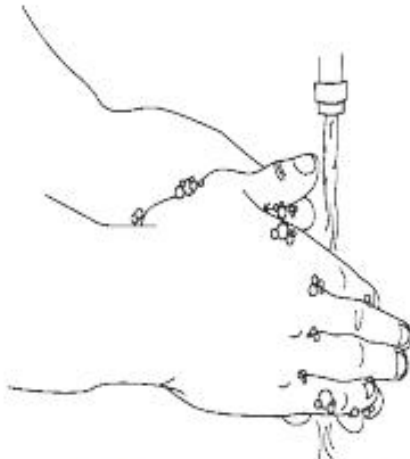
 <i>Gray cap paediatric bottle</i>	<i>Microtainer Glucose</i>	0.5 ml	Pediatric Blood for Glucose, Ammonia and Lactate	8-10
 <i>Gold cap paediatric bottle</i>	<i>Microtainer Plain with Gel Separator</i>	0.5 ml	Pediatric Blood for Clinical Chemistry (Bilirubin, LFT, RP, FSL, CE, etc), ImmunoChemistry (Anemia, Fertility hormones, TFT, Tumor Markers, Cardiac Markers) and etc.	—
 <i>ESR Tube</i>	<i>3.2% Sodium Citrate</i>	As mark	ESR tube for ESR test	4
 <i>Arterial blood gases syringe</i>	<i>Heparin</i>	1.0ml	Heparinized syringed for ABG	Mixed well

8.0 BLOOD COLLECTION PROCEDURE (WHO GUIDELINES ON DRAWING BLOOD: BEST PRACTICES IN PHLEBOTOMY, 2010)

- a) Assemble equipment
- b) Perform hand hygiene
- c) Identify and prepare the patient.
- d) Select the site, preferable at the antecubital area (i.e the bend of the elbow).
- e) Apply tourniquet (about 4-5 finger widths above the venipuncture site).
- f) Ask the patient to form a fist so that the veins are more prominent.
- g) Put on well-fitting gloves.
- h) Disinfect the venipuncture site with 70% isopropyl alcohol for 30 seconds and allow to dry completely (around 30 SECONDS)
- i) Anchor the vein by holding the patient's arm and place a thumb below the venipuncture site.
- j) Enter the vein swiftly at 30° angle.
- k) Once sufficient blood has been collected, release the tourniquet before drawing the needle.
- l) Withdraw the needle gently and then give the patient a clean gauze or dry cotton-wool ball to apply to the site with gentle pressure.
- m) Pierce the stopper on the tube with the needle directly above the tube using slow, steady pressure. Do not press the syringe plunger because additional pressure increases the risk of hemolysis. Allow the tubes to be filled directly by the vacuum inside the vacutainer tube.
- n) If a non-vacutainer tube is being used, allow the blood to fill the collection tube by using a slow and steady pressure until the blood fills immediately after collection.
- o) Discard the used needle and syringe or blood-sampling device into a sharp bin.
- p) Check the label and forms for accuracy.
- q) Remove gloves and perform hand hygiene.



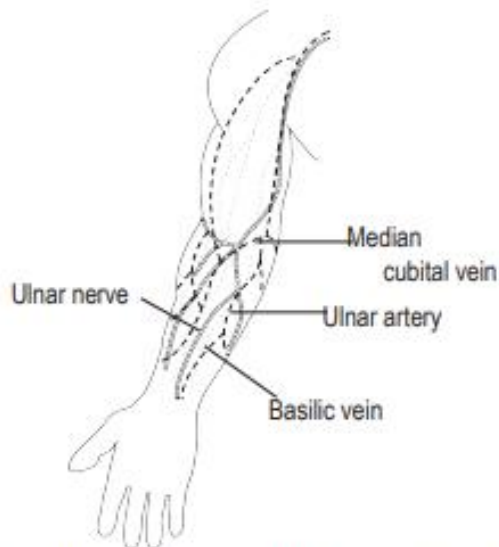
1. Assemble equipment and include needle and syringe or vacuum tube, depending on which is to be used.



2. Perform hand hygiene (if using soap and water, dry hands with single-use towels).



3. Identify and prepare the patient.



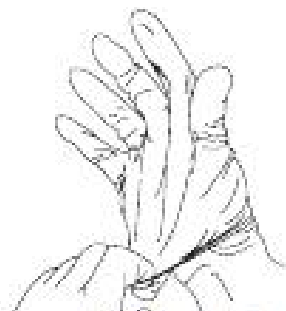
4. Select the site, preferably at the antecubital area (i.e. the bend of the elbow). Warming the arm with a hot pack, or hanging the hand down may make it easier to see the veins. Palpate the area to locate the anatomic landmarks. DO NOT touch the site once alcohol or other antiseptic has been applied.



