



MANUAL PENGGUNA

(Edisi September 2025)



**JABATAN PATOLOGI & TRANSFUSI
HOSPITAL SULTANAH MALIHA
LANGKAWI, KEDAH**

PERUTUSAN PENGARAH



Selamat datang ke laman web Hospital Sultanah Maliha

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Assalamualaikum w.b.t dan Salam sejahtera.

Terima kasih kerana meluangkan masa melawat laman web rasmi Hospital Sultanah Maliha (HSM). Sebagai pengarah hospital, saya amat berbesar hati memimpin institusi kesihatan ini yang menjadi nadi perkhidmatan perubatan kepada komuniti tempatan dan ribuan pelancong di Langkawi. Selaras dengan motto baharu, "HSM – Professional Care, Island Hospitality", kami komited memberikan perkhidmatan perubatan bertaraf dunia dengan sentuhan hospitaliti yang mesra.

Transformasi HSM dan Kemandirian Masa Hadapan

Bangunan baharu yang bakal siap kelak akan meningkatkan kapasiti hospital dengan tambahan katil kelas pertama, kedua, dan ketiga, menjadikan HSM hospital pertama di Malaysia yang menyediakan katil kelas ketiga berhawa dingin. Kemudahan rawatan rapi seperti ICU, CCU, dan HDW turut dipertingkatkan bersama teknologi canggih bagi menyokong perkhidmatan yang lebih komprehensif. Transformasi ini juga membuka peluang untuk mengembangkan kepakaran sedia ada dan merancang perkhidmatan baharu di masa hadapan.

Komitmen Kelestarian dan Kualiti

Kami berusaha megekalkan malah mempertingkatkan penarafan hijau dengan pelaksanaan inisiatif mesra alam seperti teknologi cekap tenaga dan pengurangan sisa. Selain itu, hospital sedang mempersiapkan diri ke arah pensijilan Malaysian Society for Quality in Health (MSQH) sebagai tanda aras kecemerlangan dan komitmen terhadap kualiti perkhidmatan bertaraf dunia.

Sokongan Anda, Inspirasi Kami

Dengan semua perkembangan ini, kami yakin Hospital Sultanah Maliha akan terus berkembang sebagai #5StarHospital, simbol kebanggaan Langkawi menerusi #LangkawiCare. Laman web ini adalah saluran komunikasi utama untuk maklumat dan panduan perkhidmatan terkini.

Sokongan anda adalah inspirasi kami untuk terus maju.

Sekian, terima kasih.

*Dr. Adlan Zafrulan Bin Ismail
Pengarah,
Hospital Sultanah Maliha*

**Foreword by Head of Pathology & Transfusion Department
Hospital Sultanah Maliha, Langkawi**



First and foremost, I would like to express my heartiest congratulations to the whole team who have successfully produced this book.

Manual Pengguna (Edisi 2020) Jabatan Patologi dan Transfusi, Hospital Sultanah Maliha is a guide and reference for all doctors, nurses, and various healthcare providers in HSM and Klinik Kesihatan in Langkawi to the list of tests done in this laboratory and referred to referral labs.

This handbook also describes samples requirement, types of tubes and laboratory turnaround time (LTAT) of the tests. It also includes the HSM service policy, service hours and directory of consultant and senior officers in respective disciplines to facilitate clinical consultation and technical advices. I hope this handbook will be a useful guide to all of our customers to ensure best patient care.

Thank you.

DR. EDAHAYATI BINTI AHMAD TAJUDIN

Pakar Patologi (mikrobiologi) dan Ketua Jabatan Patologi & Transfusi
Hospital Sultanah Maliha,
Langkawi, Kedah.

SIDANG EDITOR MANUAL PENGGUNA EDISI 2025
JABATAN PATOLOGI & TRANSFUSI
HOSPITAL SULTANAH MALIHA, LANGKAWI.

PENASIHAT:

Dr Edahayati binti Ahmad Tajudin
(Pakar Patologi (Mikrobiologi) UD14 dan Ketua Jabatan Patologi & Transfusi)

PENYELARAS:

Pn. Mardziah binti Manas
(Pegawai Sains (Mikrobiologi) C9)

COMMITTEE MEMBERS:

Pn. Nurul Syamimi binti Salleh
(Pegawai Sains (Kimia Hayat) C10)

Cik Nabila binti Nasir
(Pegawai Sains (Mikrobiologi) C9)

PENGHARGAAN JUGA KEPADA:

Semua staf Jabatan Patologi & Transfusi yang telah menyumbang secara langsung atau tidak langsung dalam penghasilan buku panduan ini.

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BAB 1: MAKLUMAT AM

1. VISI, MISI & OBJEKTIF JABATAN

VISI

Jabatan Patologi & Transfusi akan berusaha menyediakan perkhidmatan yang cekap, tepat dan berinovasi berlandaskan sistem kualiti untuk memenuhi keperluan pengurusan pesakit.

MISI

Perkhidmatan Patologi & Transfusi akan menjadi perkhidmatan yang cemerlang dengan teknologi yang sesuai serta dianggotai oleh pegawai-pegawai yang berwibawa dan peka kepada keperluan pelanggan berteraskan budaya kualiti, profesionalisma dan kerja berpasukan.

OBJEKTIF

1. Menyediakan keputusan makmal yang tepat dan boleh dipercayai dalam masa yang ditetapkan mengikut standard kebangsaan.
2. Mempertingkat, mengemaskini dan mengembangkan perkhidmatan makmal selaras dengan perkembangan teknologi terkini berdasarkan kemampuan jabatan.
3. Menyediakan bekalan darah dan komponen darah yang selamat dan mencukupi untuk penjagaan pesakit.
4. Untuk meningkatkan kualiti perkhidmatan kepada pelanggan kami, sama ada dalaman (dokter, paramedik, pesakit) atau luaran (penderma, penganjur), melalui aktiviti penambahbaikan yang berterusan.
5. Meningkatkan kualiti perkhidmatan dari semasa ke semasa melalui peningkatan aktiviti kualiti.
6. Memberi layanan yang mesra dan berhemah kepada pelanggan.

2. PIAGAM PELANGGAN

1. Pelanggan akan diberi layanan mesra, berhemah dan profesional.
2. Ujian-uji yang dijalankan di jabatan patologi dan transfusi menepati masa dan tepat.
3. Keputusan ujian akan dikeluarkan dalam tempoh yang dijanjikan seperti berikut:
 - $\geq 90\%$ keputusan ujian *full blood count (urgent)* dikeluarkan dalam tempoh 30 minit.
 - $\geq 80\%$ keputusan ujian *cord blood TSH* dikeluarkan dalam tempoh 48 jam.
 - $\geq 80\%$ keputusan *sputum acid fast bacilli (AFB)* dikeluarkan dalam tempoh 24 jam.
 - $\geq 95\%$ ujian keserasian darah (*saline*) dijalankan dalam tempoh 30 minit.
4. Keputusan ujian yang dihasilkan adalah menepati piawaian.
 - $\geq 80\%$ *external quality assurance (EQA) performance* bagi ujian *prothrombin time (PT)* dan *activated partial prothrombin time (APTT)* tercapai.

3. SKOP PERKHIDMATAN

Bil.	Unit	Skop
1	Unit Kaunter & Outsource	Penerimaan semua sampel ujian dan menguruskan penghantaran sampel ke makmal rujukan bagi ujian yang tidak dijalankan di sini.
2	Unit Patologi Kimia	Ujian rutin dan ujian khas Patologi Kimia,
3	Unit Hematologi	Ujian rutin dan ujian khas Hematologi
4	Unit Mikrobiologi	Merangkumi Bakteriologi, Mikologi, <i>Mycobacteriology</i> , Parasitologi, Serologi dan Virologi.
5	Unit Transfusi	Ujian Immunoematologi dan pembekalan darah & komponen darah
6	Unit Tabung Darah	Memberi perkhidmatan derma darah & menjalankan aktiviti derma darah di kawasan sekitar Langkawi.

4. WAKTU PERKHIDMATAN

Waktu perkhidmatan adalah seperti berikut:

Ahad – Rabu : 8 pagi – 5 petang
Khamis : 8 pagi – 3.30 petang

Perkhidmatan selepas waktu bekerja, cuti hujung minggu dan cuti kelepasan akan dijalankan oleh Unit Patologi Kimia, Unit Hematologi, Unit Mikrobiologi dan Unit Transfusi (rujuk senarai perkhidmatan ujian 24 jam).

5. KOMUNIKASI

UNIT	EXT.
Pentadbiran	
Ketua Jabatan	Dr Edahayati binti Ahmad Tajudin 3181
Juruteknologi Makmal Perubatan U38	En. Saiful Azmi bin Ismail/ Puan Siti 3188

Kaunter Penerimaan & Outsource	(24 jam)	3328
Pegawai Sains (Mikrobiologi)	Cik Nabila binti Nasir	3197
 Patologi Kimia		
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Makmal Patologi Kimia	(Waktu Pejabat)	4124
 Hematologi		
Makmal Hematologi	(24 jam)	3187
 Mikrobiologi		
Pakar Klinikal (Mikrobiologi)	Dr. Edahayati binti Ahmad Tajudin	3181
Pegawai Sains (Mikrobiologi)	Pn Normadihan bt Azhar	3197
Makmal Mikrobiologi	(Waktu Pejabat)	3190
 Transfusi		
Pegawai Perubatan	Dr. Fatin Muthla binti Izahar	3192
Pegawai Sains (Mikrobiologi)	Pn. Mardziah bt Manas	3197
Makmal Immunoematologi	(Waktu Pejabat)	3185
Bilik Menderma Darah	(Waktu Pejabat)	3179

6. LANGKAH-LANGKAH KESELAMATAN

Langkah-langkah keselamatan yang ketat dipraktikkan seperti yang digariskan dalam Manual Keselamatan Makmal (*Laboratory Safety Manual*) dan juga Act 514 *Occupational Safety and Health Act* 1994. Langkah-langkah keselamatan ini juga harus dipatuhi oleh semua pelanggan untuk memastikan tiada bahaya berpotensi untuk petugas makmal.

7. PERMOHONAN UJIAN

7.1 Permohonan dalaman

- 7.1.1 Bagi Jabatan Kecemasan & Trauma (AE) dan Klinik Pakar, permohonan ujian perlu dilakukan melalui sistem iReportAG HSM oleh Pegawai Perubatan dan perlu disertakan dengan ringkasan klinikal.

- 7.1.2 Setiap barcode untuk permohonan ujian perlu dicetak oleh pemohon. Pegawai Perubatan/ Pakar Perubatan yang memohon perlu menyatakan jenis ujian yang diminta mengikut unit dan jenis spesimen.
- 7.1.3 Sekiranya berlaku masalah pada sistem iReportAG HSM, Pegawai Perubatan perlu mengisi borang PER-PAT 301 untuk menghantar sampel.
- 7.1.4 Bagi jabatan dan wad lain, semua permohonan ujian perlu dilakukan menggunakan Borang Patologi PER-PAT 301 **dua salinan** (salinan yang pertama adalah salinan original dan yang kedua *carbonised*) kecuali dinyatakan dalam jadual senarai ujian (rujuk Lampiran 1). **Sila gunakan set borang permohonan berasingan untuk ujian yang dilakukan di unit yang berbeza.**
- 7.1.5 **Untuk permintaan ujian segera (*urgent*), gunakan borang kuning (PER-PAT 301).** Rujuk Senarai Ujian Segera di mukasurat 12.

7.2 Permohonan luar (Klinik Kesihatan)

Semua spesimen yang dihantar ke makmal mestilah disertakan dengan borang permohonan yang betul dan diisi dengan lengkap dan ditandatangani oleh Pegawai Perubatan. Sila rujuk daftar ujian bagi jenis- jenis borang berkaitan.

7.3 Pengambilan dan penghantaran sampel

- 7.3.1 Sampel hendaklah diambil di wad/klinik, dilabel dan dihantar ke makmal dalam bekas yang sesuai. Sila rujuk bahagian Pre-Analitik bagi panduan penggunaan bekas sampel mengikut ujian yang diminta.
- 7.3.2 Arahan yang jelas perlu diberikan kepada pesakit jika sampel perlu diambil sendiri oleh pesakit (contoh: urin, kahak).
- 7.3.3 Sampel mestilah dilabel dengan sekurang-kurangnya dua identifikasi (nama pesakit dan nombor kad pengenalan) dan ujian yang diminta.
- 7.3.4 **Setiap sampel perlu dimasukkan ke dalam beg plastik biohazard yang berasingan dan dilampirkan dengan borang permintaan.**
- 7.3.5 Penghantaran sampel ke makmal harus mengikut keperluan jenis ujian, contohnya jika ujian tersebut perlu dikekalkan suhu dibawah 4°C, maka sampel harus diletakkan dalam kotak beris (Rujuk Lampiran 1 – Senarai Ujian Dalaman).
- 7.3.6 Semua sampel perlu dihantar dengan segera ke Kaunter Penerimaan selepas pengambilan, sama ada melalui sistem porter atau *manual tubing* (Jabatan Kecemasan dan Trauma). Penghantaran sampel haruslah disertakan dengan buku rekod penghantaran sampel, dan diakui penerimaan sampel oleh staf makmal.
- 7.3.7 Bagi sampelyang dihantar ke Hospital Sultanah Bahiyah, penghantaran adalah pada setiap hari Ahad, Selasa dan Khamis (kecuali cuti umum). Sampel perlu sampai ke Kaunter Penerimaan sebelum jam 8.00 pagi pada hari penghantaran (rujuk jadual). Sampel yang lewat diterima selepas jam yang ditetapkan akan dihantar pada hari penghantaran seterusnya.

Hari	Masa akhir penerimaan sampel
Ahad, Selasa, Khamis	8.00 pagi
Isnin, Rabu	Sepanjang hari (Waktu Pejabat)

7.3.8 Bagi sampel yang dihantar ke makmal rujukan lain, penghantaran adalah pada setiap hari Isnin dan Rabu. Sampel perlu sampai ke Kaunter Penerimaan sebelum jam 8.00 pagi pada hari penghantaran.




8. KRITERIA PENOLAKAN SAMPEL SECARA UMUM







NO	CRITERIA
	Form
1	Patient Detail Differ from Container Label
2	Form not received in duplicate
3	Wrong Request Form
4	No Doctor's name, signature and stamp
5	Test requested is not stated
6	No form received
	Repeat/Frequency Test (minimum requirement interval)
1	>1 Sputum specimen same day
2	Less than 3 months from previous order
3	Less than 2 month from previous order
4	Less than 6 month from previous order
5	TB Culture request < 2 month
	Container
1	No label on specimen container
2	Wrong container/ transport media/fixative
3	Empty container received
	Specimen
1	Contaminated Form or Specimen
2	Delay in receiving the specimen
3	Icteric serum/plasma received
4	Blood Clotted
5	Insufficient Sample
6	Specimen leakage/broken (including slide)/spilled
7	Lipemic serum/plasma received
8	Hemolyzed Blood
9	Mislabeled of specimen
10	Specimen not in ice
11	No Specimen received
12	Incorrect ratio of blood to fixative
13	Wrong Specimen







14	Poorly smeared
15	Unsuitable sample for analysis
16	Plasma with fibrin formation
	Pre-analytical issue (beyond lab control)
1	Prior appointment needed
2	Specialist authorization required
3	Incorrect/ Incomplete Information
4	No clinical summary
5	Test not indicated / justified
6	No Location Given
7	Wrong order/code in Ireport
	Test
1	Test temporarily suspended
2	Test run on Sunday, Tuesday and Thursday only
3	For positive cases, only 2 specimen processed







9. PRE-ANALITIKAL







9.1 Panduan penggunaan bekas spesimen

NO	UJIAN	BEKAS / TIUB	ISIPADU
1	Blood C&S	Bactec Blood Culture Aerobic	 8-10 ml
2	Blood C&S	Bactec Blood Culture Anaerobic	 8-10 ml
3	Blood C&S	Bactec Blood Culture Paediatric	 1-3 ml

4	Blood C&S (for Mycobacteria & Fungi)	Bactec Myco/F Lytic		8-10 ml
5	Coagulation (PT / INR & APTT)	Sodium Citrate (1.8ml)		1.8 ml
		Sodium Citrate for Paed (0.5ml)		0.5 ml
6	<ul style="list-style-type: none"> - CSF Cell count - CSF C&S, Gram stain, Indian ink - CSF AFB - Qiasat Meningitis Panel (ME) 	Bijou Bottle (Sterile)		1-2 ml
7	<p>Culture & Sensitivity (C&S). Specimen: Abscess, Wound, Ear/Eye discharge, Throat <i>swab</i>, Nasal <i>swab</i>, Genital (except for Gonorrhoea)</p>	Amies Transport Media		-
8	Culture & Sensitivity (C&S) (Specimen: Body fluid, Bone, Fungal, Pus aspirate, Sputum, Stool, Tissue, Tracheal aspirate, Urine)	Specimen Container (60ml)		5-10 ml

9	Erythrocyte Sedimentation Rate (ESR)	ESR Tube		1.8 ml
10	- Fasting Blood Sugar - Random Blood Sugar (RBS) - 2 hours Post Prandial (2HPP)	Sodium Fluoride (2ml)		2.0 ml
11	- Full Blood Count (FBC) - HbA1c - GSH, GXM	K2 EDTA (3ml)		3.0 ml
		K2 EDTA for Paed (0.5ml)		0.5 ml
12	Genital C&S (for Gonorrhoea)	Amies Charcoal Transport Media		-
13	- Renal Profile (RP) - Liver Function Test (LFT) - Serum Bilirubin Venous (SBV) - Cardiac Enzyme (CE)	Lithium Heparin (4ml)		4.0 ml

	- Amylase, Uric Acid, Ca, Phos, Mg	Lithium Heparin for Paed (0.5ml)		0.5 ml
14	Seminal fluid analysis (SFA)	Specimen Container (60ml)		1-5 ml
15	- Serology test (RF, ASOT, VDRL, Dengue serology) - TDM Gentamicin, Vancomycin - Troponin-I	Gel & Clot Activator (3.5ml)		4 ml
16	Stool C&S	Cary Blair		-
17	Test which required collection of Urine 24 Hour	Urine Container 24 Hour		1 L
18	Urine C&S	Urine Container with Boric Acid		20 ml

19	Urine Drug Screening	Specimen Container (60ml)		30 ml
20	PCR test - MERS-CoV Monkeypox	Viral Transport Media (VTM)		-
21	Qiasat SARS-CoV-2 Respi Panel	Universal Transport Media (UTM)		-
22	- Qiasat Meningitis Panel (ME) - Xpert MTB/Rif (for CSF only)	Bijou Bottle (Sterile)		0.5-1 ml
23	RTK Covid-19, RTK Respiratory Virus	Swab in falcon tube		-
24	Xpert MTB/Rif	Sterile Container		Sputum, bronchiol lavage, urine = 1 ml

9.2 Permohonan Bekalan Konsumabel

Bekalan tiub dan bekas sampel boleh dimohon secara online melalui Sistem Pengurusan Stor (SPS), atau menggunakan Borang Permohonan Konsumabel bagi kes kecemasan atau

sekiranya sistem online menghadapi masalah. Pengeluaran stok akan dilakukan pada setiap hari **ISNIN** dan **RABU** (rujuk jadual), bermula dari jam 2.30 petang sehingga 4.30 petang. Permohonan bekalan pada hari pengeluaran stok perlu dilakukan **sebelum jam 10 pagi** bagi memastikan bekalan diterima pada hari yang sama.

Hari Pengeluaran	Pesanan Melalui SPS / Borang
Isnin (2.30 petang-4.30 petang)	Rabu (Selepas Jam 10.00 pagi) Khamis - Ahad Isnin (Sebelum Jam 10.00 pagi)
Rabu (2.30 petang-4.30 petang)	Isnin (Selepas Jam 10.00 pagi) Selasa Rabu (Sebelum jam 10.00 pagi)

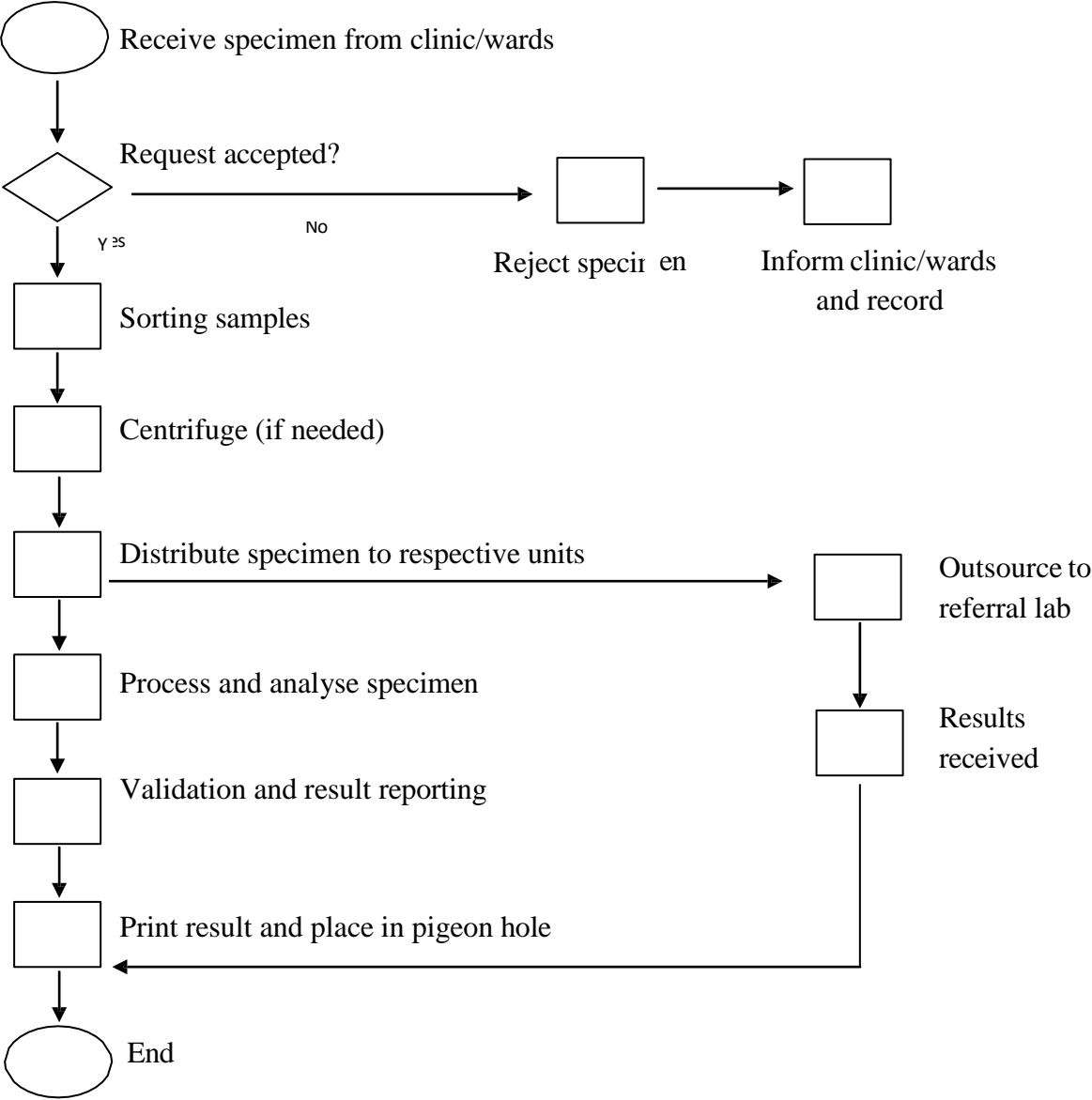
10. SENARAI PERKHIDMATAN UJIAN 24 JAM

UNIT	UJIAN
Patologi Kimia	Ammonia
	Amylase
	AST
	Calcium
	Creatine Kinase
	CSF Biochemistry
	CKMB
	Renal Profile (CREAT, UREA, NA, K & CL)
	Serum Bilirubin - Paeds (SBV - TBIL, DBIL, IBIL)
	Troponin-I
Haematologi	Activated Partial Thromboplastin Time (APTT)
	D-Dimer
	Full Blood Count (FBC)
	International Normal Ratio (INR)
	Prothrombin Time (PT)
Mikrobiologi	Blood film for malaria parasite (BFMP) (1 st case)
	CSF Gram Stain
Transfusi	Emergency crossmatching (saline phase)
	Crossmatch

11. KEPUTUSAN UJIAN

- 11.1 Keputusan ujian dalaman (*in-house test*) boleh disemak dari sistem Lisag.
- 11.2 Keputusan ujian *outsourced* akan dicetak dan dimasukkan ke dalam *pigeon hole* yang terletak di Kaunter Penerimaan mengikut wad/klinik masing-masing, kecuali keputusan serologi Human Immunodeficiency Virus (HIV) akan dimasukkan ke dalam sampul dan diambil dari JTMP Y/M Kaunter Penerimaan.
- 11.3 Bagi ujian Patologi Kimia, Histopatologi dan Sitologi yang dihantar ke Hospital Sultanah Bahiyah, keputusan ujian boleh disemak melalui aplikasi ireportAG HSB dan dicetak sekiranya perlu oleh wad/klinik yang memohon ujian berkenaan.
- 11.4 Petugas wad/ klinik yang ditugaskan untuk mengambil keputusan ujian di Jabatan Patologi dan Transfusi mestilah membawa kunci dan pastikan ***pigeon hole* dikunci dengan baik selepas keputusan diambil**. Langkah ini perlu bagi memastikan keselamatan dan *confidentiality* keputusan makmal.
- 11.5 Keputusan ujian yang tidak normal (*exceeding critical limit*) akan dimaklumkan melalui telefon terlebih dahulu dan disusuli laporan di dalam sistem Lisag. Staf yang menerima keputusan tersebut hendaklah memaklumkan kepada doktor yang merawat pesakit itu dengan kadar segera supaya tindakan atau rawatan yang sewajarnya diambil.
- 11.6 Sebarang percanggahan (*discrepancy*) antara *clinical findings* dan keputusan ujian hendaklah diberitahu segera kepada petugas Jabatan Patologi & Transfusi yang berkaitan.
- 11.7 Permintaan bagi cetak semula (*re-printed*) keputusan ujian bagi pesakit luar (*out-patients*) hanya akan dilayan jika diminta **3 hari sebelum tarikh TCA**.

12. GENERAL WORKFLOW OF PATHOLOGY DEPARTMENT



BAB 2: PATOLOGI KIMIA

1. SENARAI UJIAN

Rujuk Lampiran 1: Senarai Ujian Dalaman

2. SENARAI *BIOCHEMISTRY PROFILE TEST*

BIL	PROFILE	TIUB	ISIPADU	UJIAN
1	Blood Gas (ABG/VBG/CBG)	Heparinised Syringe	1 ml	<ul style="list-style-type: none">- Blood pH- CO2 pressure- O2 pressure- Bicarbonate- Total CO2- Base Excess- O2 saturation
2	Cardiac Enzyme	Lithium heparin	4 ml	<ul style="list-style-type: none">- CK- LDH
3	CSF Chemistry	Bijou bottle	1 ml	<ul style="list-style-type: none">- Glucose- Total protein
4	Fasting Lipid Profile	Lithium heparin	4 ml	<ul style="list-style-type: none">- Cholesterol- HDL Cholesterol- LDL Cholesterol- Triglycerides- HDL/T.cholesterol ratio
5	Liver Function Test (LFT)	Lithium heparin	4 ml	<ul style="list-style-type: none">- Total Protein- Albumin- Total Bilirubin- Direct Bilirubin- Alkaline Phosphatase- Alanine Transaminase
6	Renal Profile (RP)	Lithium heparin	4 ml	
7	Serum Bilirubin (SBV)	Lithium heparin	500ul	<ul style="list-style-type: none">- Total bilirubin- Direct bilirubin- Indirect bilirubin
8	Urine Drug Screening (DOA)	Urine container	30 ml	<ul style="list-style-type: none">- Morphine- Cannabinoids (THC)- Amphetamine- Methamphetamine

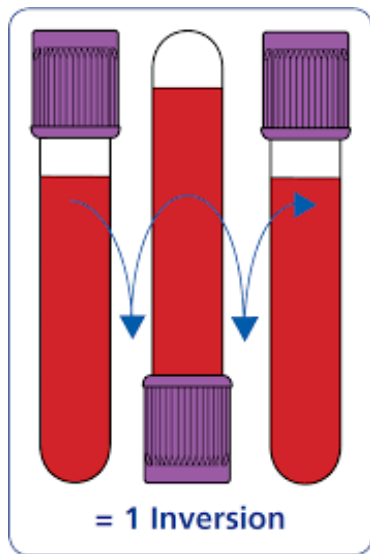
Nota: Atas faktor penjimatan, ujian spesifik haruslah diutamakan berbanding ujian *profile*.

Contoh:

- i. Untuk kes *Electrolytes imbalance* (*Hypokalemia, Hyponatremia* dsb) yang memerlukan pemantauan bersiri, ujian Renal Profile digantikan dengan ujian *electrolyte* yang berkenaan sahaja.
- ii. Sekiranya hanya *analyte* ALT diperlukan, pohon ujian ALT sahaja dan bukan LFT.

3. GARIS PANDUAN AM

- 1) Semua permohonan ujian mestilah menggunakan borang elektronik atau PER-PAT 301 yang diisi lengkap dengan butiran (Nama, No. K/P, Wad) dan *clinical history* serta ditandatangani lengkap oleh Pegawai Perubatan.
- 2) Semua sampel hendaklah dimasukkan ke dalam tiub yang sesuai mengikut jenis ujian yang dipohon.
- 3) Bagi memastikan keputusan yang tepat, isipadu darah perlu mematuhi *volume anticoagulant ratio* seperti yang tercatat pada tiub pengumpulan sampel darah.
- 4) Bagi mengelakkan hemolisis, elakkan menekan piston *syringe* semasa memasukkan darah ke dalam tiub pengumpulan sampel darah bagi jenis tiub *vacuum*. Manakala untuk tiub tanpa *vacuum*, jarum perlu ditanggal terlebih dahulu sebelum memasukkan sampel darah ke dalam tiub. Elakkan *vigorous mixing* kerana akan menyebabkan hemolisis. Sampel darah yang hemolisis akan memberi keputusan yang tidak tepat kepada ujian yang dipohon.
- 5) Bagi mengelakkan pembekuan sampel darah, pastikan proses pengambilan darah berjalan dengan lancar. Sampel darah perlu dimasukkan dengan segera ke dalam tiub. Sebaik sahaja sampel darah dimasukkan ke dalam tiub, pastikan ia bercampur dengan *anticoagulant* melalui kaedah *tube inverted* (rujuk Rajah 1 dan Rajah 2) sekurang-kurangnya 8-10 kali. Pembentukan bekuan darah kecil akan menyebabkan keputusan yang tidak tepat.



Rajah 1: Kaedah *tube inverted* yang betul.

Closure Color	Collection Tube	Mix by Inverting
BD Vacutainer® Blood Collection Tubes (glass or plastic)		
	• Blood Cultures - SPS	8 to 10 times
	• Citrate Tube*	3 to 4 times
or	• BD Vacutainer® SST™ Gel Separator Tube	5 times
	• Serum Tube (glass or plastic)	5 times (plastic) none (glass)
	• BD Vacutainer® Rapid Serum Tube (RST)	5 to 6 times
or	• BD Vacutainer® PST™ Gel Separator Tube With Heparin	8 to 10 times
	• Heparin Tube	8 to 10 times
or	• EDTA Tube	8 to 10 times
	• BD Vacutainer® PPT™ Separator Tube K ₂ EDTA with Gel	8 to 10 times
	• Fluoride (glucose) Tube	8 to 10 times

Rajah 2: *Order of draw* dan bilangan *inversion* mengikut jenis tiub.

