

2024

KEDAH CONSENSUS GUIDELINES ON PRIMARY CARE MANAGEMENT OF MEDICAL DISORDERS IN PREGNANCY



Kedah State Health Department

Kedah Consensus Guidelines on Primary Care Management of Medical Disorders in Pregnancy Second Edition 2024 was developed by the Kedah Family Medicine Specialists in collaboration with Kedah State Health Department.

STATE OF INTENT

This consensus guidelines is a guide to clinical management of medical disorders in pregnancy and its related problems in the local primary care setting. It is based on the best available evidence present at the time of development and print. Adherence to these guidelines may not necessarily guarantee the best outcome in every case. Every health care provider is responsible for the management of his / her patient based on the clinical picture presented and the patient's unique characteristics, using management options available locally.

REVIEW OF THE GUIDELINES

These consensus guidelines are issued in 2024 and will be reviewed within a minimum period of 5 years (2029) or sooner if new evidence arises which may affect management.

TABLE OF CONTENTS

FOREWORD	4
PREFACE.....	5
TASKFORCE COMMITTEE.....	6
REVIEW COMMITTEE.....	8
ABBREVIATIONS AND ACRONYMS.....	10
MEDICAL DISORDERS	
Section 1: Concept of Prepregnancy Care	15
Section 2: Early Pregnancy	
2.1 Approach to Nausea and Vomiting.....	27
Section 3: Endocrine Disorders	
3.1 Diabetes.....	33
3.1.1 Preexisting Diabetes/ Overt Diabetes.....	33
3.1.2 Gestational Diabetes.....	38
3.2 Thyroid Disorders.....	45
3.2.1 Hyperthyroidism.....	45
3.2.2 Hypothyroidism.....	51
3.3 Maternal Obesity.....	56
Section 4: Cardiovascular Disorders	
4.1 Hypertensive Disorders.....	61
4.2 Heart Disease.....	70
4.3.1 Approach to Maternal Tachycardia.....	77
Section 5: Respiratory Disorders	
5.1 Bronchial Asthma.....	82
5.2 Pulmonary Tuberculosis.....	92
Section 6: Hematological Disorders	
6.1 Approach to Anaemia.....	101
6.1.1 Iron Deficiency Anaemia.....	101
6.1.2 Thalassaemia.....	106
6.2 Approach to Thrombocytopenia.....	115
6.3 Rhesus Negative.....	120
6.4 Venous Thromboembolism.....	123

Section 7: Renal Disorders

7.1 Chronic Kidney Disease.....	129
7.2 Approach to Persistent Proteinuria.....	136

Section 8: Connective Tissue Disease

8.1 Systemic Lupus Erythematosus.....	142
---------------------------------------	-----

Section 9: Pregnancy - specific Dermatoses

9.1 Polymorphic Eruption of Pregnancy.....	150
9.2 Atopic Eruption of Pregnancy.....	152
9.3 Pemphigoid Gestationis.....	155
9.4 Intrahepatic Cholestasis.....	157

Section 10: Infectious Diseases

10.1 Urinary Tract Infection.....	159
10.2 Group B Streptococcus Infection.....	165
10.3 Retroviral Disease.....	169
10.4 Syphilis.....	172
10.5 Hepatitis B.....	179
10.6 Chicken Pox	184
10.7 Anogenital Warts.....	187
10.8 Approach to Abnormal Vaginal Discharge.....	189
10.9 Approach to Vaginal Ulcer.....	194

Section 11: Neurological Disorders

11.1 Epilepsy.....	200
--------------------	-----

Section 12: Mental Disorder

12.1 Perinatal Mental Health.....	207
12.1.1 Depression.....	207
12.1.2 Generalized Anxiety Disorder.....	218
12.1.3 Postpartum Psychosis.....	220
12.1.4 Severe Mental Illness	224
(Schizophrenia, Bipolar Disorder)	
12.2 Substance Use Disorders.....	233

FOREWORD

I would like to congratulate the Family Health Unit, Kedah State Health Department, and all the consultants, contributors, and editors who have been instrumental in developing the “Kedah Consensus Guidelines on Primary Care Management of Medical Disorders in Pregnancy.”

Pregnancy, while a natural physiological process, can present significant challenges when complicated by medical disorders. Maternal mortality remains a critical concern in Kedah, highlighting the urgency of effective clinical management strategies. These guidelines prioritize early identification, comprehensive assessment, and timely intervention to mitigate risks associated with medical disorders during pregnancy. By standardizing best practices in primary care settings, we aim to reduce maternal mortality rates, ultimately enhancing the quality of care for pregnant women throughout Kedah.

This guideline will serve as a valuable guide and reference for primary health care providers in identifying and managing pregnant women with medical disorders. It will also empower health care providers to effectively manage the increasing challenges related to maternal mortality.

I hope this initiative will contribute to the vision of safe motherhood in Malaysia.

Thank you.



DR ISMUNI BIN BOHARI

State Health Director

Kedah State Health Department

PREFACE

Primary care practitioners play a crucial role in managing medical disorders in pregnancy, significantly influencing maternal and fetal outcomes. Often the first point of contact for pregnant women, primary care practitioners are ideally positioned to identify potential issues early and intervene effectively. Their role extends beyond pregnancy and delivery, as continuity of care postpartum is essential for monitoring the health of both mother and baby.

The development of these guidelines aim to empower primary care practitioners with comprehensive, evidence-based guidelines to enhance the overall quality of maternal healthcare. These guidelines are based on evidence-based medicine, ensuring that recommendations are supported by the latest and most reliable research. To ensure they are relevant and practical, we incorporate both local and international standards. Expert consensus also plays a crucial role in the development of these guidelines, particularly in areas where evidence may be limited or still evolving, helps in filling these gaps and providing well-rounded recommendations for common clinical scenarios that encountered in the primary care level.

The guidelines focus on medical disorders frequently encountered in primary care settings, such as diabetes, hypertension, anaemia, and thyroid disorders. In addition, we include special chapters on mental health disorders and dermatological conditions, which are often overlooked but critically important in primary care. Addressing these areas makes these guidelines distinctive, ensuring a holistic approach to patient care.

The development of these guidelines reflects the dedication and teamwork of the development committee members, including our reviewers, persevered with continuous and timely discussions to reach final consensus, enabling its completion. For this, we extend our appreciation and gratitude, and commend their unwavering commitments to providing the standardized, evidence-based primary care approach for our patients.



DR ARTINI BINTI ABIDIN

Editor in Chief

TASKFORCE COMMITTEE

CHAIRPERSON	CO-CHAIRPERSON
Dr Artini Abidin Family Medicine Specialist Klinik Kesihatan Bandar Alor Setar	Dr Mahani Kamaruddin Family Medicine Specialist Klinik Kesihatan Simpang Kuala
MEMBERS (in alphabetical order)	
Dr Abu Bakar Mohd Yusof Family Medicine Specialist Klinik Kesihatan Lubuk Merbau	Dr Alyani Mohamad Mohsin Family Medicine Specialist Klinik Kesihatan Pokok Sena
Dr Anis Farhanah Abdul Rahim Family Medicine Specialist Klinik Kesihatan Merbau Pulas	Dr Azeanty Ahmad Family Medicine Specialist Klinik Kesihatan Kuah
Dr Cheah Lin Shie Family Medicine Specialist Klinik Kesihatan Bandar Baharu	Dr Farah Hanim Muhamad Fadzil Family Medicine Specialist Klinik Kesihatan Bandar Alor Setar
Dr Hasniza Hasim Family Medicine Specialist Klinik Kesihatan Bandar Sungai Petani	Dr Logeswari Natchiar A/P Kannan Family Medicine Specialist Klinik Kesihatan Bukit Selambau
Dr Masniza Izani Md Sapar Family Medicine Specialist Klinik Kesihatan Merbok	Dr Mohd Redhuan Abdul Muin Family Medicine Specialist Klinik Kesihatan Simpang Kuala
Dr Mohd Shahrman Ahmad Fuat Family Medicine Specialist Klinik Kesihatan Sg Tiang	Dr Nawal Nabilah Kamaludin Family Medicine Specialist Klinik Kesihatan Langgar
Dr Noor Liani Harun Family Medicine Specialist Klinik Kesihatan Langgar	Dr Noor Nazeerah Halil Abdul Razak Family Medicine Specialist Klinik Kesihatan Karangan
Dr Nor Asyura Ngah Family Medicine Specialist Klinik Kesihatan Bandar Sungai Petani	Dr Nor Azilla Che Ani Penolong Pengarah Kanan Unit kesihatan Keluarga Jabatan Kesihatan Negeri Kedah
Dr Norazlin Zainuddin Family Medicine Specialist Klinik Kesihatan Sg Limau Dalam	Dr Norzazalina Samsudin Family Medicine Specialist Klinik Kesihatan Kupang
Dr Nur Syafiqa Binti Amri Family Medicine Specialist Klinik Kesihatan Malau	Dr Nurulaini Abdullah Family Medicine Specialist Klinik Kesihatan Kuah

Dr Nurul Syuhada Samsuri

Family Medicine Specialist
Klinik Kesihatan Ayer Hangat

Dr Raihan Abd Aziz

Family Medicine Specialist
Klinik Kesihatan Kulim

Dr Shakirah Ismail

Family Medicine Specialist
Klinik Kesihatan Taman Selasih

Dr Siti Rohana Ahmad

Public Health Medicine Specialist
Unit Kesihatan Keluarga
Jabatan Kesihatan Negeri Kedah

Dr Teh Tat Sin

Family Medicine Specialist
Klinik Kesihatan Kodiang

Dr Powell Roy Louis

Family Medicine Specialist
Klinik Kesihatan Kampung Betong

Dr Sarah Nur Alya Mohd Sofian

Family Medicine Specialist
Klinik Kesihatan Padang Serai

Dr Shariffah Shafinaz Syed Hamzah

Family Medicine Specialist
Klinik Kesihatan Kota Kuala Muda

Dr Tanusha a/p Nathan

Family Medicine Specialist
Klinik Kesihatan Kampung Lalang

Dr Wan Wahida Wan Mohd Zohdi

Family Medicine Specialist
Klinik Kesihatan Kepala Batas

REVIEW COMMITTEE

MEMBERS (in alphabetical order)

Dr Abdul Jamil Ahmad

Consultant Family Medicine Specialist
Klinik Kesihatan Kulim

Dr Arfah Ahmad

Family Medicine Specialist
Klinik Kesihatan Changlun

Dr Aznita Ibrahim

Internal Medicine Physician
Hospital Sultan Abdul Halim

Dr Harun Hj Husin

O&G Specialist
Hospital Sultan Abdul Halim

Dr Ismail Aliyas

Head of O&G Department
Consultant O&G Specialist
Hospital Sultanah Bahiyah

Dr Liew Hong Keng

Haematologist
Hospital Sultanah Bahiyah

Dr Muhammad Arif Muhamad Rasat

Addiction Psychiatrist
Hospital Sultanah Bahiyah

Dr Nor Juhaida Jaaffar

O&G Specialist
Hospital Baling

Dr Nur Afidah Mat Yusof

O&G Specialist (Fetal Maternal Medicine)
Hospital Sultan Abdul Halim

Dr Saravanan A/L Krishinan

Consultant Cardiologist
Hospital Sultanah Bahiyah

Dr Sharifah Baizura Syed Alwi

Infectious Disease Physician
Hospital Sultanah Bahiyah

Dr Sri Wahyu Taher

Consultant Family Medicine Specialist
Klinik Kesihatan Simpang Kuala

Dr Ahmad Rostam Md Zin

Consultation-Liason Psychiatrist
Hospital Sultanah Bahiyah

Dr Arvindran A/L Alaga

Respiratory Specialist
Hospital Sultanah Bahiyah

Dr Ching Chen Hua

Consultant Nephrologist
Hospital Sultanah Bahiyah

Dr Ilyani Mohd Ilias

O&G Specialist
Hospital Kulim

Dr Lee Shen Wei

Dermatologist
Hospital Sultanah Bahiyah

Dr Loh Hoong Heng

Head of Medical Department
Internal Medicine Physician
Hospital Kulim

Dr Nik Nur Hidayah Ilias

O&G Specialist
Hospital Kulim

Dr Nor Shaffinaz Yusoff Azmi Merican

Endocrinologist
Hospital Sultanah Bahiyah

Dr Nurul Nadia Ismail

Psychiatrist
Hospital Sultanah Bahiyah

Dr Sharifa Azlin Hamid

O&G Specialist (Fetal Maternal Medicine)
Hospital Sultanah Bahiyah

Dr Siti Sarah Ahmad

O&G Specialist
Hospital Sultanah Bahiyah

Dr Tan Chou Luan

Rheumatologist
Hospital Sultanah Bahiyah

Dr Tan Wei Leong

Public Health Medicine Specialist
Sik District Health Office

Dr Teoh Aik Tatt

Internal Medicine Physician
Hospital Baling

Dr Zalwani Zainuddin

Head of Medical Department
Consultant Gastroenterologist
Hospital Sultanah Bahiyah

Dr Zamri Mansor

Head of FMS Kedah
Consultant Family Medicine Specialist
Klinik Kesihatan Taman Intan

ABBREVIATIONS AND ACRONYMS

AADK	Agensi Anti Dadah Kebangsaan	cART	Combined Antiretroviral Therapy
Ab	Antibody	CBT	Cognitive Behaviour Therapy
ACEi	Angiotensin Converting Enzyme Inhibitor	CHO	Carbohydrate
ACR	American College of Rheumatology	CCB	Calcium Channel Blocker
ACT	Asthma Control Test	CHB	Chronic Hepatitis B
ADHD	Attention Deficit Hyperactive Disorder	CHC	Combined Hormonal Contraceptives
AED	Antiepileptic Drugs	CHD	Congenital Heart Disease
AF	Atrial Fibrillation	CHF	Congestive Heart Failure
AFB	Acid Fast Bacilli	CIC	Combined Injectable Contraceptive
ALT	Alanine Aminotransferase	CKD	Chronic Kidney Disease
Anti-dsDNA	Anti-double Stranded DNA	CLD	Chronic Liver Disease
Anti-HBs	Anti-Hepatitis B Surface	CNS	Central Nervous System
APH	Antepartum Haemorrhage	COC	Combined Oral Contraceptive
aPL	Antiphospholipid Antibody	C&S	Culture and Sensitivity
APRI	Aspartate Aminotransferase to Platelet Ratio	CTD	Connective Tissue Disease
ARB	Angiotensin Receptor Blocker	CTNG	Chlamydia trachomatis Neisseria gonorrhea
ART	Anti-Retroviral Therapy	CV	Cardiovascular
ASB	Asymptomatic Bacteriuria	CVS	Cardiovascular System
AST	Aspartate Aminotransferase	CXR	Chest X-ray
ATD	Anti-Thyroid Drug	DBP	Diastolic Blood Pressure
BCG	Bacille Calmette-Guerin	DKD	Diabetic Kidney Disease
BD	Bidaily	DM	Diabetes Mellitus
BDZ	Benzodiazepine	DMPA	Depo Medroxyprogesterone Acetate
Beta HCG	Beta Human Chorionic Gonadotrophin	DNA	Deoxyribonucleic Acid
BMI	Body Mass Index	DOTS	Directly Observed Treatment, Short-course
BP	Blood Pressure	DSM-5	Diagnostic And Statistical Manual of Mental Disorders - 5
BPD	Bipolar Disorder	DVT	Deep Venous Thrombosis
bpm	Beats Per Minute	ECG	Electrocardiography
BVC	Betamethasone Valerate Cream	ECV	External Cephalic Version

ENT	Ear, Nose and Throat	HBV	Hepatitis B Virus
eGFR	Estimated Glomerular Filtration Rate	HBsAg	Hepatitis B Surface Antigen
ERPOC	Evacuation of Retained Product of Conceptus	HCV	Hepatitis C Virus
ESRF	End Stage Renal Failure	HELLP	Hemolysis, Elevated Liver Enzymes and Low Platelets
ET	Effort Tolerance	HF	Heart Failure
EULAR	European League Against Rheumatism	HPV	Human Papilloma Virus
FBC	Full Blood Count	4vHPV	Quadrivalent HPV Vaccine
FDA	Food and Drug Administration	9vHPV	9-valent HPV Vaccine
FEV	Forced Expiratory Volume	HPT	Hypertension
FIB-4	Fibrosis-4 index	HR	Heart Rate
FKC	Fetal Kick Chart	HSV	Herpes Simplex Virus
FMS	Family Medicine Specialist	IAP	Intrapartum Antibiotics Prophylaxis
FNAC	Fine Needle Aspiration Cytology	ICS	Inhaled Corticosteroid
FPG	Fasting Plasma Glucose	ID	Infectious Disease
ft4	Free T4	IDA	Iron Deficiency Anemia
ft3	Free T3	IHD	Ischemic Heart Disease
FVC	Forced Vital Capacity	IM	Intramuscular
GAD	Generalized Anxiety Disorder	INR	International Normalised Ratio
GAD 7	Generalized Anxiety Disorder-7	IOL	Induction of Labour
GBS	Group B Streptococcus	IPT	Isoniazid Prophylaxis Therapy
GDM	Gestational Diabetes Mellitus	IUCD	Intrauterine Contraceptive Device
GERD	Gastroesophageal Reflux Disease	IUD	Intrauterine Death
GIT	Gastrointestinal Tract	IUGR	Intrauterine Growth Restriction
GN	Glomerulonephritis	IV	Intravenous
GP	General Practitioner	IVIG	Intravenous Immunoglobulin
GTT	Gestational Transient Thyrotoxicosis	JKM	Jabatan Kebajikan Masyarakat
GWG	Gestational Weight Gain	KUB	Kidney Ureter Bladder
2HPP	2 Hours Post Prandial	LARC	Long-acting Reversible Contraception
HbA1c	Glycosylated Haemoglobin	LFT	Liver Function Test
HBeAb	Hepatitis B e Antibody	LGV	Lymphogranuloma Venerum
HBeAg	Hepatitis B e Antigen	LMWH	Low Molecular Weight Heparin
HBIG	Hepatitis B Immunoglobulin	LNG	Levonorgestrel
HBS	Hepatobiliary System	LNG-IUS	Levonorgestrel-releasing Intrauterine System

LPPKN	Lembaga Penduduk & Pembangunan Keluarga Negara	OCD	Obsessive Compulsive Disorder
LTBI	Latent Tuberculosis Infection	OD	Once daily
LUTI	Lower Urinary Tract Infection	O&G	Obstetric and Gynecology
MAFLD	Metabolic Associated Fatty Liver Disease	OGLD	Oral Glycemic Lowering Drugs
MCH	Mean Corpuscular Hemoglobin	OGTT	Oral Glucose Tolerance Test
MDD	Major Depressive Disorder	ON	On Night
MDI	Metered Dose Inhaler	OPD	Outpatient Department
MDR-TB	Multidrug-resistant Tuberculosis	OSA	Obstructive Sleep Apnea
MDT	Multidisciplinary Team	OSCA	One Stop Center for Addiction
MEC	Medical Eligibility Criteria	OT	Occupational Therapist
MEOWS	Modified Early Obstetric Warning System	PBF	Peripheral Blood Film
MFM	Maternal Fetal Medicine	PCOS	Polycystic Ovarian Syndrome
MMR	Measles Mumps Rubella	PCR	Polymerase Chain Reaction
MMT	Methadone Maintenance Therapy	PDA	Patent Ductus Arteriosus
MO	Medical Officer	PE	Preeclampsia
MOPD	Medical Outpatient Department	PEFR	Peak Expiratory Flow Rate
MS	Mitral Stenosis	PID	Pelvic Inflammatory Disease
MSE	Mental State Examination	PIH	Pregnancy Induced Hypertension
MSU	Mid-stream Urine	PJP	Pneumocystis Jiroveci Pneumonia
MTB C&S	Mycobacterium Tuberculosis Culture and Sensitivity	PLCS	Pre-labour Caesarean Section
mWHO	Modified World Health Organisation	PND	Perinatal Depression
NAAT	Nucleic Acid Amplification Tests	PO	Per Oral
NCD	Non-communicable Disease	POA	Period of Amenorrhea
NGO	Non-Government Organization	POG	Period of Gestation
NLE	Neonatal Lupus Erythematosus	POP	Progesterone-Only Pills
NTD	Neural Tube Defect	PPC	Prepregnancy Care
NVP	Nausea and Vomiting in Pregnancy	PPH	Postpartum Hemorrhage
OAC	Oral anti-coagulant	PR	Pulse Rate

PrEP	Pre-exposure Prophylaxis	SMBG	Self-Monitoring Of Blood Glucose
PRN	When Required (Pro Re Nata)	SMI	Severe Mental Illness
PSP	Pegawai Sains Pemakanan	SNRI	Serotonin and Norepinephrine Reuptake Inhibitors
PTB	Pulmonary Tuberculosis	SOB	Shortness of Breath
PTU	Propylthiouracil	SOPD	Surgical Outpatient Department
PUQE	Pregnancy-Unique Quantification of Emesis	SSRI	Selective Serotonin Reuptake Inhibitor
PV	Per Vagina	STD	Sexually Transmitted Disease
PVC	Premature Ventricular Contraction	STI	Sexually Transmitted Infection
QID	Four Times A Day (Quarter In Die)	SUA	Serum Uric Acid
RA	Rheumatoid Arthritis	SUDEP	Sudden, Unexpected, Witnessed, or Unwitnessed, Nontraumatic and Non-drowning Death in Patients with Epilepsy
RAI	Radioiodine 131 ⁱ	SVD	Spontaneous Vaginal Delivery
RDT	Rapid Diagnostic Test	SVT	Supraventricular Tachycardia
RDW	Red Blood Cell Distribution Width	TB	Tuberculosis
REDD	Revised Estimated Date of Delivery	TCA	To Come Again
RMD	Rheumatic and Musculoskeletal Disease	Tdap	Tetanus, Diphtheria, Acellular Pertussis Vaccine
RME	Routine Medical Examination	TDM	Therapeutic Drug Monitoring
RPG	Random Plasma Glucose	TDS	Thrice Daily
RSAT	Rumah Sakit Angkatan Tentera	TFT	Thyroid Function Test
RP	Renal Profile	TIBC	Total Iron Binding Capacity
RPR	Rapid Plasma Reagent	TIRADS	Thyroid Imaging Reporting Data System
RRT	Renal Replacement Therapy	TOC	Target Organ Complications
RVD	Retroviral disease	TOD	Target Organ Damage
SABA	Short Acting Beta Agonist	TOP	Termination of Pregnancy
SBP	Systolic Blood Pressure	TPOAb	Thyroid Peroxidase Antibodies
SFH	Symphysiofundal Height	TPPA	Treponema Pallidum Particle Agglutination
SGLT2i	Sodium-glucose Cotransporter-2 Inhibitors	TRAB	TSH Receptor Antibodies
SIDS	Sudden Infant Death Syndrome	TRO	To Rule Out
SLE	Systemic Lupus Erythematosus	TSH	Thyroid Stimulating Hormone

TVS	Transvaginal Scan	UVB	Ultraviolet B
UFEME	Urine Full Examination and Microscopic Examination	VCV	Varicella Zoster Virus
UFH	Unfractionated Heparin	VL	Viral Load
UPCI	Urine Protein Creatinine Index	VP	Venous Plasma Glucose
UPCR	Urine Protein Creatinine Ratio	VTE	Venous Thromboembolism
UPT	Urine Pregnancy Test	WHO	World Health Organization
USG	Ultrasonography	WWE	Women with Epilepsy
UTI	Urinary Tract Infection		

SECTION 1

CONCEPT OF PREPREGNANCY CARE (PPC)

PHASE	ASSESSMENT AND MANAGEMENT
Definition	Preconception care is the provision of biomedical, behavioural and social health interventions to women and couples before conception occurs, aimed at improving their health status, and reducing behaviours and individual and environmental factors that could contribute to poor maternal and child health outcomes (WHO Preconception Care to Reduce Maternal and Childhood Mortality and Morbidity, 2012)
Prepregnancy Care & Family Planning	Target groups (refer <i>appendix figure 1</i>) Women in reproductive age group (15 – 49 years old) with: - Chronic medical conditions - HPT, DM, heart disease, thyroid disease, epilepsy, bronchial asthma, CTD, renal disorders, blood disorders, malignancy, transplant surgery, mental illnesses - Infectious diseases - HIV, active TB under treatment, Hepatitis B or C - Lifestyle risks - Smoking, alcoholism, substance abuse, obesity - History of genetic conditions or structural congenital anomalies - Personal - Previous children - Familial Exception for women with: - Bilateral Tubal Ligation - Menopause - Hysterectomy Place of PPC service - Klinik Kesihatan - Incorporated into chronic diseases clinic or integrated clinic - Virtual clinic - Hospital (PPC Clinic by O&G team) Entry points for PPC service - Klinik Kesihatan - OPD & other primer services e.g. CDC, NCD, premarital screening - Maternal & Child Health (MCH) services - Hospital Specialized Clinics - Ambulatory Care Centre - Others - LPPKN, RSAT, GP, private medical centres, NGO PPC team in Klinik Kesihatan - Family Medicine Specialist - Medical Officer - Pharmacist, dietitian/ nutritionist, OT, physiotherapist, counsellor

	• Paramedics - medical assistants & nurses Multidisciplinary team discussion/ referral involving hospital specialized clinics can be done when required during case management. Management during PPC visit (refer <i>appendix figure 2</i>) • Identification of prepregnancy risk factors • Assessment of clients: ○ History taking ○ Physical examination ○ Laboratory tests • Appropriate interventions: ○ Disease-specific investigations, treatment & management. ○ Contraceptive counselling & family planning. ○ Supplementation. ▪ Folic Acid (refer <i>remarks</i>) - to reduce risk of occurrence or recurrence of neural tube defects. ▪ Vaccination (if indicated) - Covid-19, varicella (avoid conception for 4 weeks), Tdap (tetanus toxoid, diphtheria toxoid, and acellular pertussis vaccine), pneumococcal, MMR (mumps, measles, rubella) (avoid conception for 4 weeks), meningococcal, inactivated influenza vaccine, human papilloma vaccine, hepatitis A and B. ○ Health educations. ○ Appropriate referral for shared care, or further workout and management. ○ Follow up schedule: ▪ Patients should be followed up for PPC at least 6 months to 1 year before a planned pregnancy and aims for optimum health level at least 3 months prior to conception. ▪ Reassess regularly for decision on the suitability of embarking pregnancy. ○ If pregnancy is contraindicated: ▪ Re-evaluation of therapeutic options. ▪ Discussion on effective contraception. ▪ Discussion on TOP in the event of unplanned pregnancy (Refer PPC clinic by O&G team in the hospital). ○ If suitable for pregnancy, the patient should undergo: ▪ Re-evaluation of medical therapy. ▪ Follow-up / care plan for the antenatal period. ▪ Combined care with FMS/ PPC Clinic by O&G team in the hospital/ hospital specialists until embarking on pregnancy if indicated.
Antenatal Care	Disease-specific approach
Referral/ Shared Care	• Multidisciplinary involvement in the care is vital to ensure positive pregnancy outcome. • Reason for referral during prepregnancy: ○ Shared care for optimizing prepregnancy medical conditions especially clients with poorly optimized conditions. ○ For determination of suitability/ fitness for pregnancy in certain medical conditions.

	- Relevant specialties for referral: - FMS - PPC Clinic by O&G team in the hospital, or hospital specialists with other disciplines - Allied health team
Delivery Plan	Disease-specific timing and mode of delivery.
Postnatal Care	- Appropriate review and management for both mother and baby by MO/ FMS (as per indication). - Reassessment of health risks. - Appropriate lactation and breastfeeding counselling. - Appropriate contraceptive counselling and prescription (based on MEC for contraceptive use recommendation). - Register and continue PPC if risks still present.

REMARKS

- PPC focus on women in their reproductive age (15 – 49 years) with medical problems or high-risk health factors.
- PPC aims for optimum health level at least 3 months prior to conception.
- PPC clients must be put on effective family planning measures during the process of optimization.
- Effective contraception is an essential component for effective PPC.
- Folic acid supplementation – dosage and duration recommendation:

Indication for supplementation	Dose (Daily)	Start prior to conception (minimum)
High risk		
Open NTD any first degree relative of either parent or a personal history of open NTD in either parent	4 mg	3 months (SOGC, ACOG)
Moderate risk		
Personal or family history of folate-sensitive congenital anomaly other than NTD	1 mg	3 months (SOGC)
Family history of NTD (first or second degree relative)	1 mg	3 months (SOGC)
Type 1 or II diabetes	1 mg	3 months (SOGC)
	0.4 mg	1 month (ADA, ACOG)
Maternal gastrointestinal malabsorption	1 mg	3 months (SOGC)
Medical conditions associated with risk (advanced liver disease, dialysis, alcohol overuse)	1 mg	3 months (SOGC)
Low risk		
Pregnancy or potential for pregnancy	0.4 mg	At least 1 month (ACOG, CDC)
	0.4 – 0.8 mg	1 month (USPSTF)

*Pregnancies at increased NTD risk: The recommended preconception dose is maintained for the first 12 weeks of pregnancy, followed by continuation of 0.4 mg daily till 4-6 weeks postpartum or completion of breastfeeding.

**Reference: ACOG (American College of Obstetricians and Gynaecologists); ADA (American Diabetes Association), CDC (Centers for Disease Control and Prevention); SOGC (Society of Obstetricians and Gynaecologists of Canada); SOGC (Society of Obstetricians and Gynaecologists of Canada); USPSTF (United States Preventive Services Task Force).

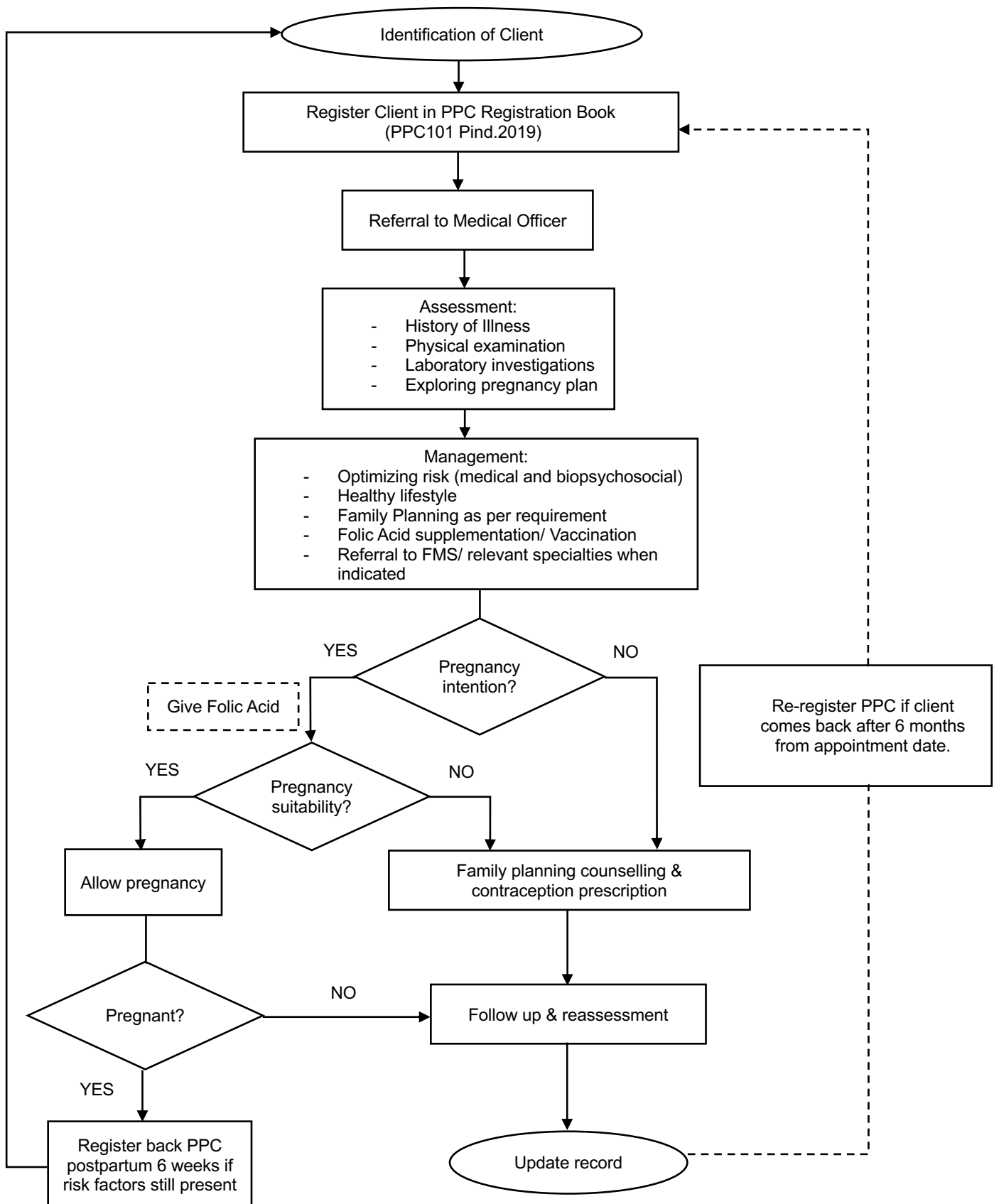
APPENDIX**Figure 1: Potential Health Problems Causing High Risk Pregnancy**

RISK CODE	RISK CONDITIONS
1	Diabetes Mellitus
2	Obesity ($\geq 35 \text{ kg/m}^2$)
3	Thyroid Disorders
4	Heart Disease
5	Hypertension
6	Asthma
7	Epilepsy
8	Mental Health Problems
9	Chronic Kidney Disease
10	Hematological Disorders: Thalassaemia, Anaemia
11	Malignancy on treatment
12	Connective Tissue Disease
13	Retroviral Disease
14	Hepatitis B or C
15	Tuberculosis on treatment
16	Substance, Smoking or Alcohol Addiction
17	History of Transplant Surgery
18	Pre-diabetes

Perkhidmatan atau khidmat nasihat prakehamilan bagi wanita yang mempunyai penyakit atau masalah perubatan selain daripada yang tersenarai di atas boleh diberikan mengikut keperluan dan penilaian klinikal. Walau bagaimanapun, hanya penyakit seperti tersenarai perlu didaftarkan di dalam Buku Daftar Perkhidmatan Prakehamilan (PPC101 Pind.2023).

Reference: Garis Panduan Perkhidmatan Prakehamilan di Penjagaan Kesihatan Primer Pind Disember 2023

Figure 2: Flow Chart for PPC in Klinik Kesihatan



Reference: Garis Panduan Perkhidmatan Prakehamilan di Penjagaan Kesihatan Primer Pind Disember 2023

Figure 3: First PPC Assessment Form

BORANG PENILAIAN PERTAMA PENJAGAAN PRAKEHAMILAN

Tarikh :

Sejarah O&G Menarche : Kitaran haid:..... Para : LCB: Imunisasi:.....	Masalah perubatan DM ☐ HPT ☐ Asthma ☐ CVD ☐ Mental ☐ Lain-lain ☐	Ubat-ubatan: 1. 2. 3. 4. 5.	Risiko Psikososial Merokok ☐ Alkohol ☐ Obesiti ☐ Dadah/bahan terlarang ☐ Seksual ☐ Sosioekonomi ☐
---	---	--	--

Perancang Keluarga : OCP ☐ Suntikan ☐ IUCD ☐ Implan ☐ Kondom ☐ Tradisional ☐ Nil ☐	Pemeriksaan Fizikal : Ketinggian (m) : Berat (kg):..... BMI (kg/m2):..... BP (mmHg):..... PR :	Pallor: CVS: Resp: Thyroid:	Ujian Makmal : Hb (g/dL): Pap smear : Lain-lain :
---	--	--	---

Keinginan untuk hamil: Ya / Tidak

Kesesuaian untuk hamil: Ya / Tidak

Pengurusan kes :

1.

2.

3.

Temujanji susulan:

Nama Pegawai Perubatan:

Cop rasmi :

Reference: Garis Panduan Perkhidmatan Prakehamilan di Penjagaan Kesihatan Primer Pind Disember 2023

Figure 4: Annual PPC Assessment Form

BORANG PENILAIAN TAHUNAN PERKHIDMATAN PRAKEHAMILAN

Tarikh penilaian: _____		
Komponen PPC	Penilaian	Catatan
Nasihat gaya hidup sihat diberikan:	Pengurusan berat badan yang ideal ☐ Ya ☐ Tidak	
	Pemakanan sihat dan seimbang ☐ Ya ☐ Tidak	
	Pengurusan stres ☐ Ya ☐ Tidak	
	Senaman ☐ Ya ☐ Tidak	
	Lain-lain (e.g.: jauhi tingkahlaku berisiko, tabiat merokok, pengambilan dadah/ bahan terlarang dan alcohol) ☐ Ya ☐ Tidak ☐ Tidak berkaitan	
Pengendalian berkaitan penyakit	Nasihat berkaitan kesan masalah kesihatan terhadap kehamilan dan kesan kehamilan terhadap masalah kesihatan ☐ Ya ☐ Tidak	
	Kawalan penyakit telah optimum: ☐ Ya ☐ Tidak	
	Rujukan ke unit/jabatan/perkhidmatan lain telah dibuat: ☐ Ya ☐ Tidak ☐ Tidak berkaitan Unit/Jabatan (jika berkaitan): _____	
Perancang Keluarga	Nasihat dan kaunseling diberikan: ☐ Ya ☐ Tidak	
	Kaedah perancang keluarga diamalkan: ☐ Ya ☐ Tidak Jika 'Ya', kaedah: _____	
Keinginan untuk hamil	☐ Ya ☐ Tidak	
Kesesuaian untuk hamil	☐ Ya ☐ Tidak	
Suplemen Asid Folik	☐ Ya ☐ Tidak ☐ Tidak berkaitan	
Tarikh penilaian seterusnya: _____		

Reference: Garis Panduan Perkhidmatan Prakehamilan di Penjagaan Kesihatan Primer Pind Disember 2023

Figure 5: PPC Implementation Checklist (Kedah State)

SENARAI SEMAK PENGENDALIAN PPC			
<u>1.Maklumat ibu</u>			
NAMA :			
K/P :			
PARA :			
LCB :			
LMP :			
TINGGI :			
BERAT :			
BMI :			
<u>2.Masalah perubatan:</u>			
1. Diabetes mellitus		10.Masalah hematologi (thalasemia/anemia)	
2.Obesiti		11.Kanser dalam rawatan	
3.Penyakit tiroid		12.Connective tissue disease	
4.Masalah jantung		13.Retroviral disease	
5.Hipertensi		14.Hepatitis B atau C	
6.Asma		15.Penyakit tuberkulosis dalam rawatan	
7.Epilepsi		16.Ketagihan dadah, merokok, alkohol	
8.Penyakit mental		17.Sejarah pembedahan transplant	
9.Penyakit buah pinggang kronik		18.Lain-lain	
<u>3.Perancang keluarga</u>			
BTL		Kondom	
Implanon		Kaedah azal	
IUCD		Lain-lain	
IM Depo		Nyatakan: _____	
OCP		Tiada	
<u>4. Kaunseling gaya hidup sihat</u>			
4.1 Pengurusan berat badan	:YA / TIDAK / TIDAK BERKAITAN		
4.2 Pemakanan sihat	: YA / TIDAK / TIDAK BERKAITAN		
4.3 Pengurusan stress	: YA / TIDAK / TIDAK BERKAITAN		
4.4 Senaman	: YA / TIDAK / TIDAK BERKAITAN		
4.5 Elakkan pengambilan rokok/dadah/alkohol	: YA / TIDAK / TIDAK BERKAITAN		
4.6 Jauhi tingkahlaku berisiko	: YA / TIDAK / TIDAK BERKAITAN		

5. Pengendalian pesakit

- | | |
|--|--------------------------------|
| 5.1 Kauseling kesan masalah kesihatan terhadap kehamilan dan kesan kehamilan terhadap masalah kesihatan diberi | : YA / TIDAK |
| 5.2 Nasihat kesesuaian untuk hamil diberi | : YA / TIDAK |
| 5.3 Perbincangan keinginan pesakit untuk hamil diberi | : YA / TIDAK |
| 5.4 Pemantauan berkala untuk mengoptimalkan penyakit kronik diberi | : YA / TIDAK |
| 5.5 Intervensi rawatan mengikut CPG diberi | : YA / TIDAK |
| 5.6 Rujukan berdasarkan indikasi diberi | : YA / TIDAK |
| 5.7 Asid folik dibekalkan | : YA / TIDAK / TIDAK BERKAITAN |

6. Amalan perancang keluarga

- | | |
|--|--------------------------------|
| 6.1 Kaunseling perancang keluarga diberi | : YA / TIDAK / TIDAK BERKAITAN |
| 6.2 Kaedah perancang keluarga diberi | : YA / TIDAK / TIDAK BERKAITAN |

Resource: JKN Kedah

Figure 6: Referral Letter for PPC Service in Klinik Kesihatan (Kedah State)

JKN KEDAH 1/2024			
SURAT RUJUKAN PERKHIDMATAN PENJAGAAN PRA KEHAMILAN(PPC)			
Daripada: Unit Pesakit Luar KKIA Klinik Desa KKOM Klinik Bergerak Kem Kesihatan		Farmasi Klinik Pergigian NGO Klinik Swasta Lain-lain Agensi	
Kepada : KK _____			
MAKLUMAT KLIEN Nama : No Kad Pengenalan : Alamat :			
Umur : No Telefon :			
SEJARAH PERUBATAN RINGKAS: 			
KEPUTUSAN UJIAN MAKMAL (sekiranya ada): 			
SENARAI UBAT-UBATAN: 			
SEBAB RUJUKAN: PPC Lain-lain Perancang Keluarga			
Tarikh :		Tandatangan dan Cop : Nama dan Jawatan :	

Resource: JKN Kedah

Figure 7: Referral Letter for PPC Service in Hospital

PRE-PREGNANCY CARE SCREENING FORM
(all women aged 15–49-year-old with complicated medical disorders)

Medical History DM with complication ☐ HPT with complication ☐ Cardiac disease ☐ Renal disease ☐ Connective Tissue Disease ☐ Hematological Disorder ☐ Epilepsy ☐ Others, please specify:	Psychological History Morbid Obesity ☐ (BMI >40kg/m ²) Substance abuse ☐ High risk sexual behaviour ☐ Social Risk ☐ (Marginalised group, single mother, domestic violence)	List of Medication 1. 2. 3. 4. 5. 6. 7.
---	---	--

Contraception Use No ☐ If yes, please specify Pills ☐ Implanon ☐ IM Depo Provera ☐ IUCD ☐ Condom ☐ Calendar/Withdrawal method ☐ Others, please specify	Physical Examination: BP : / mmHg PR : bpm Weight : kg Height : cm BMI : kg/m ²
--	--

Pregnancy Intention : YES/NO (If YES, refer Pre-Pregnancy Clinic for assessment, if NO- refer for contraception (Health Clinic or hospital))

Suitability for Pregnancy : YES/NO (if NO, refer Pre-Pregnancy Clinic for counselling and contraception)

Care Plan & Follow-Up:

1. 2. 3. 4.	Prepared by : Date :
--	---

FEEDBACK FROM PRE-PREGNANCY SCREENING ASSESSMENT

TO : DEPARTMENT :
PATIENT'S NAME : IC NO :

Outcome For Pre-Pregnancy Assessment:

1. Fit for pregnancy YES / NO If NO, answer next question	2. Contraception of choice: Date contraception given: Next contraception follow-up: Health Clinic/ Hospital	Next PPC follow up: YES / NO (Date:) Aim for next TCA:
---	--	--

Prepared by: Date:

Adapted from Guidelines on Pre Pregnancy Care in MOH Specialist Hospital. Medical Development Division, Ministry of Health Malaysia (2023).