5. Apply a tourniquet, about 4–5 finger widths above the selected venepuncture site.



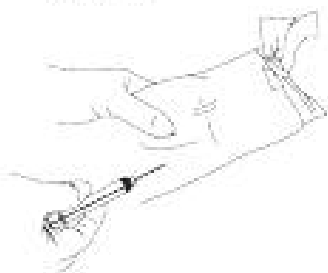
6. Ask the patient to form a fist so that the veins are more prominent.



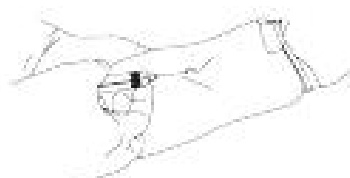
7. Put on well-fitting, non-sterile gloves.



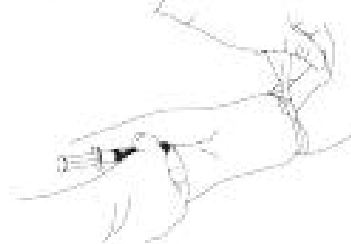
8. Disinfect the site using 70% isopropyl alcohol for 30 seconds and allow to dry completely (30 seconds).



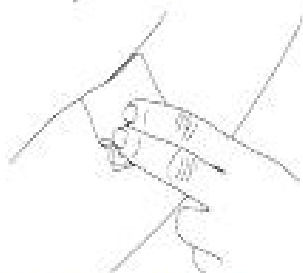
9. Anchor the vein by holding the patient's arm and placing a thumb **BELOW** the venepuncture site.



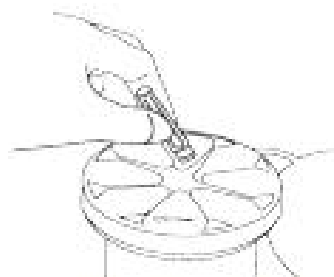
10. Enter the vein swiftly at a 30 degree angle.



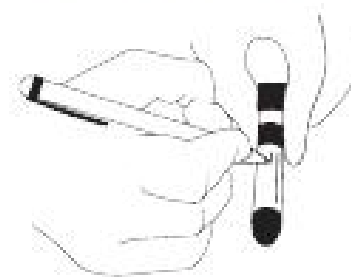
11. Once sufficient blood has been collected, release the tourniquet **BEFORE** withdrawing the needle.



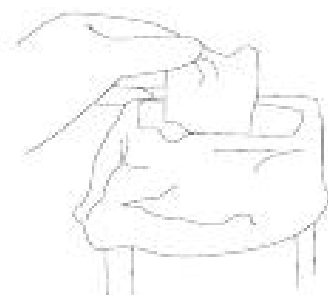
12. Withdraw the needle gently and then give the patient a clean gauze or dry cotton-wool ball to apply to the site with gentle pressure.



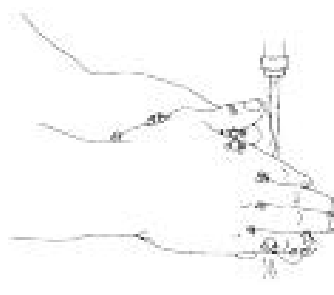
13. Discard the used needle and syringe or blood-sampling device into a puncture-resistant container.



14. Check the label and forms for accuracy.



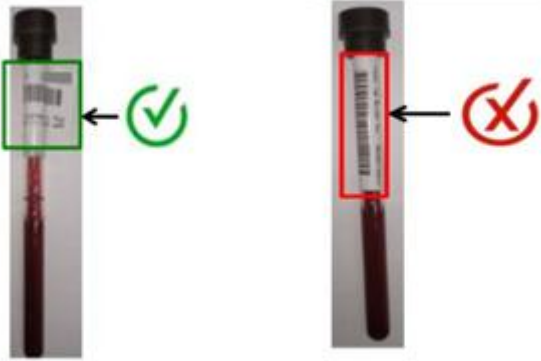
15. Discard sharps and broken glass into the sharps container. Place items that can drip blood or body fluids into the infectious waste.



16. Remove gloves and place them in the general waste. Perform hand hygiene. If using soap and water, dry hands with single-use towels.