6) Prosedur Pengambilan Darah daripada *Peripheral Vein*

Teknik pengambilan darah yang tidak betul boleh menyebabkan hemolisis dan darah menjadi beku. Lakukan cara seperti dibawah untuk mengelakkan perkara tersebut:

- Semasa mengambil darah, elakkan *probing*, *traumatic venepuncture*, penggunaan jarum yangterlalu kecil (<22 gauge) dan pengambilan pada kawasan hematoma.
- Pastikan kawasan pengambilan darah adalah bersih dan kering. Alkohol berlebihan boleh menyebabkan hemolisis sel darah merah.
- Elakkan tekanan yang kuat pada *syringe* semasa memasukkan darah ke dalam tiub. Penggunaan tekanan negatif yang berlebihan boleh mengakibatkan hemolisis.
- Elakkan menggoncang tiub darah dengan kuat. *Invert* tiub secara perlahan 6-10 kali.
- Suhu yang terlampau tinggi atau terlampau rendah, boleh menyebabkan hemolisis. Elakkan sentuhan secara langsung tiub sampel darah pada *ice* atau *frozen gel pack*.
- Pengunaan *tourniquet* yang melebihi 2 minit boleh menyebabkan *venous stasis* dan perlu dielakkan semasa proses pengambilan darah.

7) Prosedur Pengambilan Darah daripada *Intravenous* dan *Intra-arterial catheter*

- Pengambilan darah pada bahagian *drip site* atau *infusion site* boleh mengganggu keputusan ujian. Jangan ambil darah pada *proximal infusion site*. Sebolehnya ambil darah pada lengan bertentangan.
- 5ml darah pertama dari bahagian *intravenous* dan *intra-arterial catheter infusion* perlu dibuang sebelum sampel darah diambil.

- 8) Untuk ujian yang memerlukan pesakit berpuasa seperti ujian *fasting blood glucose*, *fasting lipid* dan iron/TIBC, pesakit dikehendaki untuk tidak mengambil sebarang makanan atau minuman (kecuali air kosong) selama 10-12 jam (daripada 10pm-12am hingga 8am-10am).

4. GARIS PANDUAN KHUSUS

4.1 Prosedur Pengambilan Sampel Arterial Blood Gas (ABG)

- 1) Gunakan 1ml *syringe* yang dibilas rata dengan heparin.
- 2) Ambil 1ml darah.
- 3) *Invert syringe* tersebut ke arah atas dan buang semua gelembung udara.
- 4) Gosokkan (*rubbed*) pada kedua belah tapak tangan selama 5 saat, dan tutup *syringe* dengan *stopper*.
- 5) Masukkan *syringe* tersebut ke dalam bekas berisi cairan ais (*ice slurry*) atau *frozensengel pack*, dan elakkan sentuhan secara langsung tiub sampel darah pada *ice* atau *frozen gel pack*.
- 6) Hantar segera ke makmal dalam tempoh 30 minit untuk dianalisa.
- 7) **Sampel yang dihantar bersama dengan jarum akan ditolak (*reject*) oleh pihak makmal.**

4.2 Prosedur Pengambilan Sampel bagi ujian *Glucose Tolerance Test*

- 1) Pesakit perlu berpuasa semalaman.
- 2) 8:00 pagi: Ambil darah untuk ujian *Fasting Blood Sugar*.
- 3) Pesakit diberi 75g *glucose anhydrous* dalam 250-350ml air dan minum dalam masa 5 minit.
- 4) Untuk kanak-kanak, dos *glucose* 1.75g/kg berat badan (maksimum 75g).
- 5) 10:00 pagi: Ambil sampel darah kedua.

4.3 Prosedur pengambilan sampel bagi ujian *Ammonia*

- 1) Ambil sampel darah di dalam tiub Lithium Heparin (green) atau K2-EDTA (purple).
- 2) Hantar segera ke makmal dalam bekas ber ais dan dalam tempoh 1 jam.
- 3) Elakkan sentuhan secara langsung tiub spesimen darah pada ais atau *frozen gel pack*.

4.4 Prosedur Pengambilan Darah Ujian *Lactate*

- 1) Ambil sampel darah di dalam tiub Sodium Fluoride.
- 2) Hantar segera ke makmal dalam bekas ber ais dan dalam tempoh 1 jam dari darah diambil.
- 3) Elakkan sentuhan secara langsung tiub sampel darah pada *ice* atau *frozen gel pack*.

4.5 Prosedur pengambilan darah Ujian *Renin dan Aldosterone*

- 1) Ambil sampel darah di dalam tiub EDTA.
- 2) Hantar segera ke makmal dalam tempoh 30 minit tanpa ais.

4.6 Prosedur pengambilan darah Ujian Adrenocorticotropic Hormone (ACTH)

- 1) Ambil 2ml sampel darah di dalam *pre-chilled* tiub EDTA.
- 2) Hantar segera ke makmal dalam tempoh 1 jam dengan ais.

4.7 Prosedur pengambilan darah Ujian Calcitonin

- 1) Ambil 2ml sampel darah di dalam *pre-chilled plain* tiub.
- 2) Hantar segera ke makmal dalam tempoh 1 jam dengan ais.

4.8 Prosedur Pengambilan Urin untuk 24 Jam

- 1) Cara pengumpulan:
 - a) Pesakit diarah mengosongkan pundi kencing dengan membuang urin yang pertama. Masa permulaan untuk pengumpulan urin 24 jam dikira apabila pundi kencing dikosongkan.
 - b) Kumpul urin kedua dan seterusnya selama 24 jam ke dalam botol urin 24 jam.
 - c) Urin terakhir perlu dimasukkan ke dalam bekas 24 jam pada penghujung masa 24 jam. Untuk keputusan yang berkualiti, simpan pada suhu 2-8°C jika sampel tidak terus dihantar ke makmal.
- 2) Label botol sampel dengan terang termasuk data-data berikut :
 - a) Nama
 - b) No. Kad Pengenalan
 - c) Waktu sampel diambil
 - d) Jenis ujian yang diminta

4.9 Ujian Urin Dadah Morfin/Canabis (Δ^9 -THC)

- 1) Semua sampelurin mesti dimeterikan (*seal*) dan dilabel penuh dengan data pesakit. Masa dan tarikh sampel diambil sangat penting.
- 2) Setiap permohonan mesti menggunakan Borang Permohonan Ujian Dadah Dalam Air Kencing dan diisi lengkap.
- 3) Setiap permohonan mesti dihantar terus ke makmal.

4.10 Ujian Air Kencing Catecholamine 24 jam

- 1) Untuk prosedur pengumpulan air kencing, sila rujuk ujian air kencing 24 jam.
- 2) Sila dapatkan bekas air kencing 24 jam yang mengandungi bahan pengawet 10 ml 25% HCL dari makmal (Pesakit dinasihatkan untuk tidak membuang bahan pengawet tersebut).
- 3) Penyediaan pesakit sebelum memulakan prosedur:
 - a) Jangan makan pisang, kopi, nanas dan kacang walnut sehari sebelum dan semasa proses pengumpulan air kencing.
 - b) Jangan ambil ubat seperti *alpha2 agonists, calcium channel blockers, ACE inhibitors, bromocriptine, methyl dopa, monoamine oxidase inhibitors, alpha and beta blockers, phenothiazines* dan *tricyclic antidepressants*. Dinasihatkan untuk berhenti pengambilan ubat tersebut sekurang-kurangnya 48 jam sebelum proses pengumpulan air kencing.

- c) Pesakit perlu dinasihatkan untuk mengelakkan stress, senaman dan rokok sebelum dan semasa proses pengumpulan air kencing.

BAB 3: HEMATOLOGI

1. SENARAI UJIAN

Rujuk Lampiran 1: Senarai Ujian Dalaman

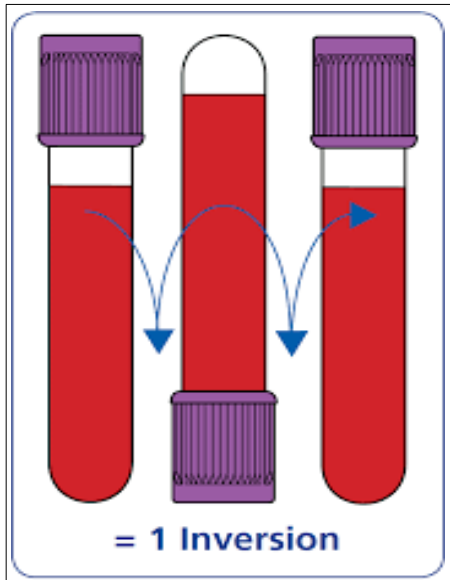
2. GARIS PANDUAN AM

- 1) Pastikan borang permohonan diisi dengan betul dan tepat.
 - a. Nama, nombor kad pengenalan/passport, RN (sekurang-kurangnya dua *unique identification*)
 - b. Sejarah klinikal dan penemuan klinikal yang bersesuaian (*relevan*) dengan kes.
 - c. Indikasi ujian yang betul.
- 2) Bagi memastikan keputusan yang tepat, isipadu darah perlu mematuhi *volume anticoagulant ratio* seperti yang tercatat pada tiub pengumpulan sampel darah.
- 3) Bagi mengelakkan hemolisis, elakkan menekan *piston syringe* semasa memasukkan darah ke dalam tiub pengumpulan sampel darah bagi jenis tiub *vacuum*. Manakala untuk tiub tanpa *vacuum*, jarum perlu ditanggal terlebih dahulu sebelum memasukkan sampel darah ke dalam tiub. Elakkan *vigorous mixing* kerana akan menyebabkan hemolisis. Sampel darah yang hemolisis akan memberi keputusan yang tidak tepat kepada ujian yang dipohon.
- 4) Bagi mengelakkan pembekuan sampel darah, pastikan proses pengambilan darah berjalan dengan lancar. Sampel darah perlu dimasukan dengan segera ke dalam tiub, dan pastikan ia bercampur dengan *anticoagulant* melalui kaedah *tube inverted* sekurang-kurangnya 8-10 kali (rujuk Rajah 3 dan Rajah 4). Pembentukan bekuan darah kecil akan menyebabkan keputusan yang tidak tepat terutamanya untuk *platelet count*.

3. GARIS PANDUAN KHUSUS

- 1) Permohonan bagi ujian FBP *urgent* (acute leukimia atau hemolisis, sila berhubung dengan Pakar Patologi (Hematologi) atau Pegawai Perubatan.

- 2) Bagi pengambilan sampel untuk ujian *Bone Marrow Aspiration* (BMA) di wad, temujanji perlu dilakukan terlebih dahulu dengan pihak makmal. Prosedur perlu dilakukan awal pagi bagi memastikan sampel dapat dihantar ke makmal rujukan pada hari yang sama.



Rajah 3: Kaedah *tube inverted* yang betul.

Closure Color	Collection Tube	Mix by Inverting
BD Vacutainer® Blood Collection Tubes (glass or plastic)		
	• Blood Cultures - SPS	8 to 10 times
	• Citrate Tube*	3 to 4 times
or	• BD Vacutainer® SST™ Gel Separator Tube	5 times
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	• Heparin Tube	8 to 10 times
or	• EDTA Tube	8 to 10 times
	• BD Vacutainer® PPT™ Separator Tube K ₂ EDTA with Gel	8 to 10 times
	• Fluoride (glucose) Tube	8 to 10 times

Rajah 4: *Order of draw* dan bilangan *inversion* mengikut jenis tiub.

- 3) Untuk ujian ke makmal rujukan, pastikan indikasi, sejarah klinikal yang sesuai (*appropriate*) diberikan dan keperluan permohonan ujian disertakan, misalnya:
- 4) Bagi ujian molekular thalassemia (*DNA analysis*) - perlu hantarkan sekali:
- Keputusan FBC pesakit (dalam masa 3 bulan).
 - Keputusan haemoglobin (Hb) analysis pesakit.
 - Keputusan ujian molekular terdahulu (jika ada, iaitu bagi kes yang perlukan ujian ulangan atas sebab-sebab tertentu).
 - Sampel darah ibu bapa bagi pesakit-pesakit paediatric untuk makmal rujukan menjalankan korelasi ujian DNA dan merancang ujian molekular yang akan dibuat.
 - Untuk kes *family/ cascade screening* yang belum dijalankan ujian Hb *analysis*, Hb *analysis* perlu dimohon bersekali dengan DNA *analysis*. Sila sertakan juga maklumat berikut dengan lengkap: Nama, No. K.P, makmal pengesanan, diagnosis kes indeks dan hubungan klien dengan kes indeks.
 - dan pastikan kebenaran (consent pesakit/ penjaga) telah diperolehi daripada pesakit/ klien/ penjaga.

- 5) Ujian Koagulasi *Special* dan Thrombophilia yang perlu dihantar ke makmal rujukan - sila berhubung dengan staf Kaunter Penerimaan untuk mendapatkan maklumat kerana ujian-ujian ini memerlukan prosedur yang *special* bagi memastikan *specimen integrity* dan keputusan ujian yang tepat dan jitu.

BAB 4: MIKROBIOLOGI

1. SENARAI UJIAN

Rujuk Lampiran 1: Senarai Ujian Dalaman

2. GARIS PANDUAN AM

- 1) Semua permohonan ujian perlu menggunakan borang elektronik atau PER-PAT 301 dalam 2 salinan berkarbon. Permohonan hendaklah diisi dengan lengkap dan jelas.
- 2) Sampel-sampel klinikal mestilah diambil ditempat terkena jangkitan dan elakkan dari pencemaran (*contamination*).
- 3) Sampel hendaklah mencukupi bagi ujian yang diminta.
- 4) Media pengangkut (*transport medium*) yang sesuai mestilah digunakan bagi menjamin pembiakan mikroorganisma. Dapatkan khidmat nasihat dari makmal sekiranya terdapat masalah.
- 5) Pengambilan sampel disarankan sebelum rawatan antibiotik dimulakan. Sekiranya antibiotik sudah diberikan, nyatakan jenis antibiotik yang diberi kepada pesakit.
- 6) Sampel hendaklah dilabel dan dihantar ke makmal secepat mungkin.
- 7) Bagi ujian yang dilakukan di makmal rujukan, pegawai perubatan perlu menggunakan borang yang telah ditetapkan mengikut keperluan makmal rujukan.
- 8) Penghantaran sampel untuk ujian molekular perlu dihantar dalam bekas berais ke makmal.
- 9) Untuk penghantaran sampel disyaki mengandungi virus yang merebak melalui titisan udara (*droplet*), sampel hendaklah dibungkus secara *triple packaging*.

3. GARIS PANDUAN KHUSUS

3.1 Garis panduan pengurusan sampel Seksyen Bakteriologi dan Seksyen Tibi

BIL	SAMPEL / UJIAN	BEKAS / ISIPADU	PROSEDUR / ARAHAN
1	<i>Catheter tip</i>	Bekas steril	<ol style="list-style-type: none"> 1. Cuci kulit dengan air yang steril. 2. Buang jahitan dan tarik <i>catheter</i>. 3. Secara aseptik, potong bahagian dalam sepanjang 2 – 3 cm dan masukkan ke dalam bekas steril. <p>*Penghantaran spesimen perlu disertakan dengan sampel kultur darah dari <i>peripheral vein</i>.</p>
2	Cecair badan (pleural fluid, pericardial fluid, peritoneal fluid, synovial fluid, ascitic fluid, amniotic fluid, peritoneal dialysate)	Bekas steril	<ol style="list-style-type: none"> 1. Cuci tangan sebelum prosedur dilakukan. 2. Cuci lapisan kulit dengan 2% chlorhexidine in 70% alcohol. Tunggu sehingga kering (30 saat). 3. Ambil spesimen dan masukkan ke dalam botol. 4. Hantar sampel dengan kadar segera ke makmal. <p>*Bagi sampel peritoneal dialysate fluid, masukkan sampel ke dalam botol BD Bactec Plus Aerobic dan BD Bactec Plus Anaerobic sekiranya perlu.</p>
3	Cerebrospinal fluids (CSF) - Kultur untuk bakteria - Indian Ink - Cryptococcal antigen	Botol Bijou steril (1-3 ml)	<ol style="list-style-type: none"> 1. Ambil sampel secara teknik aseptik. 2. Masukkan ke dalam botol yang steril. 3. Maklumkan kepada petugas makmal sebelum menghantar sampel dan hantar segera ke makmal.
4	Darah (<i>Blood</i>) Kanak-kanak	 BD Bactec Paeds	<ol style="list-style-type: none"> 1. Cuci tangan sebelum prosedur dilakukan. 2. Cuci lapisan kulit dengan 2%

	<p>Dewasa</p> <p>Untuk Anaerobic</p> <p>Fungal/Mycobacterium</p>	<p>Plus (0.5-5 ml)</p> <p>BD Bactec Plus Aerobic (8-10 ml)</p> <p>BD Bactec Plus Anaerobic (8-10 ml)</p> <p>Bactec Myco/F-lytic (1-5 ml)</p>	<p>chlorhexidine <i>in</i> 70% alkohol.</p> <ol style="list-style-type: none"> 3. Tunggu sehingga kering (30 saat). 4. Lapkan <i>rubber septum</i> pada botol blood c&s dengan <i>alcohol wipes</i>. 5. Ambil darah dan masukkan ke dalam botol kultur darah. <p>*Jika pesakit disyaki mendapat jangkitan catheter related blood stream infection (CRBSI), sampel darah perlu diambil dari <i>central catheter</i> dan <i>peripheral vein</i> pada masa yang sama, serta dihantar juga pada masa yang sama.</p> <p>*Jika pesakit disyaki mendapat jangkitan <i>Infective endocarditis</i>, ambil 3 set kultur darah (aerobe dan anaerobe) pada 3 tempat berlainan, di mana sampel pertama dan terakhir adalah di dalam selang masa 1 jam (<i>1st and last samples drawn at least 1 hour apart</i>). Masukkan darah ke dalam botol <i>aerobe</i> diikuti dengan botol <i>anaerobe</i>.</p>
5	High vaginal swab	<ol style="list-style-type: none"> 1. Amies transport media 2. Bekas steril (untuk pengesanan <i>Trichomonas vaginalis</i>) 	<ol style="list-style-type: none"> 1. Dengan menggunakan spekulum, masukkan swab dan lakukan swab pada permukaan <i>vaginal vault</i>. 2. Masukkan swab ke dalam Amies transport media. 3. Untuk pengesanan <i>T.vaginalis</i>, masukkan swab ke dalam bekas steril yang berisi <i>normal saline</i> atau lakukan calitan ke atas slaid dan hantar segera ke makmal untuk pemeriksaan mikroskopi.
6	<i>In-use testing of</i>	Bekas steril	<ol style="list-style-type: none"> 1. Hantar sampel ke makmal

	<i>disinfectants</i>		<p>secepat mungkin. Jika terlambat simpan dalam peti sejuk.</p> <p>2. Ambil sekurang-kurangnya 2ml disinfektan dengan cara aseptik ke dalam bekas steril .</p>
7	Kahak (Sputum)	Bekas steril	<p>1. Pesakit hendaklah berkumur dengan air dahulu sebelum sampel diambil bagi mengurangkan pencemaran bakteria di bahagian rongga mulut.</p> <p>2. Arah pesakit supaya batuk. Jangan meludah.</p> <p>3. Pastikan sampel yang diambil adalah kahak dan bukan air liur.</p>
8	Kikisan kornea (<i>corneal scrapping</i>)	<p>Media kultur (diambil dari Unit Mikrobiologi):</p> <ul style="list-style-type: none"> • Blood agar • Mac Conkey agar • Chocolate agar • Sabouraud dextrose agar <p>Slaid kaca</p>	<p>1. Lakukan kikisan menggunakan teknik aseptik.</p> <p>2. Kikisan perlu terus dikultur ke atas media yang disediakan.</p> <p>3. Buat calitan di atas slaid kaca.</p> <p>4. Hantar ke makmal segera bersama dengan slaid kaca.</p>
9	Lelehan urethra (<i>urethral discharge</i>)	<p>1. <i>Amies transport media with charcoal</i></p> <p>2. Slaid kaca</p>	<p>1. Masa paling sesuai untuk pengambilan sampel adalah 2 jam selepas pesakit kencing.</p> <p>2. Pungut lelehan dengan <i>swab</i> steril.</p> <p>3. Jika tiada lelehan yang dapat dikumpul, masukkan <i>swab</i> perlahan-lahan dengan gerakan memutar sepanjang 2cm kedalam urethra.</p> <p>4. Gunakan <i>swab</i> yang steril untuk melakukan calitan.</p> <p>5. Hantar ke makmal dengan kadar segera.</p> <p>*Calitan di atas slaid kaca amat</p>

			mustahak bagi pendiagnosan Gonorrhoea dalam pesakit lelaki
10	<p>Najis</p> <ul style="list-style-type: none"> • C&S • Rotavirus antigen • C. difficile toxin & antigen 	<p>Media Cary-Blair (untuk <i>rectal swab</i>) atau bekas najis steril.</p> <p>Nota: Sekiranya najis diambil menggunakan <i>bed pan</i>, elakkan dari terkena urin, sabun atau lain-lain disinfektan.</p>	<ol style="list-style-type: none"> 1. Gunakan <i>swab</i> steril, ambil sebahagian kecil najis bersama mukus, nanah atau darah. 2. Jika najis sukar diperolehi, gantikan dengan <i>rectal swab</i>. 3. Masukkan sample <i>swab</i> dalam Cary-Blair transport medium. 4. Isikan najis 1/3 penuh dalam bekas steril. 5. Permintaan ujian akan ditolak sekiranya najis adalah keras.
11	Nanah (<i>aspirate & swab</i>)	<ol style="list-style-type: none"> 1. Bekas steril; atau 2. Amies <i>transport media</i> 	<ol style="list-style-type: none"> 1. Cuci lapisan kulit dengan 2% chlorhexidine <i>in</i> 70% alkohol. Biarkan kering selama 30 saat. 2. Sedut nanah dengan picagari steril dan masukkan ke dalam bekas steril. 3. Bagi pengambilan <i>swab</i> C&S, ambil di bahagian margin luka. <p>*<i>Pus aspirates</i> adalah sampel yang lebih baik berbanding <i>pus/wound swab</i>. Permukaan luka atau ulser selalunya di kolonisasi oleh <i>environmental bacteria</i>. Oleh itu cara yang terbaik bagi mendapatkan patogen yang betul ialah dengan cara sedutan nanah (<i>pus aspirate</i>).</p> <p>*Bagi sampel nanah dari <i>brain abscess/ central nervous system (CNS) infection</i>, sampel perlu diletakkan di dalam bekas steril atau picagari dan dihantar ke makmal segera untuk kultur anaerobe.</p>
12	Sum-sum tulang (<i>bone</i>)	BD Bactec Plus	Seperti prosedur pengambilan

	<i>marrow aspirate)</i>	Aerobic BD Bactec Plus Anaerobic Myco/F Lytic	kultur darah
13	<i>Suprapubic aspiration/ Bladder tap</i>	<i>Urine container with boric acid</i>	<ol style="list-style-type: none"> 1. Ambil sampel secara teknik aseptik. 2. Masukkan ke dalam bekas yang steril.
14	<i>Swab endoservik</i>	<i>Amies transport media; atau Amies transport media with charcoal</i>	<ol style="list-style-type: none"> 1. Dengan menggunakan spekulum, masukkan <i>swab</i> ke dalam kawasan endoservik. 2. Masukkan <i>swab</i> ke dalam <i>Amies transport media</i> (untuk kes puerperal sepsis). 3. Untuk kes disyaki gonorrhoea, masukkan <i>swab</i> ke dalam media <i>Amies transport media with charcoal</i>. <p>* Adalah penting untuk mengelakkan kontaminasi dari bahagian vulva semasa pengambilan sampel</p>
15	<i>Swab hidung (Nasal swab)</i>	<i>Amies transport media</i>	<ol style="list-style-type: none"> 1. Basahkan <i>swab</i> dengan air steril. 2. <i>Swab</i> bahagian anterior lubang hidung (<i>anterior nares</i>). 3. Masukkan <i>swab</i> ke dalam <i>Amies transport media</i>. <p>*Bagi saringan MRSA <i>carrier</i></p>
16	<i>Swab mata (Eye swab)</i> <i>Swab mata untuk Gonococcus</i>	<i>Amies transport media Amies transport media with charcoal</i>	<ol style="list-style-type: none"> 1. Cuci bahagian mata dengan air yang steril. 2. Lakukan <i>swab</i> sebanyak mungkin. 3. Masukkan <i>swab</i> ke dalam <i>Amies transport media</i>. 4. Bagi <i>swab</i> mata untuk <i>Gonococcus</i>, buat calitan di

			atas sisipan kaca dan hantarkan bersama sampel kultur di dalam Amies <i>transport media with charcoal</i> .
17	Swab tekak (<i>Throat swab</i>)	Amies <i>transport media</i>	<ol style="list-style-type: none"> 1. Tekan lidah menggunakan <i>tongue depressor</i>. 2. Ambil sampel dari kawasan tonsillar, posterior pharynx dan kawasan yang inflamed dan mempunyai ulser. 3. Elakkan dari terkena kawasan pipi, gigi, uvula, lidah dan bibir semasa mengeluarkan <i>swab</i>. 4. Masukkan <i>swab</i> dalam Amies <i>transport media</i>. <p>*Bagi kes disyaki jangkitan <i>Corynebacterium diphtheriae</i>, sila maklumkan kepada kakitangan makmal sebelum menghantar sampel.</p>
18	Swab telinga (<i>Ear swab</i>)	Amies <i>transport media</i>	<ol style="list-style-type: none"> 1. Cuci bahagian luar telinga dengan air yang steril. 2. Lakukan <i>swab</i> pada tempat jangkitan. 3. Masukkan <i>swab</i> ke dalam Amies <i>transport media</i>.
19	Tisu	Bekas steril	<ol style="list-style-type: none"> 1. Pungut sampel selepas mencuci tempat jangkitan dengan air yang steril. 2. Masukkan sampel tisu ke dalam bekas steril. Jangan masukkan cecair formalin. 3. Steril <i>normal saline</i> boleh dimasukkan untuk mengelakkan tisu dari menjadi kering. <p>*Saiz sampel adalah sekurang-kurangnya 1cm³.</p>
20	<i>Tracheal aspirate/ bronchial washing/</i>	Bekas steril	<ol style="list-style-type: none"> 1. Ambil spesimen secara teknik aseptik.

	<i>bronchoalveolar lavage</i>		2. Masukkan ke dalam bekas yang steril.
21	Urin (<i>Mid Stream Urine</i>)	<i>Urine container with boric acid (10-30 ml); atau</i>	1. Sampel: Ambil urin pada awal pagi. Bersihkan bahagian kemaluan dengan air dan sabun. 2. Pungut urin yang pertengahan (<i>mid stream</i>) terus ke dalam bekas.
22	Urin <i>catheterised</i>	<i>Urine container with boric acid (10-30 ml)</i>	1. Cuci tiub dengan 70% alkohol. 2. Sedut 10-30 ml urin melalui tiub terus ke dalam botol yang steril. 3. Atau, secara aseptik, urin boleh diambil dari <i>catheter collection port</i> pada tiub. *Urin dari <i>catheter bag</i> tidak sesuai untuk dikultur. *Urin yang dikumpul dari <i>Foley catheter</i> tidak sesuai untuk dikultur kerana <i>catheter tip</i> berkemungkinan tercemar dengan bakteria dari uretra.

3.2 Garis panduan pengurusan sampel Seksyen Mikologi

BIL	SAMPEL / UJIAN	BEKAS / ISIPADU	PROSEDUR/ARAHAN
1	Cecair badan	Bekas steril; atau MYCO/ F Lytic (8-10 ml)	1. Cuci lapisan kulit dengan 2% chlorhexidine in 70% alkohol. Tunggu sehingga kering (30 saat). 2. Ambil spesimen dan masukkan ke dalam bekas steril atau botol MYCO/ F Lytic
2	<i>Cerebrospinal fluid (CSF)</i>	Bijou <i>bottle</i> steril	Seperti prosedur pengambilan kultur darah untuk isolasi bakteria.
3	Darah	MYCO/ F Lytic (8-10 ml)	Seperti prosedur pengambilan kultur darah untuk isolasi

			bakteria.
4	Kuku	Pengetip kuku Bekas steril	<ol style="list-style-type: none"> 1. Bersihkan kuku dengan 70% alkohol. 2. Kerat kuku sedalam yang mungkin bersama bahagian bawah kuku. 3. Masukkan ke dalam bekas yang steril.
5	Kulit	Steril <i>scapel</i> atau <i>blade</i> Bekas steril	<ol style="list-style-type: none"> 1. Bersihkan kulit dengan 70% alkohol, biarkan seketika. 2. Kikis kulit yang berkulis dengan menggunakan skapel tumpul dari arah luar kawasan kulit yang berkulis. <p>*Spesimen juga boleh diinokulasi terus ke atas <i>Saboraud Dextrose Agar</i>.</p>
6	Mata/ Kikisan kornea	Steril skapel <i>Saboraud Dextrose Agar</i>	<ol style="list-style-type: none"> 1. Kikis kawasan mata yang berulcer atau bernanah dan palitkan ke atas <i>Saboraud Dextrose Agar</i>. 2. Hantar <i>plate</i> agar dengan segera ke makmal.
7	Mukosa (mulut dan vagina)	Steril <i>swab</i> Air (steril) <i>Amies transport media</i>	<ol style="list-style-type: none"> 1. Basahkan <i>swab</i> dengan air steril, kemudian sapukan ke permukaan <i>lesion</i>. 2. Untuk jangkitan di bahagian vagina, sampel perlu diambil dari lelehan vagina dan dari dinding <i>lateral</i> vagina. 3. Masukkan ke dalam <i>Amies transport media</i>.
8	Nanah	Jarum (steril) Picagari Bekas steril	<ol style="list-style-type: none"> 1. Gunakan jarum dan picagari untuk menyedut nanah. 2. Masukkan ke dalam bekas yang steril.
9	Rambut	Forsep/ Steril <i>scapel</i> Bekas steril	<ol style="list-style-type: none"> 1. Bersihkan pangkal rambut dengan 70% alkohol. 2. Cabut pangkal rambut dengan forsep steril dari beberapa tempat. Jika kulit berkeruping, kikis dengan skapel yang

			tumpul. 3. Masukkan ke dalam bekas yang steril.
10	<i>Sputum</i>	Bekas steril	1. Pesakit hendaklah berkumur dengan Chlorhexidine <i>mouth wash</i> sebelum sampel diambil bagi mengurangkan pencemaran bakteria di bahagian rongga mulut. 2. Arah pesakit supaya batuk. Jangan meludah.
11	Sum-sum tulang (<i>bone marrow aspirate</i>)	MYCO/ F Lytic (8-10 ml)	Seperti prosedur pengambilan kultur darah untuk isolasi bakteria.
12	Telinga (<i>ear canal</i>)	Steril <i>swab</i> <i>Amies Transport Media</i> Saboraud Dextrose Agar	1. Kikisan dari <i>ear canal</i> (<i>preferred sample</i>) atau <i>swab</i> dari <i>lesion</i> . 2. Masukkan ke dalam <i>Amies transport media</i> (bagi <i>swab</i>). 3. Bagi kikisan dari <i>ear canal</i> , spesimen boleh diinokulasi terus keatas <i>Saboraud Dextrose Agar</i> .
13	Tisu/ biopsi	Steril <i>normal saline</i> Bekas steril	1. Pungut sampel selepas mencuci tempat jangkitan dengan air yang steril. 2. Masukkan sampel tisu kedalam bekas steril. Jangan masukkan cecair formalin. 3. Steril <i>normal saline</i> boleh dimasukkan untuk mengelakkan tisu dari menjadi kering
14	Urin	<i>Urine container with boric acid</i> (10-30 ml)	1. Pungut urin yang pertengahan (mid stream) terus ke dalam bekas urin. 2. Atau ambil 10-20 ml urin dari tiub kateter yang baru ditukar.