REFERENCES

1. Garis Panduan Perkhidmatan Prakehamilan di Penjagaan Kesihatan Primer. *Bahagian Pembangunan Kesihatan Keluarga, Kementerian Kesihatan Malaysia* (Pind. 2023).
2. Guidelines on Pre Pregnancy Care in MOH Specialist Hospital. *Medical Development Division, Ministry of Health Malaysia* (2023).
3. Perinatal Care Manual 4th Edition. *Division of Family Health Development, Ministry of Health Malaysia* (2020).

SECTION 2

EARLY PREGNANCY

2.1 Approach to Nausea and Vomiting

PHASE	ASSESSMENT AND MANAGEMENT
Definition	Classification based on ICD-11¹: <u>Mild hyperemesis gravidarum</u> Mild or unspecified, starting before the end of the 22nd week of gestation. <u>Hyperemesis gravidarum with metabolic disturbance</u> Starting before the end of the 22nd week of gestation, with metabolic disturbance such as: • Carbohydrate depletion • Dehydration • Electrolyte imbalance <u>Late vomiting of pregnancy</u> Excessive vomiting starting after 22 completed weeks of gestation. <u>Other specified excessive vomiting in pregnancy</u> Other specified excessive vomiting in pregnancy or other vomiting complicating pregnancy. <u>Excessive vomiting in pregnancy, unspecified</u>
Prepregnancy Care & Family Planning	Provide contraception as per WHO Medical Eligibility Criteria Guideline based on current co-morbid and risk factors.
Antenatal care	History taking • NVP in current and previous pregnancy. • To exclude other causes of NVP in pregnancy (e.g., urinary tract infection, hyperthyroidism etc.) • Ptyalism (excessive secretion of saliva)²- symptom of hyperemesis gravidarum. • Nutritional status and self-reported rapid weight loss³. • Assess mood, mental state, and impact on quality of life. • Quantify severity of NVP based on Modified Pregnancy-Unique Quantification of Emesis (PUQE) score⁴. Physical examination • Vital sign (BP, PR, RR, SPO₂, Weight, Pain score). • Sign of dehydration: (Dry mucous membrane, furry tongue, tachycardic, ketotic breathing, concentrated urine, loss of skin turgor, symptoms of postural hypotension).

	• Signs of malnutrition or rapid weight loss ($\geq 5\%$ pre pregnancy weight), and muscle wasting as measured by mid-arm muscle circumference. • Muscle weakness. • Abdominal palpation. • Neurological signs (confusion, nystagmus, or ataxia - indicate Wernicke's encephalopathy. • Other examination based on history taking (Fundoscopy for papilledema or neck for goiter). Investigations • UFEME: ◦ Evidence of UTI ◦ Ketonuria: Presence of ketonuria indicate carbohydrate depletion. • MSU C&S (if dipstick indicates sign of UTI). Other investigations (If necessary) • FBC • RBS- To exclude diabetic ketoacidosis (DKA) • Urea and electrolyte (BUSE) • LFT • TFT • Serum Beta HCG if suspect molar pregnancy on ultrasound • Amylase (If suspect pancreatitis) • Ultrasound: To exclude molar pregnancy or multiple pregnancy Assessment of severity Determine severity based on the Modified PUQE score (refer <i>appendix figure 2</i>). Management 1. Mild-moderate NVP: PUQE score 3-12 and patient can tolerate oral intake. <u>Non-pharmacological:</u> • Lifestyle changes (avoid triggering factor). • Encourage fluid intake. • Dietary advice/ changes: ◦ Avoid greasy/fried food/coffee/spicy and very sweet food. ◦ Encourage high protein diet/low fat/bland diet/dry toast. • Supportive psychotherapy. <u>Pharmacological:</u> • Anti-emetic: <table><tr><th>First line</th></tr><tr><td> ◦ Veloxin (Meclozine 25mg/Pyridoxine 50mg PO 1-2 tabs, 2-3 times daily) ◦ Prochlorperazine 5-10mg PO 6-8 hourly ◦ Chlorpromazine 10-25mg PO 4-6 hourly </td></tr><tr><th>Second line</th></tr><tr><td> ◦ Metoclopramide 5-10mg PO 8 hourly maximum for 5 days </td></tr></table> • Discharge home with advice and TCA 1 week to review symptoms or blood investigations if any.	First line	◦ Veloxin (Meclozine 25mg/Pyridoxine 50mg PO 1-2 tabs, 2-3 times daily) ◦ Prochlorperazine 5-10mg PO 6-8 hourly ◦ Chlorpromazine 10-25mg PO 4-6 hourly	Second line	◦ Metoclopramide 5-10mg PO 8 hourly maximum for 5 days
First line					
◦ Veloxin (Meclozine 25mg/Pyridoxine 50mg PO 1-2 tabs, 2-3 times daily) ◦ Prochlorperazine 5-10mg PO 6-8 hourly ◦ Chlorpromazine 10-25mg PO 4-6 hourly					
Second line					
◦ Metoclopramide 5-10mg PO 8 hourly maximum for 5 days					

	**Combinations of antiemetics from different classes can be used if do not respond to a single medication (to discuss with FMS) (refer <i>appendix figure 3</i>). 2. Severe NVP: PUQE score ≥ 13 - Refer for admission. Any criteria for severe NVP: - Persistent symptoms and unable to tolerate oral anti-emetic. - Persistent symptoms with ketonuria and/or weight loss (greater than 5% of body weight) despite on oral antiemetics - Severe NVP (PUQE score ≥ 13) - Confirmed or suspected comorbidity (such as UTI and unable to tolerate oral antibiotic) - Clinical dehydration. - Start 0.9% normal saline infusion prior to transfer.
Referral/ Shared Care	Refer O&G for admission for severe NVP.
Delivery Plan	As per obstetric indication.
Postnatal Care	Inform the patient future pregnancies pose a risk of hyperemesis gravidarum recurrence. Early use of lifestyle/dietary changes and antiemetics are useful.

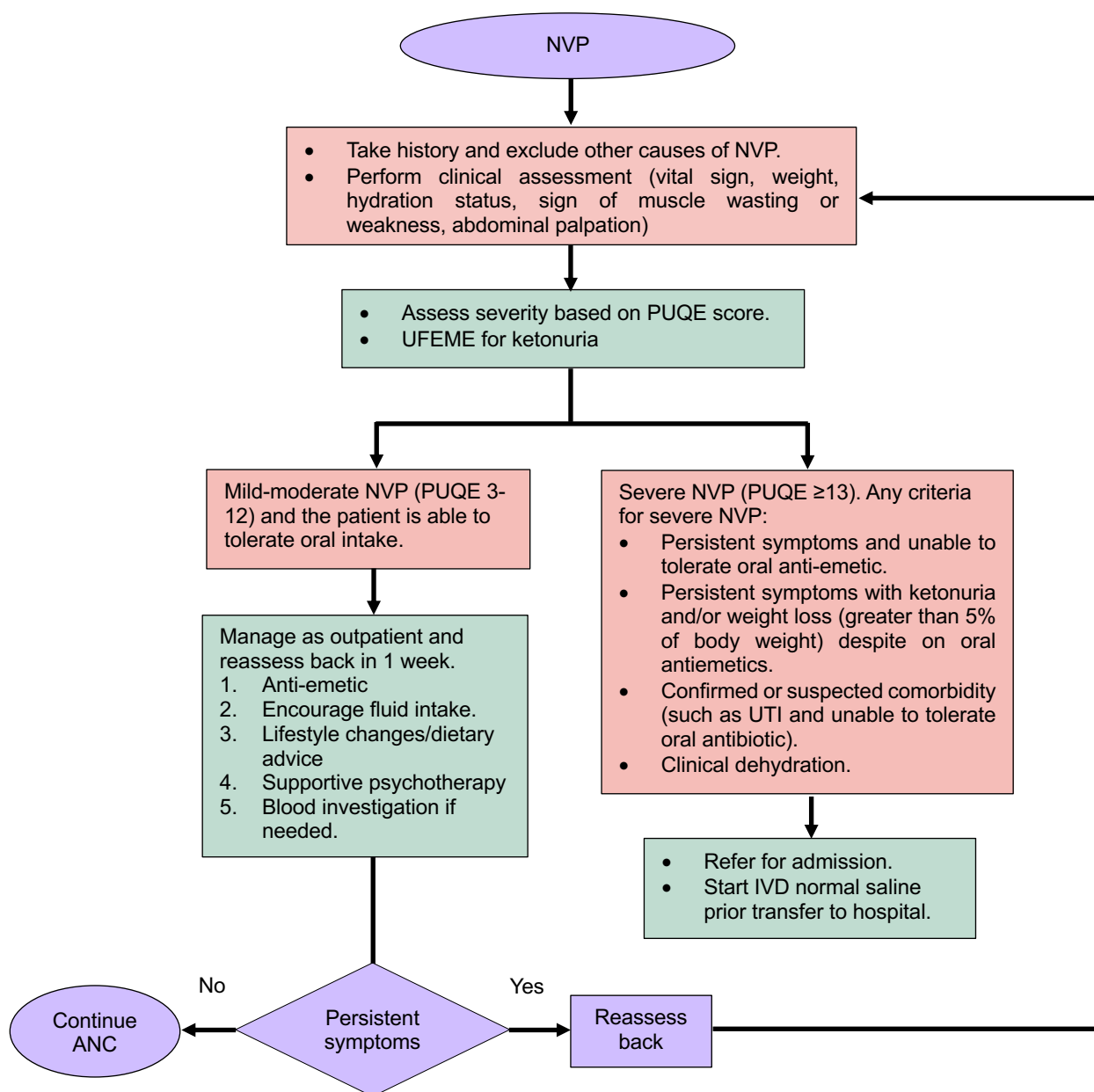
REMARKS

- Consider avoiding iron-containing preparations if they aggravate the symptoms.
- Metoclopramide is safe and effective, but due to the possibility of extrapyramidal side effects, it should be used as a second-line treatment.
- The presence of ketonuria indicate carbohydrate depletion.
- Differential diagnosis of NVP^{2,3}:

Diabetes Ketoacidosis (DKA)	Addison's Disease
Benign intracranial hypertension/raised intracranial pressure/space occupying lesion.	Hypercalcemia/dehydration
Infection (appendicitis, hepatitis, urinary tract infection, enteric infections)	Intestinal obstruction
Gastroesophageal reflux disease- offer anti-reflux medications (antacid or PPI omeprazole/pantoprazole)	Ovarian hyperstimulation syndrome/torsion of ovarian cyst
Hyperthyroidism	Eating disorder/psychological disorders
Pancreatitis	Multiple pregnancy/molar pregnancy

APPENDIX

Figure 1: Flow Chart Management of Nausea Vomiting in Pregnancy (NVP)



**** Presence of ketonuria indicate carbohydrate depletion.**

Figure 2: Modified PUQE score^{2,3}

1. On average in a day, for how long do you feel nauseated or sick to your stomach?				
Not at all (1)	≤1 hours (2)	2-3 hours (3)	4-6 hours (4)	≥6 hours (5)
2. On average in a day, how many times have you vomited or thrown up?				
I did not throw up (1)	1-2 times (2)	3-4 times (3)	5-6 times (4)	≥7 times (5)
3. On average in a day, how many times do you have retching or dry heaves without bringing up anything up?				
None (1)	1-2 times (2)	3-4 times (3)	5-6 times (4)	≥7 times (5)

Total score (sum of replies to 1, 2 and 3)

Mild NVP: ≤6

Moderate NVP: 7-12

Severe NVP: ≥13

Figure 3: Classes and Dosage of Antiemetics**3.1 Classes of Antiemetics²**

Antihistamines	- Meclozine 25mg/ Pyridoxine 50mg (Veloxin) - Promethazine
Dopamine agonist	- Phenothiazine - Prochlorperazine - Chlorpromazine - Metoclopramide - Domperidone
Serotonin inhibitors/5-HT₃ antagonist	Ondansetron
Corticosteroid	IV Hydrocortisone and oral prednisolone

3.2 Recommended antiemetic therapies and dosages³

First line	- Cyclizine 50mg PO, IM or IV 8 hourly - Prochlorperazine 5-10mg PO 6-8 hourly; 12.5mg 8 hourly IM/IV; 25 mg PR daily - Promethazine 12.5-25mg PO 4-8 hourly, IM, IV or PR - Chlorpromazine 10-25mg PO 4-6 hourly, IV or IM; or 50-100mg 6-8 hourly PR
Second line	- Metoclopramide 5-10mg PO 8 hourly, IV or IM (maximum 5 days duration) - Domperidone 1mg PO 8 hourly; 30-60mg 8 hourly PR - Ondansetron 4-8mg PO 6-8 hourly; 8mg over 15 minutes 12 hourly IV
Third line	Corticosteroid: hydrocortisone 100mg twice daily IV and once clinical improvements occurs, convert to prednisolone 40-50mg PO daily, with the dose gradually tapered until the lowest maintenance dose that controls the symptoms is reached.

*IM (Intramuscular), IV (Intravenous), PR (per rectal)

REFERENCES:

1. International Classification of Diseases Eleventh Revision (ICD-11). Geneva: World Health Organization; 2022. License: [CC BY-ND 3.0 IGO](https://creativecommons.org/licenses/by-nd/3.0/). <https://icd.who.int/browse/2024-01/mms/en#1878037467>
2. Consensus Statement on Management of Hyperemesis Gravidarum. *Ministry of Health Malaysia*. (25 February 2020).
3. Nelson-Piercy C, Dean C, Shehmar M, Gadsby R, O'Hara M, Hodson K, et al; the Royal College of Obstetricians and Gynaecologists. The Management of Nausea and Vomiting in Pregnancy and Hyperemesis Gravidarum (Green-top Guideline No. 69). *BJOG*. 2024; 00: 1–30.
4. Perinatal Care Manual 4th edition: Hyperemesis Gravidarum. *Ministry of Health Malaysia*. 237, (June 2022).

SECTION 3 ENDOCRINE DISORDER

3.1 Diabetes

3.1.1 Pre-Existing Diabetes Mellitus/ Overt Diabetes

PHASE	ASSESSMENT AND MANAGEMENT
Definition	Pre-existing diabetes – Diagnosed with diabetes mellitus before pregnancy. Overt diabetes - Hyperglycemia first recognized during pregnancy which meets the diagnostic threshold of diabetes in non-pregnant adults^{1,2}. • Suspected in the presence of at least one of the following: ○ OGTT: FPG ≥ 7.0 mmol/L ○ OGTT: 2HPP ≥ 11.1 mmol/L ○ RPG: ≥ 11.1 mmol/ L with osmotic symptoms (fatigue, lethargy, polyuria, nocturia, polydipsia, polyphagia, weight loss, pruritus vulvae). • However, the diagnosis of overt DM is confirmed with a second test (FPG/RPG/OGTT)^{1,2} or with HbA1C² (regardless trimester). • Overt diabetes in pregnancy should be managed as pre-existing diabetes.
Prepregnancy Care & Family Planning	Register PPC • Those diagnosed with DM (Type 1 or Type 2). Main objectives in disease management³ • Optimal glycemic control. • Optimal care for comorbidities. • To reduce disease severity and complications (macrovascular/microvascular). • To reduce the incidence of congenital malformation, miscarriage, preterm delivery, and perinatal mortality during pregnancy. Medications safety • Metformin is safe to be used in pregnancy (FDA category B). • May continue metformin & switch other OGLD to insulin (refer <i>remarks</i>). • Medications should be reviewed for potential teratogenicity. If needed, discuss alternative medications or switch to safer ones. However, these changes should not interrupt diabetes treatment. • Statin should be discontinued once pregnancy is confirmed as it increases the risk of miscarriage during the first trimester and slight risk elevation for cardiac malformation^{1,2}.

	Target to achieve before pregnancy^{3,4} • HbA1C $\leq 6.3\%$³ • BP $\leq 130/70$ mmHg³ • Ideal BMI 18.5-22.9 kgm² or reduction of 5-15 % of body weight (lead to reduction of HbA1C, reduce need of glucose lowering drugs & diabetes remission if short duration of DM).^{3,4} Complications assessment • Yearly investigations should be carried out, or to do more frequent if patient wish to conceive: ○ UFEME ○ Urine microalbuminuria if UFEME normal ○ UPCI to quantify the urine protein if proteinuria present ○ Renal profile- to screen for DKD ○ Fundus photography – retinopathy screening ○ ECG if indicated – to screen for IHD Referral • Refer FMS for shared care in condition: ○ Poor optimization of glycemic control or other co-morbidities. ○ Presence of diabetes complications. ○ Consult FMS for any difficulty or uncertainty in management decision. • Refer PPC by O&G team for shared decision on fitness for pregnancy and pre-pregnancy counselling if patient keen for pregnancy, in diabetes cases with: ○ Severe NPDR , PDR or maculopathy ○ Moderate to high risk of pregnancy-related progression of CKD (refer <i>section 7.1 CKD</i>). DKD increases the risk of pregnancy-related complications, such as stillbirth, intrauterine growth restriction, gestational hypertension, preeclampsia, and preterm delivery⁵. ○ Multiple cardiovascular risk factors Special precaution • Complication of diabetes such as retinopathy, nephropathy and gastroparesis can exacerbate during pregnancy. Contraception (refer <i>section 1.1 PPC</i>) • Women with diabetes needs to have a planned pregnancy. • Provide contraception while optimizing treatment (refer MEC guidelines). • Folic acid 5mg PO OD(high dose) supplementation should be given at least 3 months before conception.¹
Antenatal Care	At booking • Investigations: ○ HbA1c (refer <i>remarks</i>) ○ UFEME ▪ For UPCI or 24 hours urine protein if persistent proteinuria. If UPCI >30 mg/ml or 24 hours urine protein ≥ 0.3 g/day, to refer MOPD/ nephrology. ○ Kidney function (creatinine, potassium)

- Fundus photography
 - At booking and if normal, repeat at 28 weeks. If retinopathy present, to refer ophthalmology.
- Prophylaxis:
 - Do VTE scoring. VTE prophylaxis should be considered for women with nephropathy (refer section 6.4 VTE).
 - Start PE prophylaxis¹:
 - T. Aspirin 100-150mg PO OD at 12 weeks (or once fetal heart seen) until delivery.
 - T. Calcium Carbonate 1g PO BD at 20 weeks POA until delivery.

Subsequent ANC visits

- **Blood glucose monitoring**
 - Encourage patients for SMBG
 - Frequency of SMBG should be individualized based on treatment regime & glycemic control
 - 2 weekly or more frequent if indicated until delivery.
 - **Staggered SMBG:**
 - 6-7 points monitoring is recommended for patient on multiple dose insulin (including early morning at 2-5 am or when patient symptomatic for hyperglycaemia or hypoglycaemia)
 - Timing for glucose monitoring:

Timing of SMBG & Mode of Treatment	Breakfast		Lunch		Dinner		Early morning glucose (2-5 am or when symptomatic)
	Pre	2HPP	Pre	2HPP	Pre	2HPP	
Diet only	✓	✓		✓		✓	
OGLD or single dose insulin	✓	✓		✓		✓	
Multiple dose insulin (Suggest staggered SMBG)	✓	✓	✓	✓	✓	✓	✓

Somogyi - if prebreakfast blood glucose < 4 mmol/L, and symptoms of hypoglycemia present, the pre bed insulin dose should be reduced

Dawn - if hyperglycemia (prebreakfast) is noted, to reevaluate pre bed insulin dose & amount of CHO taken during snack prior going to bed.

- **Glycemic targets (mmol/ L)**
 - Pre-breakfast / fasting : ≤ 5.3
 - Pre-prandial / pre-bed : ≤ 5.3
 - 1-hour post-prandial : ≤ 7.8
 - 2-hours post-prandial : ≤ 6.7
 - Early morning glucose range : 4.4-6.7

	• Medications ○ Treatment option is individualized. ○ Consult FMS before initiation of metformin/ insulin. ○ Metformin and insulin (human/ analog) are acceptable & recommended treatment for diabetes in pregnancy (refer <i>remarks</i>) ○ May continue metformin if already on that medication pre-pregnancy (less weight gain, reduce increment of insulin dose). ○ Insulin initiation is recommended when¹: ▪ Blood glucose targets are not met after diet control & metformin therapy, or metformin not tolerated or contraindicated. ▪ FPG ≥ 7.0 mmol/L at diagnosis (with or without metformin) ▪ FPG of 6.0-6.9 mmol/L with complications such as macrosomia or polyhydramnios. ○ Multiple dose insulin regimen is preferred during pregnancy (refer <i>remarks</i>). • Lifestyle modification & GWG ○ Monitor GWG¹ (refer <i>appendix figure 1</i>). ○ Aim appropriate GWG to improve pregnancy outcome. ○ Exercise. • Fetal surveillance ○ Detailed scan at 18-22 week by fetomaternal / trained O&G specialist based on indication: ▪ HbA1c (as outlined by local detailed scan protocol) ○ Serial monthly growth ultrasound and AFI starting at 28 weeks (to plot on growth chart).
Referral/ Shared Care	FMS • Once started on treatment within 2-4 weeks with latest SMBG. • All pre-existing diabetes/ overt diabetes should be referred at 20-24 weeks. Multidisciplinary team • Combined Endocrine-Obstetric (CEO) Clinic/ Combined Clinic ○ Refer at 34-36 weeks if good diabetes control with no complications for mode and time of delivery. ○ Refer earlier for Type 1 DM or if poorly controlled diabetes or presence of maternal / fetal complications. ○ Aim for delivery at 37-38 weeks POA. • Nephrology ○ If diabetes nephropathy/ DKD suspected or present • Ophthalmology ○ Any degree of retinopathy present • Dietitian ○ Refer for detailed dietary counselling.
Delivery Plan	• Delivery plan by O&G team. • Hospital delivery with O&G specialist
Postnatal Care	Postnatal review • MO review in 1-2 weeks after delivery or earlier if indicated

	• Reduce insulin dosage after delivery. The required insulin dose will depend on type of diabetes and breast feeding status. • Monitor SMBG level regularly (2 weekly or more frequent) and adjust insulin accordingly. Aim to continue insulin at lower dosage, or may resume pre-pregnancy metformin dosage for pre-existing diabetes. • Avoid other types of OGLD other than metformin • Watch for hypoglycaemia. • Baby requires in-patient observation post delivery as there is increased risk of developing neonatal hypoglycaemia. Lactation & breastfeeding Encourage exclusive breastfeeding (confer longer term metabolic benefits to both mother and offspring). Contraception & PPC • Contraceptive counselling (refer MEC guidelines) • Pre-existing diabetes: ○ Re-register & continue PPC after completed postpartum period • Overt diabetes: ○ Those who require medication for diabetes optimization up to 6 weeks postpartum due to suboptimal diabetes control are likely to be diagnosed as type 2 DM. They should be referred to PPC for further diabetes management & follow up. ○ Those who do not require medication during postpartum, reevaluation should be done at 6 weeks postpartum with OGTT:- ▪ OGTT normal – for annual diabetes screening ▪ OGTT abnormal (diabetes/ prediabetes) – refer PPC for further management & follow up (refer <i>appendix figure 5</i>)
--	---

REMARKS

Role of HbA1c in overt diabetes

- If the test done in 1st trimester (≤ 12 weeks POA): HbA1c ≥ 6.3 % confirm the diagnosis of overt diabetes; predict adverse pregnancy outcome and risk of having Type 2 DM after delivery.
- If the test done after 1st trimester: HbA1c ≥ 6.3 % predict adverse pregnancy outcome and risk of having Type 2 DM after delivery.

Safety of other OGLD in pregnancy

- Empagliflozin - no data in pregnancy woman.
- Vildagliptin - limited data in pregnancy women.
- Gliclazide - lack of adequate safety and efficacy data during pregnancy

Prediabetes

- OGTT (non-pregnant adult women):
 - Impaired Fasting Glucose (IFG) - FPG 6.1- 6.9 mmol/L
 - Impaired Glucose Tolerance (IGT) – 2HPP glucose 7.8-11.0 mmol/L

Diabetes in Ramadhan

- Fasting is not advisable because
 - Risk of hypoglycaemia, hyperglycemia , dehydration and increase thrombotic event.
 - SMBG target – no specific recommendation

3.1.2 Gestational Diabetes Mellitus

PHASE	ASSESSMENT AND MANAGEMENT
Definition	- Abnormal OGTT during pregnancy and resolved after delivery. - GDM is diagnosed in the presence of any of these results from OGTT¹: - FPG ≥ 5.1 mmol/L or 2HPP glucose ≥ 7.8 mmol/L - OGTT should not be performed in women with hyperemesis gravidarum as it affects the positive GDM screening rate in the first trimester, possibly due to related glucose metabolism abnormalities⁷.
Antenatal Care	At booking - Early identification and screen of patient at risk for GDM (refer <i>remarks</i>). - Perform OGTT at booking for high-risk women (with risk factor) and repeat at 24-28 weeks of gestation if the initial result was normal. - Screen for GDM at 24 - 28 weeks if age ≥ 25 years old without other risk factors. Subsequent ANC visits - Blood glucose monitoring, glycaemic targets, medication options, and lifestyle modification & GWG are similar with pre-existing/ overt diabetes.
Referral/ Shared Care	On diet control - Refer FMS at 34-36 weeks POA for delivery plan, or earlier if indicated (e.g. multiple co-morbid, uncontrolled BSP, presence/ suspected of complications). On treatment - Discuss/ refer FMS when treatment is indicated. - Refer O&G/ Combined Clinic at 34-36 weeks for mode and time of delivery, or earlier if indicated (poorly controlled diabetes, presence/ suspected of complications).
Delivery Plan	- Not to allow postdate for GDM on diet control. - Delivery plan for GDM on treatment, or presence of fetal or/ and maternal complications is decided by O&G team. - Mode of delivery as per obstetric indication. - Hospital delivery with O&G specialist.
Postnatal Care	- Encourage exclusive breastfeeding (confer longer-term metabolic benefits to both mother and offspring)^{1,2,8}. - Contraceptive counselling (refer MEC guidelines). - Repeat OGTT at 6 weeks postpartum: - OGTT impaired (diabetes/ prediabetes): - Refer & register PPC for further diabetes/ prediabetes management & follow up (refer <i>appendix figure 5</i>) - OGTT normal: - For annual diabetes screening

REMARKS**Risk of developing GDM**

- Women age ≥ 25 year old
- BMI $> 27\text{kg/m}^2$ at booking or first visit
- History of diabetes in a first degree relative
- Glycosuria $> 2+$ on 2 occasions or in a single fasting urine sample
- Diabetes in previous pregnancy
- Previous baby $> 4\text{kg}$
- Previous unexplained intrauterine death or early neonatal death
- Congenital abnormality in a previous pregnancy
- Bad past obstetrics history
- Current obstetrics problems (PIH, Polyhydramnios, steroid usage)

APPENDIX

Figure 1: Table on Total and Rate of Weight Gain in Pregnancy

Pre- Pregnancy body weight status (BMI in kg/m ²)	Total weight gain (range in kg)	Rates of weight gain in second and third trimester [mean (range) in kg/week]
Underweight (<18.5 kg/m ²)	12.5 – 18.0	0.51 (0.44 – 0.58)
Normal weight (18.5-24.9 kg/m ²)	11.5 – 16.0	0.42 (0.35 – 0.50)
Overweight (25.0-29.9 kg/m ²)	7.0 – 11.5	0.28 (0.23 -0.33)
Obese (≥ 30kg/m ²)	5.0 – 9.0	0.22 (0.17-0.27)

Figure 2: Table on Oral Glycaemic Lowering Drugs and Insulins

Drugs	Formulations	Minimum Dose	Maximum dose
Metformin	Metformin 500mg	Initial dose 500mg PO OD Usual dose 1000mg PO BD	1000mg PO TDS
	Metformin SR 850mg	Usual dose 850mg PO BD	850mg PO TDS
	Metformin XR 500mg/ 750mg	Initial dose 500mg PO OD Usual dose 1500mg PO OD	2000mg PO OD

Types of insulin and preparations	Onset of Action	Peak Action (hour)	Duration of Action (hour)	Timing of administration of Insulin
PRANDIAL				
Short-acting, Regular Actrapid Humulin R Insugen R Insuman R	30-60 min	2-4	6-10	30 min before meal
Rapid-acting, Analogues Aspart Lispro	0-20 min	1-3	3-5	5-15 min immediately before/after meals
BASAL				
Intermediate-acting, NPH Insulatard Humulin N Insugen N Insuman N	1-2 hour	4-8	8-12	Pre-breakfast /pre-bed
Long-acting Analogues Glargine Determir	30-60 min	Less peak	16-24	Same time everyday (flexible once daily injection)
PREMIXED INSULIN				
Mixtard 30	30 min	Dual	18-23	30-60 min before meals
Humulin 30/70	30 min	Dual	16-18	30-60 min before meals
Novomix 30	10-20 min	1-4	16-20	5-15 min before meals
Humalog mix 25/75	15 min	0.25-2.5	16-18	5-15 min before meals
Humalog mix 50/50	15 min	0.25-2.5	16-18	5-15 min before meals

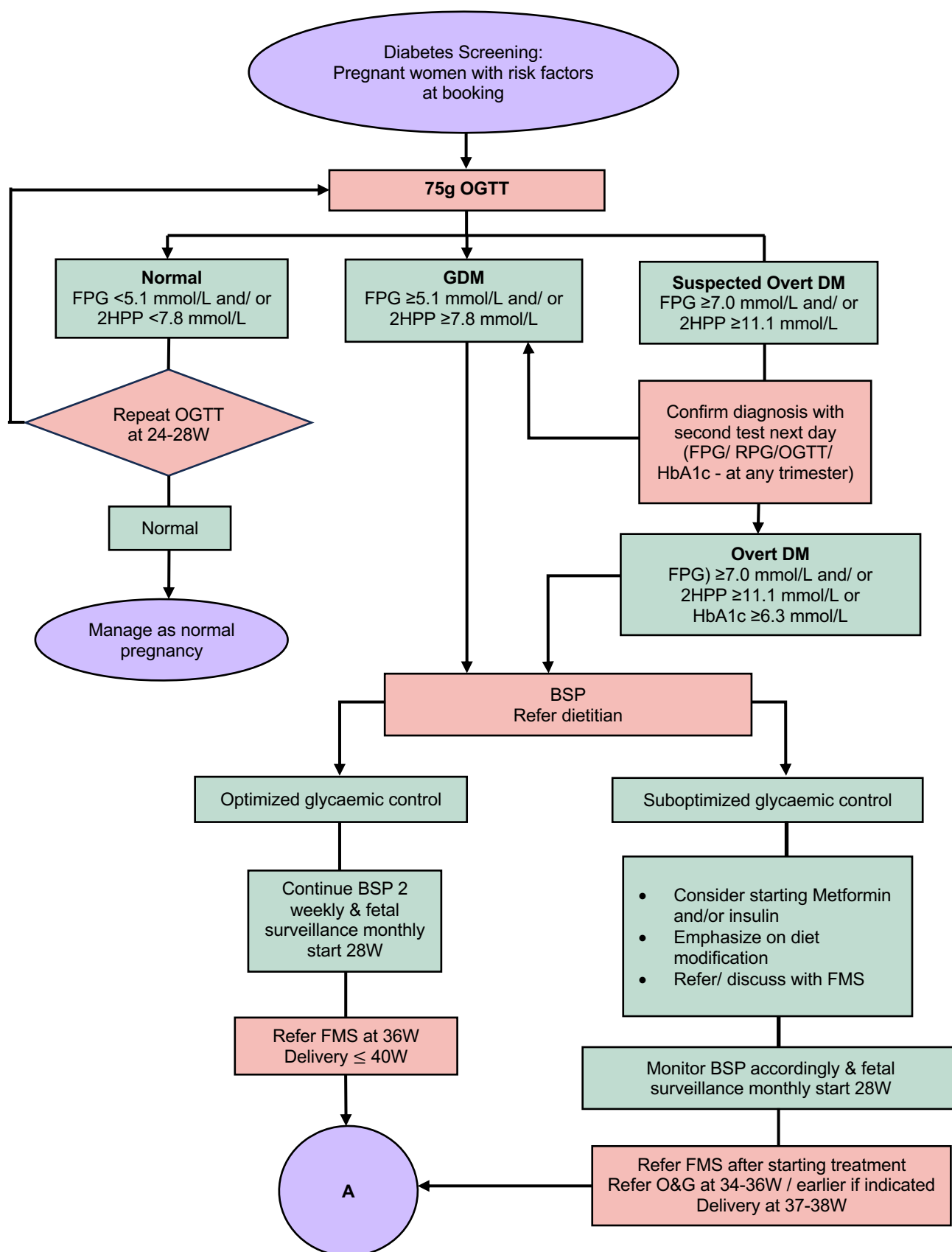
Figure 3: Insulin Initiation and Estimation of Total Daily Insulin Requirement by Gestation/ trimester

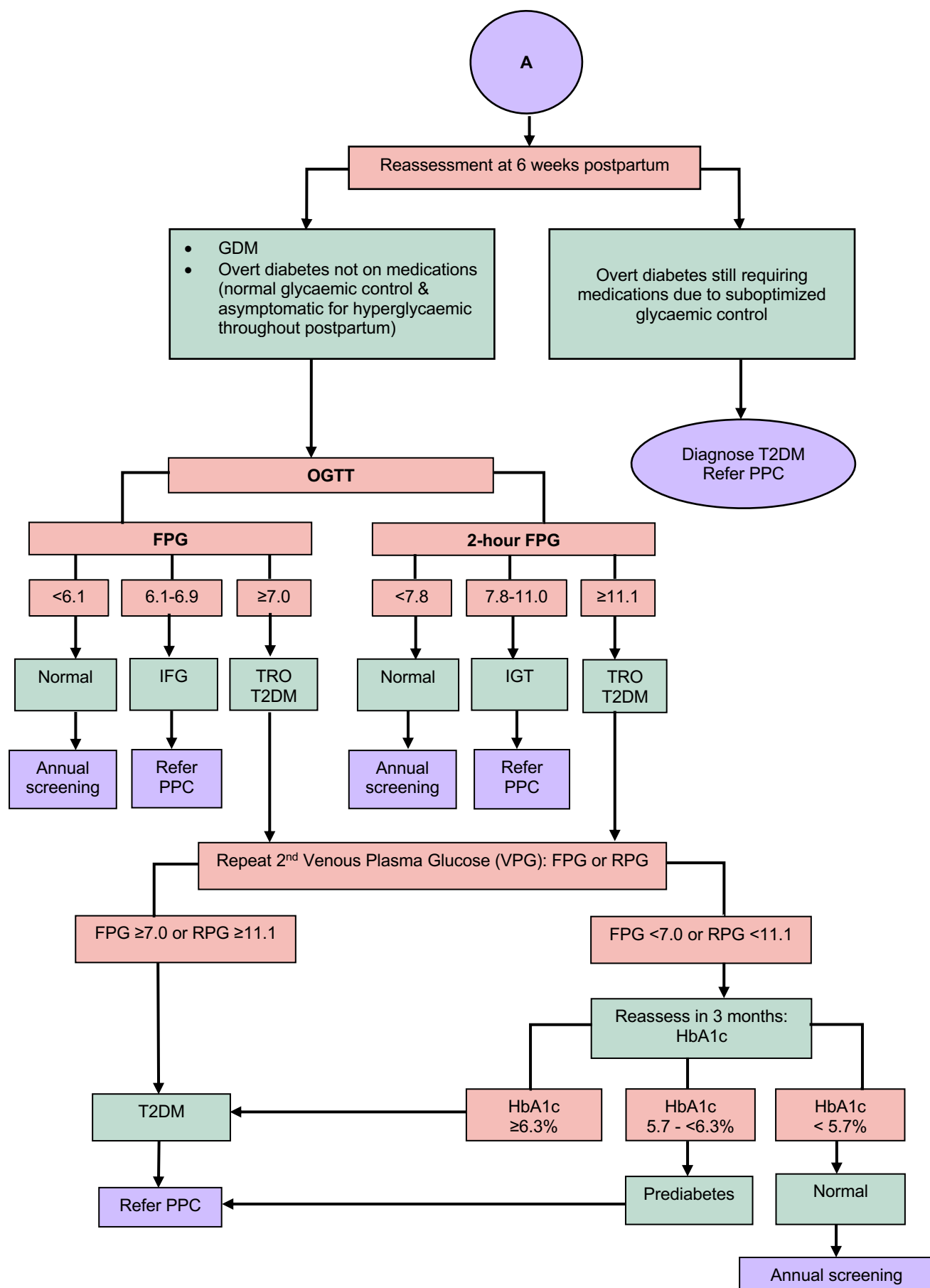
Glycaemic abnormality	Suggested Insulin Type and Dose
FPG >5.3 mmol/L	Start 0.2 units/kg of intermediate-acting insulin at bedtime, increase by 2 units every 3 days until targets are reached.
1-hour postprandial >7.8 mmol/L 2-hours postprandial >6.7 mmol/L	Start 6 units of short-acting insulin, increase by 2 units every 3 days until targets are reached. If pre-prandial short-acting insulin dose exceeds 16 units TDS, consider adding 6-10 units intermediate-acting insulin in the morning and titrate accordingly until targets are achieved.

Figure 4: Estimation of Total Daily Insulin Requirement by Gestation/ trimester

Pregnancy gestation	Total daily insulin requirement
1st trimester	0.7 units/kg/day
2nd trimester	0.8 units/kg/day
3rd trimester	0.9 units/kg/day

Reference: CPG DM in Pregnancy, Malaysia. (2017)

Figure 5: Approach to diabetes in pregnancy: Screening, diagnosis and management



Notes:

- All glucose levels are in mmol/L.
- Screening of asymptomatic individuals – Diagnosis of T2DM is made when there are 2 abnormal VPG on separate occasions or 1 abnormal VPG + 1 abnormal HbA_{1c} (from the same sample) values³.
- Screening of symptomatic individuals – A single abnormal VPG value or 1 abnormal HbA_{1c} is sufficient to make the diagnosis of T2DM³.

REFERENCES

1. CPG DM in pregnancy , Malaysia. (2017).
2. Blumer, I. et al. Diabetes and pregnancy: An endocrine society clinical practice guideline. *J. Clin. Endocrinol. Metab.* **98**, 4227–4249 (2013).
3. Ministry of Health Malaysia. Clininal Practice Guideline Management Of T2DM 6th Edition. *Minist. Heal. Malaysia* **53**, 1689–1699 (2019).
4. Davis, J. N., Shearrer, G. E., Tao, W., Hurston, S. R. & Gunderson, E. P. Dietary variables associated with substantial postpartum weight retention at 1-year among women with GDM pregnancy. *BMC Obes.* **4**, 31 (2017).
5. Lewis, H., Egberman, R., Kazory, A. & Sattari, M. Diabetes and pregnancy: Risks and opportunities. *Cleve. Clin. J. Med.* **85**, 619–628 (2018).
6. Vounzoulaki, E. & Seidu, S. Gestational diabetes mellitus. *Obes. Diabetes Sci. Adv. Best Pract.* **7**, 479–492 (2020).
7. Ohara, R. et al. International Journal of Gynecology and Obstetrics Effect of hyperemesis gravidarum on gestational diabetes mellitus screening. *Int. J. Gynecol. Obstet.* 3–5 (2015). doi:10.1016/j.ijgo.2015.06.061
8. Elsayed, N. A. et al. 15. Management of Diabetes in Pregnancy: Standards of Care in Diabetes—2023. *Diabetes Care* **46**, S254–S266 (2023).

3.2 Thyroid Disorders

3.2.1 Hyperthyroidism

PHASE	ASSESSMENT AND MANAGEMENT			
Definition		TSH	Free T4	Presentation
	Overt	↓	↑	• Heat intolerance • Palpitation • Tremors • Presence of goitre • Hyperemesis gravidarum
	Subclinical	↓	Normal	Asymptomatic/ mild symptoms
	(refer appendix figure 1)			
Pre pregnancy Care & Family Planning	• Refer early to the pre pregnancy clinic. Aim for: ○ Preconception counselling by MO/FMS/ O&G specialist. ○ Achieve euthyroid status before pregnancy. ○ Attain disease control with minimal anti-thyroid drug (ATD) dosage. ○ Women well-controlled on carbimazole and planning pregnancy can switch to PTU before trying to conceive. • For Grave's disease, consider referral for definitive therapy in those who require high doses of ATD if unable to wean off medications. ○ If Radioiodine ^{131}I treatment is being considered, effective contraception and delaying pregnancy for at least six months post-treatment are crucial until a stable euthyroid status is achieved¹. • For patient with thyroid nodule(s): ○ Perform USG thyroid and survey of cervical lymph nodes. ○ Refer to SOPD for FNAC if USG reveals TIRADS 3-5 (refer appendix figure 2). • Commence folic acid supplementation. Contraception • Provide contraception while optimizing treatment. • Advice contraception – refer to MEC guidelines.			
Antenatal Care	At booking • For women on ATD, consider discontinuation of ATD in those who are euthyroid on low doses of carbimazole ($\leq 10\text{mg}$ daily) or PTU ($\leq 100\text{mg}$ daily)¹. ○ However, various factors must be thoroughly evaluated before discontinuing these medications, such as disease history, goitre size, treatment duration, recent TFT results, TRAb levels, and other clinical considerations. • PTU is recommended until 16 weeks of pregnancy. ○ Carbimazole is recommended in the second and third trimesters. • Treat overt hyperthyroidism except for gestational thyrotoxicosis (GTT).			