9.0 SAMPLE LABELLING

Refer to the details below on how to label the patient's details on the sample tube or container. Failure to adhere to this will result in delayed analysis

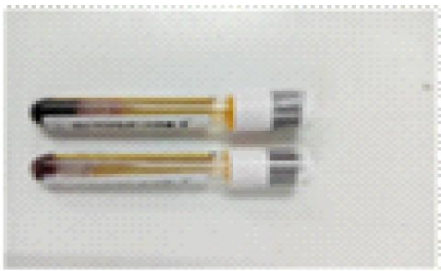
Blood Tubes • Vertical	
ESR • Horizontal	
Paediatric blood tubes • Vertical	
Blood culture • Vertical • DO NOT cover the barcode on the bottle	

10.0 REJECTION OF REQUESTS

Request which does not fulfill the laboratory requirements will be rejected as specimen or test requisition rejection criteria stated below:

Primary Rejection	1	Leakage
	2	Wrong tube/container
	3	Unlabeled/mislabeled specimen
	4	Test is not offered.
	5	No request form.
	6	Incomplete particulars on the request form
	a	Patient`s name not clearly written
	b	Identification number is unclear or not written
	c	No ward or clinic
	d	No diagnosis
	e	No clinical history
	f	Type of request not clear/ not written
	g	No requesting doctor`s signature, name, or chop
	h	No specialist sign (for special tests)
	7	Test is not offered after office hour
	8	Wrong/Inadequate written on the specimen label
	9	Others eg; other test requirement
Secondary Rejection	1	Insufficient/ overfilled specimen
	2	Hemolysed specimen
	3	Specimen contaminated
	4	Poor blood smear preparation
	5	Redundant requests
	6	Clotted Specimen
	7	Name and ID of patient not tally in LIS.
	8	Test not indicated.
	9	Incomplete and not indicated clinical history
	10	Time of received exceed specimen stability time
	11	Insufficient specimen
	12	Test is suspended temporarily
	13	Others ie; other test requirements

Examples of Unreadable Barcode

Barcode pasted horizontally or slanted.	
Poor distribution of ink on the barcode has resulted in some white spots within the bar elements, which may lead to readability issues. Contact HIS@KKM help desk if this happens	 
Barcode pasted on the cap.	
Overlapped barcode.	
Barcode pasted on the blood culture bottle's barcode.	

10.1 The laboratory procedure for rejection is as follows:

- a) The rejection will be notified to the requestor upon received or testing. The rejected specimens and forms will not be returned to the requestor except for histopathology/cytopathology specimen.
- b) When rejections are made, the wards will be notified in HIS@KKM and through Web Based System or using rejection form for Histopathology/Cytopathology

10.2 Please refer to the respective units for specific rejection criteria.

11.0 PROTECTION OF PERSONAL INFORMATION

It is the organization policy that all results and patient details will be treated as private and confidential as stated in *Akta Rahsia Rasmi* 1972.

12.0 SUPPLY OF CONTAINERS

Blood tests container will be supplied to the ward weekly on Friday afternoon. Requests should be sent in prior to the collection time.

13.0 REPORTS

- a) All test results will be available in the HIS@KKM and Web-Based System. The clients are advised to check the system regularly.
- b) All preliminary results, will be followed by final report.
- c) For serology (infectious disease), reports will be collected by ward/clinic/district
- d) All critical result (CV) will be notified to the requestor immediately.
- e) The result informed and the name of person receiving the notification will be noted in the LIS system and laboratory report.
- f) Special considerations for results: When agreed with the user, the results may be reported in a simplified way and any information that is not reported to the user will be readily available. Special counselling may be required for examination results with serious implications for the patient (e.g. for genetic or certain infectious diseases). Laboratory management will ensure that these results are not communicated to the patient without adequate counselling. Results of laboratory examinations that have been

anonymized maybe used for epidemiology, demography, or other statistical analyses, as long as all risks to patient privacy and confidentiality are mitigated.

- g) If any delay in test process due to analyzer breakdown or test suspended will be notified through HOD WhatsApp group, followed by an official MEMO/ e-mail to hospital HOD group.
- h) Result can be access via web-based (<http://10.138.131.10>) using individual password.

14.0 CONSENT

Patients consent is required where referral is needed (e.g. consent to disclose clinical information and family history to relevant healthcare professionals)

15.0 KNOWN FACTORS THAT AFFECT THE PERFORMANCE OF THE EXAMINATION / INTERPRETATION OF THE RESULT

- a) Clotted sample
- b) Venous Constriction
- c) Lysed sample
- d) Lipemic sample
- e) Aged sample
- f) Icteric sample
- g) Contaminated sample
- h) Insufficient sample
- i) Wrong container
- j) Inappropriate sample transportation
- k) Drugs
- l) Delay in transit of specimens (more than 4 hr)

16.0 ADVISORY SERVICE

- a) Laboratory Handbook Department of Pathology, Hospital Raja Permaisuri Bainun, Ipoh promote the information on choice of examination and use of the services, including required type of sample, clinical indications and limitations of examination procedures and the frequency of requesting the examination;
- b) Pathologist or Medical Officer advising on individual clinical cases;

- c) Professional judgments on the interpretation of the test results of examinations (e.g. FBP) done by Pathologist & Medical Officer;
- d) Pathologist & Medical Officer in Department of Pathology promotes the effective utilization of laboratory services by giving CMEs and screening the special tests request (e.g. Troponin I, amylase, and etc);
- e) Authorised laboratory personnel on scientific and logistic matters such as instances of failure of sample (s) to meet acceptance criteria.