3.3 Garis panduan pengurusan sampel Seksyen Molekular

BIL	SAMPEL / UJIAN	BEKAS / ISIPADU	PROSEDUR/ARAHAN
1	<i>Nasopharygeal Swab</i> (NPS) + <i>Oropharygeal Swab</i> bagi ujian Covid-19 PCR dan ujian MERS-CoV PCR	<p>Covid-19 PCR kit dan MERS-CoV PCR kit yang mengandungi <i>Nasopharygeal Swab</i> (NPS) + <i>Oropharygeal swab</i> (OPS), <i>Viral Transport Media</i> (VTM) serta borang permohonan.</p> <p>Sila ambil bersama kotak plastik dan ais di Jabatan Patologi & Transfusi.</p>	<ol style="list-style-type: none"> 1. Pakai PPE 2. Sila pilih <i>nasopharygeal swab</i> (NPS) (yang halus). 3. Pesakit harus dongakkan kepala menghala ke atas. 4. Masukkan NPS ke dalam rongga hidung secara perlahan-lahan sehingga terdapat rintangan. 5. Pusing NPS beberapa kali secara berhemah. 6. Keluarkan NPS and masukkan ke dalam VTM dan patahkan pada tempat yang ditandakan. 7. Sila pilih <i>oropharygeal swab</i> (OPS) (yang besar). 8. Pesakit harus membuka mulut. 9. Masukkan OPS kedalam mulut pesakit, swab dalam pergerakan <i>figure of eight</i> (kawasan tonsil dan uvula). 10. Keluarkan OPS dan masukkan ke dalam VTM yang sama dan patahkan pada tempat yang ditandakan. 11. Pastikan penutup VTM diketatkan. 12. Label <i>barcode</i> pesakit pada VTM, <i>biohazard plastic bag</i> serta borang permohonan. Masukkan VTM ke dalam <i>biohazard plastic bag</i> yang kecil (<i>secondary container</i>), kemudian masukkan pula ke dalam <i>biohazard plastic bag</i> yang besar (<i>tertiary container</i>). 13. Sila hantar sampel secara <i>triple packaging</i> dalam bekas berisi ais dan hantar ke makmal dalam masa 2 jam.

2	<p><i>Nasopharygeal Swab</i> (NPS) bagi ujian Covid-19 rapid antigen (RTK antigen) dan Qiasat SARS-CoV-2 Respiratory Panel</p>	<p>Covid-19 RTK antigen kit yang mengandungi <i>Nasopharygeal Swab</i> (NPS) serta borang permohonan.</p> <p>Qiasat SARS-CoV-2 Respiratory Panel kit yang mengandungi <i>Nasopharygeal Swab</i> (NPS), UTM serta borang permohonan.</p> <p>Sila ambil bersama kotak plastik dan ais di Jabatan Patologi & Transfusi.</p>	<ol style="list-style-type: none"> 1. Pakai PPE. 2. Sila pilih <i>nasopharygeal swab</i> (NPS) (yang halus). 3. Pesakit harus dongakkan kepala menghala ke atas. 4. Masukkan NPS ke dalam rongga hidung secara perlahan-lahan sehingga terdapat rintangan. 5. Pusing NPS beberapa kali secara berhemah. 6. Bagi ujian RTK, keluarkan NPS dan masuk ke dalam <i>falcon tube</i>. Patahkan pada tempat yang ditandakan. Pastikan penutup <i>falcon tube</i> diketatkan dan masukkan ke dalam <i>biohazard plastic bag</i> yang kecil, kemudian masuk ke dalam <i>biohazard plastic bag</i> yang besar. 7. Bagi ujian Qiasat, keluarkan NPS and masuk ke dalam UTM. Patahkan pada tempat yang ditandakan. Pastikan penutup UTM diketatkan dan masukkan ke dalam <i>biohazard plastic bag</i> yang kecil, kemudian masuk ke dalam <i>biohazard plastic bag</i> yang besar. 8. Sila hantar sampel secara <i>triple packaging</i> dalam bekas berisi ais dan hantar ke makmal dalam masa 2 jam.
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3	<p><i>Nasopharygeal Swab (NPS)</i> bagi ujian Respiratory ICT</p>	<p><i>Nasopharyngeal Swab/ Nasopharygeal Aspirate.</i></p> <p>Sila ambil kit di Jabatan Patologi & Transfusi.</p> <p>Perlu hantar dalam bekas berisi ais.</p>	<p>Bagi sample <i>Nasopharygeal Swab (NPS)</i>:</p> <ol style="list-style-type: none"> 1. Sila pilih <i>nasopharygeal swab</i> (yang halus). 2. Pesakit harus dongakkan kepala menghala ke atas. 3. Masukkan swab ke dalam rongga hidung secara perlahan-lahan sehingga terdapat rintangan. 4. Pusing NPS beberapa kali secara berhemah. 5. Keluarkan dan masukkan swab ke dalam bekas swab. 6. Letakkan swab di dalam <i>biohazard plastic bag</i>. 7. Hantar sampel dalam bekas berisi ais ke makmal pada waktu pejabat sahaja. <p>Bagi sample <i>Nasopharyngeal aspirate</i>:</p> <ol style="list-style-type: none"> 1. Perlahan-lahan lalukan kateter yang steril ke dalam hidung sejauh nasofarinks. 2. Lekatkan jarum suntikan yang steril ke dalam kateter dan sedut specimen mukus. <p>Masukkan spesimen ke dalam bekas berisi ais dan hantar ke makmal pada waktu pejabat</p>
4	<p>Lesion swab, lesion crust, <i>Nasopharygeal Swab (NPS)</i> bagi ujian Monkeypox PCR</p>	<p>Kit <i>Monkeypox PCR</i> mengandungi 2 unit dry swab, 2 unit conical tube 15 ml, 2 unit screw cap tube 1.5 ml (untuk <i>crust</i> sampel), <i>Nasopharygeal Swab (NPS)</i> + <i>Oropharygeal swab (OPS)</i>, <i>Viral Transport Media (VTM)</i> serta borang permohonan.</p> <p>Perlu hantar dalam bekas berisi ais.</p>	<ol style="list-style-type: none"> 1. Ambil 2 calitan dari setiap permukaan luka / keruping luka / lelehan luka, seeloknya dari berlainan tempat menggunakan 'sterile swab'. 2. Letakkan calitan dari permukaan luka/ keruping luka / lelehan luka di dalam sterile container berasingan.

3.4 Filem Darah untuk Parasit Malaria

- 1) Bersihkan dua slaid kaca (*frosted slide*) menggunakan *absolute alcohol*.
- 2) Sampel boleh diperolehi daripada darah melalui tusukan jari atau darah vena.
- 3) Untuktusukan jari, bersihkan jari menggunakan kapas yang direndam dengan alkohol 70% dan keringkan.
- 4) Cucuk hujung jari menggunakan lanset steril.
- 5) Lapkan darah pertama yang keluar menggunakan kapas kering.
- 6) **Bagaimana untuk menyediakan filem darah tebal (FDT)**
 - Picit jari dengan perlahan dan titiskan 3 titik darah ke atas permukaan slaid pertama.
 - Sebarkan darah dengan cepat menggunakan *spreader* dalam bentuk bulatan sebesar syiling 10 sen (1-2cm diameter) sebanyak 3-6 kali.
- 7) **Bagaimana untuk menyediakan filem darah nipis (FDN)**
 - Picit jari dengan perlahan titiskan 1 titik darah ke atas permukaan slaid kedua.
 - Letakkan slaid di atas permukaan rata. Sentuh darah dengan *spreader* secara sudut 45 darjah dan sebarkan ke hujung slaid.
- 8) Biarkan slaid kering pada suhu bilik.
- 9) Label nama pesakit dan nombor kad pengenalan pada slaid. **Masukkan slaid ke dalam bekas slaid** dan hantar ke makmal dengan segera beserta borang PER-PAT 301.

3.5 Analisis Cecair Semen (Seminal Fluid Analysis, SFA)

- 1) Pesakit dikehendaki tidak melakukan persetubuhan/melancap sekurang-kurangnya 3 hari dan tidak melebihi 7 hari sebelum pemeriksaan air mani.
- 2) Pastikan botol yang digunakan untuk mengisi spesimen air mani adalah bersih, kering dan steril (bebas kuman). Botol tersebut boleh diperolehi daripada Kaunter Penerimaan, Jabatan Patologi & Transfusi.
- 3) Pesakit digalakkan mengosongkan pundi kencing terlebih dahulu. Bersihkan zakar dengan sabun. Cara pengambilan air mani adalah secara melancap/masturbasi tanpa penggunaan bahan-bahan bantuan seperti kondom dan lain-lain.
- 4) Pastikan semua spesimen air mani dimasukkan ke dalam botol tersebut.
- 5) Jika spesimen air mani diambil di rumah, ia mestilah sampai ke Kaunter Penerimaan dalam masa 30 minit.
- 6) Semasa penghantaran, spesimen air mani haruslah disimpan sebaik mungkin pada suhu badan, contohnya: simpan di dalam poket atau di bawah ketiak anda.
- 7) Pemeriksaan air mani memerlukan masa yang panjang. Pesakit dinasihatkan menghantar spesimen air mani seawal yang mungkin supaya analisa yang lengkap dapat dijalankan.
- 8) Waktu penerimaan spesimen air mani: Isnin hingga Rabu, 8-11 pagi (tidak termasuk cuti umum).

3.6 Kes Medicolegal

- 1) Tatacara spesifik:
 - Sampel perlu dilakri dan dihantar terus ke makmal mikrobiologi oleh petugas khas.
 - *Chain of custody* (COC) perlu dijaga sepanjang proses ini berjalan dan direkod.
- 2) Pengambilan sampel untuk ujian yang berbeza perlu mengikut tatacara yang ditetapkan.

BAB 5: TRANSFUSI

1. SENARAI UJIAN DAN BORANG PERMOHONAN

Senarai ujian yang ditawarkan di Unit Transfusi dan jenis borang yang digunakan bagi setiap ujian adalah seperti berikut:

UJIAN	BORANG	LTAT	
		RUTIN	URGENT
<i>Blood grouping (ABO) & Rh (D) typing</i>	Borang PER-PAT 301	2 jam	
<i>Anti Human Globulin tests (Coombs test)</i>	Borang PER-PAT 301	2 jam	
<i>Group Screen & Hold (GSH)</i>	Borang Permohonan Transfusi Darah (PER-SS-BT 105 (Pind.1/2016))	2 jam	-
<i>Group & Crossmatch (GXM)</i>	Borang Permohonan Transfusi Darah (PER-SS-BT 105 (Pind.1/2016))	2 jam	-
<i>Emergency saline crossmatch</i>	Borang Permohonan Transfusi Darah (PER-SS-BT 105 (Pind.1/2016))	-	30 minit
<i>Emergency Uncrossmatched O Packed Cells (Safe O)</i>	Borang Permohonan Transfusi Darah (PER-SS-BT 105 (Pind.1/2016))	-	10 minit
<i>Component request</i>	Borang Permohonan Transfusi Darah (PER-SS-BT 105 (Pind.1/2016))	1 jam	
<i>Investigation of Adverse Transfusion Reaction</i>	i. <i>Request Form for Transfusion Reaction Investigation (Blood and Blood Components)</i> ii. <i>Reporting Form for Transfusion-Related Adverse Event</i>	10 hari bekerja	-

Bagi Borang Permohonan Transfusi Darah (PER-SS-BT 105 (Pind.1/2016)):

- 1) Borang permintaan harus diisi dengan maklumat pesakit iaitu nama (HURUF BESAR), nombor kad pengenalan, nombor pendaftaran hospital, wad, bangsa, jantina, diagnosis, kumpulan darah (jika diketahui), reaksi transfusi sebelumnya dan sebarang maklumat lain yang berkaitan. **Semua maklumat mestilah ditulis dengan LENGKAP DAN JELAS menggunakan pen berwarna BIRU/HITAM.**
- 2) Pastikan setiap permohonan menggunakan satu set borang PER-SS-BT 105 (Pind.1/2016), yang original (bahagian atas) dan *carbonised* (bahagian bawah). Pastikan tiada maklumat pesakit lain yang tertulis pada *carbonised copy* ini selain daripada pesakit yang sebenar. Hal ini menimbulkan masalah bagi makmal kerana mungkin akan menimbulkan isu identifikasi pesakit. Untuk mengelakkannya, pastikan anda tidak menulis borang lain secara terus di atas borang PER-SS-BT 105 (Pind.1/2016) atau lapik tadi dengan kertas tebal semasa menulis informasi pesakit bagi mengelakkan maklumat pesakit terdahulu tertulis di atas borang *carbonised copy* PER-SS-BT 105 (Pind.1/2016) yang akan digunakan bagi pesakit yang baru.
- 3) Anggaran masa apabila darah diperlukan mestilah ditulis di dalam borang permohonan. Permohonan darah untuk disediakan "secepat mungkin" (*to be made available as soon as possible*) perlu dielakkan kerana ini tidak akan membantu petugas Unit Transfusi dalam menentukan keutamaan (*determining priorities*).
- 4) Kuantiti darah/komponen darah yang diperlukan perlu ditulis pada borang permohonan.
- 5) Setiap komponen dipohon menggunakan borang berasingan. Permohonan komponen berlainan dalam satu borang yang sama akan ditolak.
- 6) Pegawai Perubatan dan saksi perlulah menurunkan tandatangan berserta cop nama pada borang asal dan borang pendua. Pastikan setiap maklumat diisi pada borang pendua dan bukan pada borang asal sahaja.

2. PENGAMBILAN SAMPEL

Kebanyakan *transfusion error* adalah disebabkan oleh *clerical mistakes*, seperti mengambil darah pesakit yang salah, melabel sampel menggunakan ID pesakit lain, dan memindahkan darah kepada pesakit yang salah. Oleh itu, langkah-langkah pencegahan praktikal (*practical precaution*) yang diberikan dalam bahagian ini sangat penting untuk diikuti.

2.1 Pengenalpastian pesakit dan sampel darah untuk ujian keserasian

Proses mengambil dan melabel sampel darah mesti dilakukan secara *bedside*, dan hanya satu pesakit pada satu masa. Pegawai Perubatan yang melakukan proses ini perlu memastikan:

- 1) Pesakit mesti dikenalpasti dengan betul (*correctly identified*). Pegawai Perubatan yang

mengambil sampel darah mesti membaca *wristband* (jika ada), dan bertanya kepada pesakit nama penuh dan nombor kad pengenalan beliau. Maklumat ini harus disemak dengan *case notes* atau label identiti pesakit yang telah dicetak.

- 2) Pesakit tidak sedarkan diri (*unconscious patients*) mesti dikenalpasti berdasarkan kepada *wristband* atau disahkan oleh saudara-mara.
- 3) Bagi kes kecemasan di mana pesakit tidak dapat dikenalpasti, satu *identity band* dengan nombor unik harus diberikan. Nombor ini mesti digunakan untuk mengenalpasti pesakit sehingga butiran peribadi yang lengkap dan tepat disediakan.

2.2 Pelabelan sampel

- 1) Pegawai Perubatan yang mengambil darah dan melabel tiub adalah Pegawai Perubatan yang sama yang membuat permohonan ujian GSH atau GXM, dan perlu mempunyai seorang saksi.
- 2) Sampel mesti dilabel dengan jelas dan tepat secara *bedside* sebaik sahaja darah diambil. Label perlulah mengandungi nama penuh pesakit, nombor kad pengenalan, tarikh dan masa pengambilan darah. Borang permohonan dan sampel mestilah ditulis tangan. **Jangan gunakan label pra-cetak.**
- 3) Pegawai Perubatan yang mengambil sampel darah pesakit perlu bertanggungjawab sepenuhnya dalam memastikan sampel darah dimasukkan ke dalam tiub dan dilabel dengan betul serta menandatangani borang permintaan. Tandatangan dan nama Pegawai Perubatan pada borang permohonan menunjukkan bahawa beliau telah memastikan yang sampel pesakit telah dikenalpasti dengan tepat.
- 4) **JANGAN** melabel sample lebih dari satu pesakit pada masa yang sama.

2.3 Keperluan sampel darah mengikut ujian

UJIAN		ISIPADU	TIUB	NOTA
Anti Human Globulin (AHG) test/ Coombs test (Direct & indirect test)		3-5 ml	Tiub EDTA	
Blood grouping (ABO) & Rh (D) typing		3-5 ml	Tiub EDTA	
Component request (platelet, Fresh Frozen Plasma (FFP) dan cryoprecipitate)		3-5 ml	Tiub EDTA	<p>- Jika pesakit telah menerima pemindahan komponen darah dalam masa 3 bulan sebelumnya di hospital yang sama (dengan syarat prosedur itu selesai tanpa sebarang komplikasi dan Unit Transfusi mempunyai sekurang-kurangnya 2 rekod kumpulan darah dalam sistem makmal), sampel darah baru tidak perlu dihantar bersama borang permohonan. Satu salinan borang permohonan lama hendaklah dilampirkan bersama borang permohonan baru.</p> <p>- Sekiranya borang permohonan lama tiada/lebih daripada 3 bulan dari permohonan terakhir, sampel darah perlu dihantar bersama borang permohonan baru.</p>
GSH, GXM	Bayi sehingga 4 bulan	Darah ibu: 3-5 ml Darah bayi: 1.5-2 ml	Tiub EDTA	Sampel darah bayi harus dihantar bersama dengan sampel darah ibu.
	Pesakit lebih 4 bulan	3-5 ml	Tiub EDTA	Sekiranya pesakit memerlukan pemindahan darah berulang (<i>repeated transfusion</i>) semasa <i>current admission</i> , sampel darah baru diperlukan bagi setiap permohonan darah.

3. PENGHANTARAN SAMPEL

- 1) Sampel perlu dihantar ke Kaunter Penerimaan, Jabatan Patologi & Transfusi bersama dengan buku rekod penghantaran sampel, dan diakui penerimaan sampel oleh petugas makmal.
- 2) Sampel tanpa buku rekod penghantaran sample hanya dibenarkan dalam keadaan kecemasan tetapi petugas wad perlu menulis maklumat yang relevan dalam buku tertentu yang disediakan.

4. PENOLAKAN UJIAN

Permohonan ujian akan ditolak sekiranya:

- 1) Borang dan tiub sampel dicemari dengan darah pesakit yang tertumpah.
- 2) Maklumat pesakit pada borang permohonan dan pada label tiub sampel tidak sama atau tidak lengkap.
- 3) Borang tidak diisi dalam dua salinan yang lengkap.
- 4) Sebarang *discrepancy* kumpulan darah ABO/Rh pesakit untuk ujian di makmal.
- 5) Sampel dihantar tidak menggunakan plastik biohazard yang sesuai.
- 6) Sampel yang hemolisis, tidak mencukupi (*insufficient*), *clotted*, label rosak atau penghantaran lewat.
- 7) Masa pengambilan tidak dicatat pada borang permohonan.

Nota: Bagi sampel yang ditolak, pihak makmal akan memaklumkan kepada pihak wad melalui telefon, dan nama Pegawai Perubatan/Jururawat yang dimaklumkan akan dicatatkan pada borang permohonan ujian yang ditolak. Borang dan sampel yang ditolak tidak akan dikembalikan ke wad untuk mengelakkan sebarang kesilapan. Wad perlu menghantar sampel darah dan borang permohonan baru.

5. KEPUTUSAN UJIAN

- 1) Keputusan bagi ujian kumpulan darah (ABO), Rh (D) *typing* dan Coombs test (*direct dan indirect*) boleh diambil dari *pigeon hole* di Kaunter Penerimaan, Jabatan Patologi & Transfusi.
- 2) Bagi ujian GSH dan GXM, borang permohonan akan disimpan di Unit Transfusi. Salinan borang akan diserahkan kepada petugas wad yang datang mengambil darah/komponen darah yang akan digunakan.

6. PENGAMBILAN, PENGANGKUTAN DAN PENYIMPANAN DARAH / KOMPONEN DARAH KE WAD

6.1 Pengambilan

Semasa proses mengambil darah/komponen darah di makmal, Juruteknologi Makmal Perubatan (JTMP) dan petugas wad mesti menyemak dan memastikan bahawa maklumat di borang permohonan sepadan dengan beg darah yang telah diserasikan untuk pesakit berkenaan. Maklumat termasuk:

- a) Nama penuh dan nombor pengenalan pesakit adalah sama seperti yang tercatat pada borang permohonan GXM.
- b) Kumpulan darah/ Rh pesakit dan unit darah/ komponen darah adalah sama.
- c) Kod nombor darah pada borang GXM dan unit darah/ komponen darah adalah sama.
- d) Darah/ komponen darah tidak melepasi tarikh luput.

6.2 Pengangkutan dan Penyimpanan

Kaedah pengangkutan darah/komponen darah dari Unit Transfusi dan pengendalian di wad adalah seperti jadual di bawah:

	<i>Whole blood / Red cell</i>	<i>Platelet concentrate</i>	<i>Plasma components</i>
Pengambilan	<i>Cool box</i> bersama ais	<i>Cool box</i> tanpa ais	<i>Cool box</i> bersama ais
Penggunaan	Pemindahan darah mesti bermula dalam masa 30 minit selepas penerimaan	Pemindahan segera selepas penerimaan	Pemindahan segera selepas dicairkan
Penyimpanan	2-6 °C	Tidak dibenarkan simpan di wad	Tidak dibenarkan simpan di wad
Pemulangan sekiranya tidak digunakan	SEGERA	SEGERA	SEGERA

Peringatan: Darah yang telah menjalani ujian keserasian (GXM) dan tidak digunakan dalam masa **48 jam** akan dibatalkan. Sekiranya pihak wad ingin melanjutkan tempoh penyimpanan beg darah, mereka perlu **memaklumkan kepada makmal** dalam tempoh 48 jam dari tarikh permohonan.

7. PEMULANGAN BEG DARAH TERPAKAI

- 1) Selepas proses transfusi darah selesai, beg darah terpakai bersama kad PPDK1 yang telah lengkap diisi perlu dikembalikan dengan segera ke makmal.
- 2) Beg darah tersebut perlu dimasukkan ke dalam beg plastik biohazard dan diasingkan dengan kad PPDK1 untuk mengelak kontaminasi.
- 3) Bagi proses transfusi darah yang tidak lengkap, beg darah dan kad PPDK1 perlu dikembalikan ke makmal. Sebab-sebab pemberhentian transfusi perlu dinyatakan di dalam kad PPDK1. Beg darah perlu dilabel sebagai “**USED BLOOD**” sebelum dikembalikan ke makmal.

8. PROTOKOL UJIAN GROUP, SCREEN & HOLD (GSH)

- 1) Group, Screen & Hold (GSH) adalah satu ujian yang melibatkan saringan kumpulan darah, Rhesus (D) dan antibodi ke atas darah pesakit. Ujian keserasian darah (GXM) hanya akan dilakukan sekiranya darah diperlukan.
- 2) Sampel pesakit akan disimpan sehingga 48 jam sekiranya ujian GXM perlu dilakukan dalam tempoh masa tersebut. Selepas 48 jam, permohonan ujian GXM perlu menghantar borang dan sampel darah baru.
- 3) Wad perlu memaklumkan ke makmal sekiranya perlu menukar ujian GSH kepada ujian GXM.

9. PROTOKOL UJIAN KESERASIAN DARAH (CROSSMATCH)

- 1) Sekiranya berlaku kes ujian keserasian darah yang tidak serasi (*incompatible crossmatch*) di mana tiada darah di Unit Transfusi yang sesuai untuk digunakan oleh pesakit, sampel darah pesakit akan dihantar ke Jabatan Perubatan Transfusi, Hospital Sultanah Bahiyah atau Pusat Darah Negara untuk ujian identifikasi antibodi bagi mendapatkan bekalan darah serasi/hampir serasi.
- 2) Pegawai Perubatan di wad akan dimaklumkan berkenaan situasi tersebut oleh Pegawai Perubatan Transfusi atau petugas Unit Transfusi.

10. ADVERSE TRANSFUSION REACTION

- 1) Sekiranya *adverse transfusion reaction* berlaku semasa proses transfusi darah/komponen darah, pihak wad perlu menghantar sampel pesakit ke makmal bagi tujuan siasatan.
- 2) Borang *Reporting Form for Transfusion-Related Adverse Event* dan *Request Form for Transfusion Reaction Investigation (Blood and Blood Component)* perlu diisi dengan lengkap dan dihantar bersama sample seperti jadual di bawah. Sampel kali pertama perlu dihantar dengan segera ke makmal, manakala sampel kali kedua dihantar

selepas 24 jam

SAMPEL	BEKAS	ISIPADU	UJIAN
Darah	Tiub EDTA	10 ml	ABO/Rh grouping
			GXM
			Coombs test
Urin	<i>Universal container</i>	10 ml	Hemoglobin

- 3) Bagi kes *suspected of haemolytic transfusion reactions*, ujian Full Blood Picture (FBP), Liver Function Test (LFT) dan Lactate Dehydrogenase (LDH) perlu dilakukan.
- 4) Beg darah/komponen darah yang telah digunakan perlu dipulangkan ke makmal dengan segera.

BAB 6: PATOLOGI ANATOMI

Permohonan ujian Patologi Anatomi dihantar ke Hospital Sultanah Bahiyah (HSB) untuk dijalankan di sana. Senarai ujian:

1. Histopatologi – spesimen / organ atau *biopsy* yang diambil semasa pembedahan/ prosedur *biopsy*.
2. Sitologi – *Fine needle Aspiration Cytology* (FNAC/FNAB), *Pap Smear* (*Conventional dan Liquid-Based Cytology*), *Non-Gynaecology Cytology* (*body fluids, sputum, dll*)

A. HISTOPATOLOGI

1. GARIS PANDUAN AM

- 1) Pastikan borang permohonan PER-PAT 301 diisi dengan tepat dan lengkap:
 - a. Nama, nombor kad pengenalan/passport, RN (sekurang-kurangnya dua *unique identification*).
 - b. Sejarah klinikal dan penemuan klinikal yang bersesuaian (*relevan*) dengan kes.
 - c. Indikasi ujian yang betul.
 - d. Informasi yang sama pada borang permohonan dan bekas spesimen. Pastikan identiti pesakit yang betul dan spesimen yang betul untuk pesakit (misalnya *right breast* dilabel sebagai *right breast*).

- e. Ditandatangani oleh doktor dan dicop nama pegawai tersebut serta jabatan/wad.
 - f. Sekiranya keputusan laporan diperlukan dengan segera, sila cop/tulis SEGERA di bahagian atas borang sebelah kanan dan berhubung dengan Pakar Patologi di HSB untuk berbincang.
- 2) Semua borang permohonan yang dihantar tanpa spesimen akan dipulangkan semula. Begitu juga sebaliknya.

2. GARIS PANDUAN KHUSUS

1) Spesimen

- a. Semua spesimen untuk pemeriksaan histopatologi hendaklah dimasukkan ke dalam bahan pengawet formalin (10% *buffered formalin fixative*) sebaik sahaja dikeluarkan dari pesakit.
- b. Elakkan dari membelah spesimen besar (terutama kes-kes kanser) sebelum dihantar ke makmal untuk mengelak dari berlaku perubahan bentuk spesimen (*specimen distortion*) yang mungkin menjejaskan penilaian histopatologi. Terkecuali adalah kes-kes *mastectomy* dan *wide breast excision* untuk kanser, serta spesimen yang mana pembedahan dijalankan pada hujung minggu atau cuti umum.
- c. Bagi kes-kes *mastectomy* dan *wide breast excision* untuk kanser, bahagian tumor perlu dihiris terlebih dahulu (*single slice across the tumor*) sebelum di hantar ke makmal. Ini adalah penting untuk pengawetan tisu (*fixation*) yang sempurna dalam formalin bagi memastikan *tumour grading* serta ujian imunohistokimia bagi *ostrogen receptor*, *progesterone receptor* dan *c-erb B2* adalah tepat.
- d. Pastikan isipadu formalin adalah mencukupi; anggaran 10-20 kali isipadu tisu yang hendak diawet.
- e. Bekas spesimen yang digunakan hendaklah bersesuaian dengan saiz spesimen dan hendaklah dilabel dengan kemas dan betul, serta sepadan dengan borang permohonan ujian. Elakkan dari menghantar spesimen di dalam beg plastik.
- f. Pastikan spesimen direkod di dalam buku despatch dan diterima oleh staf Kaunter Penerimaan.

2) Keputusan ujian

- a. Keputusan bagi biopsi kecil SEGERA (*urgent requests of small biopsies*) disediakan dalam masa 72 jam waktu bekerja spesimen diterima di Jabatan

Patologi, HSB. Manakala keputusan bagi kes rutin disediakan dalam masa 7 hingga 21 hari bekerja spesimen diterima.

- b. Terkecuali adalah kes-kes yang memerlukan *decalcification* atau kes-kes bermasalah yang memerlukan *re-sampling*, ujian lanjutan atau rujukan pihak kedua, di mana jangkamasa yang lebih panjang mungkin diperlukan.

B. SITOLOGI

1. GARIS PANDUAN AM

- 1) Semua spesimen hendaklah disertakan dengan borang permohonan (Borang PER-PAT 301 untuk ujian FNAB, non-gynaecology cytology; dan borang PS1/98 untuk ujian Pap smear) lengkap dengan:
 - a. Nama, nombor kad pengenalan/passport, RN (sekurang-kurangnya dua *unique identification*).
 - b. Sejarah pesakit yang berkaitan termasuk prosedur yang dilakukan dan diagnosis klinikal.
 - c. Ditandatangani oleh doktor dan dicop nama pegawai tersebut serta jabatan/wad.
 - d. Sekiranya keputusan laporan diperlukan dengan segera, sila cop/tulis SEGERA di bahagian atas borang sebelah kanan dan berhubung dengan Pakar Patologi di HSB untuk berbincang.
- 2) Semua borang permohonan yang dihantar tanpa spesimen akan dipulangkan semula. Begitu juga sebaliknya.
- 3) Bagi *Fine Needle Aspiration Cytology/ Biopsy* (FNAC/ FNAB), sila berhubung dengan staf di Kaunter Penerimaan Jabatan Patologi & Transfusi, HSML (sambungan 3328) sebelum pengambilan sampel untuk mendapatkan bantuan JTMP bagi penyediaan slaid. Maklumkan kepada JTMP di Kaunter Penerimaan mengenai:
 - i. Tarikh dan waktu temujanji
 - ii. Maklumat pesakit (nama, no. kad pengenalan, umur dan jantina)
 - iii. Organ yang akan dilakukan pengambilan sampel (*site of biopsy*)
- 4) Pastikan spesimen cecair badan tidak tumpah semasa penghantaran. Bekas spesimen hendaklah ditutup dengan kemas.
- 5) Hantar spesimen secepat mungkin ke makmal atau sekiranya terlewat dihantar, pastikan sampel disimpan di dalam peti sejuk (suhu 4°C) untuk mengelakkan sampel rosak (*deteriorate*).