	○ If the diagnosis of Grave's Disease is in doubt, especially during early pregnancy, it is advisable to take a serum TRAb test (to discuss with FMS/Specialist). ● For subclinical hyperthyroidism, generally, no treatment is required during pregnancy^{1,2}. ● Check FBC, LFT and TFT 4 weeks after commencement of ATD². Subsequent follow-up ● Assess the side effects of ATD. ● Periodic monitoring of TFT every 4 to 6 weeks. ● If ATD is stopped during pregnancy, do a clinical examination, and repeat TFT every four weeks to ensure the patient remains clinically and biochemically euthyroid. ● Fetal growth monitoring monthly after 28 weeks. Treatment target ● Free T4 levels ○ Aim to maintain 2/3 upper limit of normal value of free T4, or just above upper limit of normal range.
Referral/ Shared Care	● Consult/Refer FMS for treatment initiation and follow-up. ● Refer to Combine Clinic for shared care with O&G Specialist/ Endocrinologist at 34-36week or earlier if indicated. ● Detail scan at 18-22week by MFM specialist for Grave's Disease to assess for fetal thyroid goiter.
Delivery Plan	● Deliver at hospital with specialist as per obstetric indication. ● Not to allow postdate. ● Anticipate a thyroid crisis during intrapartum.
Postnatal Care	Postnatal review ● Trace cord blood TSH. ● Review by MO two weeks postpartum. ● Repeat TSH and FT4 at 4-6 weeks postpartum period. (from the last test done) and to review the dosage of ATD. Lactation ● The lowest effective dose should always be administered. Contraception & Pre pregnancy Care ● Refer to MEC guidelines. ● Register PPC and continue disease optimization.

REMARKS

Most common causes of hyperthyroidism in pregnancy:

- Grave's disease
- Gestational transient thyrotoxicosis
 - Limited till 16-18 weeks, characterized by ↑FT4 and ↓TSH, without thyroid antibody.
 - Management of GTT:
 - Supportive.
 - Treat dehydration.
 - ATD **not** recommended.
 - Low-dose short-term beta-blockers may be considered.

Table distinguishing Grave 's Disease and GTT:

Grave's Disease	GTT
Goiter with/without bruit	Possible thyroid enlargement
Exophthalmos/ophthalmopathy	No exophthalmos
Onycholysis	No onycholysis
Possible antibodies present/negative	Possible antibodies present/negative
Pre-existing symptoms	No pre-existing symptoms
Family history of thyroid disease	No family history of thyroid disease

Risk factors of hyperthyroidism:

Previous history of thyroid disorder	Smoking (increases risk of Grave's disease)
Family history of thyroid disorder	Type 1 diabetes or other autoimmune disorders
Goiter	Use of amiodarone
Known thyroid antibody positivity	History of recurrent pregnancy loss or preterm delivery

Treatment Choice:

Propylthiouracil (PTU)	Carbimazole	Propanolol
1 st trimester (can be continued up to 16 weeks of gestation)	2 nd and 3 rd trimester	For symptomatic control.
• Initial: 50mg BD- 400mg TDS • Maintenance: 50-150mg TDS • Postpartum: Safe to use doses up to 300mg/day while breastfeeding.	• Initial: 10-40mg OD • Maintenance: 5-15mg OD • Postpartum: Safe to use doses up to 25mg/day while breastfeeding.	20 - 40mg BD usually only for 2-4 weeks and should be discontinued if symptoms are controlled
Side effects		
Rash, fever, agranulocytosis, risk of liver toxicity	Rash, fever, agranulocytosis, aplasia cutis, methimazole embryopathy	Bronchospasm, intrauterine growth restriction, neonatal hypoglycaemia

- **Dose conversion** for Carbimazole and PTU -1:10 dose ratio (e.g., Carbimazole 10mg/d = PTU 100mg/d, administered BD/TDS due to its short half-life)².

- Definitive therapy available for Grave's Disease is RAI or thyroidectomy.

Complications of hyperthyroidism in pregnancy:

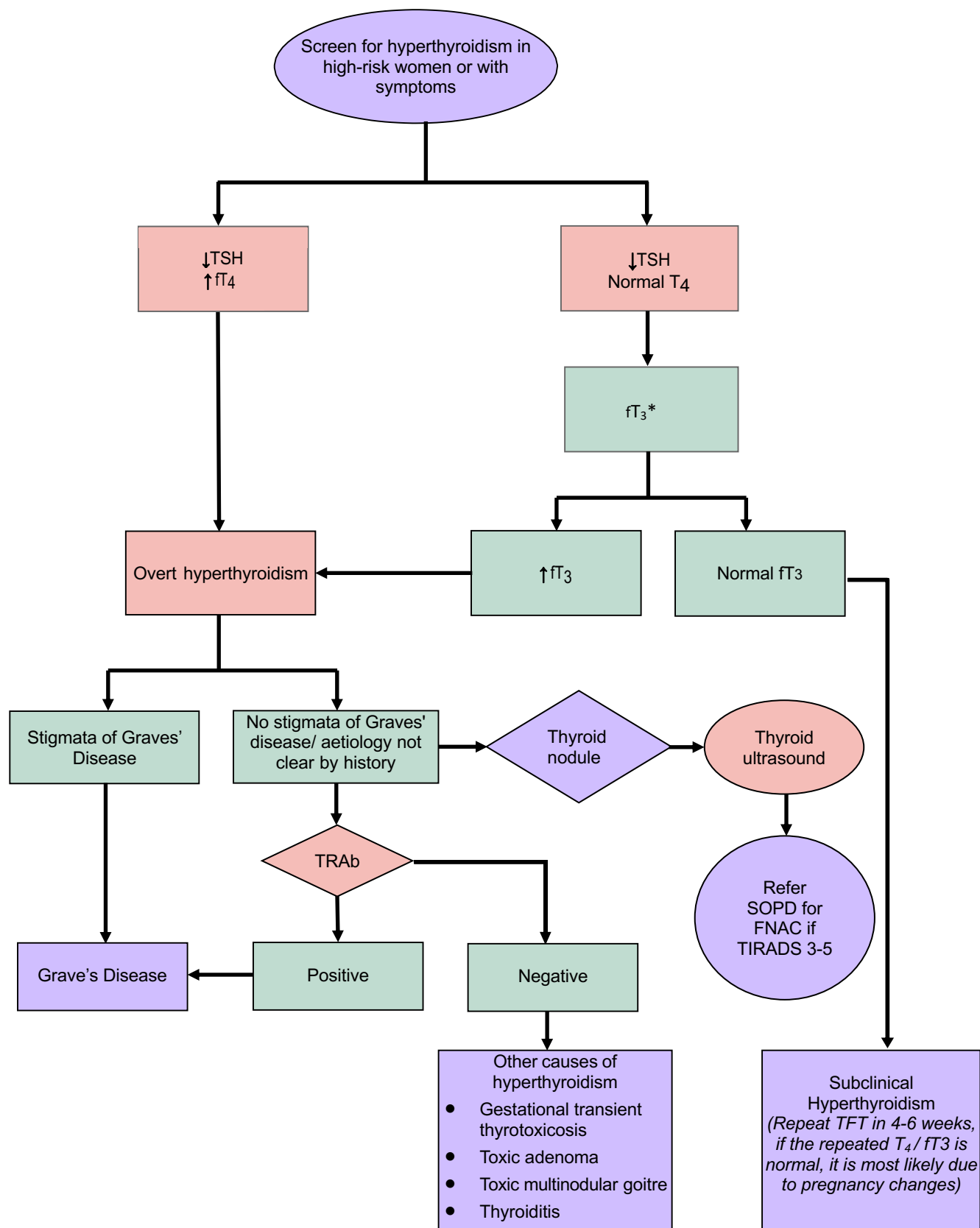
Complications	
Maternal	Fetal
Preterm delivery Pre-eclampsia Placental abruption Congestive heart failure (CHF) Thyroid storm Miscarriage	Prematurity Small size for gestational age Intrauterine foetal death Goiter Thyrotoxicosis Transient hyperthyroidism(neonates) Hydrops fetalis

- Thyroid crisis (severe thyrotoxicosis/thyroid storm):
 - Hyperpyrexia, Neuropsychiatric manifestations, e.g., delirium.
 - Precipitating factors: Infection, labour, trauma, surgery.
- Trimester-specific reference ranges** should be used to interpret thyroid function during pregnancy

Trimester	TSH	T4
1 st trimester	0.1-2.5 mlu/L	Keep 2/3 or just upper limit of normal value of free T4 (depends to hospital laboratory references)
2 nd trimester	0.2-3.0 mlu/L	
3 rd trimester	0.3-3.0 mlu/L	

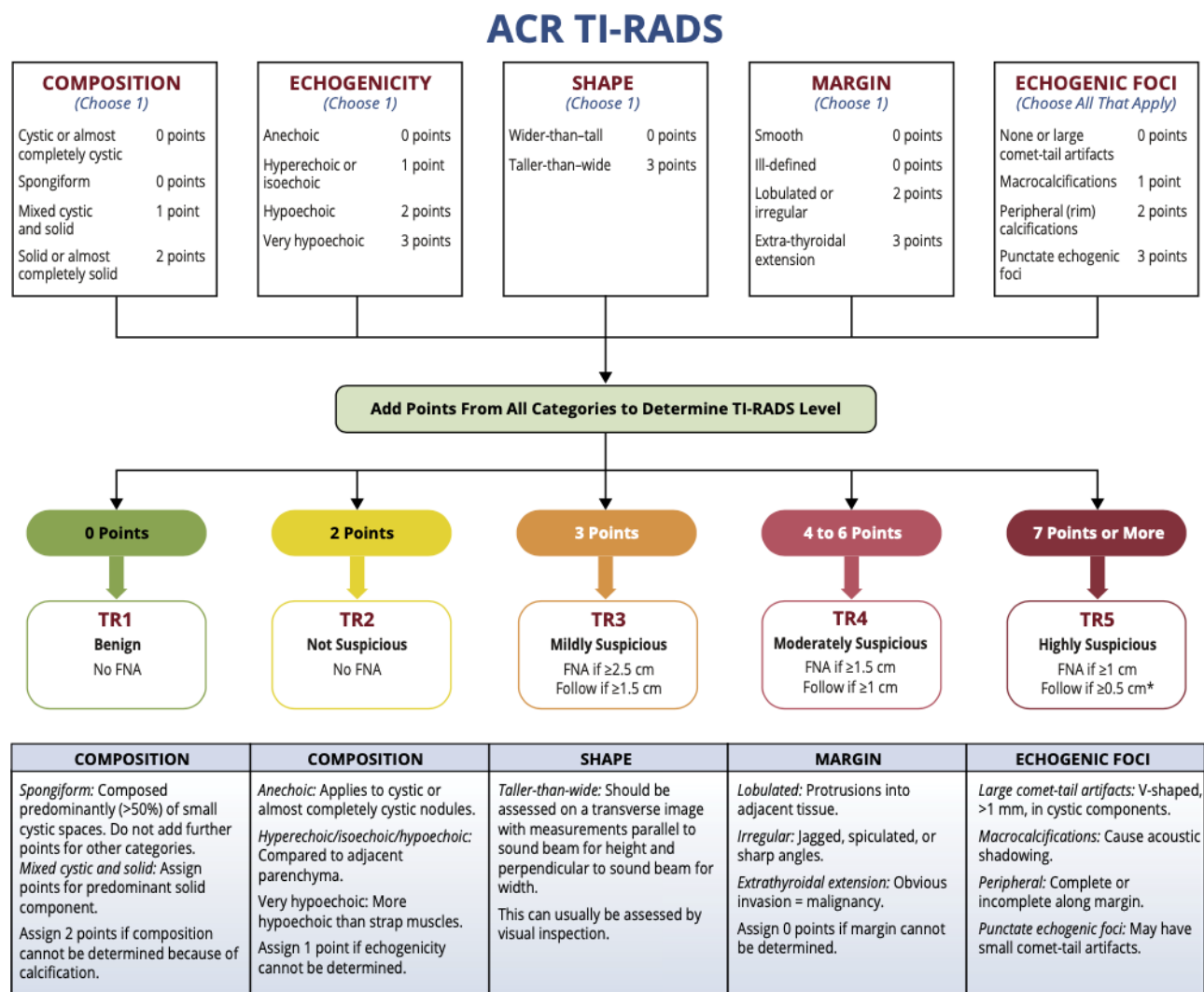
APPENDIX

Figure 1: Flow Chart For Diagnostic Testing for Aetiology of Hyperthyroidism



* fT₃ should be done when symptoms are present or when clinically indicated (to discuss with FMS/Specialist)

Figure 2: The American College of Radiology Thyroid Imaging Reporting & Data System (ACR TI-RADS) 2017 for Ultrasound Of Thyroid Nodules.



*Refer to discussion of papillary microcarcinomas for 5–9 mm TR5 nodules.

Reference: Clinical Practice Guidelines Management of Thyroid Disorder 2019, Ministry of Health Malaysia

3.2.2 Hypothyroidism

PHASE	ASSESSMENT AND MANAGEMENT																
Definition	TSH concentration elevated beyond the upper limit of 4mIU/L¹. <table><tr><th></th><th>TSH</th><th>Free T4</th><th>Presentation</th></tr><tr><td>Overt</td><td>↑</td><td>↓</td><td> • Cold intolerance • Muscle Cramps • Weight Gain • Dry skin • Prolonged relaxation of deep tendon reflexes </td></tr><tr><td>Subclinical</td><td>↑</td><td>Normal</td><td>Asymptomatic/mild symptoms</td></tr><tr><td>Isolated Hypothyroxinemia</td><td>Normal</td><td>↓</td><td>Asymptomatic</td></tr></table>		TSH	Free T4	Presentation	Overt	↑	↓	• Cold intolerance • Muscle Cramps • Weight Gain • Dry skin • Prolonged relaxation of deep tendon reflexes	Subclinical	↑	Normal	Asymptomatic/mild symptoms	Isolated Hypothyroxinemia	Normal	↓	Asymptomatic
	TSH	Free T4	Presentation														
Overt	↑	↓	• Cold intolerance • Muscle Cramps • Weight Gain • Dry skin • Prolonged relaxation of deep tendon reflexes														
Subclinical	↑	Normal	Asymptomatic/mild symptoms														
Isolated Hypothyroxinemia	Normal	↓	Asymptomatic														
Prepregnancy Care & Family Planning	Refer early to the pre-pregnancy clinic. Aim to: • Optimize L-thyroxine dose before planned pregnancy. • Achieve TSH level between 0.1-2.5 mIU/L. • Commence folic acid supplementation and family planning as per MEC. • Once pregnancy allowed: ○ Advice women to check UPT if they missed their period. ○ For early booking and to check TFT. ○ Gradually increase L-thyroxine once pregnancy is confirmed.																
Antenatal Care	At booking • Serum TSH should be obtained early in high-risk women (refer <i>appendix figure 3</i>). • To take thyroid peroxidase antibodies (TPOAb) in women with TSH 2.5-10 mIU/L³. • Treat overt hypothyroidism ○ Known hypothyroidism on treatment. ▪ Dose should be increased by 30-50% from pre-pregnancy dose as early as 7-8 weeks gestation. ~30% in autoimmune hypothyroidism ~50% in post ablative hypothyroidism ○ Newly diagnosed during pregnancy: ▪ Initiate L-thyroxine 25mg OD and titrate according to TSH every 4-6 weeks. • Treat subclinical hypothyroidism based on TPOAb and TSH levels¹. <table><tr><td>TPO antibody-negative</td><td> • TSH ≥ 10 mIU/L, treatment recommended • TSH ≥4.0 mIU/L, consider to treat </td></tr><tr><td>TPO antibody-positive</td><td> • TSH ≥4.0 mIU/L, treatment recommended • TSH ≥2.5 mIU/L, consider to treat </td></tr></table>	TPO antibody-negative	• TSH ≥ 10 mIU/L, treatment recommended • TSH ≥4.0 mIU/L, consider to treat	TPO antibody-positive	• TSH ≥4.0 mIU/L, treatment recommended • TSH ≥2.5 mIU/L, consider to treat												
TPO antibody-negative	• TSH ≥ 10 mIU/L, treatment recommended • TSH ≥4.0 mIU/L, consider to treat																
TPO antibody-positive	• TSH ≥4.0 mIU/L, treatment recommended • TSH ≥2.5 mIU/L, consider to treat																

	- Consider starting treatment while waiting for the TPOAb result. - For isolated hypothyroxinaemia, there is no need for treatment; instead, monitor thyroid function tests (TFT) every trimester. If diagnosed after 18 weeks, no follow-up is required⁴. Subsequent follow-up - Check TFT every 4-6 weeks until 20 weeks of pregnancy and at least once in the middle of the third trimester (> frequent if not euthyroid). - Fetal growth monitoring monthly after 28 weeks. Treatment target TSH level (Rapid normalizing of TSH level is advised) <table border="1"> <thead> <tr> <th>Trimester</th><th>TSH</th></tr> </thead> <tbody> <tr> <td>1st trimester</td><td>0.1-2.5 mlu/L</td></tr> <tr> <td>2nd trimester</td><td>0.2-3.0 mlu/L</td></tr> <tr> <td>3rd trimester</td><td>0.3-3.0 mlu/L</td></tr> </tbody> </table>	Trimester	TSH	1st trimester	0.1-2.5 mlu/L	2nd trimester	0.2-3.0 mlu/L	3rd trimester	0.3-3.0 mlu/L
Trimester	TSH								
1st trimester	0.1-2.5 mlu/L								
2nd trimester	0.2-3.0 mlu/L								
3rd trimester	0.3-3.0 mlu/L								
Referral/ Shared Care	- Consult/Refer FMS for treatment initiation and follow-up. - Refer to the combined clinic for shared care with O&G Specialist/ Endocrinologist.								
Delivery Plan	- Deliver at hospital as per obstetric indication. - Not to allow postdate.								
Postnatal Care	Postnatal review - Trace cord TSH. - Review by MO two weeks postpartum. - Continue L- Thyroxine dose until repeat TSH at 4 -6 weeks postpartum. Lactation L-thyroxine can be continued in breastfeeding mothers. To take ferrous fumarate and calcium 4hours apart from L-thyroxine, to reduce drug-drug interaction. Contraception Refer to MEC guidelines. PPC Referral to PPC clinic and continue disease optimization.								

REMARKS

Most common cause of hypothyroidism in pregnancy:

- Chronic autoimmune thyroiditis (Hashimoto's thyroiditis)

Other causes:

- Previous surgeries
- Post RAI
- Congenital hypothyroidism
- Lymphocytic hypophysitis

Evaluate pregnant women with vague symptoms like ongoing fatigue, unexplained weight gain, or anaemia that doesn't improve with treatment for hypothyroidism.

Risk factors of hypothyroidism¹:

History of thyroid dysfunction	History of thyroid surgery or head and neck radiation
Goiter	Morbid obesity
Known thyroid antibody positivity	Use of lithium or amiodarone
Age at or above 30 years	Infertility
Type 1 diabetes or other autoimmune disorders	Residing in areas of moderate to severe iodine deficiency
History of recurrent pregnancy loss or preterm delivery	Family history of thyroid disorders
Recent administration of iodinated radiologic contrast	Two or more prior pregnancies

Complications of hypothyroidism in pregnancy:

Maternal	Fetal
Gestational diabetes Pre-eclampsia Increased risk for Caesarean Placental abruptions Postpartum haemorrhage Goitre Anaemia Reduce fertility Miscarriage	Neurocognitive impairment Preterm birth Low birth weight Increase NICU admission.

- **L-Thyroxine** should be taken on an empty stomach. L-Thyroxine **should not** be taken together with ferrous fumarate, calcium or proton pump inhibitors. They should be taken 4hours apart from L-thyroxine, to reduce drug-drug interaction.

Appendix

Figure 3: Flow chart for TPO Antibodies Testing to Guide Treatment Of Hypothyroidism



Reference: American Thyroid Association Guideline, 2017.

REFERENCES

1. *Clinical Practice Guidelines Management of Thyroid Disorder*. Ministry of Health Malaysia, 2019.
2. *Perinatal Care Manual 4th Edition*. Ministry of Health Malaysia, 2022.
3. *American Thyroid Association Guideline*. 2017.
4. *Insignificant Effect of Isolated Hypothyroxinemia on Pregnancy Outcomes During the First and Second Trimester of Pregnancy*. Chen L., Yang H., Ye E., et al. *Frontiers in Endocrinology*, 2020, Vol. 11. doi:10.3389/fendo.2020.528146.
5. *Obstetrics And Gynaecology Protocol State of Kedah*. 2019.

3.3 Maternal Obesity

PHASE	ASSESSMENT AND MANAGEMENT
Definition	BMI ≥ 27.5 kg/m²¹. - Obese Class I (BMI 27.5-32.4 kg/m²) - Obese Class II (BMI 32.5 -37.4 kg/m²) - Obese Class III (BMI ≥ 37.5 kg/m²)
Pre pregnancy Care & Family Planning	Registration criteria for PPC - Obese women with BMI ≥ 27.5 kg/m². Aim - Aim for weight reduction 5-10% prior to embarking pregnancy. - For women with obesity class II and above, target BMI <30kg/m²². Management - Refer PPC (refer <i>remarks</i>)^{2,3}. - Assessment of associated co-morbidities e.g. HPT, DM, hypothyroidism, OSA, cardiac problem and history of bariatric surgery. Need good control of comorbidities prior conception. - Refer for combined care with Endocrine, Cardiology, ENT, O&G, Dietitian for associated comorbidities. - Counselling should include: - maternal and fetal complications in pregnancy (refer <i>appendix figure 1</i>). - lifestyle modifications (diet and physical activities) for weight reduction. - medications for weight management not recommended at time of conception. - recommendation of bariatric surgery for those BMI >40kg/m² or BMI > 35kg/m² with metabolic disease (refer <i>remarks</i>). Contraception - Provide contraception. - Advise for contraception until fit for pregnancy, target BMI <30kg/m² for individual with obese class II (refer MEC guidelines).
Antenatal care	Screening - All women need to measure their BMI at booking. Assessment History Taking² Comprehensive history at booking especially: - History of comorbidities: HPT, DM, hypothyroidism, OSA (refer <i>remarks</i>), cardiac problem, history of bariatric surgery before. - Risk screening for GDM or overt DM, Preeclampsia. - Do VTE risk scoring (refer <i>section 6.4 Venous Thromboembolism</i>). - Assess psycho-social support for depression and anxiety disorder. - Identify complications to mother and fetus (refer <i>appendix figure 1</i>). - Follow up as antenatal scheduled:

	○ assess VTE scoring as indicated. ○ review MGTT at booking and 24-28weeks POA. ○ aim for ideal weight increment. <table border="1"> <thead> <tr> <th>Total weight gain range (kg)</th><th>Rates of weight gain second and third trimester (mean range in kg/week)</th></tr> </thead> <tbody> <tr> <td>5.0 – 9.0</td><td>0.22 (0.17 – 0.27)</td></tr> </tbody> </table> Physical examination¹: • To check BMI at booking. • BP measurements – use appropriate cuff size should be used. Investigations²: • Blood: FBC, OGTT, TFT. • Imaging: ○ Refer O&G for TVS at booking for REDD if in doubt. ○ After 28 weeks, every month for fetal growth ultrasound. Fetal weight assessment at term. Treatment²: • Continue folic acid and iron supplementations. • Start Aspirin 150mg OD (12 weeks of gestation till delivery) in women with at least 2 or more risk factors: ○ BMI ≥ 35 kg/m² at first visit ○ first pregnancy ○ maternal age > 40 years ○ family history of pre-eclampsia ○ multiple pregnancy ○ pregnancy interval > 10 years	Total weight gain range (kg)	Rates of weight gain second and third trimester (mean range in kg/week)	5.0 – 9.0	0.22 (0.17 – 0.27)
Total weight gain range (kg)	Rates of weight gain second and third trimester (mean range in kg/week)				
5.0 – 9.0	0.22 (0.17 – 0.27)				
Referral/ Shared Care	FMS² • Booking BMI ≥ 40 kg/m² ^{3,4} • Any risk to mother/fetus (refer <i>appendix figure 1</i>). O&G² • Booking BMI ≥ 40 kg/m². • VTE prophylaxis as indicated. • TVS at booking for REDD if in doubt. • Estimated fetal weight at term if suspected macrosomia. Anesthesia • Early assessment for those with current BMI > 45 kg/m²: • Potential difficulties with venous access. • Higher risk of caesarean delivery. • Higher rates of epidural failure. • Increase postoperative complications. Endocrine, Cardiology, ENT^{5,6} • For associated comorbidities (if any) Nutritionist/Dietician • Those with comorbidities: ○ BMI at booking ≥ 30 kg/m². ○ Excessive GWG.				

Delivery Plan	• Can allow post-date unless obstetric indication (e.g., macrosomia). • Obesity alone is not an indication for caesarean section or induction of labour (IOL²). • Hospital delivery.
Postnatal Care	Postnatal review • MO review 4 to 6 weeks postpartum, advise to continue lifestyle modification and weight reduction. • All patients should have VTE risk assessment immediately post-partum. ○ If VTE score is 2, VTE thromboprophylaxis should continue until 10 days post-partum. ○ If VTE score > 2, VTE thromboprophylaxis should continue until 10 days post-partum followed by VTE risk reassessment. ○ If VTE score is < 2, other preventive measures such as anti - embolic stocking, adequate hydration and early mobilisation are encouraged. ○ Encourage patients to wear their stockings day and night until they no longer have significantly reduced mobility. • Discourage co-sleeping – high risk SIDS. Lactation Encourage exclusive breastfeeding. Contraception Refer MEC guidelines. PPC Register PPC & continue disease optimization.

REMARKS

Prepregnancy Care Clinic ^{1,4}

- Refer Nutritionist/Dietician/Physiotherapist regarding diet, exercise, weight loss programme.
- Medications for weight management **not recommended** at time of conception or during pregnancy.
- Bariatric surgery recommended for BMI >40kg/m² or BMI > 35kg/m² with metabolic disease.
 - Effective contraception at **least for 2 years** for women going for bariatric surgery.
 - Bariatric surgery can cause nutritional deficiency depending on type of bariatric surgery (increased risk of SGA offspring and higher rates of stillbirth or neonatal death).
- Assessment of co-morbidities:
 - metabolic disease e.g., Diabetes, Hypertension, Dyslipidemia, MAFLD, PCOS.
 - for Depression - (refer section 12 Mental Disorder).
 - OSA – Use STOP BANG score, if **≥ 3 refer ENT**.

STOP-BANG Sleep Apnea Questionnaire*Chung F et al Anesthesiology 2008 and BJA 2012***High risk of OSA:** YES 5-8**Intermediate risk of OSA:** YES 3-4**Low risk of OSA:** 0-2

S	Do you SNORE loudly (louder than talking or loud enough to be heard through closed)?	Yes	No
T	Do you often feel TIRED , fatigued, or sleepy during the daytime?	Yes	No
O	Has anyone OBSERVED you stop breathing during your sleep?	Yes	No
P	Do you have or are being treated for high blood PRESSURE ?	Yes	No
B	BMI more than 35kg/m ² ?	Yes	No
A	AGE over 50 years old?	Yes	No
N	NECK circumference >16 inches (40 cm) or larger	Yes	No
G	GENDER: Male?	Yes	No
TOTAL SCORE			

APPENDIX

Figure 1: Complications of Obesity in Pregnancy ^{1,3}

Antenatal	Intrapartum	Anaesthetic risks	Postpartum	Neonates
• Miscarriage • Fetal congenital abnormalities (e.g. NTD) • Diabetes – pre-existing and gestational • Stillbirth • Pre-eclampsia • Thromboembolism • Obstructive sleep apnoea (OSA) • Maternal death • Preterm birth • Depression • Fetal growth restriction	• IOL, prolonged labour and failure to progress • Instrumental delivery • Difficult fetal heart rate monitoring • Shoulder dystocia • Caesarean section • Post-partum haemorrhage • Perinatal death	• Difficulty with labour analgesia • Need for general anaesthesia • Difficult maintaining an adequate airway • Failed intubation • Need for ICU care post operation	• Delayed wound healing and infection • Thromboembolic disease • Need support with breastfeeding establishment and continuation • Postnatal depression	• Macrosomia • Neonatal Obesity • Neonatal Metabolic syndrome

REFERENCES

1. Ministry of Health Malaysia. Clinical Practice Guidelines Management of Obesity 2nd Edition.(2023).
2. Ministry of Health Malaysia, Consensus Clinical Guideline on Obesity in Pregnancy(2022)
3. Weight management before, during and adter pregnancy. NICE, 2010.
4. Ministry of Health Malaysia. Rekod Kesihatan Ibu KIK/1(b) 96 Pindaan 2020. (2020).
5. RANZOG et. al.Management Obesity in Pregnancy. 2013 (Reviewed 2022).
6. Gaudet et al. Guidelines for the management od pregnancy women with obesity:A systemic review. Obesity Reviews 21: e12972(2020)

SECTION 4

CARDIOVASCULAR DISORDER

4.1 Hypertensive Disorders

PHASE	ASSESSMENT AND MANAGEMENT
Definition	Hypertension BP $\geq$ 140/90 mmHg on 2 occasions or 4-6 hours apart³. - Mild : SBP 140-149 mmHg/ DBP 90-99 mmHg - Moderate : SBP 150-159 mmHg/ DBP 100-109 mmHg - Severe : SBP $\geq$160 mmHg/ DBP $\geq$110 mmHg Chronic hypertension HPT diagnosed before 20 weeks gestation or presence of HPT preconception¹. Gestational hypertension HPT detected for the first time after 20 weeks of pregnancy¹. Preeclampsia HPT in pregnancy with significant proteinuria (2+) at $\geq$ 20 weeks gestation³: Preeclampsia with severe feature⁹ - SBP BP $\geq$ 160 mmHg, or DBP of $\geq$ 110 mmHg on 2 occasions at least 4 hours apart - Thrombocytopenia – platelet count below 100,000/cm³ - Abnormal liver enzymes (elevated AST/ALT). - Pulmonary oedema - Renal insufficiency (serum creatinine $\geq$ 90μmol/L or a doubling of serum creatinine in the absence of other renal disease) - Presence of severe persistent right upper quadrant or epigastric pain unresponsive to treatment, new-onset headache unresponsive to medication and not accounted for by alternative diagnoses, visual disturbance or difficulty in breathing.
Prepregnancy Care & Family Planning	Registration criteria for PPC - All patients with HPT or Pre-hypertension in reproductive age group. Pre-hypertension (SBP 120-139/ DBP 80-89mmHg) Aims - Aim for good control of BP, less than 140/90mmHg² - Consider aim for lower BP, less than 130/80mmHg in certain selective patient: DKD, CKD & high CV risk. Management - Work out for secondary causes if clinical suspicion of secondary HPT. - Screen for TOD/TOC

	• Refer FMS or physician if: secondary HPT, resistant hypertension, presence of TOD/ TOC. • Revise safety of medications: ◦ Diuretics, ACE-inhibitors and ARBs are not suitable in pregnancy, consider switching to CCB, labetalol or methyldopa for those plans to conceive. • For early booking. Contraception • Provide contraception while optimizing treatment. • Advice on contraception (refer MEC guidelines). • In general: ◦ Well controlled BP- avoid CHC (category 3 MEC) ◦ Poorly controlled BP- avoid DMPA (category 3 MEC) and CHC (category 4 MEC).
Antenatal Care	At booking • To do early booking for patient with chronic HPT. • PE prophylaxis³ (refer <i>appendix figure 1</i>) ◦ Aspirin 100 - 150mg PO OD once fetal heart activity seen till delivery.³ (not recommended to start after 20 weeks) ◦ Calcium 1.5 - 2g of elemental calcium after 20 weeks till delivery (Calcium Carbonate 1g PO BD / Calcium lactate 600mg PO TDS). • Investigation (PE Profile)³ ◦ Urine protein ◦ Full blood count (platelet count) ◦ Renal profile ◦ Liver function test ◦ Uric acid • Medication ◦ To continue with existing antihypertensive if safe in pregnancy or switch to an alternative unless sustained SBP <100 mmHg or DBP <70 mmHg⁵. Subsequent ANC visits • General ◦ Provide patient and family education on the importance of signs and symptoms of preeclampsia for early diagnosis. • Monitoring & follow up ◦ Urine albumin ◦ BP, weight gain, pedal edema • Frequency of BP and Preeclampsia (PE) profile monitoring: ◦ Mild HPT- weekly BP³, PE profile at diagnosis as baseline³ or when indicated. ◦ Moderate HPT- biweekly BP³, PE profile every trimester or when indicated Medication/ target • Start antihypertensive if BP persistent above 140/90mmHg⁵ • Target BP SBP <135 mmHg/ DBP <85 mmHg⁵ • Medication option as below: ◦ Medication – methyldopa, labetalol, nifedipine¹. ▪ Before 20 weeks- methyldopa is preferred³.

	▪ After 20 weeks- methyldopa, labetalol or nifedipine can be used³. <table border="1"> <thead> <tr> <th>DRUGS</th><th>REMARKS</th></tr> </thead> <tbody> <tr> <td>Methyldopa (first line)</td><td>250mg PO TDS, doubling every 48 hours (up to 1gm PO TDS) until BP well controlled. Oldest anti-HPT agent used in pregnancy, with best safety profile.</td></tr> <tr> <td>Labetalol (alternative first line)</td><td>100mg PO BD, doubling every 48 hours (up to 400mg PO BD) until BP well controlled.</td></tr> <tr> <td>Nifedipine (second line)</td><td>10mg PO TDS, up to 20mg PO TDS, when BP poorly controlled despite maximum doses of methyldopa ± labetalol.</td></tr> </tbody> </table> <i>Anti-HPT drugs commonly used in pregnancy³</i> Fetal monitoring - Fetal surveillance with SFH, FKC, fetal growth monitoring by serial ultrasound starting at 28 weeks, at 4-weekly interval. More frequent if clinically indicated³. Emergency condition (refer <i>appendix figure 4 and 5</i>) - Severe preeclampsia - Eclampsia	DRUGS	REMARKS	Methyldopa (first line)	250mg PO TDS, doubling every 48 hours (up to 1gm PO TDS) until BP well controlled. Oldest anti-HPT agent used in pregnancy, with best safety profile.	Labetalol (alternative first line)	100mg PO BD, doubling every 48 hours (up to 400mg PO BD) until BP well controlled.	Nifedipine (second line)	10mg PO TDS, up to 20mg PO TDS, when BP poorly controlled despite maximum doses of methyldopa ± labetalol.
DRUGS	REMARKS								
Methyldopa (first line)	250mg PO TDS, doubling every 48 hours (up to 1gm PO TDS) until BP well controlled. Oldest anti-HPT agent used in pregnancy, with best safety profile.								
Labetalol (alternative first line)	100mg PO BD, doubling every 48 hours (up to 400mg PO BD) until BP well controlled.								
Nifedipine (second line)	10mg PO TDS, up to 20mg PO TDS, when BP poorly controlled despite maximum doses of methyldopa ± labetalol.								
Referral/ Shared Care	FMS/ O&G³ - Mild HPT- refer FMS at 20-24 weeks. Earlier if presence of other indications (twin pregnancy, social issue, other co-morbid etc). - Moderate HPT- early referral to FMS/ O&G. Urgent Referral to O&G³ - Any HPT with significant proteinuria³. - Severe HPT (SBP≥160 or DBP≥110) without proteinuria³. - Diagnosis of preeclampsia³. - Chronic HPT with TOC/ TOD								
Delivery Plan	- Delivery plan to be outlined by O&G specialist at about 36 weeks, if well controlled BP without fetal or maternal complications³. - Refer earlier if uncontrolled HPT/ fetal compromised. - Not to allow postdate if not on treatment.								
Postnatal Care	Postnatal discharge & review - High-risk discharge notification from hospital to respective health clinics as per guideline. - Review by MO at 2 weeks postnatal or earlier if indicated. - Home visit: To do BP monitoring and review any signs & symptoms of PE or impending eclampsia. The frequency of visit and monitoring is individualized³. - Continue to monitor BP after delivery until 6 weeks postpartum. The frequency of BP monitoring should be individualised³. - Aim for BP <140/90 mmHg.								

	- Continue antenatal anti-HPT after delivery for chronic HPT, consider switch to previous medicine if it is safe in breastfeeding (refer <i>appendix figure 2</i>). - For gestational HPT, to wean down treatment dose of anti-HPT and do not stop abruptly. Lactation Review medication safe in lactation. Contraception - Discuss contraception plan with couple. - Advise contraception (refer MEC Guidelines). PPC - Refer PPC if: - BP persistently high after 6 weeks postpartum. - Chronic hypertension.
--	---

REMARKS

- BP measurement using correct BP cuff size as per CPG on Hypertension 2018.
- Calcium Carbonate have better absorption compared to other types.
- Preeclampsia with severe features** term of diagnosis is being used by ACOG and ISSHP, as all women with preeclampsia are at risk of developing severe features.
- Maternal and fetal complications:

MATERNAL	FETAL
- Eclampsia - HELLP (Haemolysis, Elevated Liver enzymes - Low Platelet) syndrome - Major end-organ complications such as stroke - Placental abruption - Preterm delivery - Caesarean delivery - Death	- Small for gestational age infant - Serious neonatal morbidity - Long-term paediatric health and neurodevelopment - Stillbirth - Neonatal death

APPENDIX

Figure 1: Indications for Preeclampsia Prophylaxis

RISK	RISK FACTORS
Moderate	• Primigravida • Age >40 years old. • Pregnancy intervals > 10 years • Body Mass Index of > 35kg/m² at first visit • Family history of PE • Multiple pregnancy
High	• Hypertensive disease during previous pregnancy • Chronic kidney disease • Autoimmune disease like Systemic Lupus Erythematosus (SLE) or antiphospholipid syndrome (APS) • Type 1 or Type 2 Diabetes Mellitus or chronic hypertension.

Women with **2 moderate risk** or **1 high risk factor** should be started PE prophylaxis until delivery:

1. Aspirin 100-150mg once fetal heart activity seen (not recommended to start after 20 weeks)
2. Calcium 1.5-2g after 20 weeks.

Reference: CPG Management of Hypertension 5th edition, MOH Malaysia (2018)

Figure 2: Antihypertensive Medications and Lactation

MEDICATIONS	SAFETY IN LACTATION
Beta blocker	Consider other agents if preterm infant (atenolol) Monitor for bradycardia and hypoglycemia in infant (metoprolol)
Calcium Channel Blocker	Safe in breastfeeding
ACE Inhibitor	Safe in breastfeeding. Amounts ingested by the infant are small and would not be expected to cause any adverse effects in breastfed infants*
ARB	Avoid during breastfeeding. No information is available on the use of ARB during breastfeeding
Diuretic	Acceptable to be used during breastfeeding**
Alpha Blocker	Consider alternative antihypertensive. Little evidence is available.
Methyldopa	No issue in breastfeeding***

*caution in neonate and infant less than 2 months- risk of hypotension.

** high dose frusemide and indapamide may reduce breast milk production. Low doses of furosemide (20mg daily) do not suppress lactation.