17.0 ORAL REQUEST

The laboratory does not allow oral request of additional test on the same primary sample. Addition of test only allowed in certain special cases with approval of Pathologist/Medical Officer /scientific officer. The verbal request of addition must be followed by request form on the same day.

18.0 LISTS OF URGENT TESTS

Unit/ Division	Name of tests	LTAT
Chemical Pathology	Acetaminophen (Paracetamol)	1 hr
	Amylase	1 hr
	Arterial blood gases and pH	15 min
	Blood Gases and pH	30 min
	Bilirubin - total	1 hr
	Bilirubin - Direct	1 hr
	Calcium	1 hr
	Chloride	1 hr
	Creatinine	1 hr
	CSF Biochemistry	1 hr
	Glucose	1 hr
	Lactate	1 hr
	Paraquat	1 hr
	Potassium	1 hr
	Salicylate	1 hr
	Sodium	1 hr
	Troponin I	1 hr
	Urea (BUN)	1 hr
	Urinalysis (Biochemistry)	1 hr
	Urine Pregnancy Test (UPT)	1 hr
Microbiology	BFMP	4 hr
	CSF FEME/Gram stain	1 hr

Unit/ Division	Name of tests	LTAT
	COVID-19 RTK Ag	1 hr
	Dengue Combo (rapid)	1 hr
	Eye FEME/Gram stain	1 hr
	Organ Donation Screening	4 hr
Haematology	APTT	1 hr
	Bone Marrow	2 days
	FBC	1 hr
	FBP	1 day
	Fibrinogen	1 hr
	PT/INR	1 hr
	Retic Count	1 hr
Histopathology	Big single/multiple specimen urgent	7D*
	Small biopsy urgent	3D*
Cytology	FNAC	3D*
	Non gynaecology	3D*
	Pap smear	7D*
<i>* – Exception</i> <i>(i) Specimen receive on Friday, the TAT will be counted from the next working day</i> <i>(ii) If ancillary testing is required, eg. Histochemistry or/ and IHC</i>		

19.0 SPECIMEN STORAGE & DISPOSAL

19.1 Specimen Storage

Specimens are stored under appropriate storage conditions that permit reliable retrieval in each unit.

19.2 Specimen Disposal

All the specimens are disposed off in accordance with the Environmental Quality (Scheduled Waste) Regulation 2005 and other guidelines issued by Department of Environment (DOE) and/or local authorities. Scheduled wastes are disposed at prescribed premises for incineration.

19.3 Retention Of Samples

Safe disposal of materials used in collection according Guidelines on Retention of Pathology Records and Materials, (Version2/2022).

20.0 TEST ORDERING DURING HIS @KKM or LIS DOWNTIME (CONTIGENCY PLAN)

Hospital Information System (HIS) or Laboratory Information System (LIS) downtime is a condition where the HIS or LIS cannot be used to perform the lab processes that are LIS-assisted. All samples will need to be registered, barcoded, processed and validated manually.

Since the processes are laborious, only limited samples are able to be processed during downtime. The tests which can be requested during downtime are listed

No	Test
Chemical Pathology	
1	Acetaminophen (Paracetamol)
2	Ammonia
3	Amylase
4	Bilirubin (LSB-Paediatric)
5	Blood Gas
6	BUSE
7	Calcium
8	CSF (Biochemistry)
9	Glucose
10	Lactate
11	Paraquat
12	Salicylate
13	Troponin
14	Urine FEME (ie Urinalysis)
15	Urine Pregnancy Test (UPT)
Haematology	
1	Full Blood Count (FBC)
2	Coagulation (Pt/aPTT/Fibrinogen)
3	ESR
Microbiology	
1	CSF (Microbiology)
2	Blood Film for Malaria Parasite (BFMP)
3	Dengue Combo
4	Urgent Gram Stain
5	Organ Donation Tests
6	Needle Stick Injury Tests
7	Culture Samples can be sent but will be processed accordingly (Day Time)

All tests requested manually by using Borang PER-PAT 301 filling with patient name, IC No, Ward, Test required, Doctors name and chop.

Results will be printed and placed in pigeon hole according to Wards at the Pathology Receiving Counter.