2. GARIS PANDUAN PENGURUSAN SAMPEL MAKMAL SITOLOGI

Bil	Sampel / Ujian	Bekas / Jumlah Spesimen	Prosedur / Arahan
1	<i>Bronchial brushing</i> dan lain-lain <i>endoscopic brushing</i>	Palitan pada slaid Minima 2 slaid (TBNA - 4 slaid)	<ol style="list-style-type: none"> 1) Masukkan segera slaid yang telah dipalit ke dalam bekas mengandungi pengawet ethanoh 95% selama 30 minit. Kelewatan pengawetan akan menyebabkan palitan kering dan tidak sesuai untuk pemeriksaan mikroskopi. 2) Setiap slaid mesti dilabel dengan nama dan no. kad pengenalan pesakit. 3) Isi Borang PER-PAT 301 dengan lengkap.
2	<i>Bronchial washing/ fluidtrap</i>	Bekas steril (tanpa pengawet); anggaran 20 ml	<ol style="list-style-type: none"> 1) Hantar ke makmal dengan segera (sekiranya tidak dapat dihantar segera, simpan dalam peti sejuk pada suhu 4°C). JANGAN BEKUKAN. 2) Isi Borang PER-PAT 301 dengan lengkap.
3	<i>Bronchoalveolar lavage</i>	Bekas steril (tanpa pengawet); anggaran 20 ml	<ol style="list-style-type: none"> 1) Hantar ke makmal dengan segera (sekiranya tidak dapat dihantar segera, simpan dalam peti sejuk pada suhu 4°C). JANGAN BEKUKAN. 2) Isi Borang PER-PAT 301 dengan lengkap.
4	Cecair sinovial	Bekas steril (tanpa pengawet); anggaran 20 ml	<ol style="list-style-type: none"> 1) Hantar ke makmal dengan segera (sekiranya tidak dapat dihantar segera, simpan dalam peti sejuk pada suhu 4°C). JANGAN BEKUKAN. 2) Isi Borang PER-PAT 301 dengan lengkap.
5	<i>Cerebrospinal fluid (CSF)</i>	Bekas microcentrifuge; minimum 0.5 ml	<ol style="list-style-type: none"> 1) Hantar ke makmal dengan segera (sekiranya tidak dapat dihantar segera, simpan dalam peti sejuk pada suhu 4°C). JANGAN BEKUKAN. 2) Isi Borang PER-PAT 301 dengan lengkap.
6	<i>Fine needle aspiration (FNA)</i>	Slaid dan smear akan disediakan oleh staf Jabatan Patologi.	<ol style="list-style-type: none"> 1) Hubungi makmal segera setelah pesakit bersedia untuk membuat prosedur.

		Minimum 4 slaid	2) Isi Borang PER-PAT 301 dengan lengkap.
7	<i>Nipple discharge</i>	Slaid dan smear akan disediakan oleh staf Jabatan Patologi. Minimum 2 slaid	1) Hubungi makmal segera setelah pesakit bersedia untuk membuat prosedur. 2) Isi Borang PER-PAT 301 dengan lengkap.
8	<i>Pap smear (Conventional)</i>	Palitan tipis pada slaid. Satu slaid sahaja	1) Masukkan segera slaid yang telah dipalit ke dalam bekas mengandungi pengawet alcohol 95% selama 30 minit atau spray dengan alcohol 95%. Kelewatan pengawetan akan menyebabkan palitan kering dan tidak sesuai untuk pemeriksaan mikroskopi. 2) Setiap slaid mesti dilabel dengan nama dan no. kad pengenalan pesakit dan dihantar bersama dengan Borang PS1/98 (Pindaan2007) yang telah diisi dengan lengkap.
9	<i>Pap smear (Liquid-Based Cytology)</i>	Bekas khas yang mengandungi pengawet. 1 bekas untuk 1 pesakit.	Hantar ke Makmal Sitopatologi HSB bersama dengan Borang PS1/98 (Pindaan 2007) yang telah diisi dengan lengkap.
10	<i>Pericardial fluid</i>	Bekas steril (tanpa pengawet); anggaran 20 ml	1) Hantar ke makmal dengan segera (sekiranya tidak dapat dihantar segera, simpan dalam peti sejuk pada suhu 4°C). JANGAN BEKUKAN. 2) Isi Borang PER-PAT 301 dengan lengkap.
11	<i>Peritoneal fluid / washing</i>	Bekas steril (tanpa pengawet); anggaran 20 ml	1) Hantar ke makmal dengan segera (sekiranya tidak dapat dihantar segera, simpan dalam peti sejuk pada suhu 4°C). JANGAN BEKUKAN. 2) Isi Borang PER-PAT 301 dengan lengkap.
12	<i>Pleural fluid</i>	Bekas steril (tanpa pengawet); anggaran 20 ml	1) Hantar ke makmal dengan segera (sekiranya tidak dapat dihantar segera, simpan dalam peti sejuk pada suhu 4°C). JANGAN BEKUKAN. 2) Isi Borang PER-PAT 301 dengan

			lengkap.
13	Sputum (kahak)	Palitan atas dua slaid	<ol style="list-style-type: none"> 1) Dapatkan <i>fresh early morning specimen</i> dan hantar segera ke makmal. 2) Untuk sampel dari luar HSB, lakukan palitan pada slaid dan pengawetan dalam ethanol 95% sebelum dihantar ke Makmal Sitopatologi HSB. 3) Isi Borang PER-PAT 301 dengan lengkap.
14	<i>Tzank smear</i>	<p>Slaid dan smear akan disediakan oleh anggota klinikal/ staf Jabatan Patologi.</p> <p>Minimum 2 slaid</p>	<ol style="list-style-type: none"> 1) Hubungi makmal segera setelah pesakit bersedia untuk membuat prosedur. 2) Isi Borang PER-PAT 301 dengan lengkap.
15	Urin	Bekas steril (tanpa pengawet); anggaran 50-200 ml	<ol style="list-style-type: none"> 1) Hantar segera ke Unit Sitopatologi HSB (dalam masa 30 minit). 2) Elakkan spesimen <i>early morning</i> kerana sel-sel dalam pundi kecing telah mengalami proses degeneratif. 3) Isi Borang PER PAT-301 dengan lengkap.
16	<i>Vitreous fluid</i>	<p>Bekas steril (mengandungi Cytolyt solution).</p> <p>Minimum 0.5 ml</p>	<ol style="list-style-type: none"> 1) Tambahkan larutan Cytolyt ke dalam sampel (ratio 1:1) Hantar ke makmal dengansegera. Larutan Cytolyt dibekalkan oleh makmal. 2) Isi Borang PER-PAT 301 dengan lengkap.

LAMPIRAN 1: SENARAI UJIAN DALAMAN, JABATAN PATOLOGI & TRANSFUSI HOSPITAL SULTANAH MALIHA

Legend:

Hematologi
 Patologi Kimia
 Mikrobiologi
 Transfusi
 Kaunter & Outsource

BIL	TEST	LAB	SPECIMEN	TYPE OF CONTAINER	VOLUME	SCHEDULE	LTAT	REMARKS
1	Activated Partial Prothrombin Time (APTT)	Haematology	Plasma	Trisodium Citrate	1.8 ml – Adult 0.5 ml – Paed	Daily	1 hour (urgent) 3 hours (routine)	Time dependent test. Please indicate time of blood collection and the treatment of anticoagulant done.
2	AFB (Acid Fast Bacilli) stain	Microbiology	Sterile body fluids, bronchial washing, bronchoalveolar lavage, CSF, gastric lavage, pus aspirate, tissue, tracheal aspirate, urine, sputum	Sterile container	-	Daily	24 hours	
3	Air sampling	Microbiology	Agar plate	Agar plate	NA	Upon request	3 days	
4	Alanine Aminotransferase (ALT)	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT Form

5	Albumin	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	
6	Alkaline Phosphatase (ALP)	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT Form
7	Amylase	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT form
8	Anti-Globulin tests (Coombs test) - direct - indirect	Transfusion	Blood	EDTA tube	3-5 ml	Daily	2 hours	Use PERPAT form. Spoken to MO Blood Bank
9	Anti-Streptolysin Latex Agglutination (ASOT)	Microbiology	Serum	Plain tube/Gel tube	3-5 ml	By batch (Monday & Wednesday)	5 working days	Use PERPAT Form
10	Aspartate Aminotransferase (AST)	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT Form
11	Bilirubin, Total & Direct	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT Form
12	Blood Film for malaria parasite (BFMP)	Microbiology	Blood in EDTA, Thin and Thick blood smear	Smear slide	NA	Daily	2 hours	To request slide container from lab.

13	Blood film for microfilariae	Microbiology	Blood, 60ul thick blood film	Smear slide	NA	Daily	24 hours	Blood must be taken between 6 pm-12 am. To request slide container from lab
14	Blood Gas (ABG/VBG/CDG)	Chemical Pathology	Blood	Heparinised syringe	1ml	Daily	45 minutes (urgent)	Sample should be sent immediately in ice bath. Use PERPAT Form
15	Bone Marow Aspiration dan Trepine biopsy (BMAT)	Hematology	Bone marrow	EDTA & Sodium Heparine Formalin in sterile container	NA	By appointment	BMA 3 days (urgent) 7 days (routine) 14 working days (refer for second opinion) Trepine Biopsy 14 days (routine; require IHC once) 30 days (complicated; require IHC more than once)	Ward must make sure all the preparations for BMAT procedure is complete to avoid delay of sample collection.
16	Blood grouping & Rh (D) typing	Transfusion	Blood	EDTA tube	3-5 ml	Daily	2 jam	Use PERPAT Form

17	Body fluid Gram stain / Cell count	Microbiology	Fluid	Sterile container	3-5ml	24 hours	1 day	Use PERPAT form
18	Calcium	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT form
19	Chikungunya serology	Microbiology	Serum	Plain tube	3 ml	Daily	1 days	Use PERPAT form. Spoken to Microbiologist.
20	Chloride	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT Form
21	Cholesterol, total	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Patients are required to fast for at least 4 hours prior to blood collection.
22	Cholesterol, HDL	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml	Daily	3 hours (routine) 90 minutes (urgent)	Patients are required to fast for at least 4 hours prior to blood collection
23	Clostridium difficile, antigen and toxin screening	Microbiology	Stool	Sterile container	-	Daily	3 working days	Hard stool will be rejected.
24	Component request (Cryo, FFP, Platelet)	Transfusion	Blood	EDTA tube	3-5 ml	Daily	30 minutes	Borang Permohonan Transfusi Darah. Spoken to MO Blood Bank

25	Covid-19 rapid test antigen (RTK)	Microbiology	Nasopharyngeal / oropharyngeal swab	Swab in Falcon tube/ sterile container (in ice)	NA	Daily	24 hours	
26	Creatinine	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT Form
27	Creatine Kinase (CK)	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT Form
28	C-Reactive Protein (CRP)	Chemical Pathology	Serum	Plain tube/Gel tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT Form. All request must be spoken to specialist.
29	Cryptococcal antigen	Microbiology	CSF Serum	Bijou bottle Plain tube/Gel tube	1 ml 4 ml	Daily	1 working day	
30	CSF Biochemistry - Total protein - Glucose	Chemical Pathology	CSF	Bijou bottle	1 ml	Daily	3 hours (routine) 90 minutes (urgent)	Send immediately. Use PERPAT Form.
31	CSF Cell Count / Gram stain	Microbiology	CSF	Bijou bottle	1 ml	Daily	1 hour	To send within 2 hours to lab after sample collection
32	CSF, Indian Ink	Microbiology	CSF	Bijou bottle	10 drops	Daily	1 hour	To send within 2 hours to lab after sample collection

33	Culture & sensitivity aqueous tap	Microbiology	Aqueous tap	Sterile container	NA	Daily	5 days/ 30 days for fungal culture on SDA	
34	Culture & sensitivity bile	Microbiology	Bile	Amies transport media, sterile container	NA	Daily	3 days	
35	Culture & sensitivity blood aerobe	Microbiology	Blood	BD Bactec Plus Aerobic/ F	8-10 ml	Daily	7 days	For CRBSI case please send along (Central and Peripheral) sample
36	Culture & sensitivity blood anaerobe	Microbiology	Blood	BD Bactec Lytic/ 10 Anaerobic/F bottle	8-10 ml	Daily	9 days	
37	Culture & sensitivity blood (catheter)	Microbiology	Blood	BD Bactec Plus Aerobic/ F	8-10 ml	Daily	7 days	To send together with peripheral blood C&S
38	Culture & sensitivity blood paediatric	Microbiology	Blood	BD Bactec Peds Plus/ F	1-5 ml	Daily	7 days	
39	Culture & sensitivity body fluid (pleural, pericardial, peritoneal, synovial, peritoneal dialysate, others)	Microbiology	Body fluid	Sterile container, BD Bactec Plus Aerobic/F (for PD fluid), BD Bactec Lytic/ 10 Anaerobic/F bottle (for PD fluid)	3-5ml	24 hours	3-7 days (For sterile container, BD Bactec Plus Aerobic, Anaerobic) 42 days (For fluid in BD Bactec MYCO/ F lytic)	

40	Culture & sensitivity bone	Microbiology	Bone	Sterile container	NA	Daily	7 days	
41	Culture & sensitivity bone marrow	Microbiology	Bone Marrow Aspirate	BD Bactec Plus Aerobic/ F	5-10 ml	Daily	7 days	
42	Culture & sensitivity bronchiol washing	Microbiology	Bronchiol wash	Sterile container	NA	Daily	3 days	
43	Culture & sensitivity catheter tip	Microbiology	Catheter tip	Sterile container	NA	Daily	3 days	To send together with peripheral blood C&S
44	Culture & sensitivity contact lens	Microbiology	Contact lens in contact lens case	Sterile container	NA	Daily	3 days	
45	Culture & sensitivity contact lens solution	Microbiology	Contact lens solution	Sterile container / Contact lens solution container	NA	Daily	3 days	
46	Culture & sensitivity corneal scrapping	Microbiology	Corneal scrape, Agar plate (BA,MAC, Choc, SDA)	Agar plate	NA	Daily	5 days/ 30 days for fungal culture on SDA	
47	Culture & sensitivity cerebrospinal fluid (CSF)	Microbiology	CSF	Sterile bijou bottle	1-3 ml	Daily	3 days	Send within 2 hour to lab upon specimen collection
48	Culture & sensitivity ear swab	Microbiology	Ear swab	Amies transport media	NA	Daily	3 days	

49	Culture & sensitivity endocervical swab	Microbiology	Endocervical swab	Amies transport media	NA	Daily	3 days	
50	Culture & sensitivity environment swab	Microbiology	Environment swab	Amies transport media	NA	Daily	3 days	
51	Culture & sensitivity eye swab	Microbiology	Eye swab	Amies transport media	NA	Daily	3 days	
52	Culture & sensitivity foreign body	Microbiology	Foreign body	Sterile container	NA	Daily	3 days	
53	Culture & sensitivity gonococcus	Microbiology	Endocervical swab, eye swab, urethral discharge, penile discharge	Amies transport media with charcoal, sterile container	NA	Daily	5 days	
54	Culture & sensitivity high vaginal swab (HVS)	Microbiology	High vaginal swab	Amies transport media	NA	Daily	3 days	
55	Culture & sensitivity low vaginal swab	Microbiology	Low vaginal swab	Amies transport media with charcoal	NA	Daily	5 days	
56	Culture & sensitivity nasal swab (MRSA screening)	Microbiology	Nasal swab	Amies transport media	NA	Daily	3 days	
57	Culture & sensitivity peritoneal fluid	Microbiology	Peritoneal fluid	Sterile container, BD Bactec Plus Aerobic/F, BD Bactec Lytic/ 10 Anaerobic/F bottle	3-5 ml	Daily	5 days	

58	Culture & sensitivity pleural fluid	Microbiology	Plueral fluid	Sterile container	3-5 ml	Daily	3 days	
59	Culture & sensitivity pus swab	Microbiology	Pus swab	Amies transport media	NA	Daily	3 days	
60	Culture & sensitivity pus aspirate	Microbiology	Pus aspirate	Sterile container	NA	Daily	3 days	
61	Culture & sensitivity rectal swab	Microbiology	Rectal swab	Cary-Blair transport media	NA	Daily	3 days	
62	Culture & sensitivity seminal fluid	Microbiology	Seminal fluid	Amies transport media, sterile container	NA	Daily	3 days	
63	Culture & sensitivity sputum	Microbiology	Sputum	Sterile container	NA	Daily	3 days	
64	Culture & sensitivity stool	Microbiology	Stool	Sterile container	NA	Daily	5 days	
65	Culture & sensitivity suprapubic aspirate	Microbiology	Urine	Urine container	NA	Daily	3 days	
66	Culture & sensitivity synovial fluid	Microbiology	Synovial fluid	Sterile container	NA	Daily	3 days	

67	Culture & sensitivity throat swab	Microbiology	Throat swab	Amies transport media	NA	Daily	3 days	For suspected <i>Corynebacterium diphtheriae</i> cases, please alert lab staff before sending the specimen.
68	Culture & sensitivity tissue	Microbiology	Tissue	Sterile container	NA	Daily	7 days	
69	Culture & sensitivity tracheal aspirate	Microbiology	Tracheal aspirate	Sterile container	NA	Daily	3 days	
70	Culture & sensitivity umbilical stump	Microbiology	Umbilical swab	Amies transport media	NA	Daily	3 days	
71	Culture & sensitivity urethral swab	Microbiology	Urethral swab	Amies transport media with charcoal	NA	Daily	5 days	
72	Culture & sensitivity urine	Microbiology	Mid stream urine, suprapubic tap, catheterised urine	Urine container	NA	Daily	3 days	
73	Culture & sensitivity vitreous tap	Microbiology	Vitreous tap	Sterile container	NA	Daily	5 days/ 30 days for fungal culture on SDA	
74	Culture & sensitivity wound swab	Microbiology	Wound swab	Amies transport media	NA	Daily	3 days	

75	D-Dimer	Haematology	Plasma	Sodium citrate	1.8 ml – Adult 0.5 ml – Paed	Daily	3 hours	Spoken to MO Pathology
76	Dengue NS1/ IgG/ IgM	Microbiology	Serum	Plain tube/Gel tube	3-5 ml	Daily	1 day	Use PERPAT Form
77	Drug of Abuse (DOA) Screening - Morphine - Cannabinoids (THC) - Amphetamine - Methamphetamine	Chemical Pathology	Urine	Urine container	30 ml	Daily		<ul style="list-style-type: none"> • For Medical Checkup, Use UPD Form (2 copy) • For Clinical Testing Purpose, Use PERPAT Form
78	Emergency saline crossmatch	Transfusion	Blood	EDTA	3-5 ml	Daily	30 minutes	Borang Permohonan Transfusi Darah. Spoken to MO Blood Bank.
79	Emergency Uncrossmatched O Packed Cells (Safe O)	Transfusion	Blood	EDTA	3-5 ml	Daily	10 minutes	Only for Emergency Department. Borang Permohonan Transfusi Darah (PINK)
80	Erythrocyte Sedimentation Rate (ESR)	Haematology	Blood	ESR tube	1.2 ml	Daily	4 hours	

81	Fine Needle Aspiration Cytology (FNAC)	Kaunter Penerimaan & Outsource	Aspirated fluid	Slide and smear will be prepared by MLT	NA	Procedure done in clinic (working days)	10 working days (routine) 1-3 working days (urgent)	Contact the lab immediately after the patient is ready for procedure. Sample will be sent to HSB
82	Full Blood Count (FBC)	Haematology	Blood	EDTA	3 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 45 minutes (urgent)	
83	Full Blood Picture (FBP)	Haematology	Blood	EDTA	3 ml – Adult 0.5 ml – Paed	Daily	15 working days (routine) 24 hours (urgent)	Urgent test spoken to Haematologist Specialist
84	Fungal culture blood	Microbiology	Blood	BD Bactec MYCO/FLytic	1-5 ml	Daily	42 days	Please collect culture bottle from microbiology lab. Positive blood culture bottle will take additional 7-14 days for identification and antifungal susceptibility test (if indicated).

85	Fungal culture bone marrow	Microbiology	Bone marrow aspirate	BD Bactec MYCO/FLytic	5-10 ml	Daily	42 days	Please collect culture bottle from microbiology lab. Positive blood culture bottle will take additional 7-14 days for identification and antifungal susceptibility test (if indicated)
86	Fungal culture	Microbiology	CSF, bronchoalveolar lavage, sterile body fluids, corneal scraping, hair, nail, pus, peritoneal fluid, pleural fluid, skin, sputum, tissue, urine, vitreous tap, tracheal aspirate	Sterile container	3-5 ml	Daily	30 days	
87	G6PD Screening	Haematology	Blood	Filter Paper Whatman No.1 with blood spot	Cord/finger prick blood is placed on filter paper - about 20 cents point in size and dried	2 times daily (9 am and 3 pm)	24 hours	

88	Gentamicin	Chemical Pathology	Serum	Plain tube/Gel tube	4 ml	Weekdays (office hour)	6 hours	Use TDM form
89	Glucose, plasma <ul style="list-style-type: none"> Fasting Blood Sugar (FBS) Two hour post Prandal (2HPP) Random blood Sugar (RBS) 	Chemical Pathology	Plasma	Sodium flouride	2 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT form
90	Group & Cross Match (GXM)	Transfusion	Blood	EDTA tube	3-5 ml	Daily	2 hours	Borang Permohonan Transfusi Darah. Spoken to MO Blood Bank
91	Group & Cross Match (GXM) BABY	Transfusion	Blood	EDTA tube	Darah ibu: 3-5 ml Darah bayi : 1.5- 2ml	Daily	2 hours	Borang Permohonan Transfusi darah (Mother & Baby) separate form. Spoken to MO Blood Bank.
92	Group Screen & Hold (GSH)	Transfusion	Blood	EDTA tube	3-5 ml	Daily	2 hours	Borang Permohonan Transfusi Darah. Spoken to MO Blood Bank
93	HbA1c	Chemical Pathology	Blood	EDTA tube	3 ml	2 times per week	7 working days	Use PERPAT Form. Rejection criteria : *For patient age < 40 years,do not

								<p>send sample patient if previous request is less than 3 months. Retention time for subsequent testing is 3 month.</p> <p>*For patient age > 40 years, do not send sample less than 3 months if previous Hba1c (NGSP) result > 7%) Retention time for subsequent testing is 3 month.</p> <p>*For patient age > 40 years, do not send sample less than 6 months if previous Hba1c (NGSP) result < 7%). Retention time for subsequent testing is 6 month.</p>
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94	Investigation of Transfusion Reaction Post	Transfusion	Blood, urine	EDTA tube, sterile container	10 ml	Daily	10 working days	-Request Form Tranfusion Reaction Investigation (Blood & Blood Component) -Reporting Form for Transfusion Related Adverse Event Spoken to MO Blood Bank.
95	Lactate Dehydrogenase (LDH)	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT Form
96	Leptospira IgM	Microbiology	Serum	Plain tube/Gel tube	4 ml	Monday & Wednesday	5 working days	
97	Magnesium	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT Form
98	MERS-CoV PCR	Microbiology	Nasopharyngeal / throat swab	VTM	NA	Daily	48 hours	Spoken to Clinical Microbiologist. Sample received before 10am will be processed on the same day. Please collect MERS-CoV PCR kit from

								the lab.
99	Monkeypox PCR	Microbiology	Lesion swab, lesion crust, nasopharyngeal swab	Sterile container, VTM	NA	Daily	48 hours	Spoken to Clinical Microbiologist. Sample received before 10am will be processed on the same day. Please collect Mpox PCR kit from the lab.
100	MRSA screening	Microbiology	Nasal swab, axilla swab, groin swab, umbilical swab	Amies transport media	NA	Daily	3 days	
101	Mycobacterium C&S, blood	Microbiology	Blood	BD Bactec Myco-F lytic	1-5 ml	Daily	42 days	Please collect blood culture bottle from microbiology lab. Positive blood culture bottle will take additional incubation period of maximum 8 weeks.

102	Mycobacterium C&S, bone marrow	Microbiology	Bone marrow	BD Bactec Myco-F lytic	1-5 ml	Daily	42 days	Please collect blood culture bottle from microbiology lab. Positive blood culture bottle will take additional incubation period of maximum 8 Weeks.
103	Mycobacterium, Gene Xpert	Microbiology	Sputum, CSF, pericardial fluid, tissue, pus, gastric lavage	Sterile container	1 ml	Weekdays (office hour)	48 hours	Use TB Spoken to Clinical Microbiologist
104	<i>Mycobacterium leprae</i> Smear	Microbiology	Slit skin smear (done by Dermatology Clinic) (Maximum 3 smears in 1 slide, taken at 3 different sites)	Glass slide	NA	Weekdays (office hour)	5 working days	Please take note, minimum 3 different sites of slit skin smear has to be sent in 1 slide. If only 4 sites of slit skin is done, please send 1st slide containing 3 smears and 2nd slide containing 1 smear. Fill up LIS 102A form and send along with the sample.

105	Phosphate	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT Form
106	Potassium	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT Form
107	Prothrombin Time (PT)/INR	Haematology	Plasma	Sodium Citrate	1.8 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 1 hour (urgent)	Time dependent test. Please indicate time of blood collection and the treatment of anticoagulant given.
108	QIASTAT Respiratory SARS-CoV 2 Panel	Microbiology	Nasopharyngeal swab	UTM	NA		1. Working days (Cut off 3 pm) 2. Weekend (Cut off 1 pm)	Borang HSM/Patho/Molecular/Borang/Request/2021/V2. Spoken to Clinical Microbiologist.
109	QIASTAT Meningitidis Panel	Microbiology	CSF	Bijou bottle (sterile)	1 ml		1. Working days (Cut off 3 pm) 2. Weekend (Cut off 1 pm)	Use PERPAT Form. Spoken to Clinical Microbiologist.
110	Rapid Plasma Reagin (RPR)	Microbiology	Serum	Plain tube/Gel tube	3-5 ml	By batch (Monday & Wednesday)	5 days	Use PERPAT Form
111	Respiratory Viruses (Rapid test)	Microbiology	Nasopharyngeal swab / nasopharyngeal aspirate	Swab / Sterile container	1 ml	Daily	1 day	Spoken to Clinical Microbiologist. Use PERPAT form

112	Reticulocyte Count	Haematology	Blood	EDTA tube	3 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 45 minutes (urgent)	
113	Rotavirus antigen	Microbiology	Stool	Sterile container	NA	Weekdays (office hour)	3 days	Hard stool will be rejected.
114	Seminal fluid analysis	Microbiology	Seminal fluid	Sterile container	1 ml	Monday-Wednesday (8 am – 12 pm)	5 working days	
115	Sodium	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT Form
116	Stool for Occult Blood	Haematology	Stool	Stool container	NA	Weekdays (office hour)	24 hours	Please send immediately after collection.
117	Stool ova & cyst	Haematology	Stool	Stool container	NA	Weekdays (office hour)	1 day	Hard stool will be rejected.
118	Total Protein	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT Form
119	<i>Treponema pallidum</i> Particle Agglutination (TPPA)	Microbiology	Serum	Plain tube/Gel tube	3-5 ml	By batch (Monday & Wednesday)	5 days	
120	Triglycerides	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult	Daily	3 hours (routine) 90 minutes (urgent)	Patients are required to fast for at least 4 hours prior to blood collection.

121	Troponin I	Chemical Pathology	Serum	Plain tube/Gel tube	4 ml	Daily	60 minutes (urgent)	Use PERPAT Form. All request must be spoken with Specialist.
122	TSH (cord blood)	Chemical Pathology	Cord blood	Plain tube/Gel tube	3.5 ml	Daily	48 hours	Use Congenital Hypothyroidism Cord Blood Screening Test (HSM/O&G/011 Pin) - 2 copy
123	Urea	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT Form
124	Uric Acid	Chemical Pathology	Plasma	Lithium Heparin tube	4 ml – Adult 0.5 ml – Paed	Daily	3 hours (routine) 90 minutes (urgent)	Use PERPAT Form
125	Urine FEME - Glucose - Protein - Bilirubin - Urobilinogen - pH - Specific gravity - Blood - Ketones - Nitrate - Leucocytes	Haematology	Random Urine	Urine container	10 ml	Daily	3 hours (routine)	Use PERPAT Form
126	Vancomycin	Chemical Pathology	Serum	Plain tube/Gel tube	4 ml	Weekdays (office hour)	6 hours	Use TDM form

LIST OF OUTSOURCE TEST

Tarikh kemaskini 16.03.2025. *Setiap ujian yang memerlukan tarikh temujanji, sila maklumkan tarikh tersebut lebih awal kepada pihak makmal untuk urusan pos laju.

BIL.	TEST	SPECIMEN / VOLUME	TYPE OF CONTAINER	SCHEDULE	TAT	REMARKS
1.	(1,3) -Beta-D-Glucan Antigen Microbiology Lab	Serum (3-5 ml)	Plain tube	Upon request. Sample will be sent to referral lab twice a week (Monday & Wednesday)	7 working days	Outsource to Hospital Sungai Buloh. Please fill up PER-PAT 301 form in 3 carbon copies, countersigned by Specialist. Please inform microbiology lab prior to request. Request should be made by Anaesthetist (Intensivist) or ID Physician only.
2.	5-Hydroxy-Indol-Acetic Acid (5-HIAA), 24 H urine Chemical Pathology & Integrated Lab	24-hour urine (10 ml)	24-hr urine container with 10ml of 25% HCL (consult lab for the container)	Sample will be sent to referral lab twice a week (Monday & Wednesday)	22 working days	Outsource to IMR (Biochemistry Unit). Fill up Request Form for Biochemical Genetic Test and send along with the sample. Please state the 24-hour urine volume collected
3.	17-OH Progesterone (17-Hydroxy progesterone) Chemical Pathology & Integrated Lab	Serum (Minimum 50 ul serum)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	1 month	Outsource to Hospital Putrajaya. Fill up PER-PAT 301 request form and send along with the sample. Keep the specimen frozen or within 2-8°C during transportation.
4.	24H Urine Metanephrine Chemical Pathology & Integrated Lab	24H Urine (>750ml Urine (Adult))	24-hr urine container with 10ml of 25% HCL (consult lab for the container)	Sample will be sent to referral lab twice a week (Monday & Wednesday)	20 working days	*Currently test not offered Outsource to Hospital Kuala Lumpur. Fill up PER-PAT 301 request form and send along with the sample. Mandatory for Endocrinologist to screen and countersign form. Consult Chemical Pathologist prior to ordering.
5.	24H Urine Metanephrine Chemical Pathology & Integrated Lab	24H Urine (>750ml Urine (Adult))	24-hr urine container with 10ml of 25% HCL (consult lab for the container)	Sample will be sent to referral lab twice a week (Monday & Wednesday)	20 working days	*This test not in government centre. Need to pay (RM 220) to PPUM before sending sample. Attach resit along with sample.
6.	24H Urine Catecholamines Chemical Pathology & Integrated Lab	24H Urine (>750ml Urine (Adult))	24-hr urine container with 10ml of 25% HCL (consult lab for the container)	Sample will be sent to referral lab twice a week (Monday & Wednesday)	20 working days	*This test not in government centre. Need to pay (RM 170) to PPUM before sending sample. Attach resit along with sample.
7.	<i>Acanthamoeba spp</i> for microscopy Microbiology Lab	Corneal scraping, Contact lens, Contact lens suspension, Cerebrospinal fluid	Sterile container, contact lens storage, CSF container	Sample will be sent to referral lab twice a week (Monday & Wednesday)	2 weeks	Outsource to IMR-Please fill up PER-PAT 301 form. Medium in container: sterile distilled water or saline. Transport at room temperature.
8.	<i>Acanthamoeba spp</i> - Polymerase chain reaction (PCR) Microbiology Lab	Corneal scraping, contact lens, contact lens suspension, cerebrospinal fluid	Sterile container, contact lens storage, CSF container	Sample will be sent to referral lab twice a week (Monday & Wednesday)	2 weeks	Outsource to IMR. Please fill up PER-PAT 301 form. Medium in container: sterile distilled water or saline.
9.	Acetaminophen/	Serum	Gel Vacutainer/ Plain tube	Sample will be send to	1 hour	Outsource to Hospital Sultanah Bahiyah.