*** methyldopa is associated with postpartum depression and is advisable to stop after delivery by NICE 2019 guidelines.

Reference: Drugs and Lactation Database (LactMed®)

Figure 3: Administration of Magnesium Sulphate (MgSO₄) ^{3,7,8}

Indication																						
- Severe preeclampsia - Hypertension with neurological signs or symptoms (headache, visual symptoms, clonus) - Eclampsia																						
Route of administration and dosage																						
- Can be administered via intramuscular or intravenously. - No evidence of difference between intramuscular and intravenous regimes in their effects on recurrent convulsion - Intramuscular is painful and carries a small risk of abscess (0.5%) - Intramuscular (preferred in primary care) - Loading: 10g 50% solution (20mls + 1ml 2% lignocaine) is prepared. One half is injected into upper outer quadrant of each buttock using a 21 gauge needle. - Maintenance: 5g 50% solution is injected IM in alternate buttocks every 4 hours after ascertaining that: - Knee (patellar) jerk is present - Respiratory rate is >16/min - Urine output >100ml/4 hours																						
Side effects/ signs of toxicity																						
- Side effects - Flushing of the skin, a metallic taste in the mouth, sweating, nausea and vomiting, heaviness in the chest, palpitations, and lowering of the BP initially. - Signs of toxicity - Decrease or absent reflexes (first sign) - Respiratory depression <12/min, respiratory arrest - Hypotension - Excessive drowsy, slurred speech - Abnormal ECG (prolonged PR, widened QRS), bradycardia, arrhythmias & cardiac arrest - Reduce urine output <30ml/hour (indication to reduce MgSO4 dose)																						
Monitoring																						
Monitor signs and symptoms of MgSO4 toxicity																						
<table><thead><tr><th>Parameters</th><th>Interval of monitoring</th><th>Target</th></tr></thead><tbody><tr><td>Blood pressure</td><td>15 min</td><td>140-150/ 90-109mmHg</td></tr><tr><td>Pulse rate</td><td>15 min</td><td>60 bpm</td></tr><tr><td>Respiratory rate</td><td>15 min</td><td>16 bpm</td></tr><tr><td>Deep tendon reflex</td><td>15 min</td><td>Presence of reflexes</td></tr><tr><td>Fetal heart rate</td><td>15 min</td><td>120-160bpm</td></tr><tr><td>Urine output*</td><td>Hourly</td><td>30mls/ hour or 100ml/4 hours</td></tr></tbody></table>	Parameters	Interval of monitoring	Target	Blood pressure	15 min	140-150/ 90-109mmHg	Pulse rate	15 min	60 bpm	Respiratory rate	15 min	16 bpm	Deep tendon reflex	15 min	Presence of reflexes	Fetal heart rate	15 min	120-160bpm	Urine output*	Hourly	30mls/ hour or 100ml/4 hours	
Parameters	Interval of monitoring	Target																				
Blood pressure	15 min	140-150/ 90-109mmHg																				
Pulse rate	15 min	60 bpm																				
Respiratory rate	15 min	16 bpm																				
Deep tendon reflex	15 min	Presence of reflexes																				
Fetal heart rate	15 min	120-160bpm																				
Urine output*	Hourly	30mls/ hour or 100ml/4 hours																				
*individualised- CBD insertion may need in cases with long distance to tertiary hospital																						
Toxicity management																						
<table><tbody><tr><td>Absent patellar reflexes</td><td> - If respiration normal – withhold further doses of magnesium sulphate until the reflexes return </td></tr><tr><td>Respiratory depression</td><td> - Give oxygen by face mask - Stop magnesium therapy - Maintain the airway - Nurse in the recovery position - Give IV Calcium Gluconate 1g </td></tr><tr><td>Respiratory arrest</td><td> - Intubate and ventilate immediately - Stop magnesium therapy - Give IV Calcium Gluconate 1g </td></tr><tr><td>Urine output <100ml/4 hours</td><td> - Reduce the next dose of IM MgSO4 to 2.5g if no other signs of magnesium toxicity </td></tr></tbody></table>	Absent patellar reflexes	If respiration normal – withhold further doses of magnesium sulphate until the reflexes return	Respiratory depression	- Give oxygen by face mask - Stop magnesium therapy - Maintain the airway - Nurse in the recovery position - Give IV Calcium Gluconate 1g	Respiratory arrest	- Intubate and ventilate immediately - Stop magnesium therapy - Give IV Calcium Gluconate 1g	Urine output <100ml/4 hours	Reduce the next dose of IM MgSO4 to 2.5g if no other signs of magnesium toxicity														
Absent patellar reflexes	If respiration normal – withhold further doses of magnesium sulphate until the reflexes return																					
Respiratory depression	- Give oxygen by face mask - Stop magnesium therapy - Maintain the airway - Nurse in the recovery position - Give IV Calcium Gluconate 1g																					
Respiratory arrest	- Intubate and ventilate immediately - Stop magnesium therapy - Give IV Calcium Gluconate 1g																					
Urine output <100ml/4 hours	Reduce the next dose of IM MgSO4 to 2.5g if no other signs of magnesium toxicity																					

Figure 4 : Flow Chart for Severe HPT/ PE/ Eclampsia

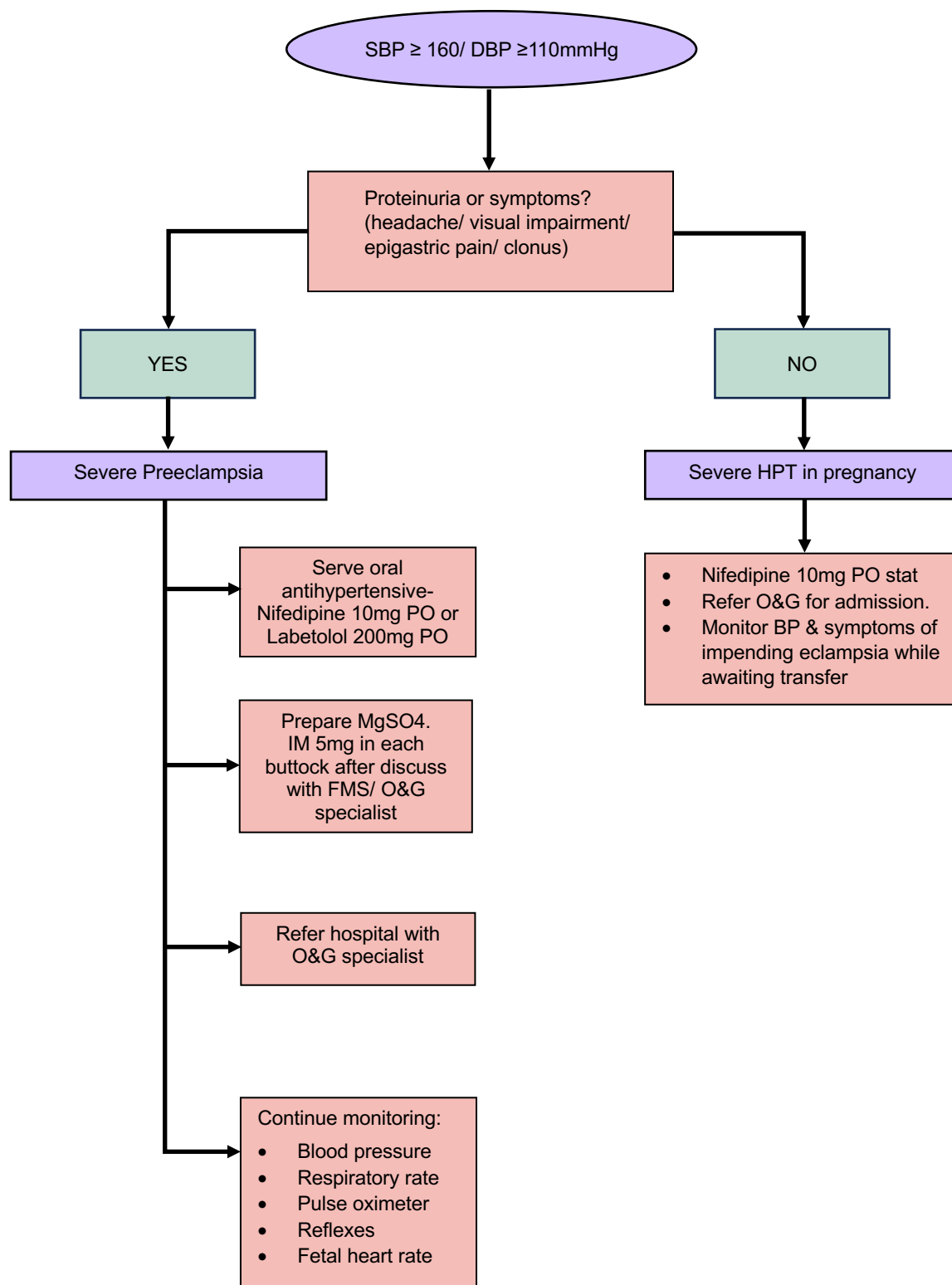
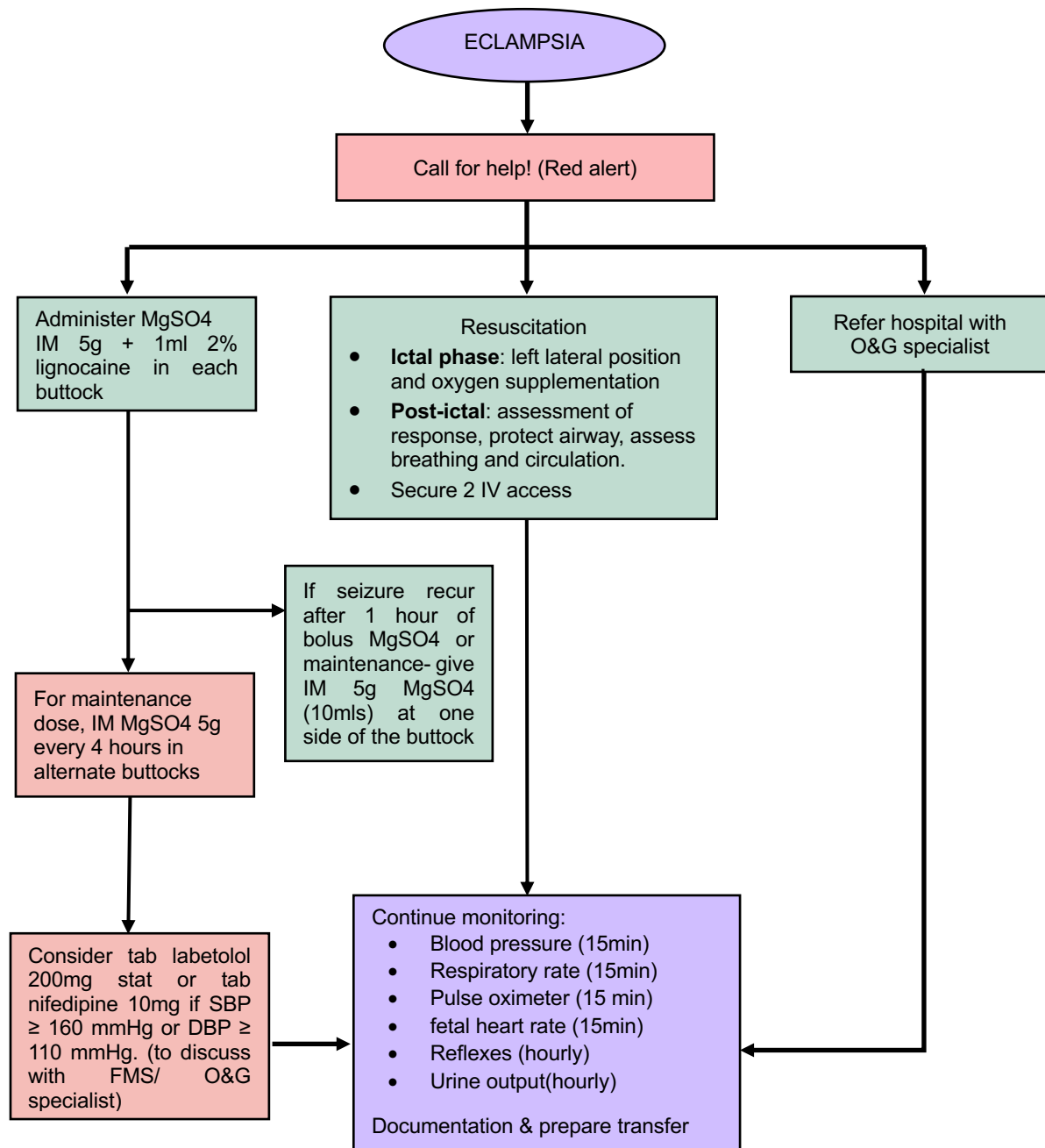


Figure 5: Flow Chart Management of Eclampsia

- All three initial path are to be run concurrently.
- May request for Obstetric Emergency Retrieval Team if available.
- Do not give too much fluid as the patient is at risk of acute pulmonary oedema, total fluids should not exceed 2L in 24 hours.
- If MgSO4 not available, can give IV diazepam/ supp diazepam 10mg. but to proceed with MgSO4 once available.

Reference:

1. *Garis panduan Pemberian Suntikan Intramuscular Magnesium Sulphate di 295 | Draft December 2021 Peringkat Penjagaan Kesihatan Primer bagi Kes Severe Preeclampsia/Eclampsia, MOH, 2014.*
2. *Perinatal care Manual 4th edition 2021*

REFERENCES

1. Ministry of Health Malaysia. Clinical Practice Guidelines Management of Hypertension 5th edition. *Minist. Heal. Malaysia* (2018)
2. Ministry of Health Malaysia. Garis Panduan Perkhidmatan Prakehamilan di Penjagaan Kesihatan Primer. *Minist. Heal. Malaysia Division of Family Health Development*. (2019)
3. Ministry of Health Malaysia. Perinatal Care Manual 4th Edition. *Minist. Heal. Malaysia Division Of Family Health Development*. (2021)
4. Magee, L.A, et al. Pregnancy Hypertension: An International Journal of Women's Cardiovascular Health. The 2021 International Society for the Study of Hypertension in Pregnancy classification, diagnosis & management recommendations for international practice. *An Int. J. of Women's Cardiovas. Heal.* **27**, 148-169 (2022)
5. Hypertension in pregnancy: diagnosis and management. *National Institute for Health and Care Excellence*. (2023)
6. Lactmed® @NIH available from <https://www.ncbi.nlm.nih.gov/bppks/NBK501922/>
7. Ministry of Health Malaysia. Garis panduan Pemberian Suntikan Intramuscular Magnesium Sulphate Peringkat Penjagaan Kesihatan Primer bagi Kes Severe Preeclampsia/Eclampsia. (2014).
8. Ministry of Health Malaysia. Training Manual for Hypertensive Disorders in Pregnancy 3rd edition. (2018)
9. ACOG Practice Bulletin. Gestational Hypertension and Preeclampsia. American College of Obstetrician and Gynaecologist (2020)

4.2 Heart Disease

PHASE	ASSESSMENT AND MANAGEMENT
Definition	Pre-existing Heart Disease in Pregnancy • Congenital heart disease (CHD) • Valvular heart disease (VHD) • Cardiomyopathy • Heart failure (HF) • Ischemic heart disease (IHD) • Arrhythmia • Pulmonary HPT in Eisenmenger syndrome Suspected Heart Disease in Pregnancy Heart disease is suspected in women with new onset disease, present for the first time when pregnant or with pre-existing yet undiagnosed cardiac disease.
Prepregnancy Care & Family Planning	Registration for PPC • For patients with CHD, the PPC should be initiated at puberty, and to be re-emphasized at age 16-18 years, and prior to marriage/sexually active¹. Management • Cardiology referral: ○ For cardiac assessment, risk stratification using modified WHO classification (mWHO) (refer <i>appendix figure 1</i>) and New York Heart Association (NYHA) (refer <i>appendix figure 2</i>) and Maternal CV Risk Factor (refer <i>appendix figure 3</i>) and shared evaluation to determine fitness for pregnancy. ○ Appropriate optimal cardiac condition with intervention as necessary prior to pregnancy. • Screen for co-morbid & treat accordingly e.g. HPT, anaemia. • To review medications if patient have plan to conceive as certain medications may have teratogenicity effect (refer <i>appendix figure 4</i>) • For patient with heart disease within mWHO Class IV: ○ Pregnancy is not recommended. ○ Counselling both couples. Contraception • Provide contraception while optimizing treatment. • Advise contraception (refer MEC guidelines) • In general, LARCs are advisable.
Antenatal Care	1. Pre-existing Heart Disease At booking: • Early booking. • Risk stratification: ○ Thorough medical history & physical examination: ▪ Symptoms: Chest pain, shortness of breath, cough, orthopnea, paroxysmal nocturnal dyspnea (PND), reduced effort tolerance, palpitation, edema, chest discomfort, syncope.

	▪ Sign: Tachypnoeic, cyanosis, ankle edema, lungs with basal crepitation, hepatomegaly +/- ascites, pathological cardiac murmur (all audible diastolic murmurs are abnormal), tachycardia, cardiomegaly, increased JVP, clubbing. ○ mWHO classification & NYHA functional class. ○ Symptomatic patients may need admission. • Investigations: FBC, ECG, ECHO ○ ECHO: Refer Cardio/ ECHO within 2-4 weeks of booking. ○ Refer FMS in 2 weeks' time from booking, or earlier if indicated. • Medications review for drug category & safety profile (refer <i>appendix figure 4</i>). Subsequent ANC visits: • Shared care between FMS, Cardiologist/ Physician and O&G specialist based on categories of mWHO. • Monitor signs & symptoms of HF on every visit. Should be aware of physiological changes in pregnancy and effect on maternal heart, and peripartum cardiomyopathy. • If new symptoms develop or changes in functional class, to refer immediately. • Frequency of ANC visits: a) mWHO/NYHA I and II: ○ FMS: 2 weeks after booking and every trimester. ○ Combined cardio/O&G to see at least once. b) mWHO/NYHA II-III, III & IV: ○ Combined cardio/O&G care. ○ Screen & treat precipitating factor for heart failure: ▪ Anaemia ▪ Infection, HPT • Prophylaxis: ○ VTE risk assessment and anticoagulant if indicated. ○ Antimicrobial prophylaxis as decided by the cardiology team. • Ensure compliance to medications and follow up. • Fetal growth and well-being: ○ Detailed scan by Maternal Fetal Medicine (MFM) specialist at 18-20 weeks POA for cases with CHD. ○ The risk of recurrence of heart lesions in fetus with parents or siblings with congenital heart disease is described in Table E (refer <i>appendix figure 5</i>). • Admission and rest maybe indicated in some cases (case to case basis). 2. Suspected Heart Disease in Pregnancy • To suspect heart disease in patients presented with symptoms & signs as mentioned previously. * <i>Symptoms and signs of normal pregnancy may mimic that of cardiac disease.</i> • All women with cardiac symptoms and signs should have a thorough history, risk assessment for cardiac disease and physical examination. • All cases suspected of heart disease must be discussed with FMS and Cardiologist (to evaluate the urgency of referral and further work out to establish the diagnosis).
--	--

Referral/ Shared Care	Shared care between FMS, Cardiologist/Physician and O&G based on risk stratification.
Delivery Plan	Outlined by O&G team. Hospital delivery.
Postnatal Care	• Individualised care plan. • High risk discharge in all women with heart disease in pregnancy. • Home visit upon discharge and MO review within 1 week to assess back cardiac status thoroughly. • FMS appointment within 2-4 weeks for contraception decision and further discussion on pre-pregnancy. • Recommence oral anticoagulant (INR should be achieved before discharge) if on OAC. • Ensure for cardio or O&G follow up if any. • Register PPC.

REMARKS

- Heart disease in pregnancy is the commonest underlying medical conditions that contributes to maternal death in Malaysia.
- There is no local registry for pregnancy with structural heart disease. From Malaysia Ropac Registry in 2018 approximately 50 cases were reported in 2 years with 56% (n=28) cases had congenital heart disease, 36% (n=18) had VHD, 4% (n=2) had IHD and 4%(n=4) had cardiomyopathy.³
- Risk of warfarin embryopathy during 1st trimester depends on daily dosing:
 - $\leq 5\text{mg}$ - risk of embryopathy is low.
 - 5mg - potential of fetal adverse event.

APPENDIX

Figure 1: Modified World Health Organization (mWHO) Maternal Cardiovascular Risk Assessment

mWHO Class I : No Increase of Mild increase in Morbidity
Small or mild : (Pulmonary stenosis, Patent ductus arteriosus ,Mitral valve prolapse) Successfully repaired simple lesions (atrial or ventricular septal defect, patent ductus arteriosus, anomalous pulmonary venous drainage) Atrial or ventricular ectopic beats, isolated.
mWHO Class II : (if otherwise well and uncomplicated) Moderate increase in Maternal Morbidity Small increase in Maternal Mortality (<1%)
Unoperated atrial or ventricular septal defect (moderate size, velocity <4 m/s) Repaired Tetralogy of Fallot (without significant residual lesions) Most asymptomatic arrhythmias without cardiac decompensation : AF,SVT, WPW syndrome, long QT syndrome without cardiac decompensation Turner syndrome without aortic dilatation
mWHO Class II-III : Maternal mortality (1-5%) depending on the individual or other co-existing conditions
Mild left ventricular impairment (EF >45%) Hypertrophic cardiomyopathy Native or tissue valve disease not considered WHO I or IV (mild mitral stenosis, moderate aortic stenosis) Marfan or other HTAD syndrome without aortic dilatation Aorta <45 mm in bicuspid aortic valve pathology Repaired coarctation Atrioventricular septal defect
mWHO Class III : Severe increase in maternal morbidity. Significant increase in maternal mortality (5-15%). Expert counselling required. If pregnancy is decided upon, need individualised pregnancy care plan with multidisciplinary team management.
Moderate left ventricular impairment (EF 30–45%) Previous peripartum cardiomyopathy without any residual left ventricular impairment Mechanical valve Systemic right ventricle with good or mildly decreased ventricular function Fontan circulation. If otherwise the patient is well and the cardiac condition uncomplicated Unrepaired cyanotic heart disease Other complex heart disease Moderate mitral stenosis Severe asymptomatic aortic stenosis Moderate aortic dilatation: (40–45 mm in Marfan syndrome or other HTAD, 45–50 mm in bicuspid aortic valve, Turner syndrome ASI 20–25 mm/m² , Tetralogy of Fallot <50 mm Ventricular tachycardia
mWHO Class IV : Maternal mortality is (25-50%). Pregnancy is not recommended or is contraindicated. If pregnancy occurs termination should be discussed. If pregnancy continues, care as for class III.
Pulmonary arterial hypertension Severe systemic ventricular dysfunction (EF <30% or NYHA class III–IV) Previous peripartum cardiomyopathy with any residual left ventricular impairment Severe mitral stenosis Severe symptomatic aortic stenosis Systemic right ventricle with moderate or severely decreased ventricular function Severe aortic dilatation (>45 mm in Marfan syndrome or other HTAD, >50 mm in bicuspid aortic valve, Turner syndrome ASI >25 mm/m² , tetralogy of Fallot >50 mm) Vascular Ehlers–Danlos Severe (re)coarctation Fontan with any complication

Figure 2: New York Heart Association (NYHA) Functional Classification.

Functional Class	Symptoms	Maternal Cardiovascular Risk
CLASS I	No limitation. Ordinary physical activity does not cause undue fatigue, dyspnea or palpitation	LOW
CLASS II	Slight Limitation of physical activity. Such patients are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea or angina	LOW
CLASS III	Marked limitation of physical activity. Although patients are comfortable at rest, less than ordinary activity will lead to fatigue, palpitation, dyspnea or angina.	HIGH
CLASS IV	Inability to carry on any physical activity without discomfort. Symptoms of congestive heart failure are present at rest. With any physical activity, increased discomfort is experienced.	HIGH

Figure 3: Maternal Cardiovascular Risk Factor

Maternal CV Risk	mWHO Class	NYHA functional Class
Low Risk	I&II	I&II
Moderate Risk	II-III & III	-
High Risk	IV	III & IV

Figure 4: Table Category & Safety Profiles of Drugs that are Commonly Used in Heart Disease in Pregnancy.

Drugs	FDA category	Placenta permeable	Transferable to breast milk	Adverse Effects
Aspirin (low dose)	B	Yes	Well tolerated	No teratogenic effects known (large data set)
Adenosine	C	No	No	No fetal adverse effects reported (limited human data)
Amiodarone	D	Yes	Yes	Thyroid insufficiency (9%), hyperthyroidism, goitre, bradycardia, growth retardation, premature birth
ACEI-Inhibitors	D	Yes	Yes	Renal or tubular dysplasia, oligohydramnion, growth retardation, ossification disorders of skull, lung hypoplasia, contractures, large joints, anemia, IUD.
Angiotensin Receptor Blockers	D	Unknown	Unknown (not recommended)	Renal or tubular dysplasia, oligohydramnion, growth retardation, ossification disorders of skull, lung hypoplasia, contractures, large joints, anemia, IUD.
Beta Blockers (bisoprolol, metoprolol, propranolol)	C	Yes	Yes	Bradycardia and hypoglycaemia in fetus,
Clopidogrel	C	Unknown	Unknown	No information during pregnancy available.
Digoxin	C	Yes	Yes	Serum level unreliable, safe
Diltiazem	C	No	Yes	Possible teratogenic effect

Diuretic (frusemide, HCTZ)	C	Yes	Yes, well tolerated, milk production can be reduced	Oligohydramnion
Fibrates (fenofibrate, gemfibrozil)	C	Yes	Yes/Unknown	No adequate human data
Fondaparinux	B	Yes	No	May increase risk of bleeding in the fetus and neonates.
Heparin (LMWH)	B	No	No	Long term application: seldom osteoporosis and markedly less thrombocytopenia than UF heparin.
Labetolol	C	Yes	Yes	Fetal growth restriction (second and third trimester), neonatal bradycardia and hypotension (used near term)
Methyldopa	B	Yes	Yes	Mild neonatal hypotension
Nifedipine	C	Yes	Yes	Tocolytic. Sublingual application and potential synergism with magnesium sulphate may induce hypotension (mother) and fetal hypoxia
Nitrates (GTN, Isosorbide dinitrate)	B	Unknown	Unknown	Bradycardia, tocolytic
Spironolactone	D	Yes	Yes, milk production can be reduced	Antiandrogenic effects, oral clefts (first trimester)
Statins	X	Yes	Unknown	Congenital anomalies
Verapamil	C	Yes	Yes	Well tolerated (limited experience during pregnancy)
Warfarin	D/X	Yes	Yes, well tolerated as inactive metabolite	Warfarin embryopathy, bleeding.

Figure 5: Risk of Recurrent Congenital Heart Lesions in the Fetus of Parents with CHD

Lesion	Mother Affected	Father Affected	Siblings in unaffected parents	
	Risk of Transmission (%)	Risk of Transmission (%)	1 sibling (%)	≥ 2 siblings (%)
Atrioventricular septal defect	7-11.6	4.3-7	3-4	NA
Aortic stenosis	8.0	3.8	2	6
Coarctation	6.3	3.0	2	6
Atrial septal defect	6.1	3.5	2-3	8
Ventricular septal defect	6.0	3.6	3	10
Pulmonary stenosis	5.3	3.5	2	6
Persistent ductus arteriosus	4.1	2.0	NA	NA
Tetralogy of Fallot	2-5	1-6	2-3	8
All heart defect	5-7	2.2	NA	NA

Figure 6 : Physical Findings and Changes Seen in Common Cardiac Investigations in Normal Pregnancy.

Clinical examination	• Peripheral edema is a common finding. • Pulse rate may be increased. • Pulse may be bounding. • Occasional ectopics are common and are often benign. • Apex beat may be shifted more laterally • ESM and continuous flow murmurs due to mammary souffle and venous hum are common. • Splitting of the first heart sound is common. • The intensity of the pulmonary second sound (P2) may be accentuated. • Physiological third heart sound may be present. • A fourth heart sound is seldom heard.
ECG	• Heart rate may be increased. • Occasional atrial or ventricular ectopics may be present. • There may be a shift of the QRS plane axis to the left. • Minor T wave changes.
CXR	• Heart size is normal • The heart may be shifted to a more horizontal position late in pregnancy. • Pulmonary blood vessels may become more prominent due to increase blood flow.
Echocardiogram	• There may be an increase in the left and right ventricular end-diastolic dimensions compared with a previous echo done in the non-pregnant state. • The left ventricular mass may be increased.

REFERENCES

1. Ministry of Health Malaysia. Clinical Practice Guidelines Heart Disease in Pregnancy 2nd Edition, *Minist. Heal Malaysia* (2016)
2. European Society of Cardiology. European Heart Journal Guidelines for the Management of Cardiovascular Diseases During Pregnancy, *Eu.Heart J.* **39**, 3165-3241 (2018)
3. Yim, C.W. et al. International Journal of Cardiology Malaysian Ropac Registry: Pregnancy with Structural Heart Disease in Malaysia, *Int. J. Cardiology* **36** Vol 273, Supplement (2018)

4.3 Approach to Maternal Tachycardia

PHASE	ASSESSMENT AND MANAGEMENT
Definition	- Defined as maternal HR of more than 100 bpm¹ - Mild tachycardia: 100-120 - Severe tachycardia: >120 - Physiological changes in pregnancy: - Comparing HR in pregnancy to prepregnancy baseline, HR increase 20–25%. - From the first trimester onward, HR increases by 10–15 bpm. - Persistent tachycardia in early pregnancy is less likely physiological than in later gestation.
Prepregnancy Care & Family Planning	Disease-specific approach
Antenatal Care	- When persistent maternal tachycardia detected, determine the causes of tachycardia (refer <i>remarks</i>). - Persistent is consider when the heart rate more than 100 in 2 or more occasions and patient has been rested at least 10 minutes in resting position. - Focused history taking & physical examination to determine the causes: - Red flags: - Chest pain, SOB, reduced ET, dizziness and confusion, syncopal attack/ spell, loss of consciousness, heart failure symptoms e.g. oedema, PND, orthopnoea, unusual/ sudden fatigue. - VTE risks (pregnancy itself is one of the risk). - Personal history of heart conditions. - Family history of cardiac disease/ sudden death. - Consider hospital admission if (MEOWS criteria) (refer <i>remarks</i>): - Persistent HR > 120 bpm, or - HR < 120 bpm but presence of red flags. - Pulmonary embolism (see section 6.4 VTE): - Pulmonary embolism is one of the crucial diagnosis not to be missed in pregnancy with maternal tachycardia. - Pulmonary embolism has wide variety of presenting features (dyspnoea, pleuritic chest pain, cough, haemoptysis, sweating, syncope or hypoxaemia, maternal tachycardia). Thorough assessment needed. - Urgent referral to medical and O&G if suspected. - Maternal tachycardia can be managed as outpatient if: - HR between 100-119 bpm, without any red flags & clinically stable. - Further assessment should be done: - Laboratory investigations (review within 2 weeks-time, or earlier if indicated): - FBC - TFT - RBS

	- Serum electrolytes - UFEME/ MSU C&S if indicated - Urine drugs if indicated ▪ 12-lead ECG ▪ Assessment TRO anxiety/ depressive disorders by using GAD 7 & PHQ 9 assessment ○ Consult FMS for maternal tachycardia (discussion at any stage of management is encouraged): ▪ ECHO may be considered TRO structural heart disease e.g. valvular heart disease (e.g. MS, AS etc). ▪ Ambulatory ECG (e.g. Holter) is indicated in patients with unexplained palpitations in a setting of:² - When history, physical examination, and 12-lead ECG suggest possibility of arrhythmias. - Diagnosed structural heart disease, family history of sudden cardiac death, inherited channelopathy with known risk of arrhythmia. - When patients need reassurance and specific explanation of their symptoms. - When symptoms warrant therapy and specifics of treatment are dependent on a formal arrhythmic diagnosis (e.g. ablation, antiarrhythmic therapy). ○ Physiological maternal tachycardia can be followed up at primary care level.
Referral/ Shared Care	• FMS referral/ discussion– at any stage of management. • Hospital specialists (as indicated): ○ Cardio/ Medical ○ O&G ○ Psychiatry
Delivery Plan	Disease-specific timing and mode of delivery.
Postnatal Care	• Reassessment of risks. • Register and continue PPC if risks still present. • Appropriate contraception according to MEC for contraceptive use recommendation.

REMARKS**A modified early obstetric warning system (MEOWS)³**

An obstetric modified early warning score chart should be used for all women undergoing observation, to allow early recognition of the woman who is becoming critically ill at impending collapse. The MEOWS is a simple screening tool for maternal morbidity. MEOWS was 89% sensitive, 79% specific, with a positive predictive value 39% and a negative predictive value of 98%.

Physiological parameters	Yellow alert	Red alert
Respiration rate	21–30	< 10 or > 30
Oxygen saturation		< 95
Temperature	35–36	< 35 or > 38
Systolic blood pressure	150–160 or 90–100	< 90 or > 160
Diastolic blood pressure	90–100	> 100
Heart rate	100–120 or 40–50	> 120 or < 40
Pain score	2–3	
Neurological response	Voice	Unresponsive, pain

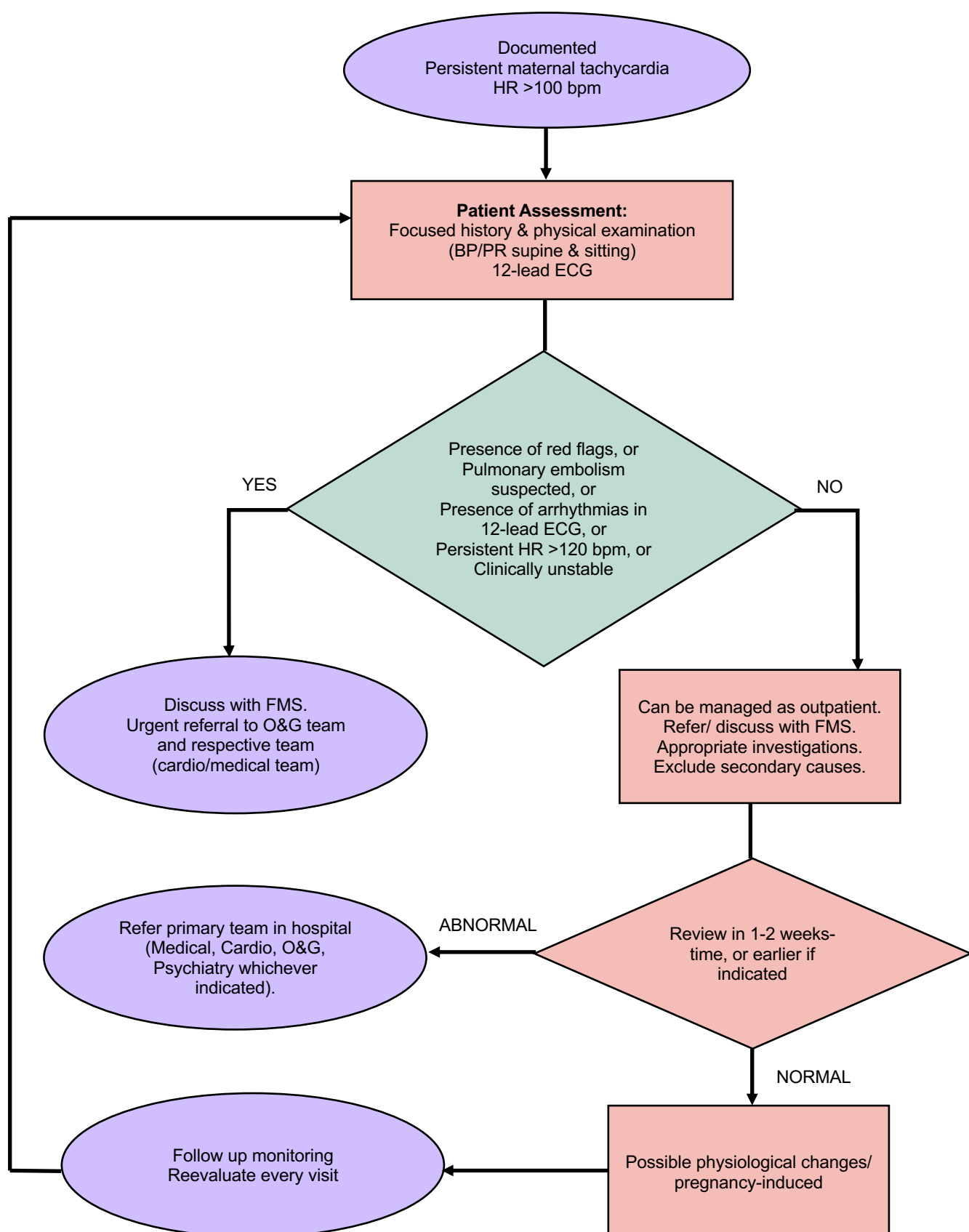
Causes for maternal tachycardia

- Cardiac cause
 - Tachyarrhythmias : SVT, AF, PVC, Inappropriate Sinus Tachycardia (IAST)
 - Structural causes: Peripartum Cardiomyopathy, Valvular Heart Disease e.g. MS)
- Embolism (pulmonary embolism/ VTE)
- Anaemia
- Anxiety
- Thyrotoxicosis
- Hyperemesis gravidarum/Hypoglycaemia/Hypotension
- Infection (e.g. UTI, Pneumonia, COVID-19, perineal infection)
- Diabetic /starvation ketoacidosis
- Bleeding
- Electrolyte imbalance (e.g. hypo and hyperkalemia, hypophosphataemia, hypomagnesaemia and hypo and hypercalcaemia)
- Drug/Substance induced (e.g. stimulant, caffeine, salbutamol, smoking)

*need to exclude the pathological causes before diagnosed as physiological changes

APPENDIX

Figure 1: Approach to Maternal Tachycardia



REFERENCES

1. Implementing Obstetric Early Warning Systems. *American Journal of Perinatology Reports*. No 2 (2018).
2. Steinberg *et al*. ISHNE-HRS Expert Consensus Statement on Ambulatory ECG and External Cardiac Monitoring/ telemetry. *wileyonlinelibrary.com/journal/anec*. **22**:e12447. (2017)
3. Singh S *et al*. A Validation Study of the CEMACH Recommended Modified Early Obstetric Warning System (MEOWS). *Anaesthesia*. **67** (01): 12-18. (2012)
4. The Oxford-based Preganancy Physiology Prediction Study RCOP; Tachycardia in Pregnancy: when to worry? <https://doi.org/10.7861/clinmed>. (2021)

SECTION 5

RESPIRATORY DISORDERS

5.1 Bronchial Asthma

PHASE	ASSESSMENT AND MANAGEMENT				
Definition	- A heterogeneous disease, usually characterized by chronic airways inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough, that vary over time and intensity together with variable expiratory airflow limitation (refer <i>appendix figure 1</i>). - Asthma control during pregnancy¹. - One third of asthma symptoms worsened. - One third of asthma symptoms remain unchanged. - One third of asthma symptoms improved.				
Pre pregnancy Care & Family Planning	Registration criteria for PPC - Women diagnosed with bronchial asthma. Aims - Achieve disease controlled. - Prevent exacerbation. - Optimize comorbid and risk factor. Management - Register asthma registry if not done. - Refer FMS/Respiratory team if diagnosis is unclear. - Assessment (refer <i>appendix figure 2</i>): - Identify and avoid triggering factors. - Optimize comorbidities that can contribute to exacerbation e.g., chronic rhinosinusitis, GERD. - Check inhaler technique and performed PEFR as baseline. - Assess level of asthma control as per GINA guidelines. - Enroll to quit smoking clinic to women who smoke. - Disease status: <table border="1"> <tr> <td>Well Controlled (ACT 20-25)</td><td>Continue current inhalers. Allow pregnancy.</td></tr> <tr> <td>Partly controlled (ACT 16-19) Uncontrolled (ACT ≤15)</td><td>Step up treatment as per GINA guidelines. Advise to defer pregnancy for partly controlled/uncontrolled asthma with use appropriate contraception until optimum control achieved within 3 months.</td></tr> </table> Contraception - Provide contraception while optimizing treatment. - Advise for contraception (refer MEC guidelines).	Well Controlled (ACT 20-25)	Continue current inhalers. Allow pregnancy.	Partly controlled (ACT 16-19) Uncontrolled (ACT ≤15)	Step up treatment as per GINA guidelines. Advise to defer pregnancy for partly controlled/uncontrolled asthma with use appropriate contraception until optimum control achieved within 3 months.
Well Controlled (ACT 20-25)	Continue current inhalers. Allow pregnancy.				
Partly controlled (ACT 16-19) Uncontrolled (ACT ≤15)	Step up treatment as per GINA guidelines. Advise to defer pregnancy for partly controlled/uncontrolled asthma with use appropriate contraception until optimum control achieved within 3 months.				

Antenatal Care	Assessment - Assess on: - Aggravating factors and comorbidities that can contribute to exacerbation such as chronic rhinosinusitis, GERD, smoking. Level of asthma control using ACT score must be performed every month (refer <i>appendix figure 4</i>). - Inhaler technique and PEFR every visit (refer <i>appendix figure 3</i>) Diagnosis - Diagnostic criteria for asthma according to GINA guideline (refer <i>appendix figure 1</i>)¹. - For new typical variable respiratory symptoms suggestive bronchial asthma can be considered for spirometry (after discussing with respiratory physician in respective locality). However, spirometry is relatively contraindicated in 3rd trimester². Treatment - Assess, adjust, and review asthma management cycle for personalized asthma care (refer <i>appendix figure 5</i>). - Treatment based on disease controlled: <table border="1"> <tr> <td> Well Controlled (ACT 20-25) </td><td> Continue medication. Do not step-down treatment. Follow up 4-6 weeks. </td></tr> <tr> <td> Partly controlled (ACT 16-19) Uncontrolled (ACT ≤15) </td><td> Consult/discussed with FMS for optimization of treatment. Continue treatment if asthma well control after step-up treatment. (refer <i>appendix figure 6</i>) </td></tr> </table> - Educate on aim of treatment. - Educate on asthma action plan. - Advise to avoid known triggering factors. - Fetal surveillance with SFH, FKC, fetal growth monitoring by serial ultrasound as indicated.	Well Controlled (ACT 20-25)	Continue medication. Do not step-down treatment. Follow up 4-6 weeks.	Partly controlled (ACT 16-19) Uncontrolled (ACT ≤15)	Consult/discussed with FMS for optimization of treatment. Continue treatment if asthma well control after step-up treatment. (refer <i>appendix figure 6</i>)
Well Controlled (ACT 20-25)	Continue medication. Do not step-down treatment. Follow up 4-6 weeks.				
Partly controlled (ACT 16-19) Uncontrolled (ACT ≤15)	Consult/discussed with FMS for optimization of treatment. Continue treatment if asthma well control after step-up treatment. (refer <i>appendix figure 6</i>)				
Referral/ Shared Care	- In well controlled asthma, refer FMS at least once at any trimester. - In partly/uncontrolled asthma, TCA FMS within 2-4 weeks. - Refer to Respiratory team for combine care in cases: - Step 4 and above (refer <i>appendix figure 6</i>) - Unclear diagnosis - Concomitant underlying comorbidities (e.g.: OSA) - Refer O&G at 34-36 weeks for timing of delivery in women with partly/uncontrolled asthma. Well controlled asthma can allow postdated. - Refer immediately for admission if patient in acute exacerbation.				
Delivery Plan	Hospital delivery.				
Postnatal Care	Postnatal review Assess asthma control and manage accordingly.				

	Continue medication and step-down treatment using a stepwise approach if well controlled. Lactation Encourage exclusive breastfeeding. Contraception Refer MEC guidelines. PPC Register PPC and continue disease optimization.
--	--

REMARKS

- Acute asthma management during pregnancy is the same as non-pregnant adult¹.
- SABA alone** is not recommended due to the increased risk of exacerbation. All patients with asthma should receive ICS treatment. We suggest use Track 1 of GINA 2023 guideline if possible ¹.
- Exacerbation and poor symptoms controlled associated with preterm delivery, low birth weight and increase perinatal mortality (baby) and pre-eclampsia (mother)¹.