	Paracetamol Chemical Pathology & Integrated Lab	(3.5 ml)		referral lab three times a week (Sunday, Tuesday, Thursday)		
10.	Acid alpha glucosidase enzyme , Blood spot (POMPE) Chemical Pathology & Integrated Lab	Dried blood spot (3 circles of dried blood spot)	Whatmann 903 Filter paper	Sample will be sent to referral lab twice a week (Monday & Wednesday)	17 days	Outsource to IMR (Biochemistry Unit). Fill up Request Form for Biochemical Genetic Test. Ensure blood completely dried before putting in plastic sheet. Wet blood spot will be rejected
11.	Acute Flaccid Paralysis investigation - Stool for polio virus PCR/ virus isolation Microbiology Lab	Stool (preferred) (to collect within 14 days of onset, 2 adequate sample to collect in 24-48 hrs apart); N.B. Test requests for age >15 years old require consultation.) Stool: >5gm (thumb size),	Sterile container in ice for stool	Upon request. Sample will be sent to referral lab twice a week (Monday & Wednesday)	3-4 weeks	Outsource to IMR. Please fill up IMR Virology Test Request Form from Lab Orders. Contact 03-33628960 for consultation.
12.	Acylcarnitines, Blood Spot (High Risk for IEM Screening) Chemical Pathology & Integrated Lab	Blood spot (4 circles of 1 cm diameter of dried blood spot)	Whatman 903 filter paper	Sample will be sent to referral lab twice a week (Monday & Wednesday)	1 month	Outsource to Hospital Tuanku Azizah (Makmal genetik). Fill up HTA - IEM REQUEST FORM and send along with the sample. Ensure blood completely dried before putting in plastic sheet.
13.	ADAM TS -13 Activity and Inhibitor Haematology Lab	Plasma 1.8ml (Collect until indicated mark)	Trisodium Citrate tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday) Please inform lab the appointment date prior to send sample.	Batch test (4-6 weeks)	Please fill up Special Haematology Requisition Form, Hospital Ampang & indicate clinical history. Sample need to separate and frozen immediately. This sample must be send in dry ice. Need to post out to Hosp Ampang by HSB. Staff Lab need to Contact Science Officer in Hematology unit HSB.
14.	Adenosine Deaminase (ADA) Chemical Pathology & Integrated Lab	Pleural Fluid (3 ml - min: 1 ml)	Plain tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	7 working days	Outsource to MKA Ipoh . Collect 3 ml (min: 1 ml) pleural fluid in plain tube. DO NOT CENTRIFUGE. Fill up MKAK-BPU-01/Rev2018 request form and send along with the sample. Sample must be send in 48 hours. Keep sample at 2-8° C.
15.	Adenovirus F41 PCR Microbiology Lab	By consultation only.	By consultation only.	By consultation only. Please call IMR at 03-33628960/ 03-33628114	2 weeks	Acute Hepatitis of Unknown Origin in Children (age 1-18). Outsource to IMR. Please fill up IMR Virology Test Request Form from Lab Orders.

16.	Adenovirus PCR- Acute Respiratory Syndrome Microbiology Lab	Nasopharyngeal swab, nasopharyngeal aspirate, nasal swab, throat swab, throat gargle, bronchioalveolar lavage (BAL), sputum, organ biopsies	VTM (for swab), sterile container (for aspirate/ tissue) in ice	Sample will be sent to referral lab twice a week (Monday & Wednesday)	2 weeks	Outsource to IMR. Please fill up IMR Virology Test Request Form.
17.	Adrenocorticotrophic Hormone (ACTH) Chemical Pathology & Integrated Lab	Plasma (2 ml)	EDTA tube (pre-chilled the tube before taking the blood). Transport to lab in ice.	Sample will be sent to referral lab twice a week (Monday & Wednesday)	12 working day	Outsource to Hospital Kuala Lumpur. Fill up PER-PAT 301 request form and send along with the sample. Sample need to separate and freeze immediately after received in Lab.
18.	Alagille Syndrome (JAG1)- Deletion/ Duplication Chemical Pathology & Integrated Lab	Blood 2 – 5ml blood EDTA (1-2ml is acceptable for infants)/DNA	EDTA tube	By consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Send at ambient temperature. If >3 hours, keep sample cooled. Protect from freezing.
19.	Alagille Syndrome (JAG1)- Sequencing Chemical Pathology & Integrated Lab	Blood 2 – 5ml blood EDTA (1-2ml is acceptable for infants) /DNA	EDTA tube	By consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Send at ambient temperature. If >3 hours, keep sample cooled. Protect from freezing.
20.	Aldosterone Chemical Pathology & Integrated Lab	Plasma 3 ml (sample should be sent to the lab rapidly without ice within 30 minutes from the time blood is withdrawn).	EDTA tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	1 month	Outsource to Hospital Putrajaya. Fill up PER-PAT 301 request form and send along with the sample. Mandatory for Endocrinologist / Paediatrician to screen and countersign. Mandatory to write down patient's clinical history, drug history, latest potassium level. Sample need to separate and freeze immediately after received in Lab.
21.	Aldosterone Renin Ratio Chemical Pathology & Integrated Lab	Plasma 2 x 3 ml blood (sample should be sent to the lab rapidly without ice within 30 minutes from the time blood is withdrawn).	EDTA tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	1 month	Outsource to Hospital Putrajaya. Fill up PER-PAT 301 request form and send along with the sample. A single barcode should be reprinted twice for both the samples. Mandatory for Endocrinologist / Paediatrician to screen and countersign. Mandatory to write down patient's clinical history, drug history, latest potassium level. Sample need to separate and freeze immediately after received

						in Lab.
22.	Alexander Disease (GFAP sequence analysis) Chemical Pathology & Integrated Lab	Blood 2 – 5ml blood EDTA (1-2ml is acceptable for infants) /DNA	EDTA tube	By consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	3 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Send at ambient temperature. If >3 hours, keep sample cooled. Protect from freezing.
23.	Alpha-1-Antitrypsin (phenotyping) Chemical Pathology & Integrated Lab	Serum (1 - 3 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	1 month	Outsource to Hospital Ampang (Biochemistry Unit). Fill up PER-PAT 301 form and send along with the sample. MANDATORY RELEVANT CLINICAL INFORMATION
24.	Alpha-1-Antitrypsin (quantitation) Chemical Pathology & Integrated Lab	Serum (1-3 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	10 working days	Outsource to Hospital Kuala Lumpur. Fill up PER-PAT 301 form and send along with the sample. Send at room temperature. If >3 hours delay, keep sample cooled/ refrigerated. Please do not freeze the sample.
25.	*Alpha-Fetoprotein (AFP) Chemical Pathology & Integrated Lab	Serum/ plasma (3 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be sent to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED.
26.	Amino Acid, CSF Chemical Pathology & Integrated Lab	CSF (1 ml CSF & 2 ml plasma)	CSF container & Heparinised tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	20 working days	Outsource to Unit Biochemistry, SDC IMR Jalan Pahang KL. Fill up IEM request form and send along with the sample. Must send paired with plasma.
27.	Amino Acid, Plasma Chemical Pathology & Integrated Lab	Plasma (2 ml)	Heparinised tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	20 working days	Outsource to Unit Biochemistry, SDC IMR Jalan Pahang KL. Fill up IEM request form and send along with the sample.

28.	Amino Acid, Urine Chemical Pathology & Integrated Lab	Urine (3 ml - min: 1 ml)	Sterile Container/ Urine container	. By consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	20 working days	Outsource to Unit Biochemistry, SDC IMR Jalan Pahang KL. Fill up IEM request form. MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED.
29.	Ammonia Chemical Pathology & Integrated Lab	Plasma 4 ml (Adult) 500uL (Paeds)	Heparinised tube. Transport to lab in ice.	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 Working days	Outsource to Hospital Sultanah Bahiyah. Sample should be sent to laboratory within 15 minutes of sample collection. Stability sample (up to 3 weeks in - 20 celcius). Sample need to separate and freeze immediately after received in Lab. Transport to HSB in freeze packaging.
30.	Amoebiasis antibody (<i>Entamoeba histolytica</i> IgG) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	4 weeks	Outsource to IMR. Please fill up PER-PAT 301 form.
31.	*Amylase Chemical Pathology & Integrated Lab	24-hr urine/ Random 24 hrs urine/ Random urine ... Body fluid (4ml)	24-hr urine container / Sterile container/Urine container ... Sterile Container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	Outsource to Hospital Sultanah Bahiyah. For 24 hr urine amylase, volume need to be stated
32.	Angelman Syndrome (SNRPN Methylation & Gene Dosage Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease
33.	Angelman Syndrome (UBE3A Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective

						disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
34.	<p>Angelman Syndrome (Uniparental Disomy & Imprinting Defect Analysis)</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Blood</p> <p>2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA</p>	EDTA tube	<p>Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)</p>	5 months	<p>Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. FOR GOVERNMENT HOSPITALS ONLY (COMPULSORY TO SEND PROBAND AND BOTH BIOLOGICAL PARENTAL SAMPLES).</p>
35.	<p>Anti Acetylcholine Receptor (ACR) Antibody</p> <p>Microbiology Lab</p>	<p>Serum</p> <p>(3-5 ml)</p>	Plain tube/ Gel tube	<p>Sample will be sent to referral lab twice a week (Monday & Wednesday)</p>	4-6 weeks	<p>Outsource to IMR. Please fill up IMR Autoimmune Request Form from Lab Orders.</p>
36.	<p>Anti Aquaporin 4 (Aq4)</p> <p>Microbiology Lab</p>	<p>Serum, CSF</p> <p>(3-5 ml/ NA)</p>	Plain tube/ Gel tube, CSF container	<p>Sample will be sent to referral lab twice a week (Monday & Wednesday)</p>	3 weeks	<p>Outsource to IMR. Please fill up IMR Autoimmune Request Form from Lab Orders.</p>
37.	<p>Anti-Cyclic Citrullinated Peptide (CCP)</p> <p>Microbiology Lab</p>	<p>Serum</p> <p>(3-5 ml)</p>	Plain tube/ Gel tube	<p>Sample will be sent to referral lab twice a week (Monday & Wednesday)</p>	4 weeks	<p>Outsource to H. Tuanku Fauziah. Please fill up PER-PAT 301 form.</p>
38.	<p>Anti Double Stranded DNA (Anti dsDNA)</p> <p>Microbiology Lab</p>	<p>Serum</p> <p>(3-5 ml)</p>	Plain tube/ Gel tube	<p>Sample will be sent to referral lab twice a week (Monday & Wednesday)</p>	4 weeks	<p>Only done when ANA is positive with homogenous pattern; or on special request. Outsource to H. Tuanku Fauziah.</p>
39.	<p>Anti Glomerular Basement Membrane antibody (Goodpasture's syndrome)</p> <p>Microbiology Lab</p>	<p>Serum</p> <p>(3-5 ml)</p>	Plain tube/ Gel tube	<p>Sample will be sent to referral lab twice a week (Monday & Wednesday)</p>	3 weeks	<p>Outsource to IMR. Please fill up IMR Autoimmune Request Form from Lab Orders.</p>

40.	Anti Mullerian Hormone Assay Chemical Pathology & Integrated Lab	Serum (2-3 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	20 working days	Outsource to Endocrine Unit, Specialised Diagnostic Centre, IMR. Fill up endocrine form Endocrine Request Form or PER PAT 301 Form and send along with the sample. Mandatory to be REQUESTED ONLY by Specialist from Infertility Clinic/ O&G.
41.	*Anti <i>Mycoplasma pneumoniae</i> total Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah.
42.	Anti N-methyl-D-aspartate receptor (NMDAR) Microbiology Lab	Serum, CSF (3-5 ml/ NA)	Plain tube/ Gel tube, CSF container	Sample will be sent to referral lab twice a week (Monday & Wednesday)	3 weeks	Outsource to IMR. Please fill up IMR Autoimmune Request Form from Lab Orders.
43.	Antinuclear antibody (ANA) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	4 weeks	Request must be authorized by Specialist . Outsource to H.TuanKu Fauziah. Please fill up PER-PAT 301 form
44.	Anti-phospholipase A ₂ receptor antibody (Anti-PLA2R) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	4-5 weeks	Outsource to IMR. Please fill up IMR Autoimmune Request Form.
45.	Anti-Platelet antibody Haematology Lab	Blood Case NAIT Baby : 1 ml EDTA Mother: 10 ml EDTA (4 tubes), 10 ml plain tube/gel tube (4 tubes) Father: 10 ml EDTA (4 tubes) Adult and paediatric cases 15 ml EDTA (6 tubes) 10 ml plain tube/gel tube (4 tubes)	Plain tube EDTA	By appointment 03-26955572	2 weeks	Please fill up PER-PAT 301 form & indicate clinical history. Outsource to Imunohematologi PDN, Kuala Lumpur.
46.	Anti-Thyroglobulin Antibody (ANTGLO) Chemical Pathology & Integrated Lab	Serum (3 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	2 weeks	Outsource to Hospital Pulau Pinang. Fill up PER-PAT 301 request form and send along with the sample. Please provide relevant clinical history and latest TFT result in the PER-PAT 301 form.

47.	Anti-Thyroid Peroxidase / Anti-Thyroid Microsomal Antibody (ATMA) Chemical Pathology & Integrated Lab	Serum (3 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	2 weeks	Outsource to Hospital Pulau Pinang. Fill up PER-PAT 301 request form and send along with the sample. Please provide relevant clinical history and latest TFT result in the PER-PAT 301 form.
48.	Anti TSH Receptor Antibody Chemical Pathology & Integrated Lab	Serum (3-5 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	1 month	Outsource to HKL (Biochemistry Unit). Fill up PER-PAT 301 request form and send along with the sample. Please provide relevant clinical history and latest TFT result. MANDATORY AUTHORIZATION BY ENDOCRINOLOGIST IS REQUIRED.
49.	Anti-Xa Haematology Lab	Plasma (Collect until indicated mark)	Trisodium Citrate 3.2 % tube	By appointment. Sample should be received on the same day 03-42896461 Please inform lab the appointment date prior to send sample.	2 days	Please fill up Special Haematology Requisition Form, Hospital Ampang & indicate clinical history. Sample need to separate and frozen immediately. This sample must be send in dry ice. Need to post out to Hosp Ampang by HSB. Staff Lab need to Contact Science Officer in Hematology unit HSB.
50.	Argininosuccinate Lyase Deficiency (ASL Sequence Analysis) (Argininosuccinic aciduria) : (ASL) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
51.	Argininosuccinic Acid Chemical Pathology & Integrated Lab	Random Urine (2 ml urine)	Clean Universal bottle	Sample will be sent to referral lab twice a week (Monday & Wednesday)	17 working days	Outsource to IMR (Biochemistry Unit). Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Transport FROZEN
52.	Aromatic Amino Acid Decarboxylase Deficiency : (DDC)	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES

	Chemical Pathology & Integrated Lab					(IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
53.	Array CGH Haematology Lab	Blood (6ml)	EDTA	By consultation only	180 days	Need to consult geneticist (Klinik Genetik HKL/HPP Use cytogenetic request form from HTA/PATH.GEN/01-2021. Outsource to HospitalTunku Azizah (Unit Molekular Genetik): 03-2600300 ext 1134 - For Syndromic cases (by appointment).
54.	Argininosuccinate Synthase Deficiency (ASS1) (Urea Cycle Defect) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
55.	Aspergillus galactomannan antigen Microbiology Lab	Serum/ bronchoalveolar lavage (BAL) (3-5 ml/ NA)	Plain tube/ Gel tube, Sterile container	Sample will be sent to referral lab twice a week (Monday & Wednesday)	9 working days	Outsource to Hospital Seberang Jaya, Pulau Pinang.
56.	Avian Influenza (H5, H7, H9) PCR/ virus isolation Microbiology Lab	After consultation ONLY	After consultation ONLY	After consultation ONLY	After consultation ONLY	Please call IMR at 03-33628960/ 03-33628114
57.	Bartonella serology Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	3 weeks	Outsource to H.Sg Buloh. Please fill up PER PAT-301 form (3 carbon copies), countersigned by Specialist.

58.	BCR-ABL1 Qualitative Haematology Lab	Blood 4-6 ml blood/2-3ml BMA (Stated type of sample clearly)	EDTA	Sample will be sent to referral lab twice a week (Monday & Wednesday)	21 days	Outsource to Makmal Hematologi, Jabatan Patologi, Hospital Tunku Azizah. Fill up PER-PAT 301 request form and send along with the sample. For new case Chronic Myeloid Leukaemia
59.	BCR-ABL1 Quantitation Haematology Lab	6 ml blood	EDTA	Sample will be sent to referral lab twice a week (Monday & Wednesday)	21 days	Outsource to Makmal Hematologi, Jabatan Patologi, Hospital Tunku Azizah. Fill up PER-PAT 301 request form and send along with the sample. Date and time of sample collection must be written clearly in the request form. A repeated test must not less than 6 months from the previous order.
60.	BCR-ABL1 Qualitative BCR-ABL1 (*for suspected CML case only) Haematology Lab	6ml Blood before starting therapy / 2-3ml BMA (acceptable) (Stated type of sample clearly)	EDTA	Sample will be sent to referral lab twice a week (Monday & Wednesday)	4 weeks	Outsource to Makmal Molecular Diagnostics (Haematology) Unit Hospital Ampang Transport samples without delay preferably within 24 hours at room temperature. DO NOT freeze specimens.
61.	BCR-ABL1 Quantitative (*CML AND Ph+ve ALL/AML case) Haematology Lab	12ml Blood (preferred) / 2-3ml BMA	EDTA	Sample will be sent to referral lab twice a week (Monday & Wednesday)	6 weeks	Outsource to Makmal Molecular Diagnostics (Haematology) Unit Hospital Ampang Transport samples without delay preferably within 24 hours at room temperature. DO NOT freeze specimens.
62.	Minor BCRABL1 Haematology Lab	2-3ml BMA	EDTA	Sample will be sent to referral lab twice a week (Monday & Wednesday)	6 weeks	Outsource to Makmal Molecular Diagnostics (Haematology) Unit Hospital Ampang Transport samples without delay preferably within 24 hours at room temperature. DO NOT freeze specimens.
63.	Benzodiazepine Chemical Pathology & Integrated Lab	Blood (3 ml)	Plain tube without gel (request from Lab)	Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 working days	Outsource to HKL. This is blood for toxicology test. Fill up TDM form in two copies with relevant clinical history and send along with sample.

64.	Berardinelli Congenital Lipodystrophy (AGPAT2) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
65.	Berardinelli Congenital Lipodystrophy (BSCL2) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
66.	Beta-2 Glycoprotein-1 (IgM / IgG) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	4 weeks	Outsource to H. Tuanku Fauziah. Please fill up PER-PAT 301 form.
67.	*Beta Human Chorionic Gonadotropin (BHCG) Chemical Pathology & Integrated Lab	Serum/ plasma (3 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
68.	Beta-2 Microglobulin Chemical Pathology & Integrated Lab	Serum (3 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	14 working days	Outsource to Hospital Ampang. Fill up PER-PAT 301 form and send along with the sample.
69.	Biogenic Amines, CSF Neurotransmitter Chemical Pathology & Integrated Lab	CSF (2 ml)	Clean tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	22 working days	Outsource to IMR (Biochemistry Unit). Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Cover from light. Transport FROZEN (easily destroyed by heat).
70.	Biogenic Amines, Urine Neurotransmitter	Random urine (2 ml)	Clean universal bottle	Sample will be sent to referral lab twice a week (Monday & Wednesday)	22 working days	Outsource to IMR (Biochemistry Unit). Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Cover from light. Transport FROZEN

	Chemical Pathology & Integrated Lab					(easily destroyed by heat).
71.	Biotinidase Deficiency : (BTD) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
72.	Biotinidase enzyme (BIOTIN), Blood spot Chemical Pathology & Integrated Lab	Dried blood spot (DBS) in filter paper (3 circles of DBS)	Whatmann 903 Filter paper	Sample will be sent to referral lab twice a week (Monday & Wednesday)	21 working days	Outsource to IMR (Biochemistry Unit). Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Ensure blood completely air dried (at least 4 hours) before sealed. • If unable to reach IMR lab WITHIN 2 DAYS from collection, please keep and transport chilled (with dessicant); • Humidity and extreme temperature may influence the stability of analyte.
73.	BK/ JC virus PCR Microbiology Lab	Plasma,CSF, urine (3-5 ml/ 20-30 ml)	EDTA tube, CSF container, sterile container	Sample will be sent to referral lab twice a week (Monday & Wednesday)	2 weeks	Outsource to H.Sg Buloh. Please fill up PER PAT-301 form (3 carbon copies)
74.	Blood Film For Trypanosoma Microbiology Lab	Plasma/ blood film (2.5 ml/ NA)	Whole blood in EDTA, Thick blood film, Lymph node film	Sample will be sent to referral lab twice a week (in ice) (Monday & Wednesday)	2 weeks	Outsource to IMR. Please fill up PER-PAT 301 form.
75.	Body fluid albumin Chemical Pathology & Integrated Lab	Body fluid (Result of same day paired serum/plasma sample is needed for body fluid result interpretation) (3 ml)	Sterile container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	Outsource to Hospital Sultanah Bahiyah. The reference range and performance specifications have not been established/ verified for this body fluid. Result must be incorporated into the clinical context for interpretation.
76.	Body fluid amylase Chemical Pathology & Integrated Lab	Pleural fluid/ Peritoneal fluid (Result of same day paired serum/plasma sample is needed for body fluid result interpretation)	Sterile container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	Outsource to Hospital Sultanah Bahiyah. The reference range and performance specifications have not been established/ verified for this body fluid. Result must be incorporated into the clinical context for interpretation.

		(3 ml)				
77.	<p>Body fluid biochemistry Profile Tests includes: Total Protein LDH Glucose Albumin</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Pleural fluid/ Peritoneal fluid (Result of same day paired serum/plasma sample is needed for body fluid result interpretation)</p> <p>(3 ml)</p>	Sterile container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	<p>Outsource to Hospital Sultanah Bahiyah. Consultation with Chemical Pathologist is required for non-listed tests and/or body fluid type.</p> <p>The reference range and performance specifications have not been established/ verified for this body fluid. Result must be incorporated into the clinical context for interpretation.</p>
78.	<p>Body fluid creatinine</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Body fluid (Result of same day paired serum/plasma sample is needed for body fluid result interpretation)\</p> <p>(3 ml)</p>	Sterile container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	<p>Outsource to Hospital Sultanah Bahiyah. The reference range and performance specifications have not been established/verified for this body fluid. Result must be incorporated into the clinical context for interpretation.</p>
79.	<p>Body fluid glucose</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Body fluid (Result of same day paired serum/plasma sample is needed for body fluid result interpretation)</p> <p>(3 ml)</p>	Sterile container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	<p>Outsource to Hospital Sultanah Bahiyah. The reference range and performance specifications have not been established/ verified for this body fluid. Result must be incorporated into the clinical context for interpretation.</p>
80.	<p>Body fluid lipid profile tests includes: Triglycerides Total Cholesterol</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Pleural fluid/ Peritoneal fluid</p> <p>(3 ml)</p>	Sterile container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	<p>Outsource to Hospital Sultanah Bahiyah. The reference range and performance specifications have not been established/ verified for this body fluid. Result must be incorporated into the clinical context for interpretation.</p>

81.	<p>Body fluid pH</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Pleural fluid (Other body fluid is not recommended)</p> <p>(1 ml)</p>	<p>Syringe with stopper/ cap (anaerobic collection)</p>	<p>Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)</p>	<p>2 working days</p>	<p>Outsource to Hospital Sultanah Bahiyah. The reference range and performance specifications have not been established/ verified for this body fluid. Result must be incorporated into the clinical context for interpretation.</p>
82.	<p>Body fluid total bilirubin</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Body fluid (Result of same day paired serum/ plasma sample is needed for body fluid result interpretation)</p> <p>(3 ml)</p>	<p>Sterile container</p>	<p>Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)</p>	<p>2 working days</p>	<p>Outsource to Hospital Sultanah Bahiyah. The reference range and performance specifications have not been established/ verified for this body fluid. Result must be incorporated into the clinical context for interpretation.</p>
83.	<p>Body fluid urea</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Body fluid (Result of same day paired serum/ plasma sample is needed for body fluid result interpretation)</p> <p>(3 ml)</p>	<p>Sterile container</p>	<p>Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)</p>	<p>2 working days</p>	<p>Outsource to Hospital Sultanah Bahiyah. The reference range and performance specifications have not been established/ verified for this body fluid. Result must be incorporated into the clinical context for interpretation.</p>
84.	<p>Body fluid uric acid</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Body fluid (Result of same day paired serum/ plasma sample is needed for body fluid result interpretation)</p> <p>(3 ml)</p>	<p>Sterile container</p>	<p>Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)</p>	<p>2 working days</p>	<p>Outsource to Hospital Sultanah Bahiyah. The reference range and performance specifications have not been established/verified for this body fluid. Result must be incorporated into the clinical context for interpretation.</p>

85.	*Bone Marow Aspiration dan Trepine biopsy (BMAT) Haematology Lab	Bone marrow	NA	By appointment	Urgent: 3 days Routine:7 days Trepine biopsy: 14 days Trepine require 2 nd opinion/complicated case: -30days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. Ward must make sure all the preparations for BMAT procedure is complete to avoid delay of sample collection.
86.	<i>Borrelia burgdorferi</i> IgG/ IgM - Lyme's disease Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	3 weeks	Outsource to H.Sg Buloh. Please fill up PER PAT-301 form (3 carbon copies)
87.	Bronchial brushing and other endoscopic brushing cytology Cytology Lab	Bronchial brushing and other endoscopic brushing (Non-gynae) Minimum 2 slides	Smear on slide	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days for URGENT case 14 days for ROUTINE case	Outsource to Hospital Sultanah Bahiyah. Immediately place the smear (on slide) in the alcohol 95% fixative for 30 minutes or spray with alcohol 95%. The smear will dry and not be suitable for microscopic examination if it is not fixed in time. Each slide must be labeled with patient's name and IC number. Please fill up PER-PAT 301 form.
88.	Bronchial washing / fluid trap cytology Cytology Lab	Bronchial washing / fluid trap (Non-gynae) Approximately 20 ml	Sterile container (without fixative)	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days for URGENT case 14 days for ROUTINE case	Outsource to Hospital Sultanah Bahiyah. Send to the lab immediately. If unable to do so, please refrigerate at 2-8°C. DO NOT FREEZE. Please fill up PER-PAT 301 form.
89.	Bronchoalveolar lavage cytology Cytology Lab	Bronchoalveolar lavage (Non-gynae) Approximately 20 ml	Sterile container (without fixative)	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days for URGENT case 14 days for ROUTINE case	Outsource to Hospital Sultanah Bahiyah. Send to the lab immediately. If unable to do so, please refrigerate at 2-8°C. DO NOT FREEZE. Please fill up PER-PAT 301 form.
90.	Brucella PCR Microbiology Lab	Blood (3-5 ml)	EDTA tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	2 weeks	Must be fresh specimen. Laboratory must be informed prior to sending sample. Outsource to IMR. Please fill up Brucella Request Form IMR/IDRC/BACT/BRUCE/02.
91.	Brucella serology	Serum	Gel tube	Sample will be sent to	3 weeks	Outsource to IMR. Please fill up Brucella Request

	Microbiology Lab	(3-5 ml)		referral lab twice a week (Monday & Wednesday)		Form IMR/IDRC/BACT/BRUCE/02
92.	Bruton Tyrosine Kinase (BTK) protein detection Microbiology Lab	Plasma (2.5 ml)	EDTA	By consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	3 weeks	Outsource to IMR. By appointment and consultation only (A mother's blood is required to assist with interpretation). Screening result MUST show Absence or less than 2% CD19+ B cells and Low serum antibodies, reduced BTK protein expression. Please fill up PID Request Form. Please call IMR at 03-3362 8386/ 03-33627412/ 03- 33627746/ 03-33627747/ 03-33627406/03-33628815/ 03-33627523
93.	CA 125 Chemical Pathology & Integrated Lab	Serum/ plasma (3 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED.
94.	CA 15-3 Chemical Pathology & Integrated Lab	Serum (3 ml)	Gel vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	1 month	Outsource to HKL (Toxicology Unit). Fill up PER-PAT 301 request form and send along with the sample.
95.	CA 19-9 Chemical Pathology & Integrated Lab	Serum/ plasma (3 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED
96.	Caeruloplasmin Chemical Pathology & Integrated Lab	Serum (3 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	12 working days	Outsource to Hospital Kuala Lumpur. Fill up PER-PAT 301 request form and send along with the sample.
97.	Calreticulin (Exon 9) Haematology Lab	Blood (peripheral blood or BMA) Minimum: 1-2 ml (BMA) Minimum: 5 ml (peripheral blood)	EDTA tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	2 months	Use Hospital Ampang request form. Transport samples without delay preferably within 24 hours at room temperature. Do not freeze samples (03-42896056)

98.	Canavan Disease : (ASPA Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
99.	Carbamazepine Chemical Pathology & Integrated Lab	Serum (3.5 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	2 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up TDM request form.
100.	Carbamoyl Phosphate Synthetase 1 Deficiency (CPS1) Deficiency (CPS1 Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
101.	*Carcinoembryonic Antigen (CEA) Chemical Pathology & Integrated Lab	Serum/ plasma (3 ml)	Gel Vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED
102.	Cardiolipin Antibody Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	4 weeks	Outsource to H Tuanku Fauziah. Please fill up PER-PAT 301 form.

103.	Carnitine-Acylcarnitine Translocase Deficiency : (SLC25A20 Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
104.	Carnitine Palmitoyltransferase 1 (CPT1) Deficiency (CPT1A Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
105.	Carnitine Palmitoyltransferase 2 (CPT2) Deficiency (CPT2 Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.

106.	Carnitine (Total and Free) Chemical Pathology & Integrated Lab	Plasma/Serum (3-5 ml)	Heparinised Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	14 working days	Outsource to IMR (Biochemistry Unit). Fill up request Form for Biochemical Genetic Tests and send along with the sample. Sample need to separate and freeze immediately after received in Lab. Transport FROZEN
107.	Carnitine Uptake Deficiency : (<i>OCTN2</i> Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
108.	CD4	Blood (2-3 ml)	EDTA tube		2 working days	Outsource to KK Kuah. Need spoken to FMS KK Kuah. Sample must reach lab before 11.00 am (Monday, Tuesday and Wednesday only). Fill up PER-PAT 301 form
109.	CD4/ CD8 count Haematology Lab	Blood (2-3 ml)	EDTA	By appointment. Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 days	Outsource to Hospital Sultanah Bahiyah. Test done on Sunday and Tuesday only. Please send fresh sample (within 24-hour of blood collection)
110.	Cerebral Autosomal Dominant Arteriopathy with Subcortical Infarcts and Leukoencephalopathy CADASIL(<i>NOTCH3</i>)-Hotspots Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	. Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.

111.	Cerebrospinal fluid (CSF) cytology Cytology Lab	CSF (Non-gynae) (Minimum 0.5 ml)	CSF container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days for URGENT case	Outsource to Hospital Sultanah Bahiyah. Send to the lab immediately. If unable to do so, please refrigerate at 2-8°C. DO NOT FREEZE. Please fill up PER-PAT 301 form.
112.	Chikugunya PCR Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	4 weeks	Outsource to MKAK-Please fill up Borang Ujian Permohonan Makmal (specimen klinikal) from Lab Orders. Specimen should be collected ≤ 5 days after onset of illness. A brief concise history of illness and physical findings is required.
113.	Chloride Chemical Pathology & Integrated Lab	24-hr urine/ Random 24 hrs urine/ Random urine ... Vitreous humor 3.5 ml	24-hr urine container/ Sterile container ... Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days ... 5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
114.	Cholesterol, total Chemical Pathology & Integrated Lab	Body fluid 3 ml	Sterile container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
115.	Cholinesterase Chemical Pathology & Integrated Lab	Serum/ plasma (3.5 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	1 day (urgent request) 5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.