APPENDIX

Figure 1: Diagnostic Criteria for Asthma

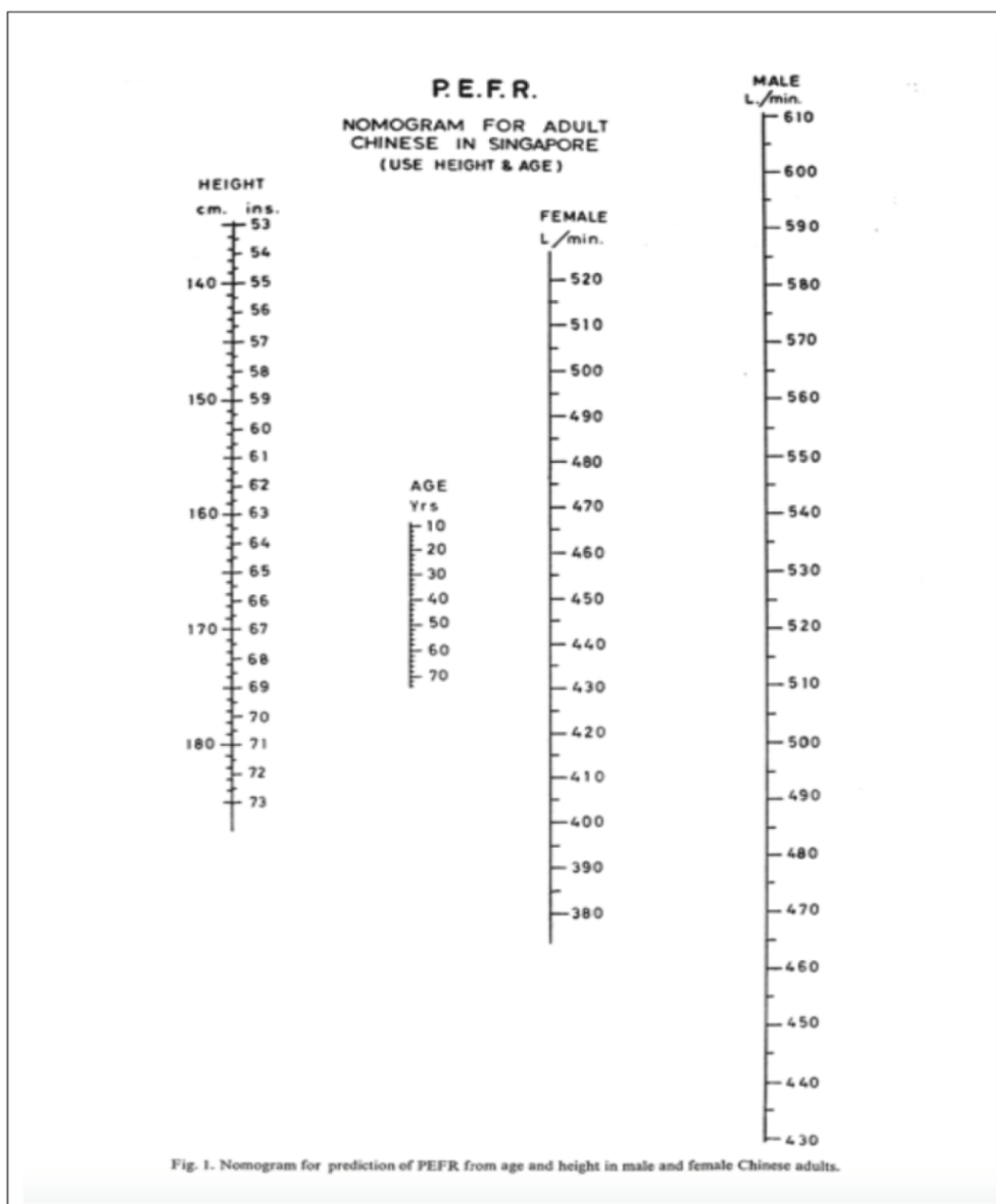
a. History of typical variable respiratory symptoms • More than one type of respiratory symptom (in adult, isolated cough is seldom due to asthma) • Symptoms occur variably over time and vary in intensity • Symptoms are often worse at night or on waking • Symptoms are often triggered by exercise, laughter, allergen, or cold air • Symptoms are often appear or worsen with viral infection
b. Confirm presence of airflow limitation or variable expiratory airflow limitation. • FEV1/FVC is reduce compare lower limit normal (<70%). • Positive Bronchodilator reversibility test – Increase FEV1 >12% and >200mls • Excessive variability in twice (Daily PEFR over 2 weeks) – average daily diurnal PEFR variability >10%

Reference: Global Strategy for Asthma Management and Prevention (2023) by Global Initiative for Asthma (GINA)

Figure 2: Assessment Asthma Control (Symptoms Control & Risk factor for exacerbation)

A. Asthma symptom control						
In the past 4 weeks, has the patient had:				Well controlled	Partly controlled	Uncontrolled
• Daytime asthma symptoms more than twice/week?	Yes	No	}	None of these	1–2 of these	3–4 of these
• Any night waking due to asthma?	Yes	No				
• SABA* reliever for symptoms more than twice/week?	Yes	No				
• Any activity limitation due to asthma?	Yes	No				
a. Risk factors for exacerbations						
Uncontrolled asthma symptoms		Having uncontrolled asthma symptoms is an important risk factor for exacerbations. ⁹⁸				
Factors that increase the risk of exacerbations even if the patient has few asthma symptoms†	Medications	High SABA use (≥3 x 200-dose canisters/year associated with increased risk of exacerbations, increased mortality particularly if ≥1 canister per month) ^{74,75,99,100} Inadequate ICS: not prescribed ICS, poor adherence, ¹⁰¹ or incorrect inhaler technique ¹⁰²				
	Other medical conditions	Obesity, ^{103,104} chronic rhinosinusitis, ¹⁰⁴ GERD, ¹⁰⁴ confirmed food allergy, ¹⁰⁵ pregnancy ¹⁰⁶				
	Exposures	Smoking, ¹⁰⁷ e-cigarettes, ¹⁰⁸ allergen exposure if sensitized, ¹⁰⁷ air pollution ¹⁰⁹⁻¹¹²				
	Psychosocial	Major psychological or socioeconomic problems ^{113,114}				
	Lung function	Low FEV1 (especially <60% predicted), ^{107,115} high bronchodilator responsiveness ^{104,116,117}				
	Type 2 inflammatory markers	Higher blood eosinophils, ^{104,118,119} elevated FeNO (in adults with allergic asthma taking ICS) ¹²⁰				
	Exacerbation history	Ever intubated or in intensive care unit for asthma, ¹²¹ ≥1 severe exacerbation in last 12 months ^{122,123}				

Reference: Global Strategy for Asthma Management and Prevention (2023) by Global Initiative for Asthma (GINA)

Figure 3: Peak Expiratory Flow Nomogram

Reference: Malaysia Clinical Practice Guidelines Management Asthma in Adult 2017

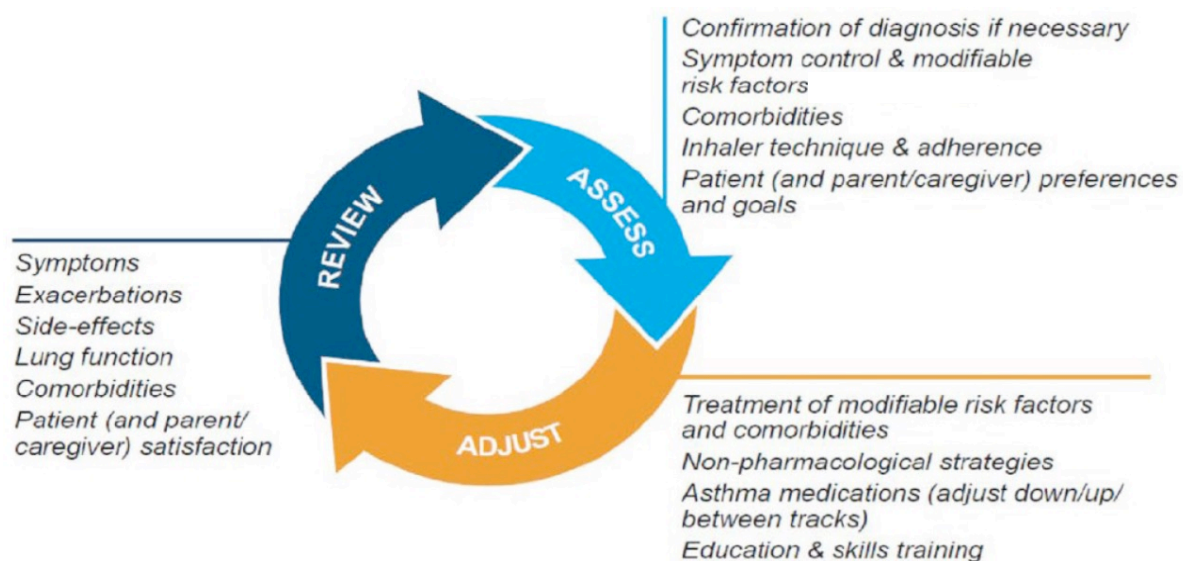
Mark the patient's height and age on the respective lines. Draw a straight line connecting the two points and extend this line to the corresponding gender line to get the expected PEF value¹. PEFR aim: $\geq 80\%$ from expected rate based on age and height⁵.

Figure 4: Asthma Control Test (ACT) Score

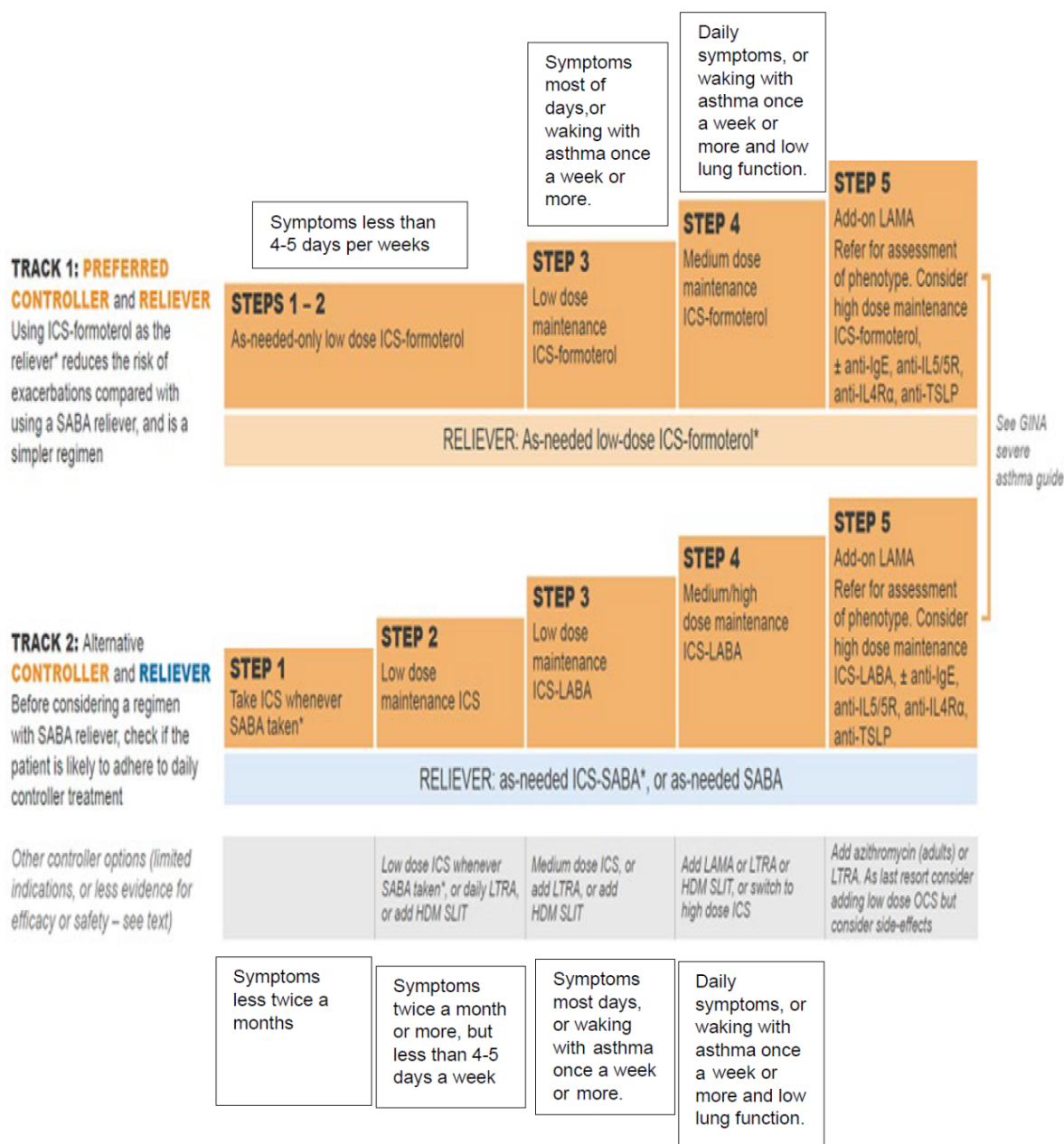
1.	Dalam 4 minggu kebelakangan ini, berapa kerapkah asma anda menghalang anda daripada melakukan sebanyak mungkin di tempat kerja, sekolah atau di rumah?					Markah
	Sepanjang masa (1)	Kebanyakan masa (2)	Kadang-kadang (3)	Sedikit masa (4)	Tiada langsung (5)	
2.	Sepanjang tempoh 4 minggu yang lalu, berapa kerapkah anda telah mengalami sesak nafas?					Markah
	Lebih daripada sekali sehari (1)	Sekali sehari (2)	3 hingga 6 kali seminggu (3)	Sekali atau dua kali seminggu (4)	Tiada langsung (5)	
3.	Sepanjang 4 minggu yang lalu, berapa kerapkah gejala asma (berdehit/wheezing, batuk, sesak nafas, sesak dada atau sakit) menyebabkan anda terbangun pada waktu malam atau lebih awal dari biasa di waktu pagi?					Markah
	4 malam atau lebih seminggu (1)	2 hingga 3 malam seminggu (2)	Sekali seminggu (3)	Sekali atau dua kali (4)	Tiada langsung (5)	
4.	Sepanjang tempoh 4 minggu yang lalu, berapa kerapkah anda telah menggunakan ubat sedut yang melegakan dengan cepat atau nebuliser anda (seperti sabutamol, terbutaline atau fenoterol?)					Markah
	3 kali atau lebih sehari (1)	1 atau 2 kali sehari (2)	2 atau 3 kali seminggu (3)	Sekali seminggu atau kurang (4)	Tiada langsung (5)	
5.	Bagaimana anda menilai kawalan asma anda sepanjang tempoh 4 minggu yang lalu?					Markah
	Tidak terkawal langsung (1)	Kawalan adalah buruk (2)	Agak terkawal (3)	Terkawal dengan baik (4)	Terkawal sepenuhnya (5)	

Reference: Malaysia Clinical Practice Guidelines Management Asthma in Adult 2017

Figure 5: Asthma Management Cycle for Personalized Asthma Care



Reference: Global Strategy for Asthma Management and Prevention (2023) by Global Initiative for Asthma (GINA)

Figure 6: Asthma treatment: Adjust treatment up and down for individual patient needs

Reference: Global Strategy for Asthma Management and Prevention (2023) by Global Initiative for Asthma (GINA)

Figure 7: Asthma Medications and Strength of ICS

Usual Inhaler	Dose	Strength of ICS	FDA Category
MDI Budesonide (200)	1puff BD 2puff BD 3puff BD	Low dose Medium dose High dose	B
Turbohaler Budesonide/Formoterol (160/4.5)	1puff BD 2puff BD 3puff BD	Low dose Medium dose High dose	C
MDI Beclometasone/Formoterol (100/6), delivered dose 81.9/5	1puff BD 2puff BD 3puff BD	Low dose Medium dose High dose	C
Evohaler Fluticasone/Salmeterol (125/25)	1puff BD 2puff BD	Low dose Medium dose	C
Accuhaler Fluticasone/Salmeterol (250/50) (500/50)	1puff BD 1puff BD	Medium dose High dose	C

Reference: Global Strategy for Asthma Management and Prevention (2023) by Global Initiative for Asthma (GINA)

Figure 8: FDA Use in Pregnancy Ratings for Specific Asthma Drugs

Drug class	Drug	FDA Category
B Adrenergic Agonist	Salbutamol (Albeterol)	C
	Terbutaline	B
	Formoterol	C
	Salmeterol	C
	Bitolterol	C
	Pirbuterol	C
	Adrenaline	C
Anticholinergic Drugs	Ipratropium	B
	Tiotropium	C
Methylxanthines	Theophylline	C
	Aminophylline	C
Corticosteroids Inhaled	Beclomethasone	C
	Budesonide	B
	Fluticasone	C
	Triamcinolone	C
	Flunisolide	C
	Mometasone	C
Oral	Prednisone	B
	Prednisolone	C
Cromoglycates	Cromolyn Sodium	B
	Nedocromil	B
Agent affecting leukotrienes	Zafirlukast	B
	Montelukast	B
	Zileuton	C
Anti-histamines	Chlorpheniramine	B
	Astemizole	C
	Loratadine	B
	Fexofenadine	C
	Cetirizine	B
Decongestants	Pseudoephedrine	C

Reference: Gaga M, Oikonomidou E, Zervas E, Papageorgiou-Georgatou N. Asthma and pregnancy: interactions and management. *Breathe*. 2007 Mar;3(3):266–76.(4).

REFERENCES:

1. Global Strategy for Asthma Management and Prevention by Global Initiative for Asthma (GINA) (2023)
2. Brian L. Graham et al, Standardization of Spirometry 2019 Update. An Official American Thoracic Society and European Respiratory Society Technical Statement (2019)
3. Perinatal Care Manual 4th Edition, Ministry of Health Malaysia (2022)
4. Gaga M, Oikonomidou E, Zervas E, Papageorgiou-Georgatou N. Asthma and pregnancy: interactions and management. *Breathe*;3(3):266–76 (2007).
5. Malaysia Clinical Practice Guidelines Management Asthma in Adult 2017.

5.2 Pulmonary Tuberculosis

PHASE	ASSESSMENT AND MANAGEMENT
Definition	Tuberculosis (TB) is caused by a bacterium called <i>Mycobacterium tuberculosis</i> which primarily infects the lungs. The bacteria can also infect extra-pulmonary sites such as lymph node, spine, brain and kidney. Tuberculosis symptoms during pregnancy are often masked by physiological changes of pregnancy such as fatigue, malaise and weight changes⁴.
Prepregnancy Care & Family planning	Pre-pregnancy • Women with Tuberculosis should complete anti-TB regime prior to conception and must be on contraception². • Women with active MDR-TB are not advised to conceive due to the adverse outcomes from the disease and contraindication to second-line anti-TB drugs such as Streptomycin, Kanamycin and Amikacin. • Combined oral contraceptive pills (COCP)-Rifampicin drug interaction reduces efficacy of contraception. Higher doses of COCP (at least 50 micrograms of estrogen) or alternative contraceptives should be used until one month after Rifampicin is stopped⁸.
Antenatal Care	Screening All pregnant women should be screened for PTB at booking based on the checklist below: • Prolonged cough for more than 2 weeks • Prolonged fever for more than 2 weeks • Hemoptysis • Unexplained weight loss • History of contact with PTB patient Diagnosis • Presence of clinical symptoms with any of the following positive investigations: ○ Sputum GeneXpert (as first line in pregnancy). To arrange with nearest designated health clinic laboratory if test is not available in respective health clinic. ○ Sputum AFB (at least 2 sputum samples sent for AFB¹). ○ MTB C&S, sent once sputum AFB or Gene Xpert is positive. ○ Chest X-ray (CXR) – to discuss with FMS for radiological procedure in pregnancy. The benefits of performing a CXR in pregnancy outweigh the risk. Refer <i>Appendix</i> for consent form for radiological procedures in pregnancy. • Baseline investigations upon diagnosis, same as non-pregnant adults- FBC, RBS, RP, LFT, and HIV screening. Treatment • Active PTB ○ For pregnant and lactating women, standard anti-TB regimens can be administered safely: 2 EHRZ + 4 HR.

	○ Pyridoxine 30mg/day is recommended in those taking Isoniazid¹. ● Streptomycin is contraindicated in pregnancy; risk of fetal ototoxicity. Monitoring ● Maternal ○ Monitoring for PTB in pregnancy is same as non-pregnant adults. Monitoring Schedule of Adults on PTB Treatment <table><tr><th>Visit</th><th>Treatment duration</th><th>Regimen</th><th>Investigations</th></tr><tr><td>1</td><td>0 Month</td><td>EHRZ</td><td>FBC, RBS, RP, LFT, HIV screening Sputum smear for AFB Sputum mycobacterial culture & drug susceptibility testing CXR</td></tr><tr><td>2</td><td>2 – 4 weeks</td><td>EHRZ</td><td>LFT Sputum smear for AFB*</td></tr><tr><td>3</td><td>2 months</td><td>HR</td><td>Sputum smear for AFB CXR</td></tr><tr><td>4</td><td>5 months</td><td>HR</td><td>Sputum smear for AFB[#]</td></tr><tr><td>5</td><td>6 months</td><td>Treatment complete</td><td>Sputum smear for AFB CXR</td></tr></table> <i>EHRZ (Ethambutol Isoniazid Rifampicin Pyrazinamide)</i> <i>HR (Isoniazid Rifampicin)</i> <i>*for return to work/school purposes</i> <i>[#]sputum direct smear for AFB should be done at the end of five months of standard anti-TB treatment¹</i> ● Fetal ○ Fetal monitoring is as per obstetric indications.	Visit	Treatment duration	Regimen	Investigations	1	0 Month	EHRZ	FBC, RBS, RP, LFT, HIV screening Sputum smear for AFB Sputum mycobacterial culture & drug susceptibility testing CXR	2	2 – 4 weeks	EHRZ	LFT Sputum smear for AFB*	3	2 months	HR	Sputum smear for AFB CXR	4	5 months	HR	Sputum smear for AFB [#]	5	6 months	Treatment complete	Sputum smear for AFB CXR
Visit	Treatment duration	Regimen	Investigations																						
1	0 Month	EHRZ	FBC, RBS, RP, LFT, HIV screening Sputum smear for AFB Sputum mycobacterial culture & drug susceptibility testing CXR																						
2	2 – 4 weeks	EHRZ	LFT Sputum smear for AFB*																						
3	2 months	HR	Sputum smear for AFB CXR																						
4	5 months	HR	Sputum smear for AFB [#]																						
5	6 months	Treatment complete	Sputum smear for AFB CXR																						
Referral/ Shared Care	● Refer to Pusat Rawatan-1 for treatment initiation. ● Notify and trace contacts. ● Refer FMS for review. ● Refer chest clinic if: ○ Unsure of diagnosis ○ Smear negative PTB ○ Drug-resistance TB ○ Persistent smear positive PTB ○ Renal and or liver impairment ○ HIV-TB co-infection ○ Extrapulmonary TB ● Refer O&G clinic for shared care at 3rd trimester. ● Continuation of treatment/DOTS can be done at Pusat Rawatan-2.																								
Delivery Plan	Deliver in hospital with specialists.																								
Postnatal Care	Maternal ● Allow breastfeeding- safe with standard anti-TB ○ Treatment should be continued in lactating mothers because the amount of anti-TB drug in breastmilk is minimal.																								

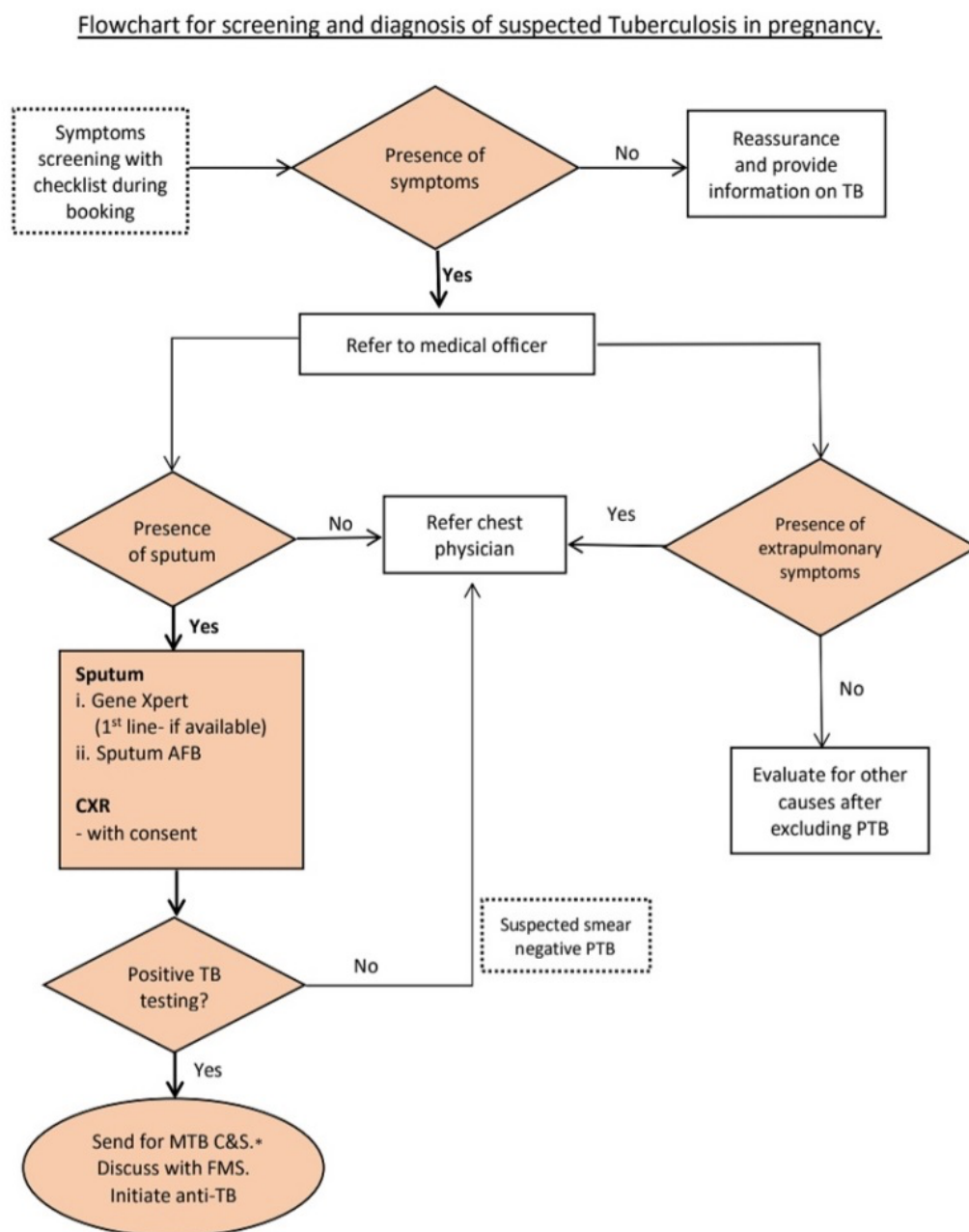
	○ Rifampicin may cause orange coloured-milk ,which is harmless. ○ Surgical mask should be used if the mother is in infectious state (sputum AFB positive). ○ Breastfeeding is contraindicated in women with MDR TB due to side effects of second line drugs to baby – to refer PSP for formula milk supplementation⁶. • Contraception (refer MEC guidelines) • Continue scheduled TB follow-up as normal adults if still on treatment. • Register pre-pregnancy care. Newborn • The management of newborn of women with TB depends on the maternal infective state (refer <i>appendix figure 2</i>): • For women diagnosed to have PTB post-partum, their newborn should be screened for active TB. Once excluded, LTBI treatment should be initiated.
--	---

REMARKS

- CXR must not be delayed in diagnosis of PTB because the risk of ionizing radiation is very low with an abdominal shield.
- Tuberculin skin test is safe in pregnancy for the diagnosis of latent TB. If positive, treatment may be delayed 6-12 weeks postpartum to avoid unnecessary medications during pregnancy.

APPENDIX

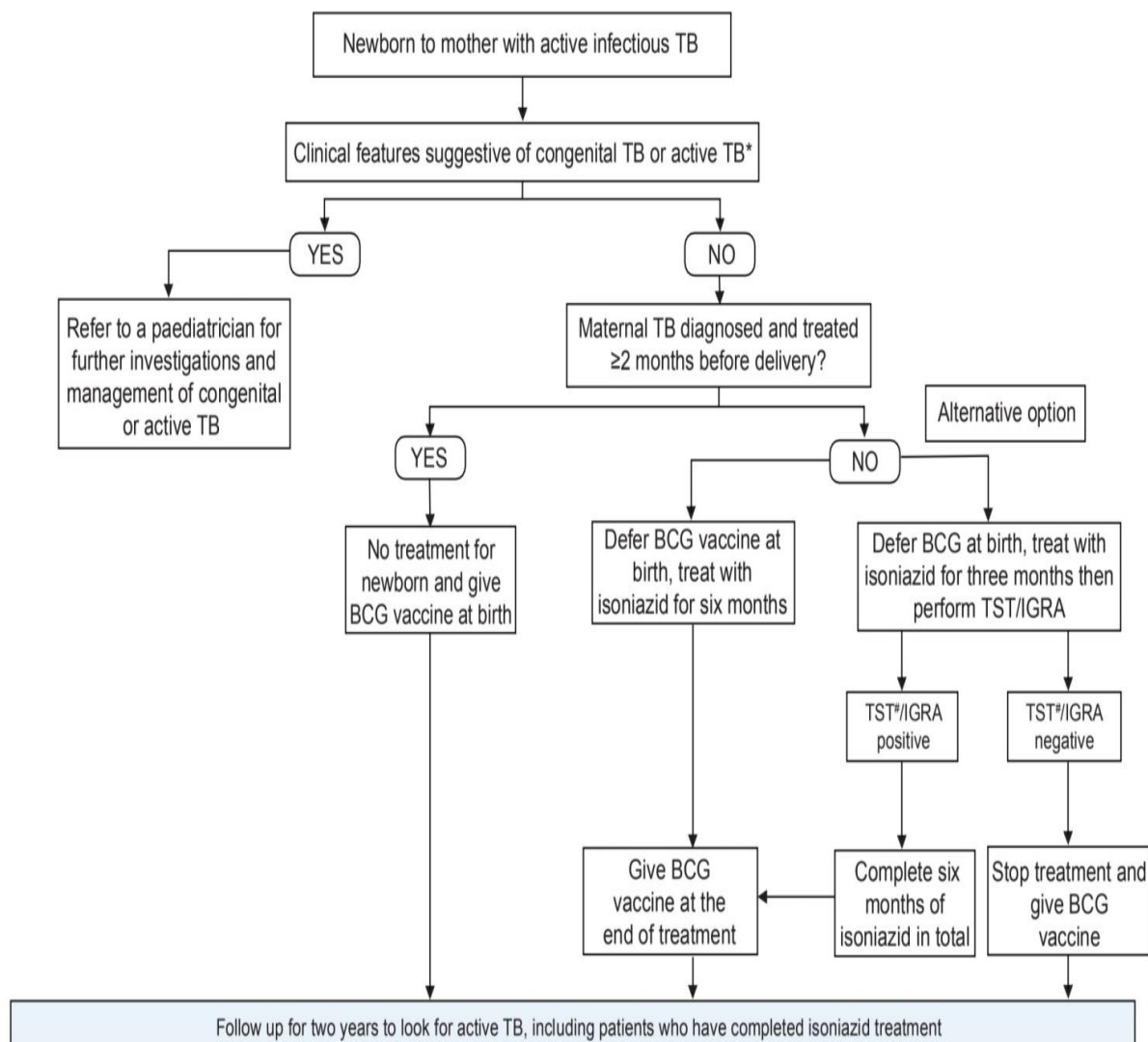
Figure 1: Flow Chart for Screening and Diagnosis of Suspected Tuberculosis in Pregnancy



* To send Sputum MTB C&S together with sputum AFB if Gene Xpert is not available.

Adapted and modified from "Garis Panduan Kawalan dan Pencegahan Tibi Dalam Kalangan Ibu Mengandung 2018"

Figure 2: Management of Newborn to Mother with Active Infectious TB



Adapted from Clinical Practice Guidelines Management of Tuberculosis Ministry Of Health 2021 (Fourth Edition

Figure 3: Radiology Consent Form for Pregnant Patient



NAMA FASILITI KESIHATAN

KEIZINAN - Prosedur Radiologi Bagi Wanita Mengandung atau Berpotensi Mengandung

Name : _____

No. K/P : _____ LMP : _____

Wad / Klinik : _____

Borang keizinan ini diguna pakai bagi pemeriksaan radiografi, Imbasan CT atau Imbasan MR. Anda dan kandungan akan didedahkan dengan radiasi / frekuensi radio. Risiko pendedahan sinaran ini adalah sangat minimal. Sinaran-X ini berkemungkinan meningkatkan kebarangkalian untuk mendapatkan penyakit kanser ke atas kandungan anda di masa depan. Pemeriksaan ini tidak menambahkan risiko kecacatan semasa kelahiran.

Risiko anda mendapat penyakit kanser adalah wujud namun risikonya adalah jauh lebih rendah dari risiko ke atas bayi anda. Sehingga kini tidak ada sebarang indikasi yang menunjukkan bahawa seseorang yang menjalani Imbasan MR semasa mengandung akan memberikan kesan yang tidak baik ke atas kandungan. Walau bagaimanapun seperti yang dinyatakan oleh U.S. Food and Drug Administration (FDA), bahawa kesan penggunaan pengimejan MR ketika mengandung belum terbukti lagi.

Pakar perubatan yang merawat anda telah menimbangkan risiko yang berkaitan dengan pemeriksaan ini dan yakin bahawa pemeriksaan ini adalah demi kebaikan anda dan anak anda. Memandangkan pemeriksaan ini adalah penting maka prosedur ini perlu diteruskan. Sebarang pertanyaan boleh dikemukakan kepada pakar radiologi.

Saya, No. K/P :
(Nama Pesakit / Suami / Ibubapa / Penjaga)

beralamat di.....

.....dengan ini memberi keizinan bagi diri * saya / isteri / anak / anak jagaan saya

.....
(Nama pesakit)

untuk menjalani prosedur radiologi (nama prosedur)

**BORANG KEIZINAN PESAKIT MENGANDUNG ATAU KEMUNGKINAN HAMIL MENJALANI
PROSEDUR RADIOLOGI**

A) Bila keizinan pesakit mengandung atau berpotensi untuk mengandung diperlukan

- i) Semua pemeriksaan radiologi di mana radiasi mengion (x-ray) digunakan seperti pemeriksaan am, pemeriksaan fluoroskopi dan pemeriksaan imbasan CT.
- ii) Pemeriksaan imbasan MR.

B) Siapa yang perlu mengambil keizinan ini

- i) Doktor yang memohon pemeriksaan pada hari permohonan.
- ii) Doktor Radiologi pada hari permohonan.
- iii) Pegawai Perubatan dibenarkan mengambil kebenaran untuk prosedur radiologi tetapi haruslah ditandatangani (*counter signed*) oleh Pakar yang merawat.

C) Bagaimana mengambil keizinan

- i) Doktor yang memohon akan menerangkan tentang keperluan pemeriksaan tersebut, alternatif lain sekiranya ada dan bagaimana keputusan pemeriksaan ini akan membantu dalam pengurusan rawatan pesakit seterusnya.
- ii) Doktor Radiologi akan menekankan kepada risiko dan komplikasi terhadap pesakit dan kandungannya.
- iii) Bagi pemeriksaan radiografi am, pegawai perubatan yang memohon boleh mengambil keizinan selepas merujuk kepada pakar masing-masing.
- iv) Bagi pemeriksaan X-ray khas, imbasan CT dan imbasan MR keizinan perlu diambil oleh pegawai perubatan yang memohon dan pegawai perubatan radiologi yang menerima kes tersebut selepas perbincangan bersama Pakar Perubatan.
- v) Keizinan perlu diambil dari pesakit sendiri. Sekiranya pesakit tidak dapat berbuat demikian, keizinan boleh diambil dari penjaga / waris.
- vi) Sekiranya prosedur memerlukan penggunaan media kontras maka borang kebenaran pesakit menjalani prosedur radiologi berkontras perlu dilengkapkan.

Figure 4: Summary of Suspected-In-Utero Induced Deterministic Radiation Effects

Menstrual or Gestational age (weeks)	< 50 mGy	50-100 mGy	> 100 mGy
0 - 2	None	None	None
3 - 4	None	Probably none	Possible spontaneous abortion
5 - 10	None	Potential effects are scientifically uncertain and probably too subtle to be clinically detectable	Possible malformations increasing in likelihood as dose increases
11 - 17	None	Potential effects are scientifically uncertain and probably too subtle to be clinically detectable	Increased risk of deficits in IQ or mental retardation that increase in frequency and severity with increasing dose
18 - 27	None	None	IQ deficits not detectable at diagnostic doses
>27	None	None	IQ deficits not detectable at diagnostic doses

Adapted from ACR Practice Guideline For Imaging Pregnant or Potentially Pregnant Adolescents and Women with Ionizing Radiation; ACR Practice Guideline 2014

Figure 5: Approximate fetal doses from common diagnostic procedure

Examination	Mean (mGy)	Maximum (mGy)
<u>Conventional X-ray examination:</u>		
Abdomen	1.4	4.2
Chest	<0.01	<0.01
Intravenous Urogram	1.7	10
Lumbar Spine	1.7	10
Pelvis	1.1	4
Skull	<0.01	<0.01
Thoracic spine	<0.01	<0.01
<u>Fluoroscopic examination:</u>		
Barium meal (upper GI)	1.1	5.8
Barium enema	6.8	24
<u>Computed Tomography:</u>		
Abdomen	8.0	49
Chest including CTPA	0.06	0.96
Head	<0.005	<0.005
Lumbar Spine	2.4	8.6
Pelvis	25	79

Adapted from Pregnancy and Medical Radiation; ICRP publication 84, Annals of the ICRP Vol 30, No 1 2000

REFERENCES

1. Malaysian CPG Tuberculosis 4th Edition 2021.
2. Perinatal Care Manual MOH 4th Edition 2022.
3. CDC- Tuberculosis in pregnancy. Retrieved from <https://www.cdc.gov/tb/topic/populations/pregnancy/default.htm>
4. Miele K, Bamrah Morris S, Tepper NK. Tuberculosis in Pregnancy. Obstet Gynecol. 2020 Jun;135(6):1444-1453
5. Andrew MK. Antibiotics and Oral Contraceptives: Should We Worry? Medscape. September 18, 2020.
6. Garis Panduan Kawalan dan Pencegahan Tibi di Kalangan Ibu Hamil 2018.
7. Semakan Semula Saringan Tibi dan Latent TB Infection Bagi Kumpulan Berisiko Tinggi Serta Saringan Menggunakan Rapid Molecular Technique di Negeri Kedah. Ruj JKNKED.KA2100-1/2 (17), Jilid 3.
8. Will antibiotics stop my contraception working? Your contraception guide. NHS UK. Last reviewed 28 January 2019.

SECTION 6

HEMATOLOGICAL DISORDERS

6.1 Approach to Anemia

6.1.1 Iron Deficiency Anemia

PHASE	ASSESSMENT AND MANAGEMENT																					
Definition	Trimester-specific haemoglobin (Hb) thresholds for diagnosing anemia¹ : <table><tr><th>1st</th><th>2nd</th><th>3rd</th><th>Postpartum (1 month)</th></tr><tr><td>11.0g/dl</td><td>10.5 g/dl</td><td>11.0 g/dl</td><td>10g/dl</td></tr></table> <table><tr><td rowspan="3">Severity</td><td>Mild</td><td>10 – 10.9 g/dl</td></tr><tr><td>Moderate</td><td>7.0 – 9.9 g/dl</td></tr><tr><td>Severe</td><td>< 7.0 g/dl</td></tr><tr><td>Potential Iron depletion (with or without anemia)</td><td colspan="2">Serum ferritin < 100 ng/ml</td></tr><tr><td>Absolute iron deficient</td><td colspan="2">Serum ferritin < 30 ng/ml</td></tr></table>	1 st	2 nd	3 rd	Postpartum (1 month)	11.0g/dl	10.5 g/dl	11.0 g/dl	10g/dl	Severity	Mild	10 – 10.9 g/dl	Moderate	7.0 – 9.9 g/dl	Severe	< 7.0 g/dl	Potential Iron depletion (with or without anemia)	Serum ferritin < 100 ng/ml		Absolute iron deficient	Serum ferritin < 30 ng/ml	
1 st	2 nd	3 rd	Postpartum (1 month)																			
11.0g/dl	10.5 g/dl	11.0 g/dl	10g/dl																			
Severity	Mild	10 – 10.9 g/dl																				
	Moderate	7.0 – 9.9 g/dl																				
	Severe	< 7.0 g/dl																				
Potential Iron depletion (with or without anemia)	Serum ferritin < 100 ng/ml																					
Absolute iron deficient	Serum ferritin < 30 ng/ml																					
Prepregnancy Care & Family Planning	Aims - Optimization of Hb level before embarking on pregnancy accordingly. - Women to bring records of previous follow up if any comorbidities to be reviewed. Management - Diet advice if Hb < 12 g/dl (refer <i>appendix figure 1</i>)². - Treatment with oral or parenteral iron whenever indicated. Contraception - Provide contraception while investigating and optimizing treatment. - Advise for contraception (refer MEC guidelines).																					
Antenatal Care	Screening All women should to be screened for anemia at booking. Assessment History taking and physical examination: <table><tr><th>Symptoms of anemia</th><th>Signs of anemia</th></tr><tr><td>Non-specific symptoms: - tiredness - weakness </td><td> - pale (conjunctiva/palms) - koilonychia </td></tr></table>	Symptoms of anemia	Signs of anemia	Non-specific symptoms: - tiredness - weakness	- pale (conjunctiva/palms) - koilonychia																	
Symptoms of anemia	Signs of anemia																					
Non-specific symptoms: - tiredness - weakness	- pale (conjunctiva/palms) - koilonychia																					

	- dizziness or light-headedness - drowsiness - palpitations - shortness of breath, especially upon exertion	- angular stomatitis - CVS: tachycardia, heart murmur, gallop rhythm (more severe) - hepatosplenomegaly															
Investigations - FBC - Serum Ferritin - Serum Iron/TIBC (reflex testing) - PBF (if indicated) - Hb analysis (MCH is < 27pg, MCV ≤ 80 fl, normal serum ferritin) - DNA analysis (if indicated) - Urine FEME - Stool for ova & cyst (if indicated) - Renal profile – in case of CKD , which may lead to anemia - Other relevant investigations to look for chronic diseases that may contribute to anemia.																	
Diagnosis Established diagnosis and severity (refer <i>definition</i>).																	
Treatment - Commencement of oral or parenteral iron treatment when necessary (<i>refer appendix figure 2 & figure 3</i>) and see the response. 2 weekly FBC until Hb normalized. Indications for oral iron supplement : - As prophylaxis for IDA during 1st trimester pregnancy. - To give as treatment for IDA throughout pregnancy and to continue up to 3 months postpartum. - Check for compliance of treatment (<i>refer remarks</i>). - Advise ways to take oral iron for better absorption (<i>refer remarks</i>). - Educate women on the complications of anemia (<i>refer remarks</i>). - Fetal surveillance if suspected IUGR. - If confirmed thalassemia carrier: - screen husband with cascade screening (<i>refer figure 4</i>) - refer Section “Thalassaemia” for further management. Recommended prophylaxis oral iron dose¹: Elemental iron requirement: - Up to 60mg daily. Recommended therapeutic oral iron dose: Elemental iron requirement: 120mg daily.																	
Oral Iron Treatment:																	
<table><tr><th>Iron preparation</th><th>Dose iron per tablet</th><th>Elemental iron per tab</th><th>Prophylaxis dose per day</th><th>Maximum treatment dose per day</th></tr><tr><td>Ferrous fumarate (Obimin)</td><td>90mg</td><td>30mg</td><td>1 tab*</td><td>-</td></tr><tr><td>Ferrous fumarate</td><td>200mg</td><td>66mg</td><td>1 tab*</td><td>2 tabs*</td></tr></table>	Iron preparation	Dose iron per tablet	Elemental iron per tab	Prophylaxis dose per day	Maximum treatment dose per day	Ferrous fumarate (Obimin)	90mg	30mg	1 tab*	-	Ferrous fumarate	200mg	66mg	1 tab*	2 tabs*		
Iron preparation	Dose iron per tablet	Elemental iron per tab	Prophylaxis dose per day	Maximum treatment dose per day													
Ferrous fumarate (Obimin)	90mg	30mg	1 tab*	-													
Ferrous fumarate	200mg	66mg	1 tab*	2 tabs*													

			*Administer with: Ascorbic acid 100mg OD Folate 5mg OD	
Ferrous fumarate (Zincofer)	350mg	115mg	1 tab	2 tabs
Ferrous sulphate (Iberet)	525mg	105mg	1 tab	2 tabs
Iron polymaltose (Maltofer)	370mg	100mg	1 tab	3 tabs

*Tolerance beyond 1tablet of oral iron/day is expected to be poor.