116.	Chromosome/ Cytogenetic Analysis Haematology Lab	Blood (2-3 ml)	Sodium heparin tube	By appointment with payment to IPPT Bertam (RM 125)	Urgent: 4 weeks Routine: 2 months	Outsource to Advance Diagnostic Lab, IPPT, Bertam USM. Please call 04-5622292 or 04-5622293. Sample must be received on the same day of blood collection.
117.	Chromosome/ Cytogenetic Analysis for Leukemia Cases (Bone Marrow Aspirate): • Philadelphia Chromosome t(9:22) • t(15;17) Haematology Lab	Bone marrow aspirate (2-3 ml) Blood (4 ml)	Sodium heparin tube	By appointment	18 working days	Outsource to Unit Cytogenetik, Makmal Hematologi, Hospital Balik Pulau. Fill up bone marrow cytogenetic form (HPP/ PAT/ HM/ SD/ 151). Authorization by specialist is required.
118.	Chromosome/ Cytogenetic Analysis (Blood): Chimerism Haematology Lab	Blood (10 ml)	Sodium Heparin	Sample will be sent to referral lab twice a week (Monday & Wednesday)	18 working days	Use Hospital Ampang request form. Transport samples without delay preferably within 24 hours at room temperature. (03-42896055) Outsource to Hospital Ampang.
119.	Chimerism Pre and post transplant Haematology Lab	Blood (10 – 20 ml)	EDTA	Sample will be sent to referral lab twice a week (Monday & Wednesday)	30 working days	Use Chimerism Analysis Request form (Version 3.0) The recipient pre-HSCT sample and donor sample are required for this analysis. The recipient sample should be collected prior to conditioning Outsource to IMR (NIH Setia Alam)
120.	Chromosome/ Cytogenetic Analysis (Blood): Hypereosinophilia Haematology Lab	Blood (12 ml)	Sodium Heparin	Sample will be sent to referral lab twice a week (Monday & Wednesday)		Use Hospital Ampang request form. Outsource to Hospital Ampang.

121.	<p>Chromosome/ Cytogenetic Analysis (Blood):</p> <p>Pediatric cases: e.g Edward Syndrome Patau Syndrome Ambiguous Genitalia</p> <p>Adult cases: e.g Recurrent Abortion • Karyotyping of chromosome + FISH study</p> <p>Haematology Lab</p>	<p>Blood</p> <p>(5 ml)</p>	<p>Lithium heparin tube</p>	<p>By appointment 03-26003000</p>	<p>Urgent : 10 working days</p> <p>Routine : 30-60 days</p>	<p>Use cytogenetic request form (HTA/PATH.GEN/01-2021)</p> <p>Outsource to Hospital Tunku Azizah (Unit Makmal Genetik, Jabatan Patologi, HTA): 03-26003000ext1144</p>
122.	<p>Citrin Deficiency :(Type II Citrullinemia) (LR-PCR & SLC25A13 Sequence Analysis)</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Blood</p> <p>2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA</p>	<p>EDTA tube</p>	<p>Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)</p>	<p>5 months</p>	<p>Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.</p>
123.	<p>CKMB</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Plasma/ serum</p> <p>(4 ml)</p>	<p>Heparinised tube or Gel vacutainer/ Plain tube</p>	<p>Active by consultation only. Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)</p>	<p>1 working days</p>	<p>Outsource to Hospital Sultanah Bahiyah. It is not recommended to use different types of tube interchangeably when monitoring same patient. For internal patients (HSB) and offered for Cardiology Department only. For request other than Cardiology Department, please consult Chemical Pathologist at ext 6766</p>

124.	Classical Galactosemia : (GALT Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	. Active by consultation only. Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
125.	Coeliac Anti Endomysium, Coeliac Anti Gliadin, Coeliac Anti Tissue Transglutaminase/ tTG (coeliac antibodies) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	5 weeks	Outsource to IMR. Please fill up IMR Autoimmune Request form.
126.	*Complements: C3 C4 Chemical Pathology & Integrated Lab	Plasma (3.5 ml)	Gel vacutainer/ Plain tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED
127.	Copper, blood Chemical Pathology & Integrated Lab	Serum 2 ml serum	Plain tube without gel (request from Lab)	Sample will be sent to referral lab twice a week (Monday & Wednesday)	30 working days	Outsource to Hospital Selayang. Fill up PER-PAT 301 request form and send along with the sample. Samples must be collected using an appropriate container, free of heavy metal or trace elements. Authorization by specialist is required. Keep sample frozen
128.	Copper, urine Chemical Pathology & Integrated Lab	24 hrs urine (>500 ml)	24-hour urine container without preservative.	Sample will be sent to referral lab twice a week (Monday & Wednesday)	30 working days	Outsource to Hospital Selayang. Fill up PER-PAT 301 request form and send along with the sample. Samples must be collected using an appropriate container, free of heavy metal or trace elements. Authorization by specialist is required. Keep sample frozen.
129.	Cortisol	Serum (3.5 ml)	Gel vacutainer/ Plain tube	Sample will be send to referral lab three times a week (Sunday, Tuesday,	1 day (urgent request) 3 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form

	Chemical Pathology & Integrated Lab			Thursday)		
130.	Cortisol, urine Chemical Pathology & Integrated Lab	24 hrs urine (24-hr urine collection)	24-hr urine container without preservative	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form
131.	Covid-19 Genome Sequencing Microbiology Lab	Nasopharyngeal swab/ oropharyngeal swab (same sample sent for SARS-CoV2 PCR)				Test offered as surveillance only, for positive cases with Ct value of <33.
132.	Coxiella IgG Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	3 weeks	Outsource to H.Sg Buloh. Please fill up PER PAT-301 form (3 carbon copies) countersigned by Specialist.
133.	Coxiella IgM Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	3 weeks	Outsource to H.Sg Buloh. Please fill up PER PAT-301 form (3 carbon copies) countersigned by Specialist.
134.	C-Peptide Chemical Pathology & Integrated Lab	Serum (3.5 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	11 working day	Outsource to Hospital Kuala Lumpur. Fill up PER-PAT 301 request form and send along with the sample.
135.	Creatine & Guanidino acetate, Dried Blood Spot Chemical Pathology & Integrated Lab	Dried Blood Spot (3 circles)	Filter Paper Whatman No.1 with blood spot	Sample will be sent to referral lab twice a week (Monday & Wednesday)	22 working days	This test is outsourced to IMR. Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Send at ambient temperature. Ensure blood completely air dried (at least 4 hours) • PREFERABLY keep and transport chilled (with dessicant); may transport at room temperature if send WITHIN 2 days from collection • Humidity and extreme temperature may influence the stability of analyte
136.	Creatine & Guanidino acetate, Plasma Chemical Pathology & Integrated Lab	Plasma/ Serum (2-3ml)	EDTA/ Heparinised tube/ Plain tube	Sample will be sent to referral lab twice a week (Monday & Wednesday)	22 working days	This test is outsourced to IMR. Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Transport FROZEN Separate plasma immediately.
137.	Creatine & Guanidino acetate, urine Chemical Pathology & Integrated Lab	Random urine (2ml)	Clean Universal bottle	Sample will be sent to referral lab twice a week (Monday & Wednesday)	22 working days	This test is outsourced to IMR. Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Transport FROZEN
138.	*Creatinine	24-hr urine 24-hr urine .. Vitreous humor	24 hrs urine container .. Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days ... 5 working days ...	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.

	Chemical Pathology & Integrated Lab	(3.5 ml) .. Dialysate (10 ml)	.. Urine container		2 days	
139.	Creatinine Clearance Chemical Pathology & Integrated Lab	24 hrs urine 24-hr urine & 4 ml blood	24-hr urine container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
140.	CSF Lactate Chemical Pathology & Integrated Lab	CSF (1-2 ml)	CSF container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	1 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. The reference range and performance specifications have not been established/verified for lactate CSF. Result must be incorporated into the clinical context for interpretation.
141.	CSF VDRL Microbiology Lab	CSF (1-3 ml)	CSF container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	7 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. Please note result serum RPR/TPPA in form. Test offered for patients with positive RPR/ TPPA test.
142.	Cyclosporine Chemical Pathology & Integrated Lab	Whole blood (2.5 ml)	EDTA	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 week	Outsource to Hospital Pulau Pinang. Pack in dark container. Please fill up TDM REQUEST form and send along with the sample.
143.	Cyst fluids/ fluid from chest tube and etc cytology Cytology Lab	Cyst fluids/ fluid from chest tube (Non-gynae) (Approximately 20 ml)	Sterile container (without fixative)	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days for URGENT case 14 days for ROUTINE case	Outsource to Hospital Sultanah Bahiyah. Send to the lab immediately. If unable to do so, please refrigate at 2-8°C. DO NOT FREEZE. Please fill up PER-PAT 301 form.
144.	Cysticercosis antibody (Taenia IgG antibody) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Outsource to IMR. Please fill up PER-PAT 301 form.
145.	Cystine Chemical Pathology & Integrated Lab	Urine (2-3 ml)	Urine container (protect from light)	Sample will be sent to referral lab twice a week (Monday and Wednesday)	21 working days	Outsource to Hospital Tunku Azizah. Fill up PER-PAT 301 request form and send along with the sample. FROZEN immediately if > 4 hours. Transport FROZEN
146.	Cystine & Homocystine, urine Chemical Pathology & Integrated Lab	Random Urine (2 ml)	Clean universal bottle	Sample will be sent to referral lab twice a week (Monday and Wednesday)	17 working days	This test is outsourced to IMR. Fill up Request Form for Biochemical Genetic Tests and send along with the sample. FROZEN immediately. Transport FROZEN
147.	Cytomegalovirus Genome Detection/ PCR Microbiology Lab	Blood, vitreous fluid, urine (baby less than 3 months old)	EDTA, sterile container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	Outsource to H.Sg Buloh. Please fill up PER-PAT 301 form (3 carbon copies)

148.	Cytomegalovirus IgG Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	7 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
149.	Cytomegalovirus IgM Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	7 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
150.	Dehydroepiandrosterone Sulfate (DHEA - S) Chemical Pathology & Integrated Lab	Serum (3 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	12 working day	Outsource to Hospital Kuala Lumpur. Fill up PER-PAT 301 request form and send along with the sample.
151.	Delta-Amino Levulinic Acids (Delta-ALA), Urine Chemical Pathology & Integrated Lab	Random urine (2 ml)	Clean universal bottle (protect from light)	Sample will be sent to referral lab twice a week (Monday and Wednesday)	27 working day	Outsource to IMR (Unit Biochemistry, SDC IMR Jalan Pahang KL). Fill up IEM request form and send along with the sample. Protect from light, D-ALA easily destroyed by light
152.	Dengue virus genome detection (PCR) Microbiology Lab	Serum, plasma, organ/ tissue biopsies, CSF (3-5 ml/ NA)	Plain tube/ Gel tube, EDTA, sterile container, CSF container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	2 weeks	Outsource to IMR. Please fill up IMR Virology Test Request form.
153.	Panel Diabetes antibodies: Anti Islet Cells (ICA), Anti-Glutamic Acid Decarboxylase (GAD) & Anti-Insulinoma-Associated Antigen 2 (IA2) Chemical Pathology & Integrated Lab	Serum (2-3 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	20 working days	Outsource to Endorine Unit, Specialised Diagnostic Centre, IMR. Fill up endocrine form and send along with the sample. Separate the serum (require at least 2ml) and place into the plain tube(without gel) Stability : 2-8°C (3 days) -20°C (up to 6 months) *** to be REQUESTED ONLY by Specialist.
154.	Dialysate profile - Urea - Creatinine - Glucose Chemical Pathology & Integrated Lab	Dialysate (10 ml)	Urine container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
155.	Digoxin Chemical Pathology & Integrated Lab	Serum (3.5 ml)	Gel vacutainer/ Plain tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. Consult pharmacist for urgent requests.

156.	Dihydrorhodamine assay (DHR) - for CGD Microbiology Lab	Blood (2.5 ml)	Lithium heparin	By appointment and consultation only	3 weeks	Outsource to IMR. Please fill up IMR PID Request Form from Lab Orders. Please call IMR for consultation and appointment at 03-3362 8386/ 03-33627412/ 03-33627746/ 03-33627747/ 03-33627406/ 03-33628815/ 03-33627523. Strictly no ice during transportation.
157.	Dihydropyriminidase Deficiency (DPYS Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	By appointment and consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
158.	Direct Immunofluorescence Histopathology	Fresh tissue only (skin and renal biopsies) 2 set of sample : A – Skin biopsy in formalin (submerged in formalin, 20x specimen size), keep room temperature B - Skin biopsy in phosphate buffer saline (PBS) just small amount not fully submerged. Keep in ice. Both sample send immediately to lab.	Universal container on ice/ icepacks Preservative solution: Phosphate Buffer Saline	Sample will be send to referral lab two times a week (Sunday, Tuesday)	2 weeks (70% of all cases) Note : Except for complicated and problematic cases (eg : repeat testing, second opinion)	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
159.	DNA Analysis/ Molecular for Alpha Thalassemia Haematology Lab	Blood Adult: 2-3 ml Paeds: 0.25 – 0.5 ml	EDTA	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	90 days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. Please attach FBC result and HB analysis report with complete clinical history. Please fill up DNA analysis and consent form; and send together with the sample.

160.	DNA Analysis / Molecular for Beta Thalassemia and further testing for alpha thalassemia Haematology Lab	Blood Adult: 2-3 ml Paeds: 0.25 – 0.5 ml Neonate: 0.25-0.5 ml Mother's blood: 2-3 ml Father's blood: 2-3 ml	EDTA	Sample will be sent to referral lab twice a week (Monday and Wednesday)	90 days	Please fill up DNA analysis and consent form; and send together with the sample. Outsource to IMR. Please attach FBC result and HB analysis report with complete clinical history. For neonate, please attach FBC and Hb analysis report of the neonate, mother and father
161.	DNA Analysis / Molecular for South East Asian Ovalocytosis (SEAHO) Haematology Lab	Blood Adult: 2-3 ml Paeds: 0.25 - 0.5 ml	EDTA	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	6 weeks	Outsource to Hospital Sultanah Bahiyah. Need to consult Heamatopathologist HSB Please fill up PER-PAT 301 form and consent form. Please attach FBP report with complete clinical history
162.	DNA extraction & storage Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)	EDTA tube	By appointment and consultation only	2 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
163.	Duchenne/ Becker Muscular Dystrophy (DMD/BMD) Chemical Pathology & Integrated Lab	Blood (3-5 ml)	EDTA	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 months	Outsource to HospitalTunku Azizah. Fill up MOLECULAR TESTS REQUEST FORM and send along with the sample.
164.	Ebola virus PCR Microbiology Lab	After consultation ONLY	After consultation ONLY	After consultation ONLY	After consultation ONLY	Please call IMR at 03-33628960. Please fill up IMR Virology Test Request form from Lab Orders.
165.	Echinococcosis antibody (Echinococcus IgG) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube (send sample in ice)	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Outsource to IMR. Please fill up PER-PAT 301 form.
166.	Electrophoresis for protein +	Serum	Gel Vacutainer/ Plain tube	Sample will be sent to	21 working days	Outsource to Hospital P.Pinang. Fill

	Immunofixation (serum) Chemical Pathology & Integrated Lab	(2.5 ml)		referral lab twice a week (Monday and Wednesday)		up PER-PAT 301 request form, need history and specialist's signature. Please contact Chemical Pathologist if the test needs to be repeated in less than 45 days. MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED.
167.	Electrophoresis for protein, Urine Chemical Pathology & Integrated Lab	Urine & serum (10ml urine & 3.5 ml serum)	Clean Universal Container (urine) & Plain tube (serum)	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 month	This test is outsourced to Hospital Ampang. Fill up PER PAT 301 form and send in pair, serum and urine. Send in pair, serum & urine Urine from the same patient must be collected at the same occasion within 4 hours. Urine collection preferred early morning, must be refrigerated and sent to the lab within 5 days (at 2-8°C) after collection date. No preservative required. MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED
168.	Electrophoresis for protein, CSF Chemical Pathology & Integrated Lab	Serum & CSF (3.5 ml serum & 1– 2 ml CSF)	Gel Vacutainer/ Plain tube & CSF Container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 month	This test is outsourced to Hospital Ampang. Fill up PER PAT 301 form and send in pair, serum and 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) MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED.
169.	Enterovirus genome detection (Inclusive of Pan Entero, EV71 and CA16) - PCR Microbiology Lab	i) Nasopharyngeal aspirate(NPA) ii) Nasopharyngeal swab (NPS) / Oropharyngeal swab (OPS) iii) Throat swab iv) Cerebrospinal fluid (CSF) v) Bronchoalveolar lavage (BAL), vi) Sputum vii) Vesicular Swab (Skin lesion), viii) Organ biopsy, ix) Pericardial fluid, x) Rectal swab, xi) Stool	VTM (swab), sterile container (other samples), CSF container in ice	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Please consult Microbiologist HSM before send sample. Outsource to IMR. Please fill up IMR Virology Test Request form.
170.	Enterovirus Isolation	i) Nasal aspirate/ wash (NA/ NW) ii) Nasopharyngeal aspirate/ wash (NPA/ NPW) iii) Nasopharyngeal swab (NPS) iv) Throat/ Tonsillar/ Oropharyngeal	VTM (swab) & Sterile container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4-6 weeks	Please consult Microbiologist HSM before send sample. Outsource to IMR. Please fill up IMR Virology Test Request form.

	Microbiology Lab	swab (OPS) v) Sputum. vi) Tracheal aspirate (TA) ix) Bronchoalveolar lavage (BAL) xi) Lung tissue xii) Pleural fluid				
171.	SARS-CoV Viral Isolation Microbiology Lab	Non-forensic Cases: i) Nasopharyngeal aspirate/ wash (NPA/NPW) ii) Nasopharyngeal Swab (NPS) iii) Oropharyngeal Swab (OPS) iv) Tracheal aspirate (TA) Forensic Cases: Tracheal/ Bronchial/ Lower airway/ Lung/ Heart/ Brain swabs or tissues.	VTM (swab) & Sterile container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4-6 weeks	Outsource to IMR. Please fill up IMR Virology Test Request form.
172.	Eosinophilic Cationic Protein Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	By appointment only	4 weeks	Outsource to IMR. Please consult Pakar Patologi Unit Alergi, Dr Husna Farhanah at 03-33627638 before ordering. Request form will be emailed to requestor if request is granted..
173.	*Epstein Barr Virus Capsid IgG Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	7 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
174.	*Epstein Barr Virus Capsid IgM Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	7 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
175.	Epstein Barr Virus genome detection (PCR) Microbiology Lab	Plasma (3-5 ml, NA)	EDTA tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Outsource to H.Sg Buloh. Please fill up PER-PAT 301 form (3 carbon copies)
176.	Erythropoietin (EPO) Haematology Lab	Serum (1.5 ml)	Plain tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday) Please inform lab the	MDS: 6-8 weeks MPN & PRV: 12 weeks	Please fill up Special Haematology Requisition Form, Hospital Ampang & indicate clinical history. Sample need to separate and frozen immediately. This sample must be send in dry ice. Need to post out to Hosp Ampang by HSB. Staff Lab need to Contact Science Officer in Hematology unit HSB.

				appointment date prior to send sample.		
177.	Estradiol Chemical Pathology & Integrated Lab	Serum/ Plasma (3.5 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED
178.	Ethanol Chemical Pathology & Integrated Lab	Blood (3 ml)	Plain tube without gel (request from Lab)	Sample will be sent to referral lab twice a week (Monday and Wednesday)	7 working days	Outsource to HKL. This is blood for toxicology. Fill up TDM form in two copies with relevant clinical history and send along with sample.
179.	Ethylmalonic Encephalopathy : (ETHE1 Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	By appointment and consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
180.	Everolimus Chemical Pathology & Integrated Lab	Whole blood (3 ml)	EDTA	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 week	Outsource to Clinical Toxicology Unit, HKL. Fill up TDM request form and send along with the sample.
181.	Extractable nuclear antigen (ENA) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	Outsource to H.Tuanku Fauziah, Perlis. Please fill up PER PAT 301 form.
182.	Factor II, V, VII, X, XI, XII or XIII Haematology Lab	Plasma Adult 5 ml Paeds (1-12 years old) 5ml Paeds (<1 year old) 3-4ml	Trisodium Citrate	By appointment 03-4289 6217 Please inform lab the appointment date prior to send sample.	Urgent: 1 day Routine: 5 working days	Please fill up Special Haematology Requisition Form, Hospital Ampang & indicate clinical history. Sample need to separate and frozen immediately at -20°C/ -80°C . This sample must be send in dry ice. Need to post out to Hosp Ampang by HSB. Staff Lab need to Contact Science Officer in Hematology unit HSB
183.	Ferritin Chemical Pathology & Integrated Lab	Plasma/ serum (3.5 ml)	Heparinised tube or Gel vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form

184.	Fibrinogen Chemical Pathology & Integrated Lab	Plasma 1.8 ml/ 2.7 ml – adult tube 0.5 ml x 2 – paed's tube Fill up to indicator level on tube	Trisodium Citrate	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	4 hours	Requestor outside HSB: Please spin the sample (to get platelet poor plasma <10,000. Eg: 15 min at 3300) and keep the plasma at -20°C/ -80°C. Please fill up PER PAT 301 form. Transport to HSB in freeze packaging
185.	Filaria PCR Microbiology Lab	Whole blood in EDTA, blood on slides or filter paper (2.5 ml/ NA)	EDTA tube, Glass slides, filter paper	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Outsource to IMR. Please fill up PER-PAT 301 form. Blood taken between 6pm-12am
186.	Filaria serology (Filariasis IgG Antibody) Microbiology Lab	Serum (3-5 ml/ NA)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1-2 weeks	Outsource to IMR. Please fill up PER-PAT 301 form.
187.	*Fine needle aspiration (FNA) including transbronchial needle aspiration (TBNA) and Endoscopic-ultrasound guided FNA (EUS-FNA) cytology Cytology Lab	Aspirated fluid (Minimum 4 slides)	Slide and smear will be prepared by laboratory staff	Procedure done in clinic (working days) Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days for URGENT case 14 days for ROUTINE case	Contact the lab immediately when the patient is ready for procedure. Please fill up PER-PAT 301 form.
188.	Floating-Harbor Syndrome (FHS) : (SRCAP- Sequence Analysis <i>Hotspots</i>) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
189.	Folate Chemical Pathology & Integrated Lab	Serum/ plasma (3 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
190.	FMR1 Disorders (Fragile X Syndrome, FXTAS, FXPOI, FXAND) (CGG Repeat Analysis - FMR1)	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g.

	Chemical Pathology & Integrated Lab					biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
191.	Free Androgen Index (FAI) Chemical Pathology & Integrated Lab	Serum (2-3 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	20 days	Outsource to Hospital Putrajaya. Fill up PER-PAT 301 request form and send along with the sample.
192.	Free Light Chain Chemical Pathology & Integrated Lab	Serum (2-3 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 month	Outsource to Hospital Pulau Pinang. Fill up PER-PAT 301 request form and send along with the sample. MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED.
193.	Friedreich Ataxia (FRDA) (GAA Repeat Analysis – FXN) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	6 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
194.	Fructosamine Chemical Pathology & Integrated Lab	Serum (3 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 month	Outsource to Hospital Ampang Fill up PER-PAT 301 request form and send along with the sample. Sample serum must reach the lab within 7 days (at 2°C-8°C) after the collection date.
195.	Fructose-1, 6-Bisphosphatase Deficiency : (FBP1) Sequence Analysis Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening

						test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
196.	FSH Chemical Pathology & Integrated Lab	Serum/ plasma (3 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED
197.	Full Blood Picture (FBP) Haematology Lab	Blood Adult: 2-3 ml Paeds: 0.25-0.5 ml	EDTA	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	Urgent: 3 days/ 24 hours (with approval from Haematopathologis t through phone call)-Routine: 3 weeks	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form Must have clinical history Requestor outside HSB please attach FBC result and provide unstained slide.
198.	Fungal PCR Microbiology Lab	Fresh clinical specimens : Blood in EDTA, serum, blood in blood culture vial, CSF and other sterile body fluids, skin/tissue biopsies, FFPE can be sectioned and submit in sterile container (3-5 ml for blood/ other samples as much as possible)	Blood in EDTA, plain tube or blood culture bottle. Tissue and other body fluids in sterile containers. FFPE ribbon shavings in sterile container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	Outsource to IMR. Please fill up IMR Mycology Request Form.
199.	G6PD enzyme activity/ quantitative assay Haematology Lab	Blood Adult: 2-3 ml Paeds: 0.25-0.5 ml	EDTA	By appointment 06-2892877	3 weeks	Patient criteria: Normal reticulocyte count: Neonate <5% Pediatric and adult <2.5% Blood only can be taken 3 months after transfusion OR 2 months after acute haemolytic crisis Outsource to Hospital Melaka. Please fill up PER-PAT 301 form.
200.	Mucopolysaccharides (MPS) Glycosaminoglycan (GAGs/HRE), urine Chemical Pathology & Integrated Lab	First morning urine (5 ml)	Clean universal bottle	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 month	Outsource to IMR (Biochemistry Unit). Fill up Request form for Biochemical Genetic Tests and send along with the sample. Freeze immediately • Transport FROZEN
201.	Galactokinase Deficiency : (GALK1 Sequence Analysis)	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and

	Chemical Pathology & Integrated Lab					send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
202.	Galactose Epimerase Deficiency : (GALE Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
203.	Galactosemia Screening, blood spot Chemical Pathology & Integrated Lab	Dried blood spot (3 circles of dried blood spot)	Whatmann 903 Filter paper	Sample will be sent to referral lab twice a week (Monday and Wednesday)	2 weeks	Outsource to IMR (Molecular & Diagnostic Services). Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Ensure blood completely air dried (at least 4 hours) before sealed. • If unable to reach IMR lab WITHIN 2 DAYS from collection, please keep and transport chilled (with dessicant); • Humidity and extreme temperature may influence the stability of analyte.
204.	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) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	Outsource to IMR. Please fill up IMR Autoimmune Request Form.
205.	Gaucher Disease: (GBA Sequence Analysis)	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g.

	Chemical Pathology & Integrated Lab					biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
206.	Genetic Test Chemical Pathology & Integrated Lab	Blood (2 X 2.5 ml blood EDTA)	EDTA	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 months	Outsource to Hospital Tunku Azizah. Fill up MOLECULAR TESTS REQUEST FORM and send along with the sample. KINDLY DISCUSS WITH GENETICIST HKL prior to sending sample.
207.	GGT Chemical Pathology & Integrated Lab	Plasma/ serum (3 ml)	Heparinised tube or Gel vacutainer/ Plain tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	1 day (routine)	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
208.	Glycogen Storage Disease Type 1a : (G6PC Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
209.	Glycogen Storage Disease Type 1b : (SLC37A4 Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.

210.	Glycogen Storage Disease Type III : (AGL Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
211.	Growth Hormone Chemical Pathology & Integrated Lab	Serum (3.5 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	12 working days	Outsource to Hospital Kuala Lumpur. Fill up PER-PAT 301 request form and send along with the sample.
212.	Hantavirus Genome Detection Microbiology Lab	By consultation only.	By consultation only.	By consultation only. Please call IMR at 03-33628960/03-33628114	2 weeks	By consultation only. Please call IMR at 03-33628960/03-33628114
213.	Haptoglobin Chemical Pathology & Integrated Lab	Serum (3 ml)	Gel Vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	12 working days	Outsource to Hospital Kuala Lumpur. Fill up PER-PAT 301 request form and send along with the sample.
214.	Hb Analysis (Thalassemia screening) Haematology Lab	Blood Adult: 2-3 ml Paeds: 0.25-0.5 ml	EDTA tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	Screening: 6 weeks Diagnostic: 4 weeks High risk couple: 2 weeks	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form and provide relevant clinical history. Please attach FBC result and provide unstained slide
215.	Hematology Molecular Study: • BCR/ ABL • JAK2 V617F mutation • Calreticulin • PML-RARA (quantitative) Haematology Lab	Blood/ BMA (2-3 ml blood or bone marrow aspirate)	EDTA	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4-8 weeks	Sample must be received on the same day of blood collection. No Tel: 03-4289 6056. Outsource to Hospital Ampang. Fill up Hospital Ampang form.
216.	Hepatitis A IgG	Serum	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week	8 weeks	Outsource to HKL. Please fill up PER-PAT 301 form.

	Microbiology Lab	(3-5 ml)		(Monday and Wednesday)		
217.	Hepatitis A IgM Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	9 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
218.	Hepatitis B core antibody, total (HBcAb) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	9 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
219.	Hepatitis B core IgM (HBc IgM) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	9 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
220.	Hepatitis Be antibody (HBeAb) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	9 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
221.	Hepatitis Be antigen (HBeAg) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	9 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
222.	Hepatitis B surface antibody (HBsAb) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	9 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
223.	Hepatitis B surface antigen (HBsAg) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
224.	Hepatitis B virus DNA viral load Microbiology Lab	Plasma (3-5 ml each tube)	EDTA (4 tubes)	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	4 weeks	Outsource to Hospital Sultanah Bahiyah . Sample need to separate and freeze immediately after received in Lab. Fill up PER-PAT 301 form, countersigned by Gastroenterologist.
225.	Hepatitis C virus antibody (HCV Ab) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.

226.	Hepatitis C virus Genotyping Microbiology Lab	Serum/Plasma (1-3 ml)	Plain tube/EDTA tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	8 weeks	Test only done to patients with recent HCV viral load of > 1000 IU/mL (please provide recent viral load result) and liver cirrhosis. Outsource to IMR NIH. Please fill up Virology Test Request form IMR//VIRO/ADMIN/, countersigned by Gastroenterologist.
227.	Hepatitis C virus RNA viral load Microbiology Lab	Plasma (3-5 ml each tube)	EDTA tube (4 tubes)	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	4 weeks	Outsource to Hospital Sultanah Bahiyah. Sample need to separate and freeze immediately after received in Lab. Fill up PER-PAT 301 form, countersigned by Gastroenterologist.
228.	Hepatitis D IgM Microbiology Lab	Serum, plasma (3-5 ml)	Plain tube/ Gel tube, EDTA tube	By consultation only. Please call IMR at 03-33628960	3-4 weeks	Outsource to IMR. Please fill up IMR Virology Test Request form.
229.	Hepatitis E IgM Microbiology Lab	Serum, plasma (3-5 ml)	Plain tube/ Gel tube, EDTA tube	By consultation only. Please call IMR at 03-33628960	3-4 weeks	Outsource to IMR. Please fill up IMR Virology Test Request form.
230.	Hereditary Orotic Aciduria : (UMPS Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
231.	Herpes simplex virus 1&2, IgG Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	9 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form
232.	Herpes simplex virus 1&2, IgM Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	9 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form
233.	Herpes simplex virus Genome/ DNA detection (PCR) Microbiology Lab	Plasma, vitreous fluid, vesicular fluid (3-5 ml/ NA)	EDTA tube, sterile container, swab in VTM	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Outsource to H.Sg Buloh. Please fill up PER-PAT 301 form.

234.	<p>*Histopathology : Routine Examination (Formalin fixed paraffin embedded section)</p> <p>Histopathology Lab</p>	Tissue	<p>Suitable container with size of specimen</p> <p>Fixative solution : 10% Neutral Buffered Formalin (10x-20x specimen size)</p>	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	<p>1) 72 working hours for single and small biopsy URGENT cases</p> <p>2) 2 weeks for routine histopathology cases (70% of all cases)</p> <p>Note : Except for complicated and problematic cases (eg : resampling or decalcification), second opinion cases and cases require further test</p>	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
235.	<p>HIV (Human Immunodeficiency Virus)</p> <p>Microbiology Lab</p>	<p>Serum</p> <p>(3-5 ml)</p>	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	7 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
236.	<p>HIV Genotyping Drug Resistance Test</p> <p>Microbiology Lab</p>	<p>Plasma</p> <p>(3-5 ml)</p>	EDTA tube	Upon request.	8 weeks	Outsource to IMR. Please fill up Borang HIV Genotyping Resistance Testing ver 1. Please consult an ID Physician before sending the sample.
237.	<p>HIV PCR for paediatrics (HIV baby)</p> <p>Microbiology Lab</p>	<p>Plasma</p> <p>(2.5 ml)</p>	EDTA tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Outsource to IMR. Please fill up the HIV PCR baby. DO NOT spin and send with ice.
238.	<p>HIV RNA viral load</p> <p>Microbiology Lab</p>	<p>Plasma</p> <p>(3-5 ml each tube)</p>	EDTA tube (4 tubes)	Sample will be send to referral lab three times a week (Monday, Tuesday, Wednesday)	2 working days	Outsource to KK Kuah. Need spoken to FMS KK Kuah. Sample must reach lab before 11.00 am (Monday, Tuesday and Wednesday only). Fill up PER-PAT 301 form.

239.	HLA Antibody Test Microbiology Lab	Whole blood (10 ml)	Plain tube x 2	By appointment only. Please call IMR at 03-3362 8383.	4 weeks	Outsource to IMR. Please call IMR for appointment. Please fill up HLA Antibody Test Request Form.
240.	HLA Crossmatch - Deceased Donor Microbiology Lab	Blood Donor: 9 ml x 16 tubes of blood in Sodium Heparin Recipient: 6 ml of blood in plain tube.	Sodium heparin x 32 (Donor) Plain Tube x 2 (Recipient)	By appointment only. Please call IMR at 03-3362 8382/ 8383.	3 weeks	Outsource to IMR. Please fill up HLA Crossmatch Test Request Form - Deceased Donor.
241.	HLA Crossmatch - Living Donor Microbiology Lab	Blood Donor: 18 ml of blood in Sodium Heparin Recipient: 6 ml of blood in plain tube.	Sodium heparin x 6 (Donor) Plain Tube x 2 (Recipient)	By appointment only. Please call IMR at 03-3362 8382/ 8383.	3 weeks	Outsource to IMR. Please fill up HLA Crossmatch Test Request Form - Living Donor.
242.	HLA Typing Microbiology Lab	Plasma 6 ml/ 15 ml (If patient is anaemic, TWBC less than 1.5 x 10³ cells/ ml)	EDTA tube x 2/ 5	By appointment only. Please call IMR at 03-3362 8383.	4 weeks	Outsource to IMR Please fill up HLA Typing Test Request Form from Lab Orders. Patient must not have had transfusion in 3 weeks preceding blood collection.
243.	HLA Typing - Disease Association Microbiology Lab	Plasma 6 ml/ 15 ml (If patient's TWBC less than 1.5 x 10³ cells/ ml)	EDTA tube x 2/ 3	By appointment only. Please call IMR at 03-3362 8383.	4 weeks	Outsource to IMR. Please fill up HLA Typing - Disease Association Test Request Form from Lab Orders. Patient must not have had transfusion in 3 weeks preceding blood collection.
244.	Homocysteine Total, plasma Chemical Pathology & Integrated Lab	Plasma (2 ml)	EDTA tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 month	Outsource to IMR (Biochemistry Unit). Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Separate plasma immediately •Transport FROZEN

245.	Classical Homocystinuria (CBS Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
246.	Hypophosphatasia : (ALPL Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
247.	*Immunoglobulin (serum) Ig A Ig G Ig M Chemical Pathology & Integrated Lab	Serum/ plasma (3.5 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED
248.	Immunophenotyping Leukemia/ lymphoma/ PNH Haematology Lab	Blood/ BMA (6ml blood/ 2-3 ml marrow aspirate)	EDTA	Sample will be sent to referral lab twice a week (Monday and Wednesday)	Verbal report (HTA) : 36 hours Written report (HTA) : 21 days	Please send sample immediately. Test must be analysed within 24 hours from blood collection. Please provide unstained bone marrow smear. Outsource to Haematology Unit , Department of Pathology, Hospital Tunku Azizah

249.	Immunophenotyping PNH Haematology Lab	Blood (3 ml blood)	EDTA	By appointment 03-42896218	7 working days	Outsource to Hospital Ampang. Please fill up Hospital Ampang Haematology Requisition Form. The request form must be complete with date and time of sample collection, complete history, requesting Dr's name and contact number.
250.	Inorganic Phosphate Chemical Pathology & Integrated Lab	24-hr urine (24-hr urine container)	24-hr urine container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
251.	Insulin Chemical Pathology & Integrated Lab	Serum (3.5 ml)	Gel vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	12 working days	Outsource to Hospital Kuala Lumpur. Fill up PER-PAT 301 request form and send along with the sample.
252.	Insulin Autoantibodies (IAA) Chemical Pathology & Integrated Lab	Serum (2-3 ml)	Gel vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	21 working days	Outsourced to IMR (Endokrine Uni). Fill up Endokrine Request Form and send along with the sample. Spin, separate the serum and place into the plain tube (without gel) Stability : 2-8°C (3 days) -20°C (up to 6 months) *** to be REQUESTED ONLY by Specialist. Advised for IAA blood testing to be drawn BEFORE insulin therapy is initiated for the first time.
253.	Insulin like growth factor-1 (IGF-1) Chemical Pathology & Integrated Lab	Serum 3-5 ml (0.5 ml serum)	Gel vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 months	Outsource to Hospital Putrajaya. Fill up PER-PAT 301 request form and send along with the sample.
254.	Iodine Chemical Pathology & Integrated Lab	Random Urine (10ml)	Clean Universal bottle	Sample will be sent to referral lab twice a week (Monday and Wednesday)	25 working days	Outsource to MKAK Sg Buloh. Fill up MKAK-BPU-O1/Rev2018 form in two copies with relevant clinical history and send along with sample. Send in 2-8°C or keep in -20°C if delay. Send immediately to the lab.
255.	Japanese Encephalitis (JE) IgM Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Outsource to MKAK Sg Buloh. Please fill up MKAK Laboratory Request Form BPU-2018 from Lab Orders.
256.	Japanese Encephalitis (JE) PCR Microbiology Lab	Serum, CSF (1-3 ml/ NA)	Plain tube, CSF container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Outsource to MKAK Sg Buloh. Please fill up MKAK Laboratory Request Form BPU-2018 from Lab Orders.
257.	Kennedy Disease (CAG Repeat Analysis – AR)	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	. Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g.

	Chemical Pathology & Integrated Lab					biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
258.	Lactate Chemical Pathology & Integrated Lab	Plasma 4 ml (Adult)/ 500 uL (Paeds)	Sodium Fluoride Potassium Oxalate tube. Transport to lab in ice.	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	1 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. Sample need to separate and freeze immediately after received in Lab. Transport to HSB in freeze packaging.
259.	Lactate Dehydrogenase (LDH) Chemical Pathology & Integrated Lab	Body fluid (3 ml)	Sterile Container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
260.	Lead Chemical Pathology & Integrated Lab	Whole blood (2 ml plasma)	EDTA tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	30 working days	Outsource to Outsource to Hospital Selayang. Fill up PER-PAT 301 request form and send along with the sample. Samples must be collected using an appropriate container, free of heavy metal or trace elements. Authorization by specialist is required.
261.	Leber Hereditary Optic Neuropathy (LHON) Panel : (m.3460>A, m.11778G>A, m.14484T>C Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	.Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
262.	Legionella antigen Microbiology Lab	Urine	Sterile container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	1 working day	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form

263.	Leigh Syndrome (SURF1 Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
264.	Leigh Syndrome (8993 hotspot) (MT-ATP6 Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
265.	Leigh Syndrome Full Panel (MT-ATP6, MT-TL1, MT-TK, MT-TW, MT-TV, MT-ND1, MT-ND2, MT-ND3, MT-ND4, MTND5, MT-ND6, MT-CO3 Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
266.	Leishmania antibody (IgG) Microbiology Lab	Serum, anti-coagulated blood (3-5 ml)	Plain tube, EDTA tube (send sample in ice)	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	Outsource to IMR. Please fill up PER-PAT 301 form. Send sample in ice.

267.	Leopard Syndrome : (<i>PTPN11</i> Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
268.	Lepto (Leptospiral) culture Microbiology Lab	Whole blood in EDTA (3-5 ml)	EDTA tube	Please take sample before initiation of antibiotics.	3 weeks	Outsource to IMR. Suggest sending together with Leptospirosis PCR test, prior to initiation of antibiotics. Please fill up Leptospira Request Form.
269.	Leptospirosis PCR Microbiology Lab	Blood, CSF, body fluid, tissue biopsy, bronchial lavage (3-5 ml/ NA)	EDTA tube, CSF container, sterile container	Before initiation of antibiotics	2 weeks	Outsource to IMR. Please fill up Leptospira Request Form.
270.	Lesch-Nyhan Syndrome : (<i>HPRT1</i> Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.

271.	Leukemia Translocation Confirmation (by Multiplex PCR Method) -Blood or bone marrow aspirate Haematology Lab	Blood/ BMA 2-3 ml (4 tubes)	EDTA	Sample will be sent to referral lab twice a week (Monday and Wednesday)	7 working days	Please fill up Molecular Analysis For Leukaemia form. Please attach the latest FBP report. 03-26162711 ext 2716/2715. Outsource to Makmal Hematologi, IMR.
272.	Lissencephaly : (DCX Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
273.	Lissencephaly : (LIS1 Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
274.	Lithium Chemical Pathology & Integrated Lab	Serum (5 ml)	Gel Vacuteiner	Sample will be sent to referral lab twice a week (Monday and Wednesday)	5 days	Outsource to Hospital Pulau Pinang. Fill up PER PAT301 request form and send along with the sample.
275.	Liver antibody - Anti-mitochondrial antibody (AMA), anti-smooth muscle antibody (ASMA), anti liver kidney microsomal antibody (Anti-LKM) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	6 weeks	Outsource to H.Tuanku Fauziah. Please fill up PER-PAT 301 form.

276.	Long-Chain 3-Hydroxyacyl-CoA Dehydrogenase (LCHAD) Deficiency : (HADHA Sequence) Analysis Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
277.	Lupus Anticoagulant Haematology Lab	Plasma 4ml – adult tube Fill up to indicator level on tube	Trisodium Citrate	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 weeks	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. Please spin the sample First spin 2500rpm for 15 min , then transfer to secondary tube and respin with 2500rpm for 15 min and transfer to tertiary tube (to get platelet poor plasma <10,000) and keep the plasma at -20°C/ -80°C. Transport to HSB in freeze packaging
278.	Luteinising Hormone, LH Chemical Pathology & Integrated Lab	Serum/ plasma (3.5 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED
279.	Lymphocyte activation test Microbiology Lab	Blood (5 ml)	Sodium heparin	By appointment and CONSULTATION only	6 weeks	Outsource to IMR (PID unit). Please fill up IMR PID Request Form from Lab Orders. Please call IMR for consultation and appointment at 03-3362 8386/ 03-33627412/ 03-33627406/ 03-33627746/ 03-33627747/ / 03-33628815
280.	Panel test : Lysosomal Storage Disorder Enzyme Assay (Lysosomal Storage Diseases: Niemann Pick Type A/B, Fucosidosis, Fabry, α-Mannosidosis, Mucopolipidosis, Schindler, Aspartyl glucosaminuria, GM1-gangliosidosis, Gaucher, Tay-Sachs, Sandhoff, β-Mannosidosis, Gaucher, Krabbe, Neuronal Ceroid Lipofuscinosis (INCL/CLN1), Metachromatic Leukodystrophy) Chemical Pathology & Integrated Lab	Whole blood (6 ml)	2 EDTA tube	Consultation with Geneticist is required.	1 month	Outsource to IMR (Biochemistry Unit). Fill up Request Form for Biochemical Genetic Tests and send at least 6 ml of whole blood in EDTA tube. DO NOT SPIN • DO NOT FREEZE • Sample shall arrived IMR within 72 HOURS after collection • Option maximum up to 2 diseases of enzyme • Required consultation by geneticist. • Transport CHILLED with ice. Consultation with Geneticist is required.

281.	Lysinuric Protein Intolerance (LPI) : (SLC7A7) Sequence Analysis	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
	Chemical Pathology & Integrated Lab					
282.	Magnesium	24-hr urine	24-hr urine container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form
	Chemical Pathology & Integrated Lab					
283.	Malaria PCR	Blood, Dried blood (filter paper), thick/ thin blood film (3-5 ml/ NA)	EDTA/ slide box (blood sample in ice, filter paper seal in plastic bag)	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	Outsource to MKA Ipoh. Please fill up PER-PAT 301 form.
	Microbiology Lab					
284.	Maple Syrup Urine Disease (MUSD)	Blood 0.5ml blood (peads tube) 2.0ml (adult tubes)	Lithium Heparin tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	14 working days	Outsource to Hospital Tunku Azizah. Fill up IEM request form and send along with the sample. Morning fasting or 4 hours after last meal. Centrifuge and freeze plasma immediately. Transport in ice
	Chemical Pathology & Integrated Lab					
285.	Maroteaux-Lamy Syndrome (MPS VI) : (ARSB Sequence Analysis)	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
	Chemical Pathology & Integrated Lab					

286.	MCT8-Specific Thyroid Hormone Cell Transporter Deficiency : (SLC16A2 Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
287.	Measles PCR Microbiology Lab	Secretions, urine, CSF, throat swab/ nasopharyngeal swab	Sterile container, CSF container, VTM in ice	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	Outsource to MKAK Sg Buloh. Please fill up Borang permohonan dan keputusan ujian makmal Measles. Respiratory secretion (nasopharyngeal specimen) should be taken 1 - 7 days of rash onset.
288.	Measles IgG Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	Outsource to Hospital Sungai Buloh. Please fill up PER-PAT 301 form.
289.	Measles IgM Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	Outsource to MKA Ipoh. Please fill up Borang permohonan dan keputusan ujian makmal Measles. Collect sample anytime up to 28 days of rash onset.
290.	Megcp2 gene Chemical Pathology & Integrated Lab	Whole blood (2 x 2.5 ml EDTA)	EDTA	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 months	Outsource to Hospital Tunku Azizah. Fill up MOLECULAR TESTS REQUEST FORM and send along with sample. KINDLY DISCUSS WITH GENETICIST HKL prior to sending sample.
291.	Melioidosis serology (<i>Burkholderia pseudomallei</i> IgM) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Outsource to IMR. Please fill up IMR Bacteriology Request Form.

292.	Metachromatic Leukodystrophy (MLD)/ Arylsulphatase A (ARSA Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
293.	Methanol Chemical Pathology & Integrated Lab	Whole blood/ urine (3 ml)	Na Flouride Potassium Oxalate Tube (Grey cap)	Sample will be sent to referral lab twice a week (Monday and Wednesday)	Surveillance Case: 14 working days Poisoning Case: By appointment	Outsource to MKAK Sg Buloh. Fill up MKAK-BPU- O1/Rev2018 form in two copies with relevant clinical history and send along with the sample. No special preparation is necessary. Use non-alcoholic solution such as peroxide, saline or water to clean venepuncture site. Do not use alcohol preparation. It is advisable that sample is taken prior to any detoxification treatment. Do not centrifuge. Send immediately to the lab.
294.	Methotrexate Chemical Pathology & Integrated Lab	Serum (3.5 ml)	Gel vacutainer/ Plain tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. Consult pharmacy for urgent request.
295.	Methylenetetrahydrofolate Reductase Deficiency : (MTHFR) Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.

296.	Methylmalonic Acidemia (MMA) (MMAA Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
297.	Methylmalonic Acidemia (MMA) (MMAB Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
298.	Methylmalonic Acidemia (MMA) (MMUT Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.

299.	Methylmalonic Aciduria and Homocystinuria Type C (MMACHC Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
300.	Methylmalonic Aciduria and Homocystinuria Type D (MMADHC) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
301.	Methylmalonyl CoA Epimerase Deficiency : (MCEE Sequence Analysis) Chemical Pathology & Integrated Lab	Blood (1-2 x 2.5 ml blood in EDTA tube or dried blood spot)	EDTA tube	Active by consultation only	3 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up IMR-REQUISITION FOR MOLECULAR DIAGNOSTICS SERVICES request form and send along with the sample. Send at ambient temperature. If >3 hours, keep sample cooled. Protect from freezing. By consultation only.
302.	Microalbumin, Urine (ACR) Chemical Pathology & Integrated Lab	Random urine (10 ml)	Urine container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.

303.	Mitochondrial DNA Deletion Syndromes - Chronic Progressive External Ophthalmoplegia (CPEO) (mtDNA Deletion/Duplication Analysis) Chemical Pathology & Integrated Lab	Muscle biopsy, urine sediment, blood 2-5 ml blood EDTA (1-2 ml is acceptable for infants)/urine sediment (20 mL of early morning urine)/muscle biopsy/DNA	Sterile container, urine container, EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
304.	Mitochondrial DNA Deletion Syndromes - Kearns-Sayre Syndrome (KSS) (mtDNA Deletion/Duplication Analysis) Chemical Pathology & Integrated Lab	Muscle biopsy, urine sediment, blood 2-5 ml blood EDTA (1-2 ml is acceptable for infants)/urine sediment (20 mL of early morning urine)/muscle biopsy/DNA	Sterile container, urine container, EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
305.	Mitochondrial DNA Deletion Syndromes - Pearson Syndrome (mtDNA Deletion/Duplication Analysis) Chemical Pathology & Integrated Lab	Muscle biopsy, urine sediment, blood 2-5 ml blood EDTA (1-2 ml is acceptable for infants)/urine sediment (20 mL of early morning urine)/muscle biopsy/DNA	Sterile container, urine container, EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
306.	Mitochondrial DNA Depletion Syndromes (MDS) (ANT1 Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND

						clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
307.	Mitochondrial DNA Depletion Syndromes (MDS) (<i>DGUOK</i> Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
308.	Mitochondrial DNA Depletion Syndromes (MDS) (<i>MPV17</i>) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
309.	Mitochondrial DNA Depletion Syndromes (MDS) (<i>POLG</i> Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.

310.	<p>Mitochondrial DNA Depletion Syndromes (MDS) (<i>RRM2B</i> Sequence Analysis)</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Blood</p> <p>2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA</p>	<p>EDTA tube</p>	<p>Active by consultation only</p>	<p>5 months</p>	<p>Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.</p>
311.	<p>Mitochondrial DNA Depletion Syndromes (MDS) (<i>SUCLA2</i> Sequence Analysis)</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Blood</p> <p>2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA</p>	<p>EDTA tube</p>	<p>Active by consultation only</p>	<p>5 months</p>	<p>Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.</p>
312.	<p>Mitochondrial DNA Depletion Syndromes (MDS) (<i>SUCLG1</i> Sequence Analysis)</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Blood</p> <p>2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA</p>	<p>EDTA tube</p>	<p>Active by consultation only</p>	<p>5 months</p>	<p>Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.</p>

313.	Mitochondrial DNA Depletion Syndromes (<i>TYMP</i>) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
314.	Mitochondrial Encephalomyopathy, Lactic Acidosis, and Stroke-Like Episodes (MELAS) Syndrome (3243 hotspot) (m.3243A>G Sequence Analysis) Chemical Pathology & Integrated Lab	Muscle biopsy, urine sediment, blood 2-5 ml blood EDTA (1-2 ml is acceptable for infants)/urine sediment (20 mL of early morning urine)/muscle biopsy/DNA	Sterile container, urine container, EDTA tube	Active by consultation only.	3 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
315.	Mitochondrial Encephalomyopathy, Lactic Acidosis, and Stroke-Like Episodes (MELAS) Syndrome (Full Panel) (m.3243A>G, m.3252A>G, m.3256C>T, m.3271T>C, m.3291T>C, m.3697G>A, m.4332G>A, m.12147G>A, and m.13514A>G) Sequence Analysis) Chemical Pathology & Integrated Lab	Muscle biopsy, urine sediment, blood 2-5 ml blood EDTA (1-2 ml is acceptable for infants)/urine sediment (20 mL of early morning urine)/muscle biopsy/DNA	EDTA tube, urine container, sterile container	Active by consultation only	3 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample.

316.	Mitochondrial HMG-CoA Synthase Deficiency : (<i>HMGCS2</i> Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
317.	Mitochondrial Neurogastrointestinal Encephalopathy (MNGIE) (<i>TYMP</i>) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
318.	Mitochondrial Short-Chain Enoyl-CoA Hydratase 1 Deficiency : (<i>ECHS1</i> Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.

319.	Mitochondrial Trifunctional Protein Deficiency-beta subunit (<i>HADHB</i> Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
320.	Mixing test (PT or APTT) Chemical Pathology & Integrated Lab	Plasma 1.8 ml /2.7 ml (Adult) 1.8 ml (Paeds)	Trisodium Citrate	By appointment	Urgent: 2 working days Routine : 5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. Sample need to separate and frozen immediately. Transport to HSB in freeze packaging
321.	Mycophenolic Acid Chemical Pathology & Integrated Lab	Whole blood (3 ml)	EDTA	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 week	Outsource to Clinical Toxicology Unit, HKL. Fill up TDM request form and send along with the sample.
322.	Molecular cytogenetic (Prenatal & Karyolite BoBs) Eg : Prader-Willi Syndrome, DiGeorge Syndrome, Cri Du Chat Syndrome Haematology Lab	Blood (2.5-5 ml)	i) EDTA (molecular) ii) Lithium Heparin (conventional)	By appointment	3 months	Outsource to Unit Genetik, Jab Patologi, Hospital Tunku Azizah. Please Call: 03- 26155555 ext 5637.
323.	Molecular Study: • BCR/ ABL • JAK2 V617F mutation • Calreticulin • PML-RARA (quantitative) • RUNX1-RUNX1 T1 (quantitative) • CBFβ-MYH11A(quantitative) Haematology Lab	Blood/ BMA (2-3 ml blood or bone marrow aspirate)	EDTA	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1-2 months	Sample must be received on the same day of blood collection at room temperature. No Tel: 03-4289 6056. Outsource to Hospital Ampang. Please fill up Hospital Ampang form.
324.	Molecular study: Acute Myeloid Leukaemia Mutation studies • AML Mutation Panel by NGS (for patient at diagnosis or relapse only)	Blood/ BMA (2-3 ml blood or bone marrow aspirate)	EDTA	Sample will be sent to referral lab twice a week (Monday and Wednesday)	14 working days	Please fill up Molecular Analysis For Leukaemia form. Copy of FBC of the patient Copy of BMA report of the patient Copy of immunophenotyping report of the patient

	<ul style="list-style-type: none"> • FLT3 ITD Mutation Analysis <p>Haematology Lab</p>					
325.	<p>Morquio A Disease (Mucopolysaccharidosis type IVA) (MPS IVA) : (GALNS Sequence Analysis)</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Blood</p> <p>2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA</p>	EDTA tube	Active by consultation only	5 months	<p>Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.</p>
326.	<p>Mucopolysaccharidoses Enzyme Assay - MPS type I, II, IIIA, IIIB, IVA, IVB, VI, VII, Multiple Sulfatase - panel test</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Whole blood</p> <p>(6ml)</p>	EDTA tube	Required consultation by geneticist.	1 month	<p>Outsource to IMR (Biochemistry Unit). Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Do NOT SPIN • Do NOT FREEZE • Sample shall arrived IMR within 72 HOURS after collection • Option maximum up to 2 diseases of enzyme • Required consultation by geneticist. • Transport CHILLED with ice.</p>
327.	<p>Multiple Respiratory Chain Deficiencies (Mitochondrial Translation Defect) : (Mitochondrial Translation Defect/ OXPHOS Deficiency) (GFM1 Sequence Analysis)</p> <p>Chemical Pathology & Integrated Lab</p>	<p>Blood</p> <p>2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA</p>	EDTA tube	Active by consultation only	5 months	<p>Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.</p>
328.	<p>Mumps IgG</p> <p>Microbiology Lab</p>	<p>Serum</p> <p>(3-5 ml)</p>	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Outsource to H.Sg Buloh. Please fill up PER-PAT 301 form.
329.	<p>Mumps IgM</p> <p>Microbiology Lab</p>	<p>Serum</p> <p>(3-5 ml)</p>	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Outsource to H.Sg Buloh. Please fill up PER-PAT 301 form.

330.	Mycobacterium C&S	Urine, Stool (2-3 ml) Min 1 ml	Sterile container	Sample will be sent to referral lab twice a week (Monday and Wednesday)		Outsource to Institut Perubatan Respiratori, HKL. Sample must be transported in 2°C-8°C. Borang TBIS 20C.
331.	Mycobacterium C&S Microbiology Lab	Bronchoalveolar lavage, sputum, CSF, sterile body fluids, tracheal aspirate, pus aspirate, tissue, urine (3-5 ml)	Sterile container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	8 weeks	Outsource to Hospital Sultanah Bahiyah. Please fill up Borang TBIS 20C. Mycobacterium C&S using liquid medium (MGIT) is not suitable for bloody sample.
332.	<i>Mycobacterium leprae</i> culture Microbiology Lab	Skin/ tissue biopsy (fresh sample) Minimum size of 4 mm x 12 mm (skin incision) or Minimum of 5 mm (punch biopsy)	Sterile container without preservative	Sample will be sent to referral lab twice a week (Monday and Wednesday)	12-18 months	Outsource to MKAK Sg. Buloh (Unit Kawalan Kusta). Fill up MKAK <i>Mycobacterium leprae</i> Viability Drug Sensitivity Test Request Form.
333.	<i>Mycobacterium leprae</i> PCR Microbiology Lab	Skin/ tissue biopsy Minimum size of 4 mm x 12 mm (skin incision) or Minimum of 5 mm (punch biopsy)	Sterile container without preservative	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	Outsource to MKAK Sg. Buloh (Unit Kawalan Kusta). Fill up PER- PAT 301 form and send along with the sample.
334.	Mycobacterium line probe assay (TB LPA) Microbiology Lab	Sputum (3-5 ml)	Sterile screw capped container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	2 weeks	Outsource to MKA Ipoh. Please fill up TBIS 20C form. Specimen must be smear positive (at least 1+) The test is only done for highly suspected MDR-TB. Specimen with no clinical history will be rejected. Countersign by specialist is required.
335.	Mycobacterium PCR Microbiology Lab	Blood Adult: 5 ml Paeds: 3-5 ml	Plain tube (non serum separator)	Sample will be sent to referral lab twice a week (Monday and Wednesday)	14 working days	Outsource to MKA Ipoh. Please fill up TBIS 20C form
336.	Mycobacterium TB PCR Microbiology Lab	Bone marrow aspirate (2-3 ml)	Sterile screw capped container without preservatives	Sample will be sent to referral lab twice a week (Monday and Wednesday)	14 working days	Outsource to MKA Ipoh. Please fill up TBIS 20C form
337.	Mycobacterium TB PCR Microbiology Lab	CSF As much sample as available, preferably minimum of 0.5 ml	CSF container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	14 working days	Outsource to MKA Ipoh. Please fill up TBIS 20C form
338.	Mycobacterium TB PCR/ Genome Detection	Sputum, tracheal aspirate, bronchial washing, gastric lavage, sterile body	Sterile container	Sample will be sent to referral lab twice a week	14 working days	Outsource to MKAK Sg Buloh. Please fill up TBIS 20C form . No transport media is needed for swab, only put

	Microbiology Lab	fluid, tissue, pus aspirate, pus swab, urine 3-5 ml		(Monday and Wednesday)		in sterile container wet with sterile saline.
339.	Mycobacterium PCR Microbiology Lab	Tissue (As large sample as possible should be sent)	Sterile container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	14 working days	Outsource to MKA Ipoh. Please fill up TBIS 20C form. Add 2-5 ml sterile saline/ distilled water to prevent desiccation.
340.	Myoclonic Epilepsy with Ragged-Red Fibers (MERRF) Syndrome (8344 hotspot) (m.8344A>G Sequene Analysis) Chemical Pathology & Integrated Lab	Blood, urine sediment, muscle biopsy 2-5 ml blood EDTA (1-2 ml is acceptable for infants)/urine sediment (20 mL of early morning urine)/muscle biopsy/DNA	EDTA tube, urine container, sterile container	Active by consultation only	3 month	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM). Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping. DNA needs to be ambient for overnight delivery or otherwise should be chilled/ frozen. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease.
341.	Myoglobin, urine Chemical Pathology & Integrated Lab	Random urine (5 ml)	Clean universal container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	12 working days	Outsource to Hospital Ampang (Biochemistry Unit). Fill up PER-PAT 301 form and send along with the sample. Please collect 10ml of urine sample in container. When sample arrived lab, staff lab need to add on 200 mg of sodium bicarbonate (2% final concentration). Check pH make sure more than 8 and documented on request form. Sample must be sent within 48 hours of collection.
342.	N-Acetylglutamate Synthase (NAGS) Deficiency : (NAGS Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.

343.	Neuropathy, Ataxia and Retinitis Pigmentosa (NARP) Syndrome : (<i>m.8993T>G/C</i>) Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
344.	Nipah IgG/ Nipah IgM Microbiology Lab	Serum/ CSF (3-5 ml/ NA)	Plain tube/ Gel tube, CSF container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Outsource to IMR. Please fill up IMR Virology Test Request Form.
345.	Non Ketotic Hyperglycinemia (NKH) (AMT Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
346.	Non Ketotic Hyperglycinemia (NKH) (GCSH Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.

347.	Non Ketotic Hyperglycinemia (NKH) (GLDC)- Deletion/duplication Analysis Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
348.	Non Ketotic Hyperglycinemia (NKH) (GLDC)-Sequence Analysis Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
349.	Noonan Syndrome : (PTPN11 Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
350.	Oligoclonal banding, CSF	CSF (2 ml CSF & 3 ml serum)	CSF container (must be accompanied by 3 ml of blood in plain tube for serum protein electrophoresis).	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 month	Outsource to Hospital Ampang. Fill up PER PAT 301 form send along with the sample. 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). For external client: • CSF specimens should be

	Chemical Pathology & Integrated Lab					<p>collected with care to avoid blood contamination</p> <ul style="list-style-type: none"> • Reseal cap bijou bottle for CSF sample with parafilm to avoid leaking sample. • Ensure packaging both sample in single biohazard bag (do not separate) • Serum and CSF must be sent to the lab within 5 days (at 2-8°C) after the collection date. • Both samples must be frozen at -20°C within 24 hrs after collection if delayed transportation.
351.	Oligosaccharide, urine Chemical Pathology & Integrated Lab	Random Urine 2 ml	Clean universal container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	22 working days	Outsource to IMR (Biochemistry Unit). Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Freeze immediately • Transport FROZEN
352.	Organic Acids, plasma (forensic only) Chemical Pathology & Integrated Lab	Plasma/ serum (3-5 ml)	EDTA/ Heparin tube/Plain tube	By consultation only.	10 days	Outsource to IMR (Molecular & Diagnostic Services). Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Separate plasma/ serum immediately. By consultation only.
353.	Organic Acid, urine Chemical Pathology & Integrated Lab	Random urine (5 ml)	Clean universal container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 week	Outsource to IMR (Molecular & Diagnostic Services). Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Transport FROZEN. Organic acids easily destroyed by heat.
354.	Organic Acids, vitreous Humour (Forensic only) Chemical Pathology & Integrated Lab	Vitreous Humour (2 ml)	Clean tube	By consultation only.	17 working days	Outsource to IMR (Molecular & Diagnostic Services). Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Transport FROZEN. Organic acids easily destroyed by heat By consultation only.

355.	Ornithine Transcarbamylase (OTC) Deficiency : (OTC) Sequence Analysis Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
356.	Orotic Acid, urine Chemical Pathology & Integrated Lab	Random urine (5 ml)	Clean universal container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	14 working days	Outsource to IMR (Biochemistry Unit). Fill up IMR - IEM REQUEST FORM and send along with the sample. Transport FROZEN . Organic acids easily destroyed by heat
357.	Osmolality Chemical Pathology & Integrated Lab	Serum/ plasma (3.5 ml) ... Urine (5 ml)	Gel vacutainer/ Plain tube/ Heparinised tube ... Urine container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 day (urgent) 3 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
358.	P & C - Anti neutrophil cytoplasmic antibodies (ANCA) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	6 weeks	Outsource to H. Tuanku Fauziah. Please fill up PER-PAT 301 form.
359.	Pap smear (Liquid-Based Cytology) Cytology Lab	Pap smear (Gynae) (One container for each patient)	Specific container with fixative.	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	7 working days for URGENT case 6 weeks for ROUTINE case	Outsource to Hospital Sultanah Bahiyah. Please fill up Borang PS1/98 (Pindaan 20072007)/ (Pindaan 2019)
360.	Paraneoplastic neurological ab (Anti-Ma, Anti-Yo, Anti-Ri, Anti-Hu, Anti-Amphiphysin, Anti-CV2) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3-4 weeks	Outsource to IMR. Please fill up the IMR Autoimmune Request Form.