Parenteral Iron Treatment

- **Indications for parenteral iron treatment:**
 - Fail to achieve desired Hb (<2g/dL in 4 weeks) despite full compliance with oral iron.
 - Intolerant to oral iron treatment.

Iron Sucrose (e.g. Venofer)¹

- Must be given IV (as per protocol).
- Can be given in outpatient setting with availability of emergency and resuscitation facility.
- Common side effect:

bloating or swelling of the face, arms, hands, lower legs, or feet	blurred vision
chest pain or tightness in the chest	confusion
difficult or laboured breathing	dizziness, faintness, or light headedness when getting up suddenly from a lying or sitting position
headache	nervousness
pounding in the ears	rapid weight gain
slow or fast heartbeat	sweating
tingling of the hands or feet	

- Available preparation for sucrose elemental iron 100mg/5ml in 1 ampoule (IV injection or IV infusion).

Low molecular Iron Dextran (e.g. Cosmofer)

- Can be given IM or IV.
- Available preparation elemental iron is 100mg/2ml in 1 ampoule (IM or IV injection).

- Withhold oral iron supplement during parenteral iron administration and resume after 7 days.
- Repeat Hb at 2 weeks after the last dose of parenteral iron and resume oral iron (maximum increment of Hb after 4 weeks of parenteral iron).
- **Absolute Contraindications for parenteral iron:**
 - Non-iron deficiency anaemia
 - 1st trimester
 - Known allergy to iron
 - Thalassemia with iron overload

	• Relative Contraindications for parenteral iron: ○ Thalassemia except with concurrent IDA. ○ Refer <i>appendix figure 3</i> for parenteral iron charts.
Referral/ Shared Care	• Refer/discuss with FMS in all moderate and severe anemia (to determine whether the needs of parenteral iron as outpatient management). • Refer Haematologist/Physician, O&G for shared care if Hb persistent < 8 g/dl despite optimal iron treatment at primary care clinic¹. • Refer for admission if: ○ symptomatic anemia, irrespective of gestational age. ○ Hb < 8g/dl with or without symptoms. ○ any obstetrical indication, fetal compromise (refer <i>remarks</i>).
Delivery Plan	Hospital delivery.
Postnatal Care	Postnatal review • MO review in 1 month to ensure Hb within normal range. • To register in PPC clinic by 1 month if Hb not optimized. • Continue oral iron supplement (prophylaxis) for 3-6 months¹ postpartum for IDA regardless of level of anemia during antenatal period. Lactation Encourage exclusive breastfeeding. Contraception Refer MEC guidelines.

REMARKS

- Compliance of iron checklist:
 - Iron side effects: nausea, vomiting, giddiness, gastrointestinal discomfort
 - Blackish stool
- Recommendation for better iron absorption:
 - Taken with empty stomach with a source of vitamin C (ascorbic acid) such as orange juice to maximize absorption.
 - Not to be taken with calcium, antacids, dairy products, caffeinated drinks together.
 - If patient is taking calcium supplementation during pregnancy, arrange the timing of iron consumption at least 2 hours apart.
- Complications of the anemia in pregnancy

Maternal	Fetal
Preterm contractions, preterm labour Intercurrent illness PPH	IUGR, fetal hypoxia Increased risk of development ASD, ADHD, particularly ID later in life ⁷

- Serum iron and TIBC are **not routinely** done. Only added as reflex testing (autorun tests) if serum ferritin between 30-100µg/l or interpretation is inconclusive, the tests are proceeded to calculate Transferrin Saturation (TSat)^{1,3}. In pregnancy with no concurrent infection/inflammation, serum ferritin of < 30 µg/l indicates iron deficiency^{1,4}.

- Women during booking with previous anemia records to bring any summary of hospitalizations, appointment records, Thalassemia cards etc.
- **Importance additional** information in PERPAT form when **requesting for serum ferritin**^{4,5}.
 - Period of gestation
 - Important summarized history
 - Any concomitant history or underlying of:
 - ESRF / CKD/ on dialysis
 - Autoimmune diseases e.g., RA / SLE
 - Liver failure
 - Heart failure
 - Any infection / inflammation
 - Recent blood transfusion/parenteral iron transfusion
- Any concurrent biochemistry evidence of infection/inflammation, serum ferritin of < 70 µg/l indicates iron deficiency⁴.

6.1.2 Thalassemia Carrier

PHASE	ASSESSMENT AND MANAGEMENT
Prepregnancy Care & Family Planning	Registration criteria for PPC Women diagnosed with Thalassemia trait. Women to bring records of previous follow ups if any comorbidities to review. Aims • Optimization of Hb level before embarking on pregnancy. Management • Advice for early booking before 12 weeks gestation. • If both couple is thalassaemia carrier, refer to FMS for genetic counselling (refer <i>remarks</i>). Contraception • Provide contraception while optimizing treatment. • Advise for contraception (refer MEC guidelines).
Antenatal Care	Assessment History taking • Assess symptoms of anemia. • Enquire regarding history of transfusion reaction if ever receive blood transfusion. Physical Examination • Hepatomegaly (if any) Investigations • FBC • Serum Ferritin • Screen partner for thalassaemia status with Hb analysis and to state in the form as cascade screening (if have not done) (refer <i>figure 4</i>). Treatment • Arrange for early dating scan. • Aim Hb $\geq 8\text{g/dl}$. • Look for concomitant IDA $\rightarrow$ take serum ferritin at booking. If serum ferritin < 30,^{1,3,4} to give iron supplement. • Folic acid 5mg PO OD should be given throughout pregnancy.
Referral/ Shared Care	If both couples diagnosed as thalassemia trait: FMS • To counsel regarding perinatal diagnosis to couple. • Possible complications pertaining to both couples being alpha trait: ○ Fatal hydrops fetalis • Possible complications pertaining to both couples being beta trait ○ Cooley anemia / beta thalassemia major O&G/MFM • As early as (before 11 weeks) if both couples are both alpha carriers and both beta carriers to aid in prenatal diagnosis (chorionic venous sampling (CVS)).

	- Detailed scan appointment to look for hydrops fetalis at 16 - 20 weeks POG if both couples are alpha thalassaemia carrier. Hematologist/ Physician - When evidence of iron overload e.g., high serum ferritin, and complications of chronic anemia such as heart failure, pulmonary hypertension, hypersplenism or bone marrow suppression. Consider admission If Hb less than 7g/dl or/and symptomatic.
Delivery Plan	- Keep Hb > 7g/dl. - Generally, may allow post-date, unless specified otherwise. - Hospital delivery. - PPH prophylaxis.
Postnatal Care	- If both parents are carriers – refer baby to paediatric team at delivery¹. Postnatal Review - Babies (at risk of being thalassaemia major or carrier) to be seen at 6 months in health clinic and decide on cascade screening (Hb analysis)^{1,3}. Lactation Encourage exclusive breastfeeding. Contraception Refer MEC guidelines. PPC Register PPC & continue disease optimization.

REMARKS

Offspring possibility⁶

Pasangan	α^0 trait	α^+ trait	α^T trait	Bukan pembawa α	Hb E trait	β trait
α^0 trait	50% α^0 trait 25% hydrop fetalis 25% bukan pembawa α	25% bukan pembawa α 25% Hb H disease 25% α^0 trait 25% α^+ trait	25% bukan pembawa α 25% Hb H disease 25% α^0 trait 25% α^T trait	50% α^0 trait 50% bukan pembawa α	25% Hb E trait/ α^0 trait 25% α^0 trait 25% Hb E trait 25% normal	25% α^0 trait/ β trait 25% α^0 trait 25% β trait 25% normal
α^+ trait		50% α^+ trait 25% α^+ homozygous 25% bukan pembawa α	25% α^T trait 25% α^+ trait 25% α^T compound heterogygous 25% bukan pembawa α	50% α^+ trait 50% bukan pembawa α	25% Hb E trait/ α^+ trait 25% α^+ trait 25% Hb E trait 25% normal	25% α^+ trait/ β trait 25% α^+ trait 25% β trait 25% normal
α^T trait			50% α^T trait 25% α^T homozygous 25% bukan pembawa α	50% α^+ trait 50% bukan pembawa α	25% Hb E trait/ α^T trait 25% α^T trait 25% Hb E trait 25% bukan pembawa	25% α^T trait/ β trait 25% α^T trait 25% β trait 25% bukan pembawa
Bukan pembawa α				100% bukan pembawa α	50% Hb E trait 50% bukan pembawa α	50% β trait 50% bukan pembawa α
Hb E trait					50% Hb E trait 25% Hb E homozygote 25% bukan pembawa	25% Hb E β thal. 25% Hb E trait 25% β trait 25% bukan pembawa
β trait						50% β trait 25% β thal. major 25% normal

- Risiko mendapat anak Thalassaemia
- Status Saringan Thalassaemia Bapa
- Status Saringan Thalassaemia Ibu

Petunjuk

thal trait Thalassaemia Pembawa

α^+ Alpha plus – 1 gene deletion
 α^0 Alpha zero – 2 genes deletion

Clinical significance of:

	Gene / genes affected	Patient / Carrier	Symptoms
Hb H disease	3 α genes affected	Patient	Moderate anaemia and usually not transfusion dependent
Hb H phenotype	2 α genes affected at both allele	Patient	Moderate anaemia and usually not transfusion dependent
α^0 trait (heterozygous)	2 α genes affected	Carrier	Asymptomatic (FBC parameters are more severe)
α^0 homozygous	2 α genes affected at both allele	α Thal major	Hydrops foetalis
α^+ trait (heterozygous)	1 α gene affected	Carrier	Asymptomatic
α^+ homozygous	1 α gene affected at both allele	Carrier	Asymptomatic
Hb E trait	1 β gene affected	Carrier	Asymptomatic
Hb E homozygous	β genes affected at both allele	Carrier	Asymptomatic
Hb E trait with α^0 trait	1 β gene with concomitant 2 α genes affected	Carrier	Asymptomatic
Hb E trait with α^+ trait	1 β gene with concomitant 1 α gene affected	Carrier	Asymptomatic
Hb E β Thalassaemia	2 β genes affected	Patient	Moderate to severe anaemia
β trait	1 β gene affected	Carrier	Asymptomatic
α^0 trait with β trait	2 α genes with concomitant 1 β gene affected	Carrier	Asymptomatic
α^+ trait with β trait	1 α gene with concomitant 1 β gene affected	Carrier	Asymptomatic

Reference: Taklimat Garispanduan Pengendalian Kes Ibu Hamil yang Disyaki Pembawa Thalassaemia dan Pasangan serta Pengesanan Anak Kepada Pasangan Pembawa 2017

APPENDIX

Figure 1: Approach of Anemia in PPC Clinic

Level of Hb (<i>non-pregnant women</i>)	Actions (decision starts at 1 month postpartum)
Hb < 12 g/dl	• Treat underlying causes of anemia. • Take serum ferritin and other relevant investigations. • Established diagnosis whether the case is pure IDA or with other concomitant diseases. • In case of IDA: - Advice on high iron diet - Challenge with iron therapy - Referral to PSP⁶ - Repeat Hb within 3 months - If target Hb not achieved, check compliance with oral iron, revise diagnosis.

Figure 2: Flow Chart for Anemia in Pregnancy in Primary Care

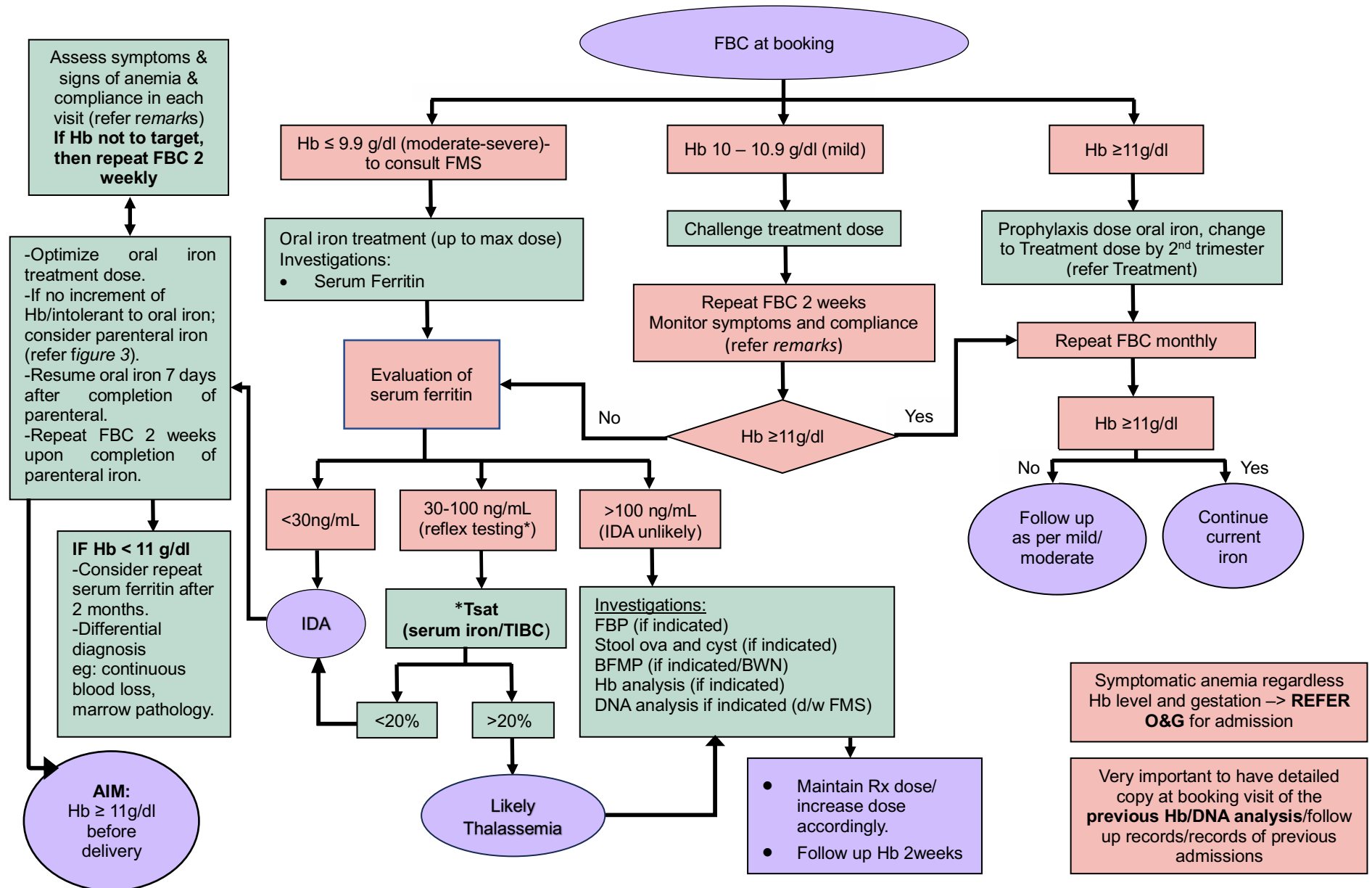


Figure 3: Parenteral Iron Treatment

Parenteral iron formula:

Iron dextran (intramuscular)

Dose calculation from Ganzoni Formula

Based on target Hb in Malaysian CPG on the Management of Anemia in Pregnancy and Chronic Kidney Disease

$$\text{Body weight (kg)} \times (\text{target Hb} - \text{actual Hb})(\text{g/dL}) \times 2.4 + \text{iron stores (500mg)}$$

Actual Hb							
Body weight (kg)		6	7	8	9	10	No of ampules (2ml)
	40	10	9	8	7	6	
	45	10	9	8	7	6	
	50	11	10	9	7	6	
	55	12	10	9	8	6	
	60	12	11	9	8	6	
	65	13	11	10	8	7	
	70	13	12	10	8	7	
	75	14	12	10	9	7	
	80	15	13	11	9	7	
	85	15	13	11	9	7	
	90	16	14	11	9	7	

Based on target Hb = 11g/dl, body weight ≥35kg + =500mg

IM Iron Dextran 100mg/ 2ml	IV Iron Sucrose 100mg/ 5ml
Maximum dose/ day: 1 ampoule (100mg = 2ml) intramuscular (Z-track technique): 1 ampoule (100mg) daily on alternate buttocks - Test dose: 25mg (0.5ml) – Monitor patient for 1 hour for adverse reaction.	Maximum dose/ day: 2 ampoules (200mg) regime: 2 ampoules (200mg) 3 times/ week intravenous infusion 2 ampoules in 200ml normal saline, infuse in at least 30 minutes OR 2 ampoules in 100ml NS, infuse at 12 drops/ min for first 15-30 mins, then 36 drops/ min until completed.

Parenteral Iron Sucrose (intravenous): Cumulative Dose Requirements

The dosage is individually adapted to the total iron deficit based on the Ganzoni formula:

$$\text{Body weight (kg)} \times (\text{target Hb} - \text{actual Hb})(\text{g/dL}) \times 2.4 + \text{iron stores (500mg)}$$

*Target Hb = 11 g/dl

If total required dosage exceeds maximum daily dose permitted, iron sucrose must be administered over multiple visits.

Increase in Hb Required (g/dl) (Target Hb minus Actual Hb)									
Body weight (kg)		1	2	3	4	5	6	7	No of Ampoules
	40	6	7	8	9	10	11	12	
	45	6	7	8	9	10	11	12	
	50	6	7	9	10	11	12	13	
	55	6	8	9	10	12	13	14	
	60	6	8	9	11	13	14	16	
	65	7	8	10	11	13	14	16	
	70	7	8	10	12	13	15	17	
	75	7	9	10	12	14	16	18	
	80	7	9	11	13	15	17	18	
	85	7	9	11	13	15	17	19	
	90	7	9	11	14	16	18	20	
	95	7	10	12	14	16	19	21	
	100	7	10	12	15	17	19	22	

Table 1: Quick Reference for number of ampoules (Sucrose & Dextran)

Drip infusion (Preferred)

Dilution at a rate of 1 ml of sucrose # (20mg of iron) in maximum 20ml saline (0.9% NaCl) solution.

If total required dosage exceeds maximum daily dose permitted, IV Sucrose must be administered over multiple visits.

1 ampoule	100ml NS	15 mins
2 ampoules	200ml NS	30 mins
3 ampoules	300ml NS	1.5 hours
4 ampoules	400ml NS	2.5 hours
5 ampoules	500ml NS	3.5 hours

Maximal single tolerated dose is 7 mg of iron per kg (up to 500mg / week) and must be given over 3.5 hours.

Parenteral Iron Dextran (intravenous)

Eg : IV Cosmofer

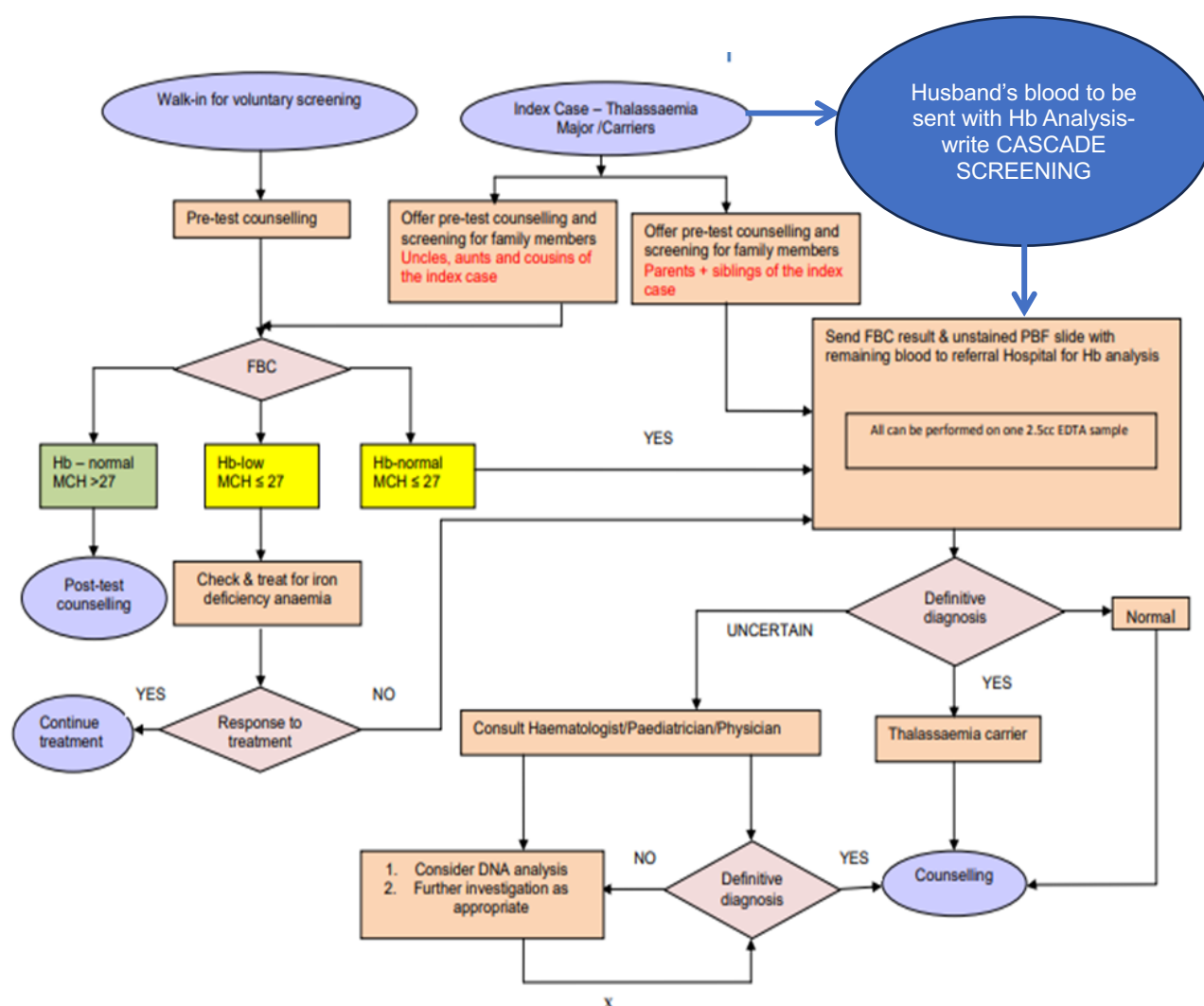
Calculation: Total Iron Deficit (mg) : Body weight (kg) X (Target Hb in g/dl) – Actual Hb in g/dl) x 2.4 + Depot Iron (mg)**Dose / number of ampoules for Intravenous iron Dextran:** refer to Table 1

Body weight (BW)	Depot Iron
<35kg	15mg /kg BW
≥ 35 kg	500mg

Administration & Infusion rate

	Slow IV	IV Infusion	Total dose infusion
Test dose	Administer the first 25 mg over 1-2 min	Administer the first 25mg over 15 min	Administer the first 25mg over 15 min
Dose	100-200 mg	100-200 mg	Determine dosage (see calculation) (max per dose: 20mg/kg)
Volume of diluent	10-20 ml	100 ml	500 ml
Rate	Inject slowly over 10-20 min	Infuse over at least 30 min	Infuse over 4-6 hour

Reference: Bahagian Perkhidmatan Farmasi Jabatan Kesihatan Negeri Selangor

Figure 4: Algorithm for Voluntary and Cascade Screening

*Husband of Thalassemia major / carriers must be screened as cascade screening with Hb Analysis

Reference: CPG Management of Transfusion Dependent Thalassemia

REFERENCE(S)

1. Ministry of Health. Perinatal Care Manual 4TH Edition (2020).
2. Surat Makluman Penambahbaikan Borang Rujukan Runding Cara Pemakanan di Klinik Kesihatan , 2 Februari 2023(2023) .
3. Ministry of Health. National Thallasaemia Screening Programme (2007).
4. Iron Studies Standardised Reporting Protocol 2nd Edition (November 2021).
5. Garis Panduan Penyelarasan Permohonan Ujian "anemia Investigations di Hospital Sultanah Bahiyah (2023).
6. Taklimat Garispanduan Pengendalian Kes Ibu Hamil yang Disyaki Pembawa Thalassemia dan Pasangan serta Pengesahan Anak Kepada Pasangan Pembawa (2017)
7. Association of Prenatal Maternal Anemia with Neurodevelopmental Disorder, JAMA Psychiatry, September 18, 2019.

6.2 Approach To Thrombocytopenia

PHASE	ASSESSMENT AND MANAGEMENT										
Definition	<table><tr><td colspan="2">Definition of thrombocytopenia in pregnancy Platelet count of < 150 x 10⁹/L</td></tr><tr><td colspan="2">Disease classification and severity</td></tr><tr><td>Mild</td><td>>100 x 10⁹/L</td></tr><tr><td>Moderate</td><td>50-100 x 10⁹ /L</td></tr><tr><td>Severe</td><td>< 50 x 10⁹ /L</td></tr></table>	Definition of thrombocytopenia in pregnancy Platelet count of < 150 x 10 ⁹ /L		Disease classification and severity		Mild	>100 x 10 ⁹ /L	Moderate	50-100 x 10 ⁹ /L	Severe	< 50 x 10 ⁹ /L
Definition of thrombocytopenia in pregnancy Platelet count of < 150 x 10 ⁹ /L											
Disease classification and severity											
Mild	>100 x 10 ⁹ /L										
Moderate	50-100 x 10 ⁹ /L										
Severe	< 50 x 10 ⁹ /L										
Prepregnancy Care & Family Planning	• All thrombocytopenia cases need to be investigated to establish the diagnosis and plan for proper follow-up accordingly¹. • A respective team need to be referred if indicated. • All thrombocytopenia in previous pregnancies must be seen in a pre-pregnancy clinic. • In case of known Idiopathic thrombocytopenic purpura (ITP), the patient with mild asymptomatic thrombocytopenia (100-150 x10⁹/L) can be monitored at Health Clinic^{1,2}. • Look for bleeding tendencies; immediate referral is required if they are present clinically. • Combined care with haematology is indicated if symptomatic thrombocytopenia and/or platelet level is less than 100x10⁹/L^{2,3}. • Folate supplementation. Contraception Refer to MEC Guidelines.										
Antenatal Care	At booking • If thrombocytopenia is found during FBC monitoring, further investigations should be done to establish the diagnosis and management^{1,2}. • Causes of thrombocytopenia in pregnancy³. <table><tr><td>Gestational or incidental thrombocytopaenia of pregnancy (mild thrombocytopaenia > 100 x 10⁹/L occurring in late gestation)</td></tr><tr><td>Preeclampsia</td></tr><tr><td>HELLP Syndrome</td></tr><tr><td>Thrombotic Thrombocytopenic Purpura (TTP)</td></tr><tr><td>Disseminated Intravascular Coagulation (DIC)</td></tr><tr><td>Antiphospholipid Syndrome (APS)</td></tr><tr><td>Folate Deficiency</td></tr><tr><td>Viral: Dengue, HIV, HCV</td></tr><tr><td>Drugs-related (Fluconazole, digoxin, phenytoin, gentamicin)</td></tr><tr><td>Spurious due to platelet clumping or macro thrombocytes</td></tr></table> History and physical examination • Detailed history and physical examination (i.e., bruises, hepatosplenomegaly) are essential to exclude other secondary causes and to assess the clinical severity of hemostatic defects.	Gestational or incidental thrombocytopaenia of pregnancy (mild thrombocytopaenia > 100 x 10 ⁹ /L occurring in late gestation)	Preeclampsia	HELLP Syndrome	Thrombotic Thrombocytopenic Purpura (TTP)	Disseminated Intravascular Coagulation (DIC)	Antiphospholipid Syndrome (APS)	Folate Deficiency	Viral: Dengue, HIV, HCV	Drugs-related (Fluconazole, digoxin, phenytoin, gentamicin)	Spurious due to platelet clumping or macro thrombocytes
Gestational or incidental thrombocytopaenia of pregnancy (mild thrombocytopaenia > 100 x 10 ⁹ /L occurring in late gestation)											
Preeclampsia											
HELLP Syndrome											
Thrombotic Thrombocytopenic Purpura (TTP)											
Disseminated Intravascular Coagulation (DIC)											
Antiphospholipid Syndrome (APS)											
Folate Deficiency											
Viral: Dengue, HIV, HCV											
Drugs-related (Fluconazole, digoxin, phenytoin, gentamicin)											
Spurious due to platelet clumping or macro thrombocytes											

	• The diagnosis of ITP in pregnancy remains one of exclusion, as there is no confirmatory laboratory test^{1,2,3}. • In gestational thrombocytopenia, platelets should have normalized by six weeks postpartum⁴. Investigations (refer <i>appendix figure 1</i>) <table><tr><td>FBC/ RP</td></tr><tr><td>Peripheral blood film To exclude platelet clumping and red cell fragmentation (in TTP, preeclampsia, HELLP or DIC)</td></tr><tr><td>LFT</td></tr><tr><td>HIV, Hepatitis B, Hepatitis C screening</td></tr><tr><td>Anti-nuclear Antibody (ANA)</td></tr></table> Subsequent ANC visits • Monitoring by FBC (platelet) as recommended^{1,2,3}. <table><tr><td>1st to 2nd trimester</td><td>Monthly</td></tr><tr><td>3rd trimester</td><td>2weekly</td></tr><tr><td>At term (36 weeks and above)</td><td>Weekly</td></tr></table> • Follow the plan laid out by the O&G / medical / haematology clinic and other respective teams. • Treatment and follow-up of the patient depends on the causes of thrombocytopenia and the diagnosis. • While in ITP, patients with mild asymptomatic thrombocytopenia (100-150 x10⁹/L) can be monitored at the Health Clinic^{3,4}. • Monitor any bleeding tendency in each visit and refer to a haematologist urgently. • Monitor fetal growth as antenatal schedule.	FBC/ RP	Peripheral blood film To exclude platelet clumping and red cell fragmentation (in TTP, preeclampsia, HELLP or DIC)	LFT	HIV, Hepatitis B, Hepatitis C screening	Anti-nuclear Antibody (ANA)	1st to 2nd trimester	Monthly	3 rd trimester	2weekly	At term (36 weeks and above)	Weekly
FBC/ RP												
Peripheral blood film To exclude platelet clumping and red cell fragmentation (in TTP, preeclampsia, HELLP or DIC)												
LFT												
HIV, Hepatitis B, Hepatitis C screening												
Anti-nuclear Antibody (ANA)												
1st to 2nd trimester	Monthly											
3 rd trimester	2weekly											
At term (36 weeks and above)	Weekly											
Referral/ Shared Care	• Known thrombocytopenia in pregnancy need to be under specialist care. • Refer haematologist for shared care if persistent downward trend or moderate/severe (< 100 x 10⁹/l)) thrombocytopenia¹. • All thrombocytopenia cases need to be referred to the O&G clinic at 36 weeks as shared care and to decide the delivery plan. • Refer for admission immediately if ^{1,3}: ○ Symptomatic bleeding in any trimester. ○ Platelet count < 20 x 10⁹ /L before 36 weeks. ○ Platelet count < 30 x 10⁹ /L after 36 weeks.											
Delivery Plan	○ As per obstetric indication. ○ Hospital delivery - avoid traumatic vaginal delivery to minimize maternal risk of hematoma formation. ○ Medical / haematology input if severe thrombocytopenia for possible need of intervention (steroid/azathioprine / IV IgG or platelet transfusion).											
Postnatal Care	Postnatal review • Upon delivery, refer baby to Paediatrics to rule out neonatal thrombocytopenia • Avoid Vit K injection for the baby until thrombocytopenia is ruled out (to discuss with Paediatric team)^{3,4}.											

	• A cord sample should be taken if the mother's platelet count is $< 100 \times 10^9/L$ during pregnancy to ensure the baby's count is normal⁵. • Repeat FBC 4 weeks postpartum. Platelet level in gestational thrombocytopenia should be normalized by 6 weeks. • For other causes of thrombocytopenia, follow the medical plan. Lactation Encourage breastfeeding. Contraception Refer to MEC guidelines. PPC Register PPC (after exclusion of the diagnosis of gestational thrombocytopenia).
--	---

REMARKS

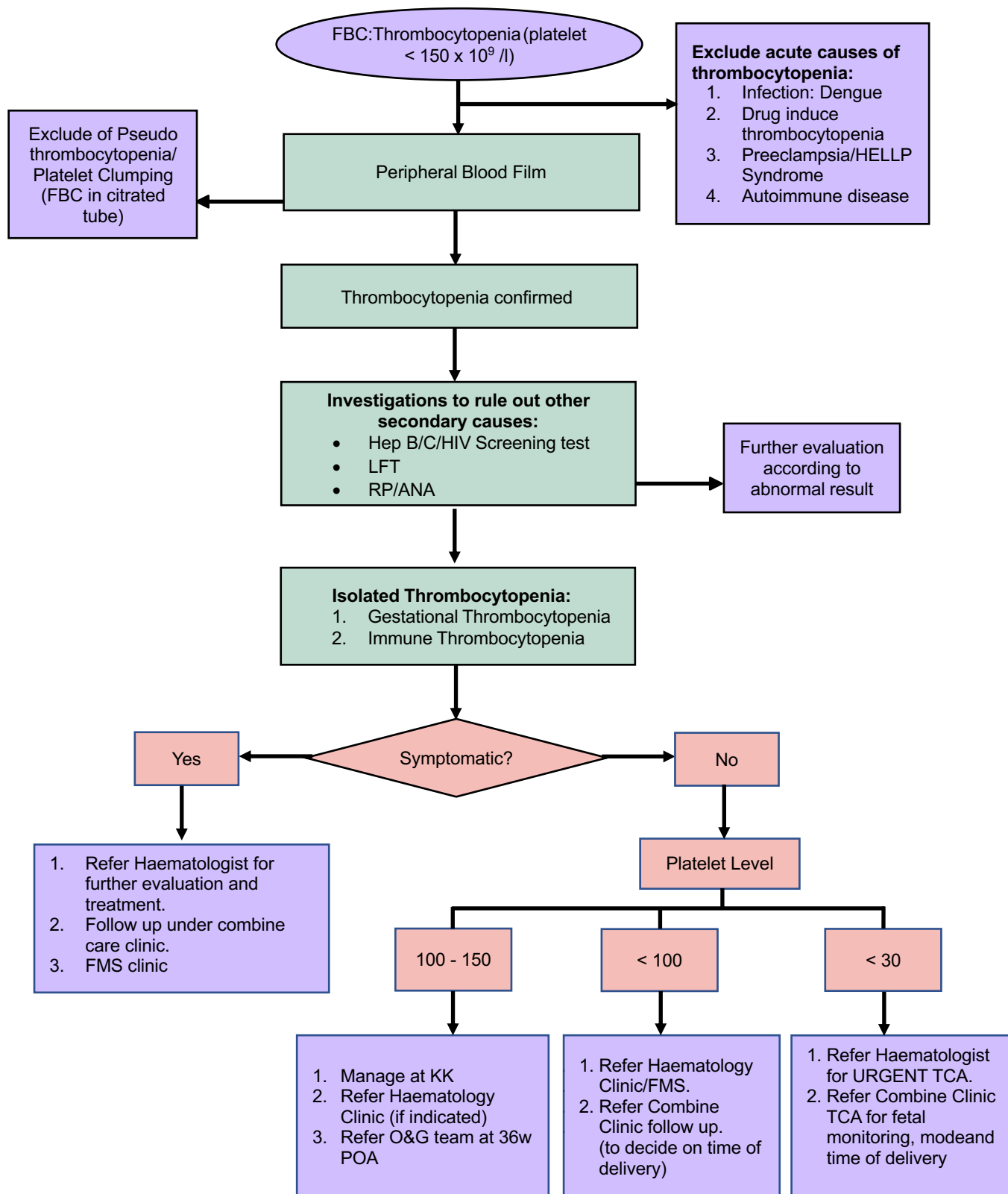
- Thrombocytopenia occurs in 7-8% of all pregnancies:
 - 70-80% are gestational thrombocytopenia
 - 15-20% are severe pre-eclampsia
 - $<1\%$ are HELLP syndrome and APS
- Platelet level should be reassessed at 36 weeks POA to decide the mode of delivery and need for pharmacological intervention^{1,2,4}.

Platelet level	Intervention
$>50 \times 10^9/L$	Safe for caesarean section
$30-50 \times 10^9/L$	IV corticosteroids
$<30 \times 10^9/L$	IV methylprednisolone + IVIG
$<10 \times 10^9/L$	IV methylprednisolone + IVIG + platelet transfusion

- In gestational thrombocytopenia, platelets **should be normalized by six weeks postpartum**^{1,3}.

APPENDIX

Figure 1: Flow Chart of Approach on Thrombocytopenia in Primary Care



REFERENCES

1. AAFP. *Thrombocytopenia in Pregnancy*. American Family Physician, 2012.
2. B., Myers. *Thrombocytopenia in pregnancy*. Royal College of Obstetrics and Gynaecology guidelines, 2009.
3. *Clinical Practice Guidelines on Management of Immune Thrombocytopenic Purpura*. Ministry of Health, 2006.
4. *Thrombocytopenia in pregnancy*. Cines DB, Levine LD. Blood, 2017, Vol. 130.
5. *Updated international consensus report on the investigation and management of primary immune thrombocytopenia*. Provan D, Arnold DM, Bussel JB, et al. 3780-817, Blood Adv., 2019, Vol. 3.

6.3 Rhesus Negative

PHASE	ASSESSMENT AND MANAGEMENT
Definition/ Introduction	- Rhesus isoimmunisation against rhesus antigen may result in hemolytic disease of the fetus and newborn. - There is a risk of isoimmunisation in any situation in which rhesus-positive red blood cells enter the circulation of a rhesus-negative woman. The degree of the risk will vary with the amount of rhesus antigen to which she is exposed^{1,2}. - The combination of antenatal administration of 100 mg (500IU) anti-D immunoglobulin to all unsensitized rhesus-negative women and a further dose administered after birth to all such women who give birth to a rhesus-positive child would reduce the remaining incidence of rhesus-isoimmunization from 0.2 to 0.06%.
Prepregnancy Care & Family Planning	- Folate supplementation. - Contraception (refer to MEC guidelines).
Antenatal Care	At booking - For all primigravida/uncertain status, send blood to the blood bank to confirm blood group and rhesus. - Check the husband's blood group rhesus status if a patient is rhesus negative. Investigations - Coomb's test (direct/indirect agglutination test) is required once the rhesus negative is confirmed^{1,2}. - If indirect agglutination test is positive, refer to MFM or O&G^{1,2,3}. Antenatal follow-up - Routine Antenatal Anti-D Prophylaxis (RAADP) for non-sensitized patient, either one of these regimes^{1,3}. - Single dose regime: IM Anti-D Immunoglobulin 1500iu between 28-34 weeks or 2-dose regime: IM Anti-D Immunoglobulin 500iu at 28 and 34 weeks (refer <i>appendix figure 1</i>).
Delivery Plan	- Hospital delivery. - Mode and timing of delivery as per obstetric indications.
Postnatal Care	Postnatal review - Refer baby at birth to Paediatrics. - Administer IM Anti-D immunoglobulin 500iu to the mother within 72 hours if the baby is rhesus positive. Lactation Encourage exclusive breastfeeding. Contraception Refer to MEC guidelines.

REMARKS

- Anti-D antibodies may cause severe haemolytic disease in fetuses and newborns as a result of fetomaternal haemorrhage in rhesus-negative women with rhesus-positive fetuses.
- IM Anti-D immunoglobulin 500iu is also required for IUD >20 weeks at diagnosis and again after delivery unless delivery is soon after IUD diagnosis.
- If the baby's direct Coomb's test / direct agglutination test is positive, the baby is at risk of haemolytic disease of newborn (HDN), and the Kleihauer test for the mother should be performed to quantify the foetal maternal haemorrhage (FMH). Further Anti-D is required if FMH >4ml.

Indication of anti- D prophylaxis^{2,3}

- Routine – Routine Antenatal Anti-D Prophylaxis (RAADP) & postnatal prophylaxis
- Any potentially sensitising events as below:

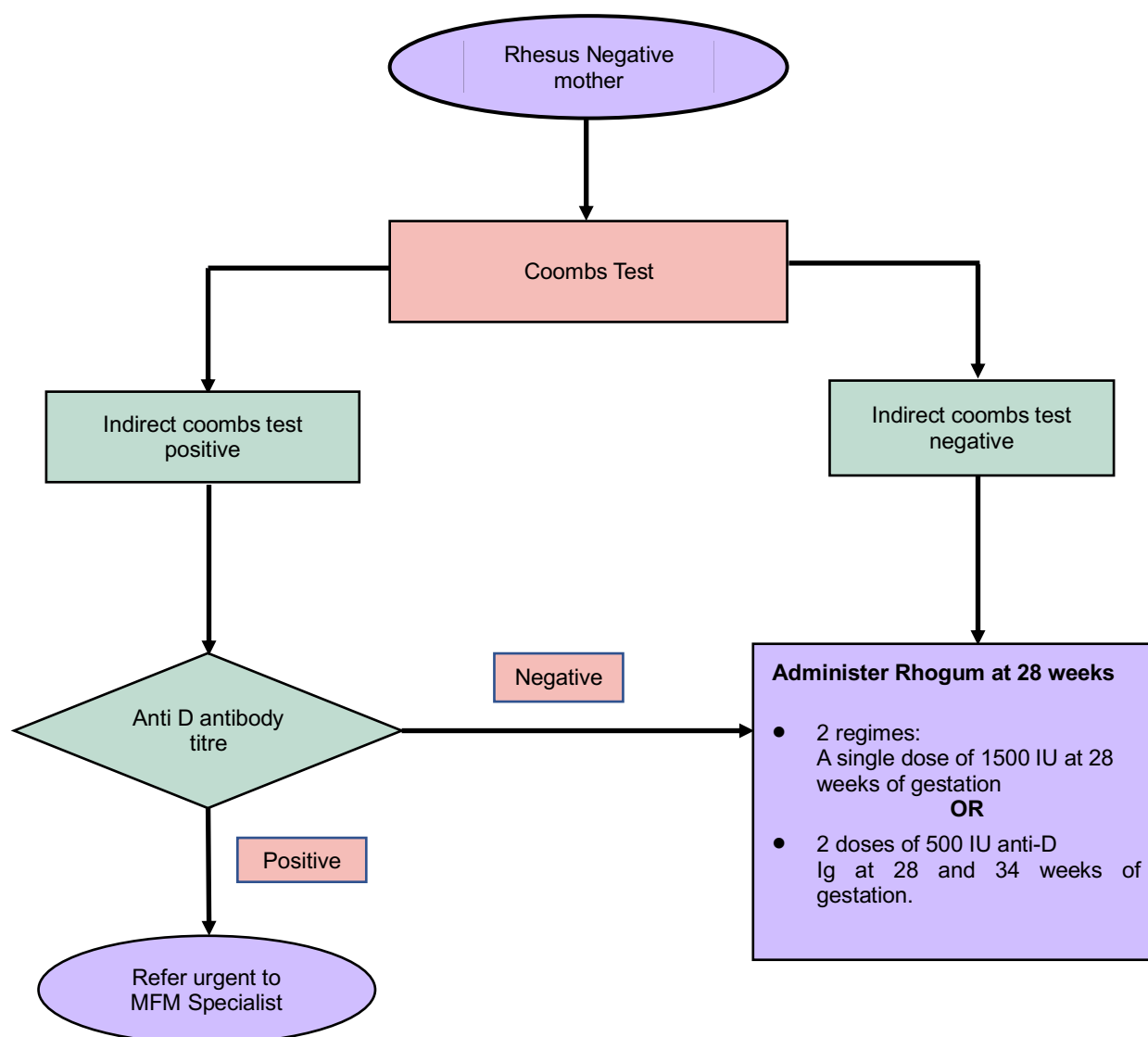
GESTATIONAL WEEK	POTENTIALLY SENSITISING EVENTS	ANTI-D PROPHYLAXIS
<12 weeks	Vaginal bleeding + severe pain ERPOC/ instrumentation of the uterus Medical / Surgical TOP Ectopic / Molar pregnancy	250iu Anti-D Immunoglobulin within 72 hours of the event
12-20 weeks	Amniocentesis, CVS, cordocentesis PV bleeding in pregnancy Abdominal trauma (sharp/blunt, open/closed) Ectopic pregnancy Miscarriages, threatened miscarriage ERPOC / TOP In-utero therapeutic interventions	250iu Anti-D Immunoglobulin within 72 hours of the event
20 weeks to term	APH ECV Abdominal trauma (sharp/blunt, open/closed) Delivery Intraoperative cell salvage IUD	Regardless of whether RAADP has been given, 500iu Anti-D Immunoglobulin to be given within 72 hours of the event

Complications of rhesus isoimmunization

EFFECT TO MOTHER	EFFECT TO FETUS
• Mild anaemia • Sensitising events during pregnancy	• Hydrops Fetalis • Neonatal jaundice • Kernicterus

APPENDIX

Figure 1: Approach on Rhesus Negative in Pregnancy



REFERENCES

1. BCSH guideline for the use of anti-D immunoglobulin for the prevention of haemolytic disease of the fetus and newborn. Qureshi, H., et al. Transfusion Medicine, 2014, Vol. 24:1.
2. The Management of Women with Red Cell Antibodies during Pregnancy. Green Top Guideline No. 65, May 2014.
3. The Use of Anti-D Immunoglobulin for Rhesus D Prophylaxis. Green-top Guideline No. 22, March 2011.

6.4 Venous Thromboembolism

PHASE	ASSESSMENT AND MANAGEMENT
Definition	• A spectrum of disorders characterized by thrombosis. • VTE is described as a thrombosis in the venous circulation and as a sequel, if it occurs in the lung; it is defined as pulmonary embolism¹. • In pregnancy, the relative risk of VTE increase by 4 to 6 folds. The risk begins at the first trimester and increases with advancing gestation. The risk is even higher during postpartum period.¹
Prepregnancy Care & Family Planning	Prepregnancy care • All women should have documented thromboembolism risk assessment during the pre-pregnancy period. • Refer early to the PPC clinic for patients who are contemplating pregnancy and have a significant risk of developing VTE during pregnancy. This should include patients with: ○ Previous VTE ○ Thrombophilia ○ Antiphospholipid syndrome ○ High risk factor for VTE e.g., Elderly, obese, etc. (refer <i>appendix figure 1</i>) • For patients who are on long-term warfarin or oral anticoagulant (e.g., previous recurrent VTE)) should be referred to the respective team early for assessment and counselling before conception (if suitable for pregnancy, aim to convert warfarin to the lowest effective dose of LMWH to reduce fetal risk)². • However, usage of warfarin is restricted to the few situations where heparin is considered unsuitable (e.g., some women with mechanical heart valves). Warfarin can increase the risk of congenital abnormalities, including characteristic warfarin embryopathy (hypoplasia of nasal bridge, congenital heart defects, ventriculomegaly, agenesis of the corpus callosum, stippled epiphyses) and increased risk of miscarriage, stillbirth, neurological problem, fetal and maternal haemorrhage². • Folate supplement before conception. Contraception: • Refer to MEC guidelines. • Generally, all women who have a higher risk of VTE (known thrombotic mutation) or a history of VTE should avoid combined hormonal contraception (COC and CIC). • The safer choices for contraception patients with a history of VTE are: ○ Progestogen-only contraception such as: ▪ Progestogen-only pill (POP) ▪ DMPA and Norethisterone ▪ LNG Implant and LNG-IUCD ○ Copper Intrauterine device (IUCD)
Antenatal Care	Assessment of VTE Risk and monitoring symptoms of VTE: • All pregnant mothers should be counselled on VTE prevention and lifestyle modifications such as encouraging ambulation and avoiding dehydration.

	• All pregnant mothers should be assessed on VTE risk using VTE risk score routinely during booking, admission, and when a new illness occurs, as further management of each mother depends on their VTE risk score. (refer <i>appendix figure 2</i>). • All patients who had symptoms and signs suggestive of an acute VTE event should be assessed and referred urgently. <table><tr><th></th><th>Deep Venous Thrombosis (DVT)</th><th>Pulmonary Embolism</th></tr><tr><td>Symptoms</td><td> ○ Unilateral leg swelling ○ Claudication pain ○ Heavy ache in the limb </td><td> ○ Sudden onset of shortness of breath ○ Chest pain – dull, worsened on inspiration ○ Nonproductive cough (occasionally blood-stained) </td></tr><tr><td>Signs</td><td> ○ Swelling – non-pitting ○ Increased warmth of the lower limb ○ Reduce capillary filling time (CRT) ○ Fever </td><td> ○ Tachypnoeic ○ Tachycardia ○ Cyanosis (if severe) ○ Cardiorespiratory compromised or sudden collapse. </td></tr></table> *Treatment should be initiated while awaiting a confirmatory test. • For a patient who is suspected of having VTE: ○ Refer urgently to the nearest hospital as this is an obstetric emergency and counsel O&G specialist/ receptive team. ○ Stabilize the patient before transfer, and patient must be accompanied by medical officer. ○ During transferring – Monitor vital signs and SPO², provide appropriate oxygen supplementation, and prepare equipment and drugs for maternal resuscitation. Follow-up and monitoring of patients with VTE: • Require close monitoring to assess treatment response, prevent recurrent VTE and manage potential complications³. • Monitor signs and symptoms of VTE event. Any presence of a new event or worsening of symptoms prompts medical attention³. • Assess medication compliance and side effects of medication (bleeding). If the patient experiences bleeding, consultation with a medical/haematologist should be made. • Advice on nonpharmacological measures such as encourage ambulation, wear TED stockings, and avoid dehydration. • Regular fetal monitoring during antenatal period is required. • For patients on warfarin (category D in pregnancy), a detailed fetal scan should be done at 18-22 weeks POA.		Deep Venous Thrombosis (DVT)	Pulmonary Embolism	Symptoms	○ Unilateral leg swelling ○ Claudication pain ○ Heavy ache in the limb	○ Sudden onset of shortness of breath ○ Chest pain – dull, worsened on inspiration ○ Nonproductive cough (occasionally blood-stained)	Signs	○ Swelling – non-pitting ○ Increased warmth of the lower limb ○ Reduce capillary filling time (CRT) ○ Fever	○ Tachypnoeic ○ Tachycardia ○ Cyanosis (if severe) ○ Cardiorespiratory compromised or sudden collapse.
	Deep Venous Thrombosis (DVT)	Pulmonary Embolism								
Symptoms	○ Unilateral leg swelling ○ Claudication pain ○ Heavy ache in the limb	○ Sudden onset of shortness of breath ○ Chest pain – dull, worsened on inspiration ○ Nonproductive cough (occasionally blood-stained)								
Signs	○ Swelling – non-pitting ○ Increased warmth of the lower limb ○ Reduce capillary filling time (CRT) ○ Fever	○ Tachypnoeic ○ Tachycardia ○ Cyanosis (if severe) ○ Cardiorespiratory compromised or sudden collapse.								
Referral/ Shared Care	• Shared care between the Health Clinic and O&G clinic. • Refer mothers with moderate and high-risk VTE score to FMS and O&G specialists accordingly. (refer <i>appendix figure 2</i>) ○ For high-risk (score ≥ 4) → Refer to O&G team for initiation of thromboprophylaxis treatment as soon as possible and FMS for shared care									

	○ For moderate risk (score 3) → Refer O&G team at 28 weeks for initiation of thromboprophylaxis.
Delivery Plan	● Delivery in the hospital and delivery plan will be outlined by a multi-disciplinary team (Physician, O&G and anaesthetist), addressing the timing and mode of delivery. ● For patients on VTE thromboprophylaxis treatment: ○ No contraindication for vaginal delivery, but vigilance for PPH is recommended. ○ Omit the LMWH dose if they have signs/symptoms of labour or experience any bleeding. Seek medical attention immediately. ○ Regional analgesia should be avoided until at least 12 hours from the last prophylactic dose of LMWH.
Postnatal Care	Postnatal review ● All patients should have a VTE risk assessment immediately post-partum (refer <i>appendix figure 2</i>) ● High-risk patient who needs longer thromboprophylaxis should be referred to their respective team for the option of conversion to warfarin. Lactation There is no contraindication for a patient on LMWH or warfarin. Contraception Refer to MEC guidelines. PPC Refer high-risk patients to PPC (refer <i>appendix figure 1</i>).

REMARKS

- All patients should be assessed on VTE risk score during the pre-pregnancy period, booking, admission/had new risk and during the postpartum period.
- LMWH is the agent of choice for thromboprophylaxis. Unfractionated heparin (UFH) is the anticoagulant of choice in patients with massive PE in cardiorespiratory compromise.

Body weight (kg)	Enoxaparin *(LMWH)	Unfractionated Heparin *(UFH)
< 50	20mg daily	Lack of evidence on safety and efficacy
50-90	40mg daily	5000-unit 12 hourly
91- 130	60mg daily	Lack of evidence on safety and efficacy
131- 170	80mg daily	
>170	0.6mg/kg/day	

*LMWH is contraindicated in patients with a significant risk of bleeding or had a history of allergy to LMWH.

*Patient with UFH required platelet monitoring every 2-3 days from day 4-14 or until heparin is stopped.

- If the mother develops a hemorrhagic problem while on LMWH, stop the treatment and consult physician/haematologist.

APPENDIX

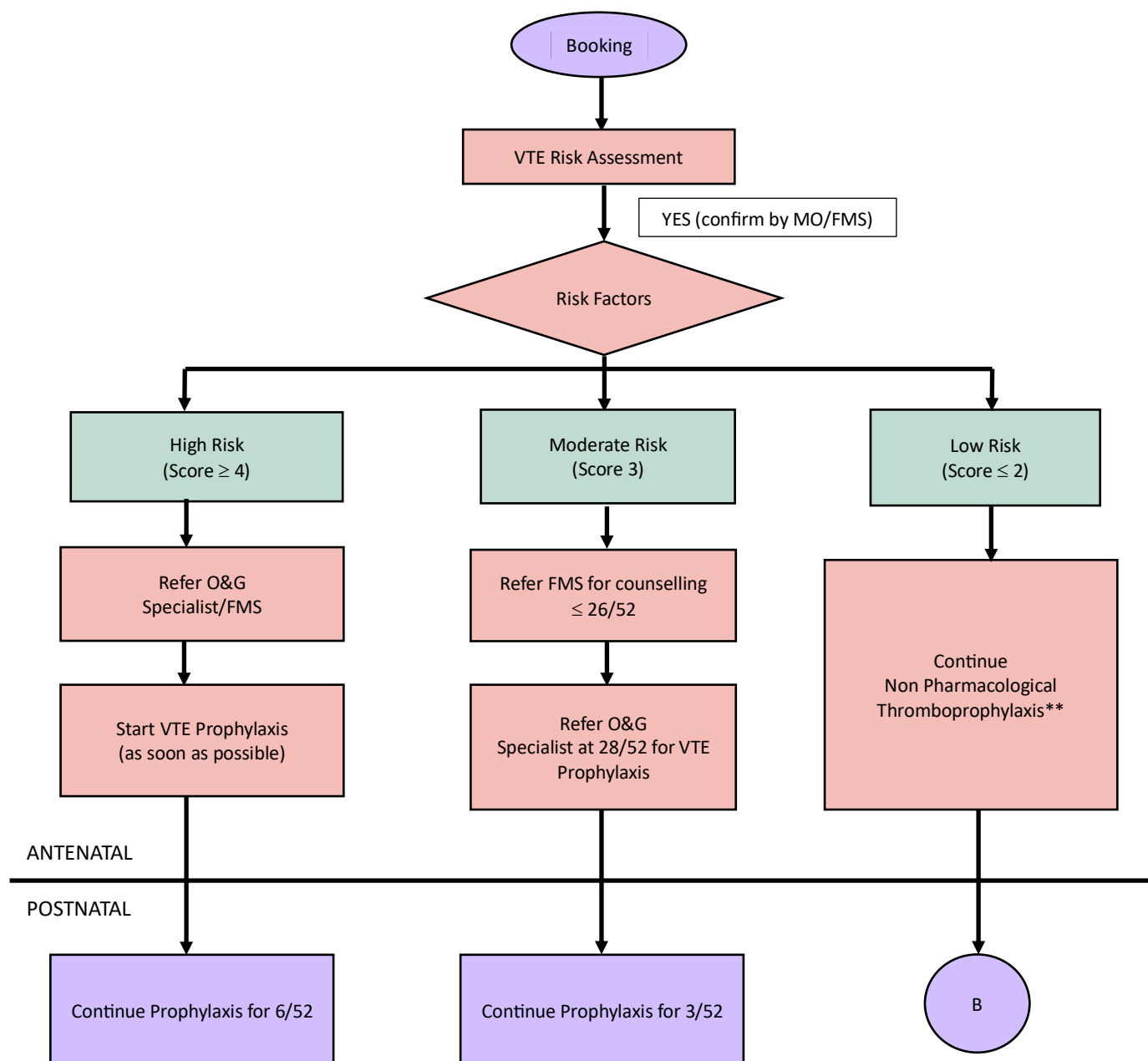
Figure 1: Risk Factors and Score for Venous Thromboembolism in Pregnancy and Puerperium

VTE Risk Factors	VTE Score	Tick		
		Pre-pregnancy/ booking	Admission/ New illness	Post-delivery
Date				
Pre-existing risk factors				
Previous thromboembolism	4			
High-risk thrombophilia (anti thrombin, protein C, protein S deficiency)	3			
Medical comorbidities (e.g., malignancies, cardiac failure, active SLE, active TB, IVDU, nephrotic syndrome, diabetic nephropathy, thalassemia major or intermedia post-splenectomy)	3			
Obesity: BMI $\geq 40\text{kg/m}^2$	2			
BMI 30-39 kg/m^2	1			
Current smoker (≥ 10 per day)	1			
Family history of VTE	1			
Low-risk thrombophilia (Factor V Leiden, High FVIII)	1			
Obstetric risk factors				
Caesarean section (elective & emergency)	2			
Pre-eclampsia	1			
Rotational instrumental delivery	1			
Prolonged labour (> 24 hours)	1			
Postpartum haemorrhage (> 1000mls) or requiring a blood transfusion	1			
Stillbirth(current)	1			
IVF (first trimester risk only)	1			
Transient risk factors*				
Surgical procedures (excluding episiotomy 1 st and 2 nd degree perineal tear repair, evacuation of retained products of conception)	4			
Hyperemesis gravidarum/ OHSS	4			
Immobility/ Dehydration/ Admission beyond 3 days	1			
Systemic/ Postpartum infection	1			
Long-distance travel (> 4 hours)	1			

*Note: Thromboprophylaxis is recommended during the transient period. Consider stopping once the transient risks are deemed no longer significant.

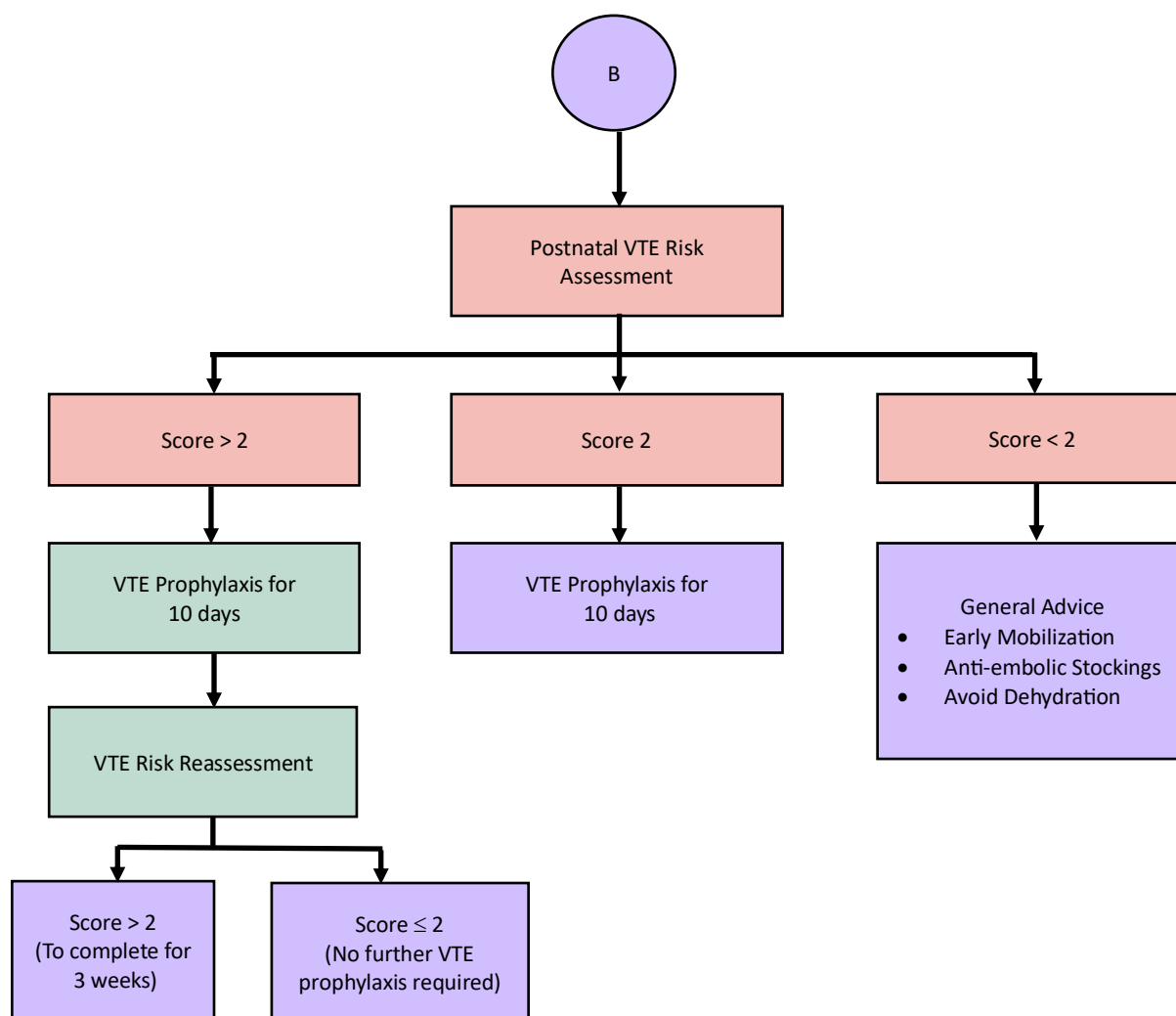
Reference: Training Manual: Prevention and Treatment of Thromboembolism in Pregnancy and Puerperium, 2018.

Figure 2: Flow Chart for Patient Management According to VTE Risk Score



** Non pharmacological thromboprophylaxis measures e.g. anti-embolic stockings, avoid dehydration, early mobilization.

Reference: Training Manual: Prevention and Treatment of Thromboembolism in Pregnancy and Puerperium, 2018



Reference: Training Manual: Prevention and Treatment of Thromboembolism in Pregnancy and Puerperium, 2018

REFERENCES

1. Training Manual Prevention and Treatment of Thromboembolism in Pregnancy and Puerperium. Ministry of Health, Second edition 2018.
2. Green-Top Guideline No. 37a: Reducing the Risk of Venous Thromboembolism. RCOG.
3. Venous Thromboembolism in Pregnancy: Challenges and Solutions. Varrias D, Spanos M, Kokkinidis DG, Zoumpourlis P, Kalaitzopoulos DR. 469-484, Vasc Health Risk Manag, July 2023, Vol. 20;19. PMID 37492280;PMCID:PMC10364824.

CHAPTER 7

RENAL DISORDERS

7.1 Chronic Kidney Disease

PHASE	ASSESSMENT AND MANAGEMENT																
Definition	- During pregnancy, eGFR is not a valid assessment for kidney function, thus serum creatinine is used. - Upper limit of normal serum creatinine in pregnancy ranges between 70-76 $\mu\text{mol/L}$ depending on the trimester, as stated below;¹ 1st trimester - 76 $\mu\text{mol/L}$ 2nd trimester - 71 $\mu\text{mol/L}$ 3rd trimester - 76 $\mu\text{mol/L}$ - Historically, creatinine cutoffs in pregnancy have been used to establish between mild (serum Cr < 123 $\mu\text{mol/L}$), moderate (123 – 212 $\mu\text{mol/L}$) and advanced/severe (> 212 $\mu\text{mol/L}$)^{1,2}. - The table below shows the risk of pregnancy-related progression of CKD¹.																
	<table><tr><td></td><td>Low: Pregnancy may infrequently contribute to progression of CKD (<15% will see an increase in GFR stage)</td><td>Moderate: Potential pregnancy-related progression of CKD; especially when multiple moderate risk factors are present (16.2-43%)</td><td>High: Progression of CKD may exceed 50% and may require dialysis in pregnancy or within 6 months postpartum; especially when multiple high- risk factors are present</td></tr><tr><td>Serum creatinine ($\mu\text{mol/L}$)</td><td><123</td><td>123 -212</td><td>> 212</td></tr><tr><td>Blood pressure (mmHg)</td><td><130/80</td><td>130-139/80-89</td><td>$\geq$140/90</td></tr><tr><td>Proteinuria (g)</td><td><1</td><td>1-3</td><td>3</td></tr></table>		Low: Pregnancy may infrequently contribute to progression of CKD (<15% will see an increase in GFR stage)	Moderate: Potential pregnancy-related progression of CKD; especially when multiple moderate risk factors are present (16.2-43%)	High: Progression of CKD may exceed 50% and may require dialysis in pregnancy or within 6 months postpartum; especially when multiple high- risk factors are present	Serum creatinine ($\mu\text{mol/L}$)	<123	123 -212	> 212	Blood pressure (mmHg)	<130/80	130-139/80-89	$\geq$ 140/90	Proteinuria (g)	<1	1-3	3
		Low: Pregnancy may infrequently contribute to progression of CKD (<15% will see an increase in GFR stage)	Moderate: Potential pregnancy-related progression of CKD; especially when multiple moderate risk factors are present (16.2-43%)	High: Progression of CKD may exceed 50% and may require dialysis in pregnancy or within 6 months postpartum; especially when multiple high- risk factors are present													
	Serum creatinine ($\mu\text{mol/L}$)	<123	123 -212	> 212													
	Blood pressure (mmHg)	<130/80	130-139/80-89	$\geq$ 140/90													
Proteinuria (g)	<1	1-3	3														
Prepregnancy Care & Family Planning	- Register PPC those with CKD. - Pre-existing CKD: - eGFR <60ml/min/1.73m² that is present > 3 months with or without evidence of kidney damage*, OR - evidence of kidney damage* that is present > 3 months with or without eGFR <60ml/min/1.73m². *Markers of kidney damage: - albuminuria (UPCR $\geq$ 30mg/mmol) - urine sediment abnormalities - electrolyte & other abnormalities due to tubular disorders - abnormalities detected by histology																

	▪ structural abnormalities detected by imaging ▪ history of kidney transplantation³. • Pregnancy should be planned, effective PPC counselling should be adequately provided and should be co-managed with PPC by O&G team. • Pregnancy can be considered in: ○ Chronic Kidney Disease Non-Dialysis Dependent (CKD-ND) ▪ Patient with serum creatinine <123umol/L, proteinuria of <1g/day and controlled hypertension and controlled systemic disease ○ End Stage Kidney Disease (ESKD) ▪ Medically stable patient after proper PPC counselling ○ Kidney Transplant Recipient (KTR) ▪ Kidney transplant > 2 years provided clinically stable with stable graft function (creatinine <123umol/L, well controlled BP and no rejection in past one year), after proper PPC counselling • Pre-pregnancy optimization: ○ Review existing medications and replace medications which is not recommended in pregnancy to pregnancy-compatible medication (refer <i>appendix Figure 1</i>). ○ Start oral Folic Acid 5mg PO OD about 3 months before conception⁴. ○ Control BP with pregnancy-safe antihypertensive. ○ Optimise pre-existing glomerular disease (including change to pregnancy-compatible immunosuppression) and ensure disease activity quiescence for at least 3 – 6 months. ○ Baseline investigations include FBC, kidney function (creatinine and serum electrolytes), serum uric acid, serum albumin, urine FEME to look for protein and RBC, and urine protein quantification if has proteinuria using UPCR. • Referral: ○ Any stage of CKD warrants referral to FMS and PPC by O&G team preconception for shared care and determination of fitness for pregnancy. • Contraception ○ Advice for contraception based on MEC.
Antenatal Care	Early booking • Start PE prophylaxis: ○ Aspirin 150mg PO OD (taken at bedtime) once fetal heart seen, before 20 weeks of gestation and need to be continued until delivery. ○ Oral calcium 1.5 - 2.0g of elemental calcium at 20 weeks of gestation until delivery (Calcium carbonate 1g PO BD or Calcium Lactate 600mg PO TDS). • Do VTE scoring assessment for VTE prophylaxis if indicated. Subsequent ANC visits • Monthly follow up by MO/ FMS. • Pregnancy safe antihypertensive agents: nifedipine, labetalol, and methyldopa. • Monitor:

	○ Signs and symptoms suggestive of pre-eclampsia, fluid overload, anaemia or uraemia (shortness of breath, headache, lower limb oedema, pallor, lethargy, reduced urine output, vomiting etc). ○ Serial laboratory investigations 1 – 3 monthly depends on clinical condition: ▪ Kidney function (creatinine, potassium), serum uric acid. ▪ Liver function test (ALT/AST) ▪ FBC (Haemoglobin, Platelet) ▪ Urine FEME, UPCR/UACR (if indicated) • Manage underlying complications: ○ For anemia- follow Nephrologist/Hematologist/Physician for plan of management ○ Screen for asymptomatic bacteriuria and treat accordingly – refer <i>section 10.1 UTI</i>. • Fetal growth & well-being: ○ Detailed scan at 18-22 weeks in the event of exposure to teratogenic drugs in pregnancy (refer <i>appendix figure 1</i>). ○ Monthly fetal growth scan starting from 24 weeks POA till delivery.
Referral/ Shared Care	FMS • Discuss or refer upon diagnosis. Primary team (O&G and nephrologist/ physician/ rheumatologist): • Early referral (to discuss with the respective team upon diagnosis, for further detailed risk stratification and management). Dietitian • For nutritional considerations, proper weight gain, concurrent anemia & low phosphate diet.
Delivery Plan	• Timing of delivery need collective decision from various treating team taking into consideration of maternal medical and obstetric condition. • Hospital delivery.
Postnatal Care	Postnatal review • MO review in 2 weeks postpartum or earlier if indicated. • To review discharge plan, patient's condition, and parameters. • Nephrology clinic follow up duration depends on patient's condition. Lactation and contraception • Re-register PPC and contraception (refer MEC guidelines). • Encouraged exclusive breastfeeding.

REMARKS

- Women with moderate to severe renal impairment results in increased risk of adverse maternal & fetal outcomes^{2,3}.
- Baseline HPT, baseline proteinuria (>1g/day), and presence of systemic disease are significant predictors of maternal-fetal outcomes¹.
- Complications related to CKD in pregnancy:^{2,3,4}

Maternal	Fetal
○ Accelerated decline in renal function and/or proteinuria ○ Potential flare of underlying disease ○ Hypertensive disorders in pregnancy ▪ Gestational HPT ▪ Pre-eclampsia ▪ HELLP syndrome ○ Complications of immunosuppression ○ Miscarriage ○ Maternal death	○ Preterm birth ○ Stillbirth or neonatal death ○ Low birth weight ▪ Fetal growth restriction ▪ Small for gestational age

APPENDIX

Figure 1: Commonly Used Drugs in Pregnant Women with CKD⁴

Drug	Teratogenicity	Safe in Pregnancy	Safe in Breastfeeding	FDA
Anti-hypertensive				
Methyldopa	Nil	Often used first line	Safe	B
Beta-blockers	Nil	Safe. *Fetal growth restriction in some studies Fetal bradycardia with Atenolol in first trimester	Excreted into breastmilk, but widely used without reports of neonatal side effects	C
CCB (e.g. Nifedipine, Amlodipine)	Nil	Usually used second line in conjunction with methyldopa or labetalol	Excreted into breastmilk, but widely used without reports of neonatal side effects	C
Hydrochlorothiazide	Nil	Theoretically, may cause intra vascular volume contraction and reduce placental perfusion, but can be used with caution for fluid overload or difficult to control hypertension	Excessive thirst in breastfeeding women; large doses may suppress lactation	C
Hydralazine	Nil	Usually used in combination with sympatholytic agent to prevent reflex tachycardia	Excreted in breast milk, but no adverse effects reported	C
ACEi/ ARB	Oligo-hydramnions, neonatal anuria and renal failure, limb contractures, cranio-facial abnormalities, pulmonary hypoplasia, and PDA	Stop at conception Prolonged exposure can result in fetal renal insufficiency and impairment in the urine-concentrating ability, likely due to papillary atrophy and disturbed formation of the medullary concentration gradient	Enalapril and Captopril are excreted in small amounts with no adverse effects reported	D

KEDAH CONSENSUS GUIDELINES ON PRIMARY CARE MANAGEMENT OF MEDICAL DISORDERS IN PREGNANCY

Immuno-suppressants				
Prednisolone	Possible increase in oral cleft palate	Maternal S/E: bone loss and possible osteo-necrosis, gestational diabetes, HPT, cataract, adrenal insufficiency Fetal effects: rare-except at large dose (cataract, infection and adrenal insufficiency)	Safe (breastfeeding is not encouraged if dose >60mg daily)	C
Azathioprine	Possible sporadic congenital abnormalities	Safe Fetal/neonatal effects: transient immune alterations in neonates	Safe	D
Tacrolimus and cyclosporine	Nil	Safe Usually increased doses required to achieve pre-pregnancy target levels. Hyperkalemia, worsening HPT and nephrotoxicity are possible Fetal/neonatal effects: Hyperkalemia and renal impairment	Excreted into breast milk, but 0.23%-0.5% of maternal weight-adjusted dose	C
Mycopheno Late Mofetil (MMF)	Congenital abnormalities in 22.9%, cleft lip and palate, absent auditory canal, hypertelorism, microtia, brachydactyly of the 5 th finger, limb abnormalities and hypoplastic toe nails	Stop at conception	Not safe	D
Cyclophosphamide	Teratogenic	Stop at conception Fetal/neonatal effects: Chromosomal abnormalities and cytopenia	Not safe	D

REFERENCES

1. Monica L.R. et al. Chronic Kidney Disease and Pregnancy.ACKD. (2020).
2. Wiles *et al.* Clinical Practice Guideline on Pregnancy and Renal disease. *BMC Nephrology* (2019).
3. *CPG Management of Chronic Kidney Disease 2nd Edition, Ministry of Health Malaysia.* (2018).
4. KDIGO 2024 Clinical Practice Guideline For The Evaluation And Management Of Chronic Kidney Disease, Vol 105, Issue 45, April 2024 .
5. *Perinatal Care Manual 4th Edition, Ministry of Health Malaysia* (2022).
6. J. Bras. *Nefrol.* Maternal and Fetal Outcomes of Pregnancy in Chronic Kidney Disease (2021).

7.2 Persistent Proteinuria

PHASE	ASSESSMENT AND MANAGEMENT
Definition	Significant proteinuria - Urine dipstick $\geq 2+$ for ≥ 2 occasions OR, - Proteinuria ≥ 300 mg in 24 hours urine collection OR, - UPCR ≥ 30 mg/mmol AND other causes of proteinuria excluded (refer <i>remarks</i>)^{1,2} Onset - Before 20 weeks POA - suspect primary or secondary kidney disease (refer <i>remarks</i>). - After 20 weeks POA - rule out preeclampsia (PE), especially if HPT / other features of severe PE present. <i>Notes:</i> - Isolated urine dipstick protein trace or 1+ only may represent non-significant proteinuria. Trace may be ignored. - However, 1+ protein persistent for ≥ 2 occasions require further investigation (to send for urine protein quantification to determine significant or not)³.
Prepregnancy Care & Family Planning	PPC recruitment - Women with proteinuria secondary to underlying primary or secondary kidney disease (multidisciplinary team) (refer section 7.1 CKD). - Contraception - refer MEC guidelines.
Antenatal Care	At the time of proteinuria detection (from urine dipstick) - Rule out other common causes for proteinuria and transient proteinuria (refer <i>remarks</i>). - Watch out for PE if ≥ 20 weeks. - After treating other common causes for proteinuria and transient proteinuria, or after exclude PE, repeat UFEME in 2 weeks or earlier if indicated (individualized). If persistent proteinuria (isolated proteinuria $\geq 1+$ in urine dipstick for ≥ 2 occasions) (refer <i>remarks</i>) - Thorough history taking & physical examination: < 20 weeks POA - Sign and symptom of PE, personal or family history of kidney disease, underlying systemic diseases e.g. DM/ HPT/ SLE, drugs history, history of passing out stone. ≥ 20 weeks POA - Commonly to look for presence of signs and symptoms of PE. - Parameters monitoring (always reassess patient and need to rule out PE each visit): - Presence of signs and symptoms of PE - Elevated BP - Excessive weight gain

	○ Urine protein or worsening proteinuria ● Urine protein quantification to look for significance of the proteinuria: ○ UPCR, or ○ 24 hours urine protein ● Focused investigations (based on clinical assessment): ○ FBC, RP and SUA ○ Urine for RBC (UFEME) ○ HIV/ HEP B & C ○ Ultrasound KUB ● Prophylaxis for obstetric risks: ○ PE prophylaxis if indicated (refer <i>remarks</i>). ○ VTE prophylaxis if indicated (refer section 6.4 VTE). ● Fetal surveillance ○ Monitor fetal growth as per indicated by underlying medical disorder or PE if present. ○ Monthly starts 28 weeks for those with significant proteinuria with onset after 20 weeks POA.
Referral/ Shared Care	FMS ● Pregnancy with significant proteinuria ● Pregnancy with suspected PE or atypical PE (refer <i>remarks</i>) Multidisciplinary hospital specialists ● Nephrology ○ Significant proteinuria <20 weeks regardless of investigation results as the cause of kidney disease is concerned (e.g. IgA nephropathy that may warrant renal biopsy postpartum) ○ For determination of pregnancy prognosis and shared care ● Urology ○ If renal calculi or KUB shows structural abnormality present ● O&G/ Combined Clinic ○ Significant proteinuria with underlying kidney disease/ systemic disease or other obstetric indications for shared care & delivery plan
Delivery Plan	● As per obstetric indications ● For hospital delivery
Postnatal Care	● Significant proteinuria ○ MO to review in 2 weeks postnatal or earlier if indicated ○ To review discharge plan, patient's condition and parameters (watch out for PE) ○ Continue nephrology team plan of postnatal management ● Preeclampsia ○ As per PE management protocol (refer section 4.1 HPT disorders) ● Re-register for PPC if risks still present ● Contraceptive counselling - refer MEC guidelines

REMARKS**Other causes of proteinuria**

- UTI excluded and fully treated, proper sampling (mid-stream urine), no contamination, no dehydration, no excessive PV discharge¹

Transient proteinuria

- Temporary excretion of protein
- Can be caused by strenuous exercise, high fever, exposure to cold, stress & physiologically (pregnant women may also excrete more protein in their urine; no underlying kidney disease & not require treatment)³

Gestational proteinuria

- A subset of isolated proteinuria, defined as significant proteinuria with onset after 20 weeks in the absence of HPT & no signs/ symptoms of preeclampsia
- A retrospective diagnosis that is made postpartum if PE does not develop
- Proteinuria that can last up to 6 months post delivery^{1,4,5}

Primary & secondary cause for kidney disease⁶

Primary	Secondary
• Membranous nephropathy • IgA nephropathy • Focal and segmental glomerulosclerosis • Membranoproliferative glomerulonephritis • Alport syndrome • Minimal change disease	• Hypertension/ pre-eclampsia • Postinfectious GN • Diabetes mellitus • Drugs e.g. heroin use • Infection (Hepatitis B/C, syphilis, HIV) • Autoimmune diseases (SLE, RA)

Atypical presentation of PE

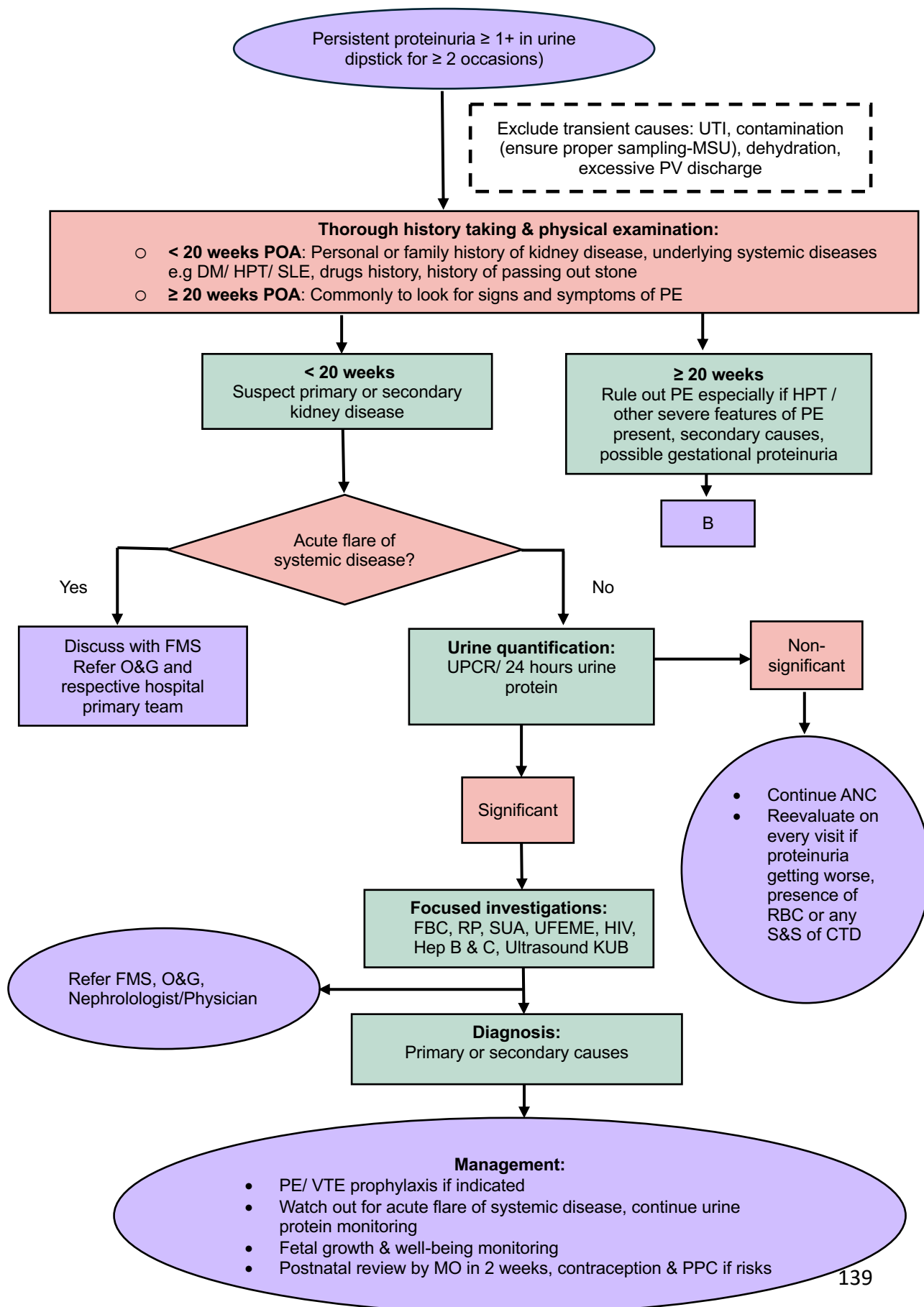
- Isolated gestational proteinuria (IGP) associated with development of HPT
- Different mechanism that leads to isolated proteinuria compared to women with PE
- 50% women with isolated proteinuria develop PE even without HPT
- Monitoring done as PE^{4,5}

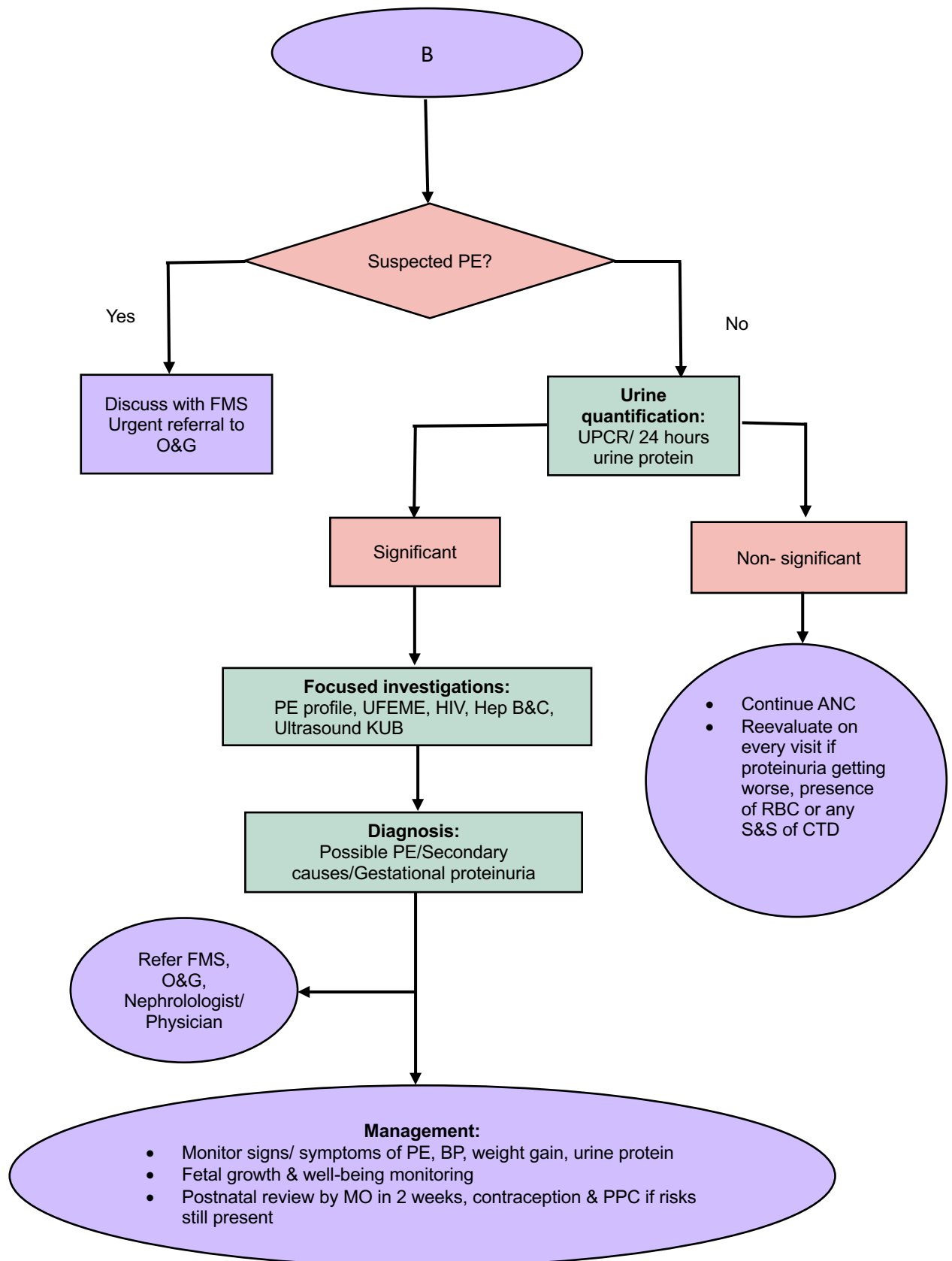
Indication for PE prophylaxis

- Underlying systemic diseases e.g. DM, HPT, SLE

APPENDIX

Figure 1: Flow Chart Management of Persistent Proteinuria





REFERENCES

1. O. Osman *et al.* Proteinuria in Pregnancy-Review (2019).
2. Michal *et al.* Proteinuria During Pregnancy: Definition, Pathophysiology, Methodology and Clinical Significance, F.B. *American Journal of Obstetrics and Gynaecology* (2023).
3. Handbook of Obstetric Medicine 6th Edition 2021.
4. Y. Takahiro *et al.* Isolated Gestational Proteinuria Preceding the Diagnosis of Preeclampsia- An Observational Study (2015).
5. M.W.Corry *et al.* Relationship of Risk Factors for Pre-eclampsia with Patterns of Occurrence of Isolated Gestational Proteinuria during Normal Term Pregnancy (2011).
6. Proteinuria in Pregnancy: Diagnosis, Differential Diagnosis and Management of Nephrotic Syndrome.*UpToDate* (2023).