361.	Paraquat Chemical Pathology & Integrated Lab	Random urine (10 ml)	Urine container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
362.	Parathyroid Hormone (intact) IPTH Chemical Pathology & Integrated Lab	Plasma (3 ml)	EDTA tube. Transport to lab in ice.	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 week	Outsource to Hospital Pulau Pinang. Fill up PER-PAT 301 request form and send along with the sample. Sample need to separate and freeze immediately after received in Lab.
363.	Parvovirus IgG Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Outsource to H.Sg Buloh. Please fill up PER-PAT 301 form.
364.	Parvovirus IgM Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Outsource to H.Sg Buloh. Please fill up PER-PAT 301 form.
365.	Parvovirus PCR/ DNA Detection Microbiology Lab	Serum, bone marrow aspirate, CSF (3-5 ml, NA)	Plain tube/ Gel tube, sterile container, CSF container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	2 weeks	Outsource to MKAK Sg Buloh. Please fill up MKAK Laboratory Request Form. Sample should be collected within 5 days after onset of illness A brief concise h/o illness and physical findings is required especially the date of illness and date of sample collection.
366.	PCR for <i>Bordetella pertussis</i> Microbiology Lab	Nasopharyngeal aspirate	Sterile container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	2 weeks	Outsource to IMR. Please fill up Bacteriology Request Form.
367.	Pericardial fluid cytology Cytology Lab	Pericardial fluid (Non-gynae) (20 ml)	Sterile container (without fixative)	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days for URGENT case 14 days for ROUTINE case	Outsource to Hospital Sultanah Bahiyah. Send to the lab immediately. If unable to do so, please reffrigate at 2-8°C. Please fill up PER-PAT 301 form.
368.	Peritoneal fluid cytology Cytology Lab	Peritoneal fluid (Non-gynae) (20 ml)	Sterile container (without fixative)	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days for URGENT case 14 days for ROUTINE case	Outsource to Hospital Sultanah Bahiyah. Send to the lab immediately. If unable to do so, please reffrigate at 2-8°C. Please fill up PER-PAT 301 form.

369.	Peritoneal washing cytology Cytology Lab	Peritoneal washing (Non-gynae) (20 ml)	Sterile container (without fixative)	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days for URGENT case 14 days for ROUTINE case	Outsource to Hospital Sultanah Bahiyah. Send to the lab immediately. If unable to do so, please refrigerate at 2-8°C. Please fill up PER-PAT 301 form.
370.	Peroxisomal Disorder Profile. Measurand : Very long chain fatty acids (C22:0, C24:0, C26:0) • Phytanic Acid • Pristanic Acid Chemical Pathology & Integrated Lab	Plasma/ Serum (1.0ml)	EDTA/ Heparin/ Plain tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 months	Outsource to IMR (Unit Special Protein, SDC IMR Jalan Pahang KL). Fill up Request Form for request form for Biochemical Genetic Tests, version 7.0 and send along with the sample. Separate plasma immediately • Transport FROZEN
371.	Phenobarbital Chemical Pathology & Integrated Lab	Serum (3.5 ml)	Gel vacutainer/ Plain tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	Outsource to Hospital Sultanah Bahiyah. Consult pharmacist for urgent requests.
372.	Phenytoin Chemical Pathology & Integrated Lab	Serum (3.5 ml)	Gel vacutainer/ Plain tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 hours	Outsource to Hospital Sultanah Bahiyah. Consult pharmacist for urgent requests.
373.	Phosphomannomutase 2 Deficiency (PMM2CDG) (PMM2 Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
374.	Pipecolic Acid,Plasma Chemical Pathology & Integrated Lab	Plasma (2 ml)	Heparinised tube /Plain tube with or without gel	Sample will be sent to referral lab twice a week (Monday and Wednesday)	2 months/ 22 working days	Outsource to IMR (Unit Biochemistry). Fill up IEM request form and send along with the sample. Separate plasma immediately

375.	Platelet Aggregation Test Haematology Lab	Blood (3 x 1.8 ml)	Trisodium Citrate	By appointment 03-26003000 (HTA)	14 working days	Please fill up PER-PAT 301 form. Fresh sample needed. Patient need to be at Hospital Tunku Azizah (HTA) for blood taking.
376.	Pleural fluid cytology Cytology Lab	Pleural fluid (Non-gynae) (20 ml)	Sterile container (without fixative)	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days for URGENT case 14 days for ROUTINE case	Outsource to Hospital Sultanah Bahiyah. Send to the lab immediately. If unable to do so, please refrigerate at 2-8°. Please fill up PER-PAT 301 form.
377.	<i>Pneumocystis carinii</i> Genome Detection Microbiology Lab	Bronchoalveolar lavage, induced sputum (3-5 ml)	Sterile container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Outsource to H.Sg Buloh. Please fill up PER-PAT 301 form, countersigned by Specialist (Physician, Paediatrician and Anaesthetist ONLY) . Must fulfill one of these criterias: a) HIV patient with CD4 count < 200 b) Patient on steroid with/ without other immunosuppressive drug c) Hematological malignancy patient with/ without chemotherapy d) Organ transplant patient (solid/ hemopoietic stem cell)
378.	Pompe Disease (GSD II) (GAA Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
379.	Porphyria Profile, urine : Porphobilinogen (qualitative), Quantitation of Uro-, Hepta-, Hexa, Penta-, Coproporphyrin & Total porphyrin Chemical Pathology & Integrated Lab	Random Urine (2 ml)	Clean Universal bottle	Sample will be sent to referral lab twice a week (Monday and Wednesday)	22 working days	Outsource to IMR (Biochemistry Unit). Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Protect from light. Porphyrin easily destroyed by light. Protect sample from light (Porphobilinogen and porphyrins easily degraded by light). • Transport FROZEN
380.	Potassium	24-hr urine/ Random (24-hr urine container / Random)	24-hr urine container / Sterile Container	Sample will be send to referral lab three times a week (Sunday, Tuesday,	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.

	Chemical Pathology & Integrated Lab	Urine) Vitreous humor (3.5 ml)	Heparinised tube	Thursday)	5 working days	
381.	Prader-Willi Syndrome : (SNRPN Methylation & Gene Dosage Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
382.	Prader-Willi Syndrome (Uniparental Disomy & Imprinting Defect Analysis) Chemical Pathology & Integrated Lab	2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
383.	PRE-ALBUMIN Chemical Pathology & Integrated Lab	Serum (3 ml)	Plain tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	2 weeks	Outsource to Hospital Ampang. Fill up PER PAT 301 request form and send along with the sample.
384.	Primary Dystonia (TOR1A) Sequence Analysis	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of

	Chemical Pathology & Integrated Lab					the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
385.	Primary Dystonia (THAP1) Sequence Analysis Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
386.	Primary Hyperoxaluria Type 1 : (AGXT Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
387.	Procalcitonin Chemical Pathology & Integrated Lab	Serum/ plasma (2 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. MANDATORY AUTHORIZATION BY INFECTIOUS DISEASE SPECIALIST IS REQUIRED
388.	Progesterone Chemical Pathology & Integrated Lab	Serum/ plasma (3.5 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED
389.	Prolactin Chemical Pathology & Integrated Lab	Serum/ plasma (3.5 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday,	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED

				Thursday)		
390.	*Prostate Specific Antigen (PSA) Chemical Pathology & Integrated Lab	Serum/ plasma (3.5 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. MANDATORY AUTHORIZATION BY SPECIALIST IS REQUIRED
391.	Protein Creatinine Index (PCI) Chemical Pathology & Integrated Lab	Urine (10 ml)	Urine container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
392.	Pseudorheumatoid Dysplasia : (<i>WISP3</i> Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
393.	PTEN-related disorders (PTEN)-Deletion/duplication Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
394.	PTEN-related disorders (<i>PTEN</i> Sequencing Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of

	Chemical Pathology & Integrated Lab					the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
395.	Pterins, CSF Chemical Pathology & Integrated Lab	CSF (0.5 ml)	Special microtube with preservative EDTA and DTE - provided by IMR (protect from light). Kindly consult lab prior to sample collection	Sample will be sent to referral lab twice a week (Monday and Wednesday)	22 working days	Outsource to IMR (Biochemistry Unit). Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Cover from light, Transport FROZEN (Pterins easily destroyed by heat and light).
396.	Pterins, urine Chemical Pathology & Integrated Lab	Urine (2 ml)	Sterile urine container. No preservative. Protect from light.	Sample will be sent to referral lab twice a week (Monday and Wednesday)	22 working days	Outsource to IMR (Biochemistry Unit) Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Cover from light, Transport FROZEN (Pterins easily destroyed by heat and light).
397.	Purine & pyrimidine Chemical Pathology & Integrated Lab	Urine (2-5 ml)	Urine container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	2 months	Outsource to Hospital Tunku Azizah (Makmal Genetic). Fill up PER-PAT 301 request form and send along with the sample.
398.	Purine Nucleoside Phosphorylase Deficiency : (PNP Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.

399.	Pyruvate Dehydrogenase Deficiency : (<i>PDHA1</i>) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
400.	Rabies RT PCR Microbiology Lab	After consultation ONLY	After consultation ONLY	After consultation ONLY	After consultation ONLY	Please call IMR at 03-33628960
401.	Renin Chemical Pathology & Integrated Lab	Plasma 3 ml (sample should be sent to the lab rapidly without ice within 30 minutes from the time blood is withdrawn).	EDTA tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 month	Outsource to Hospital Putrajaya. Fill up PER-PAT 301 request form and send along with the sample. Mandatory for endocrinologist / pediatrician to screen and countersign. Mandatory to write down clinical history, drug history, latest potassium level. Sample need to separate and freeze immediately after received in Lab.
402.	Retinoblastoma (RB1)- Deletion/duplication Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
403.	Retinoblastoma (<i>RB1</i>) - Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND

	Chemical Pathology & Integrated Lab					clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
404.	Rett's syndrome Chemical Pathology & Integrated Lab	Blood (3-5 ml)	EDTA tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 months	Outsource to Hospital Tunku Azizah (Molekular Genetik). Fill up CYTOGENETICS REQUEST FORM FOR BLOOD SAMPLES and send along with the sample.
405.	Rickettsia Indirect Immunoperoxidase (IIP) test Microbiology Lab	Serum (3-5 ml)	Plain tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	14 working days	Outsource to Hospital Raja Permaisuri Bainun. Please fill up PER-PAT 301 form.
406.	Rickettsia Disease PCR Microbiology Lab	Plasma, Tissue biopsy of eschar (3-5 ml/ NA)	EDTA tube, sterile container/ VTM	Sample will be sent to referral lab twice a week (Monday and Wednesday)	2 weeks	Outsource to IMR. Please fill up IMR Rickettsia Request Form.
407.	Rubella serology IgG Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	9 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
408.	Rubella serology IgM Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	9 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
409.	Salicylate Chemical Pathology & Integrated Lab	Serum (3-5 ml)	Gel vacutainer/ Plain tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	Outsource to Hospital Sultanah Bahiyah. . Inform/ consult pharmacist for urgent request
410.	Salivary Cortisol Chemical Pathology & Integrated Lab	Saliva (1.5ml)	SARSTEDT Salivette (Request from laboratory)	Sample will be sent to referral lab twice a week (Monday and Wednesday)	7 working days	Outsource to Hospital Pulau Pinang (HPP). Fill up PER PATH 301 FORM and send along with the sample. Collect sample using Salivary Container (request from Lab). Mandatory Authorization by endocrinologist. Consult Chemical Pathologist prior to ordering.

411.	Schinzel Giedion Syndrome : (<i>SETBP1</i> Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
412.	Schistosomiasis antibody (IgG) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 weeks	Outsource to IMR (Unit Parasitology). Please fill up PER-PAT 301 form.
413.	SCN1A-Related Seizure Disorders : (<i>SCN1A</i> Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
414.	Severe Congenital Neutropenia : (<i>ELANE</i> Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
415.	Sex Hormone Binding Globulin (SHBG) Chemical Pathology & Integrated Lab	Serum (2-3 ml)	Gel vacutainer tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	20 days	Outsource to Hospital Putrajaya. Fill up PER-PAT 301 request form and send along with the sample.

416.	Sialic acid (Total and free) Chemical Pathology & Integrated Lab	First morning urine (2 ml)	Clean universal container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	22 working days	Outsource to IMR (Biochemistry Unit). Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Freeze immediately. Transport frozen.
417.	Sirolimus Chemical Pathology & Integrated Lab	Whole blood (5 ml)	EDTA tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 week	Outsource to Jabatan Patologi Hospital Tunku Azizah. Fill up TDM request form and send along with the sample.
418.	Skin pemphigoid antibodies (Anti BP180, Anti BP230, Anti Desmoglein 1 & 3) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	Outsource to IMR. Please fill up IMR Autoimmune Request Form.
419.	Sodium Chemical Pathology & Integrated Lab	24-hr urine / Random (24-hr urine container / Random urine) ... Vitreous humor (3.5 ml)	24-hr urine container / Sterile container .. Heparinised tube	Sample will be sent to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days ... 5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
420.	Specific IgE Microbiology Lab	Serum (3.5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	Outsource to IMR. Please fill up IMR Allergy Request Form.
421.	Specific liver antibodies (Anti AMA-M2, M2-3E/ BPO, sp100, PML, gp210, LKM-1, LC-1, SLA/LP, Ro-52) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4-6 weeks	Request must be authorized by Specialist. Mandatory to test for liver antibodies prior to requesting for Specific Liver Antibodies test. Please consult Medical Microbiologist prior to sample collection. Outsource to IMR. Please fill up IMR Autoimmune Request Form.
422.	Specific Mutation Screening (1 mutation) Chemical Pathology & Integrated Lab	Blood/ Urine sediment/muscle biopsy 2-5 ml blood EDTA (1-2 ml is acceptable for infants)/urine sediment (20 mL of early morning urine)/muscle biopsy/DNA	EDTA tube/Urine Container/Sterile Container	By consultation only.	3 - 5 months	This test is outsourced to IMR. Fill up IMR-REQUISITION FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) request form and send along with the sample. By consultation only.
423.	Spinal Muscular Atrophy (SMA) -(SMN1 Gene Dosage Analysis)	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND

	Chemical Pathology & Integrated Lab					clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
424.	Spinal Muscular Atrophy (SMA)- (SMN1 Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
425.	Spinocerebellar Ataxia Full Panel (SCA Types 1,2,3,6,7),(CAG Repeat Analysis-SCA1, 2, 3, 6, 7) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	6 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
426.	Spinocerebellar Ataxia Type 1 - SCA1 (CAG Repeat Analysis ATXN1) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	6 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.

427.	Spinocerebellar Ataxia Type 2 - SCA2 (CAG Repeat Analysis - ATXN2) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	6 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
428.	Spinocerebellar Ataxia Type 3 - SCA3 (CAG Repeat Analysis - ATXN3) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	6 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
429.	Spinocerebellar Ataxia Type 6 - SCA6 (CAG Repeat Analysis - CACNA1A) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	6 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.

430.	Spinocerebellar Ataxia Type 7 - SCA7 (CAG Repeat Analysis - ATXN7) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only.	6 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
431.	Sputum cytology Cytology Lab	Sputum (Non-gynae)	Sterile container (without fixative)	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days for URGENT case 14 days for ROUTINE case	Outsource to Hospital Sultanah Bahiyah. Get a fresh early morning specimen and immediately send to the lab. Please fill up PER-PAT 301 form.
432.	S-Sulphocysteine, urine Chemical Pathology & Integrated Lab	Random urine (2 ml)	Clean universal bottle	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	22 working days	Outsource to IMR (Outsource to IMR (Unit Protein Khas)). Fill up REQUEST FORM UNIT PROTEIN KHAS (UPK) and send along with the sample. Collect WITHOUT preservative
433.	St. Louis Encephalitis virus Microbiology Lab	After consultation ONLY	After consultation ONLY	After consultation ONLY. Please call IMR at 03-33628960	After consultation ONLY	Please fill up IMR Virology Test Request Form.
434.	Stool for <i>Cryptosporidium spp</i> Microbiology Lab	Stool	Stool container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	2 weeks	Outsource to IMR. Please fill up PER-PAT 301 form. Test will be referred out to Hospital Sultan Abdul Halim in near future, will be updated through email
435.	Stool for <i>Isospora spp</i> Microbiology Lab	Stool	Stool container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	2 weeks	Outsource to IMR. Please fill up PER-PAT 301 form. Test will be referred out to Hospital Sultan Abdul Halim in near future, will be updated through email
436.	Stool for <i>Microsporidium spp</i> Microbiology Lab	Stool	Stool container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	2 weeks	Outsource to IMR. Please fill up PER-PAT 301 form. Test will be referred out to Hospital Sultan Abdul Halim in near future, will be updated through email
437.	Stool for Reducing Sugar Chemical Pathology & Integrated Lab	Stool	Stool container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	7 working days	*This test not in government centre. Need to pay (RM 10) to PPUM before sending sample. Attach resit along with sample.

438.	<i>Streptococcus pneumoniae</i> antigen Microbiology Lab	Urine, CSF	Sterile container, CSF container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	1 working day	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
439.	Succinylacetone (SAC), urine Chemical Pathology & Integrated Lab	Random urine (5 ml)	Clean universal bottle	Sample will be sent to referral lab twice a week (Monday and Wednesday)	22 working days	Outsource to IMR (Biochemistry Unit). Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Collect WITHOUT preservative
440.	Sugar & Polyols, urine Chemical Pathology & Integrated Lab	Random urine (5 ml)	Clean universal bottle	Sample will be sent to referral lab twice a week (Monday and Wednesday)	22 working days	Outsource to IMR (Biochemistry Unit). Fill up Request Form for Biochemical Genetic Tests and send along with the sample. Collect WITHOUT preservative
441.	Sulfite Oxidase Deficiency (SUOX) (SUOX Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
442.	Synovial fluid biochemistry: Total protein Glucose Uric acid Chemical Pathology & Integrated Lab	Synovial fluid (Result of same day paired serum /plasma sample is needed for body fluid result interpretation) (3 ml)	Sterile container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. The reference range and performance specifications have not been established/verified for this body fluid. Result must be incorporated into the clinical context for interpretation.
443.	Synovial fluid cytology Cytology Lab	Synovial fluid (Non-gynae) (20 ml)	Sterile container (without fixative)	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days for URGENT case 14 days for ROUTINE case	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. Send to the lab immediately. If unable to do so, please refrigate at 2-8°C. Please fill up PER-PAT 301 form.
444.	T & B enumeration test Microbiology Lab	Plasma (2 ml)	EDTA tube	By appointment only. Please call IMR at 03-3362 8386 ext 7406/7473/7412	2-3 weeks	Outsource to IMR. Please fill IMR PID Request Form.

445.	Tacrolimus Chemical Pathology & Integrated Lab	Whole blood (2.5 ml)	EDTA	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 week	Outsource to Hospital Pulau Pinang. Fill up TDM REQUEST form and send along with the sample.
446.	Taeniasis serology (Taenia IgG ab) Microbiology Lab	Serum (2 ml)	Plain tube/ Gel tube (send sample in ice)	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	Outsource to IMR. Please fill up PER-PAT 301 form.
447.	Testing of Familial Mutations/Carrier Testing Chemical Pathology & Integrated Lab	Blood/ Urine sediment/muscle biopsy 2-5 ml blood EDTA (1-2 ml is acceptable for infants)/urine sediment (20 mL of early morning urine)/muscle biopsy/DNA	EDTA tube/Urine Container/Sterile Container	Active by consultation only	3-5 months (depending on the test)	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
448.	Testosterone Chemical Pathology & Integrated Lab	Serum/ plasma (3.5 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. MANDATORY AUTHORIZATION BY SPECIALIST
449.	Theophylline Chemical Pathology & Integrated Lab	Serum (3.5 ml)	Gel vacutainer/ Plain tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up TDM form. Consult pharmacist for urgent request.
450.	Thrombophilia Profile (Inherited): -Free Protein S -Protein C -Anti- Thrombin -Activated protein C Resistance (APCR) Haematology Lab	Plasma 10 ml (5 tubes)	Trisodium Citrate	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday) Please inform lab prior to send sample.	Full panel : 20 working days	Please fill up PER-PAT 301 form. Outsource to Hospital Tunku Azizah (HTA) Please spin the sample and keep the plasma at -20°C/ -80°C. This sample must be send in dry ice. Need to post out to Hospital Tuanku Azizah by HSB. Staff Lab need to Contact Science Officer in Hematology unit HSB.
451.	Thyroglobulin Chemical Pathology & Integrated Lab	Serum (0.5 ml)	Plain tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	1 month	Outsource to Hospital Pulau Pinang. Fill up PER-PAT 301 request form and send along with the sample.

452.	Thyroxine (Free T4) Chemical Pathology & Integrated Lab	Serum/ plasma (3.5 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	(urgent request) 3 working days	Outsource to Hospital Sultanah Bahiyah. Urgent preliminary TFT results will inform verbally upon tracing by clinicians after office hours. During office hours chemical pathologist will ensure release of urgent TFT results within 90 minutes upon request.
453.	Total Immunoglobulin E Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	Outsource to IMR. Please fill up IMR Allergy Request Form.
454.	Total Iron Binding Capacity (TIBC) Chemical Pathology & Integrated Lab	Serum (3.5 ml)	Gel vacutainer/ Plain tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
455.	Total protein Chemical Pathology & Integrated Lab	24-hr urine 24-hr urine Body fluid (3 ml)	24-hr urine container Sterile Container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days 2 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. For 24 hr urine protein, volume need to be stated
456.	Toxicology Tests Chemical Pathology & Integrated Lab	Blood (2 ml) ... Urine (2 ml)	Blood in Trisodium citrate/ Sodium Fluoride Potassium oxalate (0.5%) ... Urine in Sodium Fluoride Potassium Oxalate tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	6 months - 1year)(depending on the test)	Outsource to Jab. Kimia Malaysia. Fill up Borang Permohonan Bagi Pemeriksaan Forensik/ Toksikologi (Kimia 15-Pin.1/2004 and send along with the sample. Test offered are blood for alcohol, pestisid, drugs, trace elements, gas, metal (plumbum, arsenic, zinc and mercury), and solvent. For test which is not listed above, please write the test required in req form and consult JKM Penang at 04-2293778).
457.	Toxocara antibody (IgG) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube (send sample in ice)	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	Outsource to IMR. Please fill up PER-PAT 301 form.
458.	<i>Toxoplasma gondii</i> IgG Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	9 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
459.	<i>Toxoplasma gondii</i> IgM Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	9 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.

460.	Transferin Isoform, CDG Type I & II, Serum Chemical Pathology & Integrated Lab	Serum (3 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	20 days (Basic) 2) 25 days (Traminoeatment)	Outsource to IMR (Unit Protein Khas). Fill up REQUEST FORM UNIT PROTEINKHAS (UPK) and send along with the sample. Serum must be refrigerated (2 to 8°C) immediately after collection.
461.	Transferin (Quantitation), Serum Chemical Pathology & Integrated Lab	Serum/ plasma (3 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
462.	Trichinella serology (IgG) Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube (send sample in ice)	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	Outsource to IMR. Please fill up PER-PAT 301 form.
463.	Triglycerides Chemical Pathology & Integrated Lab	Body fluid (3 ml)	Sterile container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
464.	Triiodothyronine (Free T3) Chemical Pathology & Integrated Lab	Serum/ plasma (3.5 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	1 day (urgent request) 3 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
465.	Tryptase test Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	4 weeks	<p><i>Timing of samples collection:</i></p> <p>After anaphylaxis:</p> <ul style="list-style-type: none"> • 1st sample within 15 minutes up to 3 hours after the onset of the symptoms • 2nd sample after 24-48 hours to confirm the return to baseline levels • 3rd sample after 1-2 weeks if incidents of mastocytosis or other causes of elevated basal levels are suspected <p>For forensic sample, please specify sampling site, time of death and time of sampling.</p> <ul style="list-style-type: none"> • Accurate timing of sampling is important for interpretation. <p>Outsource to IMR. Please fill up IMR Allergy Request Form.</p>

466.	TSH (serum) Chemical Pathology & Integrated Lab	Serum (3.5 ml)	Gel vacutainer/ Plain tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	(urgent request) 3 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. Urgent preliminary TFT results will inform verbally upon tracing by clinicians after office hours. During office hours chemical pathologist will ensure release of urgent TFT results within 90 minutes upon request.
467.	Tyrosine Hydroxylase Deficiency : (TH Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
468.	Tzank smear Cytology Lab	Fine needle aspiration (Minimum 2 slides)	Slide and smear will be prepared by clinical or cytology staff	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days for URGENT case 14 days for ROUTINE case	Contact the lab immediately when the patient is ready for procedure. Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
469.	Urea Chemical Pathology & Integrated Lab	24-hr urine (24-hr urine) ... Vitreous humor (3.5 ml) ... Dialysate (10 ml)	24-hr urine container ... Heparinised tube ... Urine container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days ... 5 working days ... 2 days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
470.	Uric Acid Chemical Pathology & Integrated Lab	24-hr urine (24-hr urine) Body fluid (3 ml)	24-hr urine container ... Sterile container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days ... 2 days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.

471.	Urine for Dysmorphic RBC Chemical Pathology & Integrated Lab	Urine (Fresh sample) (5-10 ml)	Sterile Container/ Urine container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	3 working days	Outsource to Hospital Tuanku Fauziah, Kangar. Fill up PER-PAT 301 form and send along with the sample. Notes: All request form must be screened by Chemical Pathologist.
472.	Urine Hemoglobin Chemical Pathology & Integrated Lab	Urine (5-10 ml)	Plain urine container	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	1 working day	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form.
473.	Urine Hemosiderin Haematology Lab	Urine (5-10 ml)	Plain urine container	By appointment Ext : 6249 (working days)	3 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form and send along with the sample.
474.	Urine (including urine for eosinophils) Cytology Lab	Urine (Non-gynae) (50-200 ml)	Sterile container (without fixative)	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days for URGENT case 14 days for ROUTINE case	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. Immediately send sample to the lab. Avoid early morning specimen as the bladder cells have undergone degenerative process.
475.	Valproic Acid Chemical Pathology & Integrated Lab	Serum (3.5 ml)	Gel vacutainer/ Plain tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	2 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up TDM form. Consult pharmacist for urgent request.
476.	<i>Varicella zoster</i> IgG Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	2 weeks	Outsource to H.Sg Buloh. Please fill up PER-PAT 301 form.
477.	<i>Varicella zoster</i> IgM Microbiology Lab	Serum (3-5 ml)	Plain tube/ Gel tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	2 weeks	Outsource to H.Sg Buloh. Please fill up PER-PAT 301 form.
478.	<i>Varicella zoster</i> Virus Genome detection (PCR) Microbiology Lab	Plasma, vitreous fluid (5 ml, NA)	EDTA tube,, sterile container	Sample will be sent to referral lab twice a week (Monday and Wednesday)	2 weeks	Outsource to H.Sg Buloh. Please fill up PER-PAT 301 form (3 carbon copies)

479.	Vitamin B1 (Thiamine) Chemical Pathology & Integrated Lab	Whole blood (4 ml)	EDTA tube	Sample will be sent to referral lab twice a week (Monday and Wednesday)	14 working days (for out break case) 1 month (for surveillance)	Outsource to MKAK (Biochemistry Unit). Fill up MKAK-BPU-U01/Rev2018 and send along with sample. Patient preparation: Fasting overnight (12-14 hours). For infant: draw prior to next feeding. Water can take as needed. Blood should be collected before breakfast in the morning and prior to any medication. In a close vial and light protected, patient's sample is stable for 24 hours at 2°-8° C.
480.	Vitamin B12 Chemical Pathology & Integrated Lab	Serum/ plasma (3.5 ml)	Gel vacutainer/ Plain tube/ Heparinised tube	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. MANDATORY AUTHORIZATION BY SPECIALIST
481.	Vitamin D Chemical Pathology & Integrated Lab	Serum (2 ml)	Plain tube	Test on hold	14 working days	Outsource to Hospital Putrajaya. Fill up PER-PAT 301 request form and send along with the sample. Mandatory for Endocrinologist / Paediatrician to screen and countersign. *Currently test on hold. Will inform if test resume. For urgent cases please consult with Dr Nor Syazwani (Chemical Pathologist, Hosp Putrajaya) at 0380903300
482.	Vitreous fluid cytology Cytology Lab	Vitreous fluid (Non-gynae) (Minimum 0.5 ml)	Sterile container (with Cytofixative solution)	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	3 working days for URGENT case	Outsource to Hospital Sultanah Bahiyah. Add Cytofixative solution into the sample (ratio 1:1) Send to the lab immediately - cytofixative solution is provided by cytology lab. Please fill up PER-PAT 301 form.
483.	Vitreous Humor Profile - Sodium - Potassium - Chloride Individual test - Creatinine - Urea - Glucose Chemical Pathology & Integrated Lab	Vitreous humor (3.5 ml)	Heparinised tube - Sodium, Potassium, Chloride, Urea, Creatinine Sodium Fluoride Potassium Oxalate Tube - Glucose	Sample will be send to referral lab three times a week (Sunday, Tuesday, Thursday)	5 working days	Outsource to Hospital Sultanah Bahiyah. Please fill up PER-PAT 301 form. The reference range and performance specifications have not been established/verified for this body fluid. Result must be incorporated into the clinical context for interpretation. Vitreous Humor Profile Test includes Sodium, Potassium and Chloride only. Vitreous Humor for Creatinine, Urea and glucose should be requested as individual test. Consultation with Chemical Pathologist is required for non-listed tests.

484.	Von Willebrand Disease Screening Haematology Lab	Plasma Adult: 5ml PaedS (<1 year old): 3-4 ml	Trisodium Citrate	By appointment 03-26003000 Please inform lab the appointment date prior to send sample.	14 working days	Please fill up PER-PAT 301 form. 03-26933888 ext 5598. Outsource to Hospital Tunku Azizah Please spin the sample and keep the plasma at -20°C/ -80°C. This sample must be send in dry ice. Need to post out to Hospital Tuanku Azizah by HSB. Staff Lab need to Contact Science Officer in Hematology unit HSB.
485.	West Nile virus PCR Microbiology Lab	After consultation ONLY	After consultation ONLY	After consultation ONLY	After consultation ONLY	Please call IMR at 03-26162671/75/76/77.
486.	Whole mitochondrial DNA (mtDNA hotspots) (mtDNA Sequence Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
487.	X-Chromosome Inactivation : (AR Fragment Analysis) Chemical Pathology & Integrated Lab	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES (IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
488.	X-linked Adrenoleukodystrophy : (ABCD Sequence Analysis)	Blood 2-5ml blood EDTA (1-2ml is acceptable for infant)/DNA	EDTA tube	Active by consultation only	5 months	Outsource to IMR (Molecular & Diagnostic Services). Fill up REQUEST FORM FOR MOLECULAR DIAGNOSTICS SERVICES

	Chemical Pathology & Integrated Lab					(IMR/SDC/UMD/REQUEST FORM) and send along with the sample. Active by consultation only. Require consultation with Clinical Geneticist/Neurologist AND clinical evidence e.g. biochemical testing result or any relevant screening test result which is suggestive of the respective disease. Blood needs to ambient for overnight delivery or can be refrigerated up to 7 days before shipping.
489.	Yellow fever PCR Microbiology Lab	After consultation ONLY	After consultation ONLY	After consultation ONLY	After consultation ONLY	Please call IMR at 03-26162671/75/76/77.
490.	Zika Virus PCR Microbiology Lab	After consultation ONLY	After consultation ONLY	After consultation ONLY	After consultation ONLY	Please call IMR at 03-26162671/75/76/77.