SECTION 8

CONNECTIVE TISSUE DISEASE

8.1 Systemic Lupus Erythematosus (SLE)

PHASE	ASSESSMENT AND MANAGEMENT
Definition	- SLE is a chronic, multi-system autoimmune disease predominantly affecting women of reproductive age. - In primary care, diagnosis is made by presenting symptoms and signs, antibodies and with consultation with a Physician/Rheumatologist (refer <i>appendix figure 1</i>)¹. - In general, testing for antiphospholipid antibody (aPL) should be performed in patients with SLE or SLE-like disease and in women with suggestive histories or physical findings in previous pregnancy².
Pre pregnancy Care & Family Planning	Registration criteria for PPC - Women diagnosed with SLE. Aim³: - Optimization of disease control. - Counselling of the potential risk of pregnancy. - Determination of suitability and the appropriate timing of conception. - Review and modification of therapeutic agents to pregnancy-compatible alternative if available. Risk Stratification³: Pregnancy is at high risk if: - The disease is still active within the last 6 months (e.g., active lupus nephritis, active neuro-psychiatric SLE); Therapeutic agents used are not safe (with no effective alternative) in pregnancy; and/or - Presence of major organ involvement with significant residual functional impairment (e.g., moderate to severe CTD, related Pulmonary HPT, severe CTD-related interstitial lung disease (ILD)). Patients with the above conditions should be counseled strongly against pregnancy, and the practice of effective contraception should be emphasized (refer <i>appendix figure 2</i>). Management: Disease activity of affected organ system needs to be carefully accessed and adequately managed prior to conception, ideally by the attending rheumatologist or subspecialty teams (e.g., nephrology, hematology) during the initial pre pregnancy discussion with the patient in their respective clinic. Compliance to treatment and follow up. - In remission with therapeutic agents to pregnancy- compatible (refer <i>appendix figure 3</i>).

	Folate supplementation 5mg daily, if possible 3months earlier prior conception.
Antenatal Care	Assessment - All SLE patients need to refer urgently to rheumatologist/ O&G/ MFM/ FMS at booking/once pregnant. Antibodies (anti-Ro/SSa and/or anti-La/SSb) need to be taken before 16 weeks for fetus prognostication. History taking at booking/ diagnosis: - Symptoms- onset, duration, severity, past episodes. - Look out for signs and symptoms of disease flares (e.g., joint pain, cutaneous manifestation, rashes, serositis and fatigue). - Anticipate for other complications of SLE such as anaemia, pre-eclampsia, and lupus nephritis. VTE risk assessment (refer <i>section 6.4 Venous Thromboembolism</i>). - Blood pressure should be monitor closely. For a woman with anti-Ro/SSa and/or anti-La/SSb positive - Patients must be counseled regarding the risk of fetal congenital heart block (CHB). - the incidence of CHB is 2% in cases of maternal anti-Ro/SSa antibody - positivity and 3 % when both anti-Ro/SSA and anti-La-SSb are positive. - following the birth of one child with CHB, the risk of recurrence is 9 times higher in subsequent pregnancies. - Once pregnant, woman needs to be followed up in a center with feta-maternal service. - Women should be initiated on Hydroxychloroquine if there is no contraindication or reminded not to discontinue if already taken. Investigations - FBC, RP, LFT, - UFEME - Urine 24hour protein (if proteinuria present) Treatment - Emphasize compliance to medication. Hydroxychloroquine (HCQ) should be continued during pregnancy. - Aspirin 100mg to 150mg PO OD from 12 weeks until delivery. - Calcium supplementation starts at 20 weeks until delivery. - VTE prophylaxis (if indicated) - Fetal surveillance: - detail scan 18 to 22 weeks. - monthly growth scan from 28 weeks-risk of SGA. - In pregnant women with positive anti-Ro/SSA and/or anti-La/SSB antibodies and history of an infant with complete heart block (CHB) or neonatal lupus erythematosus (NLE), fetal arrhythmia screening starting at week 16 up to 26 weeks gestation.
Referral/ Shared Care	Refer/discuss all SLE cases with FMS urgently.

	• Early combined clinic appointment between Medical/ Rheumatology/ O&G/MFM • Symptomatic cases/acute flare– urgent referral for admission.
Delivery Plan	• Hospital delivery. • Timing and mode of delivery as per obstetric indications.
Postnatal Care	Postnatal review • MO review in 2 weeks or earlier if indicated. • FMS review within 4 weeks or earlier if indicated. • Monitor for flares as exacerbations may occur in the postpartum period. • To review VTE risk assessment Lactation Encourage exclusive breastfeeding with precaution certain medication (refer <i>appendix figure 3</i>). Contraception Refer MEC guidelines (refer <i>appendix figure 2</i>). PPC Register PPC & continue disease optimization.

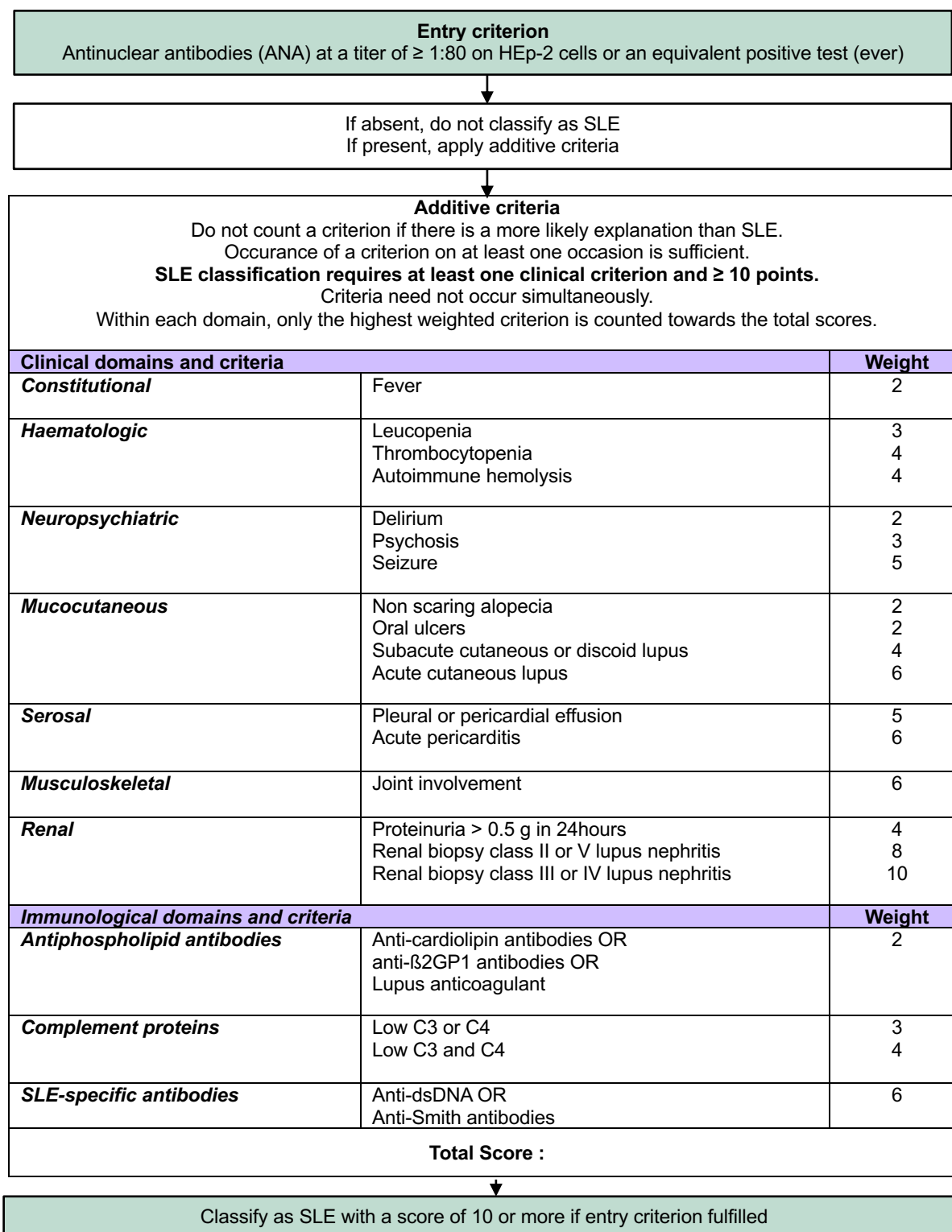
REMARKS**Risks of SLE to pregnancy and pregnancy to SLE**

Risk of SLE to pregnancy/fetus	Risk of pregnancy to SLE
Spontaneous abortions Cardiac neonatal lupus Fetal or neonatal death Birth before 36 weeks due to placental insufficiency, Hypertension or preeclampsia, Small-for-gestational-age (SGA)	May precipitate flare or aggravate manifestations of the disease.

Contraindications to pregnancy

- Severe lupus flare (including renal flare) within 6 months
 - Stroke within 6 months
 - Pulmonary hypertension
 - Moderate to severe heart failure
 - Severe valvulopathy
 - Severe restrictive lung disease
 - CKD Stage 4-5
 - Uncontrolled hypertension
 - Previous severe early onset (<28 Weeks) Pre-Eclampsia or HELLP Syndrome despite therapy with aspirin plus heparin
- EULAR guidelines recommended taking hydroxychloroquine (HCQ) before conception and throughout pregnancy to control disease activity³. HCQ has been shown to control disease activity and reduced pregnancy complications including preeclampsia and cardiac neonatal lupus. Discontinuation of HCQ is related to an increased risk for SLE exacerbations during pregnancy.
 - Patients should use contraception(refer appendix figure 2) while they are taking immunosuppressive disease-modifying drugs, such as mycophenolate and, in particular cyclophosphamide. Malformations of the fetus are possible from these drugs. Cyclophosphamide is absolutely contraindicated during pregnancy.

APPENDIX

Figure 1: Classification criteria for Systemic Lupus Erythematosus (EULAR/ACR 2019 criteria).Sensitivity 96.1%. Specificity 93.4%¹.

Reference: 2019 EULAR/ACR Classification Criteria for Systemic Lupus Erythematosus.

Figure 2. Safety and efficacy of various contraceptive methods in women with RMD***Table 1.** Safety and efficacy of various contraceptive methods in women with RMD*

Method	Safety in women with RMD	1-year failure rate, %†
Highly effective (LARC)		
Copper IUD	Safe in all women with RMD; may increase menstrual bleeding	<1
Progestin IUD	Safe in all women with RMD; may decrease menstrual bleeding	<1
Progestin implant	Limited data, but likely safe in all women with RMD	<1
Effective		
Progestin-only pill (daily)	Safe in all women with RMD; higher rate of breakthrough bleeding than with combined contraceptives; must take same time every day for efficacy	5–8
DMPA (IM injection every 12 weeks)	Safe in most women with RMD; <u>exceptions</u> : positive aPL, at high risk for OP	3
Combined estrogen and progesterone pill (daily)	Safe in most women with RMD; <u>exceptions</u> : positive aPL, very active SLE	5–8
Transdermal patch (weekly)	Safe in most women with RMD; <u>exceptions</u> : positive aPL, SLE; serum estrogen levels higher than with pill or vaginal ring	5–8
Vaginal ring (monthly)	Safe in most women with RMD; <u>exceptions</u> : positive aPL, very active SLE	5–8
Less effective		
Diaphragm	Safe in all women with RMD	12
Condom	Safe in all women with RMD; only form to prevent STD	18
Fertility awareness-based methods‡	Safe in all women with RMD; limited efficacy, especially if menses are irregular	24
Spermicide	Safe in all women with RMD; use with condoms or diaphragm to improve efficacy	28

* RMD = rheumatic and musculoskeletal disease; LARC = long-acting reversible contraception; IUD = intrauterine device; DMPA = depot medroxyprogesterone acetate; IM = intramuscular; aPL = antiphospholipid antibody; OP = osteoporosis; SLE = systemic lupus erythematosus; STD = sexually transmitted disease.

† Percent of women who will become pregnant within the first year of typical use.

‡ Methods based on the timing of the menstrual cycle.

Figure 3: Maternal Medication Use: Overview of Medication Use Before and During Pregnancy, And During Breastfeeding.

MEDICATION	PRE-CONCEPTION	DURING PREGNANCY	BREASTFEEDING
Conventional medications			
Hydroxychloroquine	++	++	++
Sulfasalazine	++	++	++
Colchicine	++	++	++
Azathioprine	++	++	+ Low transfer
Prednisolone	+ Keep at lowest effective dose & add pregnancy-compatible immunosuppressants	+ Keep at lowest effective dose & add pregnancy-compatible immunosuppressants	+ After a dose of >20 mg daily, delay breastfeeding for 4 hours
Ciclosporine, tacrolimus	+ Monitor blood pressure	+ Monitor blood pressure	+ Low transfer
NSAIDs (COX-2 inhibitors not preferred)	+ Discontinue if the woman is having difficulty conceiving	+ Continue in first and second trimesters; discontinue >20weeks	+ Ibuprofen preferred
MEDICATION	PRE-CONCEPTION	DURING PREGNANCY	BREASTFEEDING
Tumor necrosis factor inhibitors (tumor necrosis factor inhibitors are considered compatible with pregnancy)			
Infliximab, Etanercept, Adalimumab, Golimumab	+ Continue through conception	+ Continue in first and second trimesters; discontinue in third trimester several half- lives prior to delivery	++
Rituximab	+ Discontinue at conception	+ Life-/organ- threatening disease	++
Other biologics (limited safety data; limited transfer in early pregnancy but high transfer in second half of pregnancy)			

MEDICATION	PRE-CONCEPTION	DURING PREGNANCY	BREASTFEEDING
Not compatible with pregnancy			
Methotrexate	XX Stop 1–3 months prior to conception	XX Stop and give folic acid 5 mg/day	X Limited data suggest low Transfer
Leflunomide	XX Cholestyramine washout (if detectable levels)	XX Stop and give cholestyramine washout	XX
Mycophenolate mofetil & mycophenolic acid	XX Stop >6 weeks prior to conception to assess disease stability	XX	XX

Cyclophosphamide	XX Stop 3 months prior to conception	+	XX
Thalidomide	XX Stop 1–3 months prior to conception	XX	XX
Tofacitinib, Baricitinib	Unable to determine due to lack of data; small molecular size suggests transfer across the placenta and into breast milk		

RECOMMENDATION LEVEL

	++	Strongly recommend
	+	Recommend
	+	Conditionally recommend
	X	Conditionally recommend against
	XX	Strongly recommend against
		Unable to determine due to lack of data

Reference: ACR 2020 Adapted to Pre-Pregnancy Care in MOH Specialist Hospital, Ministry of Health Malaysia (2023)

REFERENCES

1. EULAR/ACR Classification Criteria for Systemic Lupus Erythematosus. Martin Aringer, Karen HCostenbader, DAvid I Daikh. 71(9), s.l. : Arthritis Rheumatol, 2019, Vols. Sept
2. Sammaritano et al .2020 American College of Rheumatology Guideline for the Management of Reproductive Health in Rheumatic and Musculoskeletal Diseases, Arthritis Care & Research,Vol. 72, No. 4, April 2020, pp 461–488. doi10.1002/acr.24130
3. Pre-Pregnancy Care in MOH Specialist Hospital, Ministry of Health Malaysia (2023)

SECTION 9

PREGNANCY-SPECIFIC DERMATOSES

9.1 Polymorphic Eruption of Pregnancy

PHASE	ASSESSMENT AND MANAGEMENT
Definition	- Formally known as pruritic urticarial papules and plaques of pregnancy (PUPPP). - A common, self-limiting disorder among primigravida. - Begins in third trimester or immediate postpartum. - Starts within abdominal striae distensae that spreads to thighs, buttocks, trunk, arms, and legs with periumbilical sparing¹. - Characterized by various skin presentations such as pruritic eczematous plaques, urticarial papules, vesicles, purpura and targetoid lesions.
Prepregnancy Care & Family Planning	Not applicable
Antenatal Care	- Diagnosis is made clinically. - Management depends on clinical severity which may include: - Emollients - Topical corticosteroids: low to moderate potency (BVC 1:4 or 1:2) - Antihistamines - Systemic corticosteroids may be necessary in severe cases (to consult FMS/ dermatologist).
Referral/ Shared Care	Refer dermatologist for severe presentations.
Delivery Plan	Not applicable
Postnatal Care	Resolves spontaneously within 4 to 6 weeks postpartum.

REMARKS
- Risk factors: - Excessive weight gain - Multiple pregnancy - Recurrence in subsequent pregnancies is rare.

Polymorphic Eruption of Pregnancy



Itchy erythematous rash often involving stretch marks with umbilical sparing.



Source of photos: Google (free images)

9.2 Atopic Eruption of Pregnancy

PHASE	ASSESSMENT AND MANAGEMENT
Definition	• Most common cause of pruritus in pregnancy. • Occurs in early first or second trimester. • Two clinical presentations (refer photos): ○ Eczematous (E-type) ○ Prurigo (P-type)
Prepregnancy Care & Family Planning	Not applicable
Antenatal Care	• Diagnosis is made clinically, with or without association of atopy. • Management depends on clinical severity which may include: ○ Emollients ○ Topical corticosteroids: low to moderate potency (BVC 1:4 or 1:2) ○ Antihistamines ○ Short course of systemic corticosteroids may be necessary in severe cases (to consult FMS/ dermatologist). ○ Narrow band UVB phototherapy
Referral/ Shared Care	Refer dermatologist for severe cases.
Delivery Plan	Not applicable
Postnatal Care	Resolves spontaneously early postpartum.

REMARKS
• 80% of cases are atopic eruption for the first time or after years of remission². • Only 20% are flare of pre-existing disease. • E-type is more common than P type. • No maternal or fetal risks. • Commonly recurs in subsequent pregnancies.

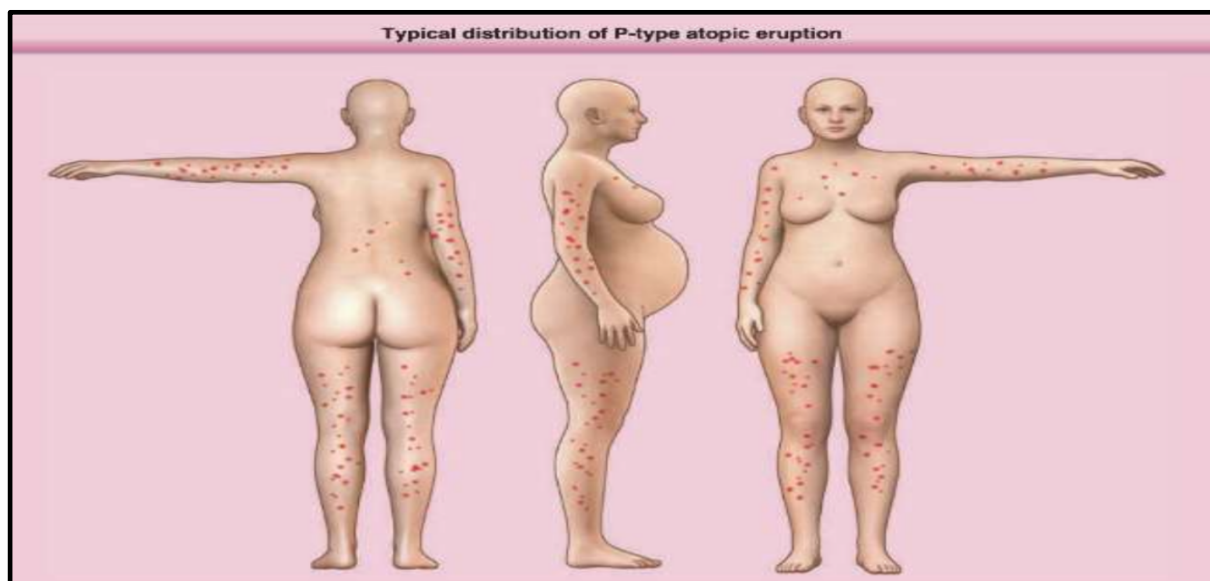
E- type Atopic eruption in pregnancy



E-type (eczematous): Classical distribution of lesions, including eczematous eruption on the face, neck, presternal and flexural areas.

Source of photos: Google (free images)

P-type Atopic eruption in pregnancy



P-type (prurigo): Presence of small, pruritic, erythematous papules disseminated predominantly on the extensors surfaces of extremities and trunk.

Source of photos: Google (free images)

9.3 Pemphigoid Gestationis

PHASE	ASSESSMENT AND MANAGEMENT
Definition	- Formerly known as “herpes gestationis”. - A rare autoimmune bullous disorder. - Occurs during 2nd trimester onwards or immediate postpartum. - Intensely pruritic urticarial plaques/papules, often begins in the abdomen which includes periumbilical area followed by multiple vesicles/bullae on the trunk and extremities³. - May be seen on palms and soles, rarely on face/mucous membranes. - Tends to remit and relapse throughout pregnancy. - Frequently improves in late pregnancy and flares during delivery.
Prepregnancy Care & Family Planning	Not applicable
Antenatal Care	- Diagnosis is established by clinical and histological examination (HPE and direct immunofluorescence). - Dermatological management depends on clinical severity which may include: - Dressing - High potency topical steroid in mild and localized disease - Management of superimposed infections. - Antihistamines - Systemic corticosteroids (prednisolone 0.5mg/kg) or steroid sparing agents (to consult FMS/ dermatologist). - Close fetal growth monitoring.
Referral/ Shared Care	- Refer dermatologist upon suspicion for confirmation of diagnosis and further management. - Refer O&G if IUGR/SGA is suspected.
Delivery Plan	Not applicable
Postnatal Care	Resolves spontaneously postpartum within weeks to months.

REMARKS
- Prognosis: - Fetus - Increased risks of prematurity, IUGR and low birth weight. - Neonatal disease may occur, typically mild with spontaneous resolution. - Mother - Increased risk of autoimmune disease postpartum eg. Hashimoto's, Grave's disease. - Commonly recurs in subsequent pregnancies. - Earlier gestation - Increased severity 25% flare up with menses and the use of oral contraceptive pills later.

Pemphigoid Gestationis



Itchy urticarial-like lesions that usually begins at the periumbilical area and may progress to widespread rash and blister formation.



Source of photos: Google (free images)

9.4 Intrahepatic Cholestasis

PHASE	ASSESSMENT AND MANAGEMENT
Definition	- A rare, reversible cholestasis that typically occurs in late 2nd or 3rd trimester. - Severe pruritus with absence of primary skin lesion. - Jaundice may be apparent 2 to 4 weeks after the onset of pruritus. - Key diagnosis is elevated total serum bile acid >19 mmol⁵. Serum AST/ALT may also be raised⁶.
Prepregnancy Care & Family Planning	Not applicable
Antenatal Care	- Ultrasound abdomen to rule out cholelithiasis. - Once diagnosis confirmed, to start on Ursodeoxycholic Acid 300mg PO BD-TDS till delivery.
Referral/ Shared Care	Combined care with dermatologist, gastroenterologist, O&G specialist for management of disease and timing of delivery.
Delivery Plan	- Timing of delivery is at the discretion of managing O&G specialist. - Mode of delivery is as per obstetric indication.
Postnatal Care	Not applicable

REMARKS
- Sudden onset of pruritus in palms and soles without any skin lesions - Presentations include excoriations or prurigo nodules due to scratching. - Associated with risk of prematurity, intrapartum fetal distress, stillbirth. - Vitamin K deficiency may lead to uterine and intracranial hemorrhage. - Fetal risk correlates with the elevation of serum bile acid. - Pruritus resolves spontaneously within 6 weeks postpartum. - May recur in subsequent pregnancies.

REFERENCES

1. Vaughan Jones S, Ambros-Rudolph C, Nelson-Piercy C. Skin disease in pregnancy *BMJ* 2014; 348 :g3489 doi:10.1136/bmj.g3489
2. Sävervall C, Sand FL, Thomsen SF. Dermatological diseases associated with pregnancy: pemphigoid gestationis, polymorphic eruption of pregnancy, intrahepatic cholestasis of pregnancy, and atopic eruption of pregnancy. *Dermatology Research and Practice*. 2015 Nov 2;2015.
3. *Dermatology* , Edited by Jean L. Bolognia , Julie V. Schaffer , Lorenzo Cerroni Fourth edition, China: Elsevier, 2018, ISBN 978–0-7020– 6275–9
4. Fitzpatrick's *Dermatology in General Medicine*, 9th Edition
5. Girling J, Knight CL, Chappell L; on behalf of the Royal College of Obstetricians and Gynaecologists. Intrahepatic cholestasis of pregnancy. *BJOG*. 2022; 129(13): e95–e114. <https://doi.org/10.1111/1471-0528.17206>
6. Himeles JR, Pomeranz MK. Recognizing, Diagnosing, and Managing Pregnancy Dermatoses. *Obstetrics & Gynecology*. 2022 Oct 7;140(4):679-95

SECTION 10

INFECTIOUS DISEASES

10.1 Urinary Tract Infection

PHASE	ASSESSMENT AND MANAGEMENT
Definition	Asymptomatic Bacteriuria (ASB) - is defined as bacterial monoculture in the quantity of $\geq 10^5$ CFU/ml in a single urine culture taken in women without urinary symptoms¹. - for Group B Streptococcus, CFU of $> 10^4$ is an indicator of vaginal colonization and is commonly used as the threshold for treatment of infection in pregnancy¹. - for borderline bacteriuria i.e CFU/ml of 10^3 to 10^4 or polybacterial culture, a repeat test is recommended after 1 week, to avoid unnecessary treatment¹. Lower Urinary Tract Infection (LUTI) - Acute cystitis (urinary bladder infection) - Acute urethritis (urethral infection) - presence of symptoms such as dysuria, cloudy urine, haematuria, abdominal or suprapubic discomfort/pain, urgency and frequency in afebrile patients with no evidence of systemic illness¹. - is confirmed by the presence of even small bacterial colony counts ($\geq 10^2$–10^3CFU/ml)¹. - all LUTIs in pregnancy is considered as complicated LUTIs¹. Recurrent UTI 2 or more UTIs within 6 months, or 3 or more UTIs within 12 months³. - Risk for recurrent UTI³: - sexual intercourse 3 or more / week - spermicide use - new or multiple sex partner - having UTI before 15 years of age
Prepregnancy Care & Family Planning	Not applicable
Antenatal Care	Asymptomatic Bacteriuria - Routine screening for ASB in all pregnant mothers is not recommended¹. - Screening should be individualized and may be considered in selected high-risk mothers at booking^{1, 4, 5}: - type 2 diabetes mellitus - those with underlying renal tract abnormalities - past or recent renal calculi - people with recurrent UTIs

- history of preterm birth in previous pregnancy
- If screening is indicated, MSU C&S is the gold standard investigation¹.
- Positive MSU C&S should be treated with antibiotic for 5-7 days¹.
- Choice of antibiotics:

Oral Antibiotics	Dose
Nitrofurantoin*	50-100mg QID (macrocrystals) OR 100mg BD (monohydrate/ macrocrystals)
Cephalexin	500mg QID OR
Trimethoprim/ sulphamethoxazole	160/100mg BD
<u>Alternative</u>	
Cefuroxime	250mg BD OR
Amoxicillin/Clavulanate**	625mg TDS OR
Ampicillin/Sulbactam	375-750 mg BD

Adapted from National Antimicrobial Guideline 2019

*Avoid nitrofurantoin in third trimester due to small risk of haemolytic anaemia in newborn².

**Amoxicillin/Clavulanate is generally safe in pregnancy (category B) except for an increasing incidence of necrotizing enterocolitis in preterm babies in babies born after premature rupture of membranes².

- MSU C&S should be repeated 1-2 weeks post treatment ^{1,2}.
- To consult FMS if repeated MSU C&S post treatment remain positive.

Acute Cystitis

- Presence of symptoms¹ (refer *definition* above).
- Obtain UFEME⁶ and MSU C&S before starting treatment².
- Treat empirically with 5-7 days antibiotics^{1,2}.
- Choice of antibiotics:

Oral Antibiotics	Dose
Nitrofurantoin*	50-100mg QID (macrocrystals) OR 100mg BD (monohydrate/ macrocrystals)
Cephalexin	500mg QID
<u>Alternative</u>	
Cefuroxime	250mg BD OR
Amoxicillin/Clavulanate **	625mg TDS OR
Ampicillin/Sulbactam	375-750mg BD

Adapted from National Antimicrobial Guideline 2019

*Avoid nitrofurantoin in third trimester due to small risk of haemolytic anaemia in newborn².

**Amoxicillin/Clavulanate is generally safe in pregnancy (category B) except for an increasing incidence of necrotizing enterocolitis in preterm babies in babies born after premature rupture of membranes².

- Trace MSU C&S and manage accordingly¹.
- MSU C&S should be repeated 1-2 weeks post treatment ^{1,2}.
- To consult FMS if repeated MSU C&S post treatment remain positive.

	Recurrent UTI - Obtain renal profile and order for ultrasound KUB⁵. - Advise on prevention steps¹. - For those who have had no improvement after behavioural and personal hygiene measures and after completion of 2 courses of antibiotic (with eradication between episodes), consider continuous antibiotic prophylaxis for 3-6 months² (to discuss with FMS/refer ID): <table border="1"> <thead> <tr> <th>Oral Antibiotics</th><th>Dose</th></tr> </thead> <tbody> <tr> <td>Nitrofurantoin*</td><td>50-100mg ON (macrocrystals) OR 100mg ON (monohydrate/ macrocrystals)</td></tr> <tr> <td>Cephalexin</td><td>250mg ON</td></tr> </tbody> </table> <i>Adapted from National Antimicrobial Guideline 2019</i> <i>*Avoid nitrofurantoin in third trimester due to small risk of haemolytic anaemia in newborn².</i> - Post coital prophylaxis (single postcoital dose of Cephalexin 250mg PO) is reasonable to use in case of recurrent UTI that appear to be temporally related to sexual intercourse¹. Acute Pyelonephritis - Suspect acute pyelonephritis (AP) if patient presented with fever, flank pain, nausea, vomiting and/or costovertebral angle tenderness¹. - Obtain full blood count, renal function test, UFEME and MSU C&S¹. - If suspected AP, admit for further management¹. - Assess patient for^{4, 5}: - Dehydration - Maternal & fetal complications - Order for ultrasound KUB to exclude obstructive pyelonephritis^{1, 2}.	Oral Antibiotics	Dose	Nitrofurantoin*	50-100mg ON (macrocrystals) OR 100mg ON (monohydrate/ macrocrystals)	Cephalexin	250mg ON
Oral Antibiotics	Dose						
Nitrofurantoin*	50-100mg ON (macrocrystals) OR 100mg ON (monohydrate/ macrocrystals)						
Cephalexin	250mg ON						
Referral/ Shared Care	- Refer urologist when there is history or presence of calculi, symptoms of urinary obstruction, voiding dysfunction³. - Refer medical/ ID in cases of multidrug-resistant organism, persistent symptoms or persistently positive MSU C&S³.						
Delivery Plan	- Timing & mode of delivery as per obstetric indication. - Hospital delivery.						
Postnatal Care	Patients who have been found to have urinary stones with history of recurrent UTI or who have recurrent UTI while on suppressive antibiotic therapy should undergo a postpartum evaluation¹.						

REMARKS**Maternal and fetal complications of untreated ASB in pregnancy¹:**

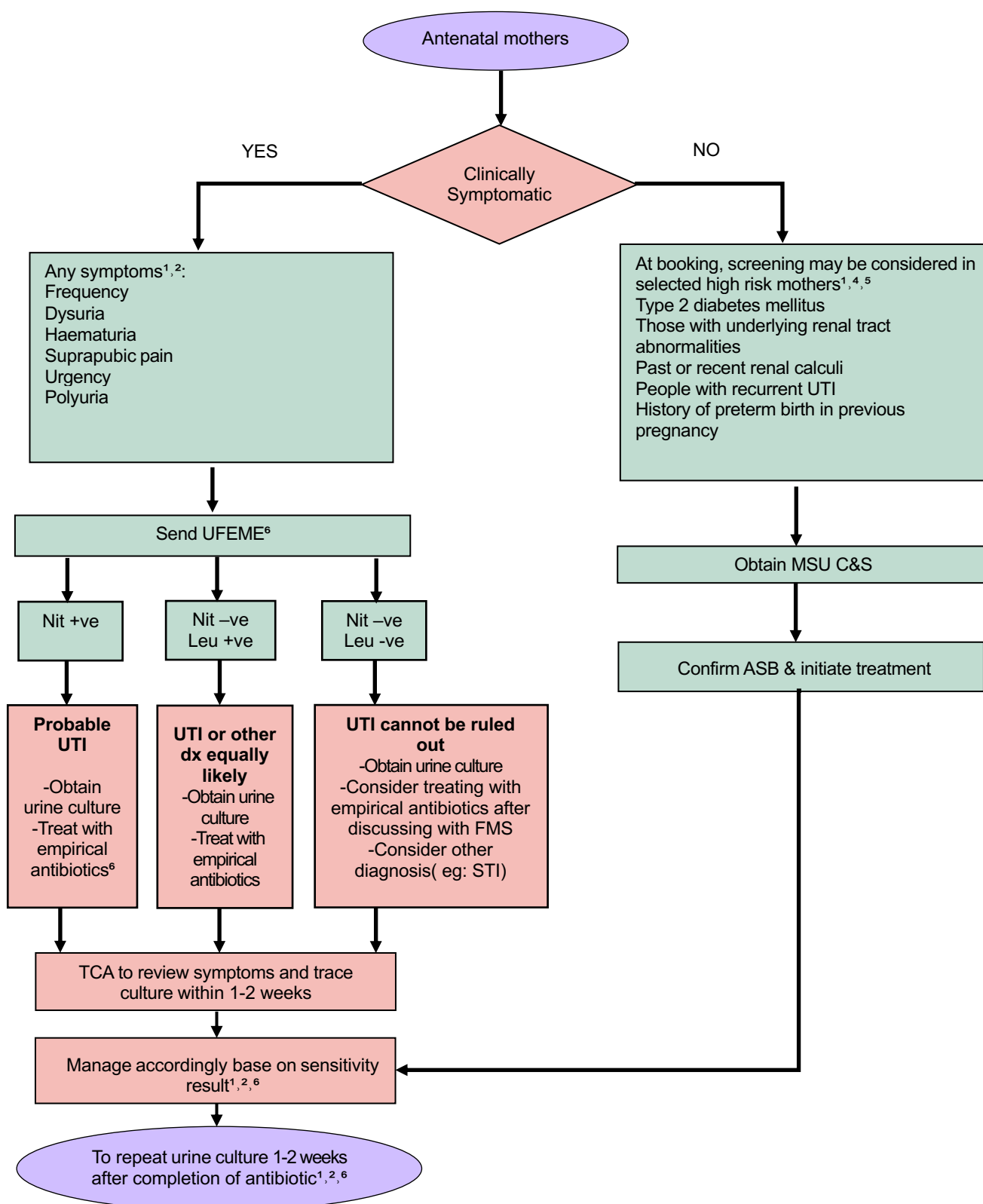
Maternal	Fetal
• Symptomatic acute cystitis • Acute pyelonephritis • Preeclampsia	• Low birth weight • Prematurity

Urine collection⁷:

- First-morning sample is preferred.
- Instructions to patients for proper mid-stream urine collection⁷:
 - Use clean container which has been labelled with your name.
 - Wash hands thoroughly with soap.
 - Cleanse down centre of vulva and dry with paper towel.
 - Do not collect the initial stream of urine since it may be contaminated with skin and urethral bacteria.
 - Void midstream portion into clean container until half full. Make sure your urine is sufficient.
 - Please don't add tap water into your urine.
 - Carefully screw cap on container to make sure no leak.
 - Wash your hands again.
 - Send your sample to lab personnel within 2 hours after collection because urine will shift to alkaline (bacteria can change urea to ammonia) if exposed in room temperature for too long.
 - Tell your doctor if you:
 - have been drinking too much water or taking diuretics (avoid diluted urine).
 - have taken any food that can change colour of the urine such as blackberries, dragon fruit, beets or certain medicine such as Vitamin B, phenazopyridine (Pyridium), rifampin dan phenytoin (Dilantin).
 - Menstruating or close to starting your menstrual period.

APPENDIX

Figure 1: Management of Urinary Tract Infection in Pregnancy



Adapted and modified from National Antimicrobial Guideline 2019

REFERENCES

1. Consensus Guidelines on the Management of Urinary Tract Infections in Pregnancy, 2021
2. National Antimicrobial Guideline, 2019
3. AAFP. Common questions about recurrent urinary tract infections in women, 2016
4. Joanna M-R et al. Urinary tract infections in pregnancy: old and new unresolved diagnostic and therapeutic problems. Arch Med Sci 2015; 11(1):67-77.
5. South Australian Perinatal Practice Guideline. Urinary tract infection in pregnancy, 2017
6. ACOG. Urinary Tract Infections in Pregnant Individuals, 2023
7. <http://www.myhealth.gov.my/en/urine-test-strip/>
8. AAFP. Urinalysis: A Comprehensive Review, 2005
9. Kacmaz B, Cakir O, Biri A: Evaluation of rapid urine screening tests to detect asymptomatic bacteriuria in pregnancy. Jpn J Dis 2006, 59:261–263

10.2 Group B Streptococcus in Pregnancy

PHASE	ASSESSMENT AND MANAGEMENT															
Definition	GBS is recognised as the most frequent cause of severe early-onset infection in newborn. GBS is present in the bowel flora of 20–40% of adults (colonisation) and those who are colonised are called ‘carriers’².															
Prepregnancy Care & Family Planning	Universal bacteriological screening is not recommended^{1,2}.															
Antenatal Care	Management of women with history of GBS in previous pregnancy¹ - To ascertain history of previously affected baby (GBS sepsis, both early and late onset) - Positive history - Intrapartum antibiotic prophylaxis (IAP) will be required - Negative history - For GBS screening (high vaginal swab) at RME 2, IAP will only be required for patients with positive results Management of women with proven GBS infection GBS bacteriuria/UTI - Treat antenatally with oral antibiotics (refer <i>Section 10.1: Urinary Tract Infection</i>) - Repeat urine C&S 2 weeks post treatment - IAP will still be required even though GBS has been eradicated GBS cultured from High Vaginal Swab (symptomatic) - Treat antenatally with oral antibiotics¹. - GBS remains susceptible to the beta-lactams. The preferred oral antibiotics should be based on drugs safety consideration and local resistance pattern ^{3,5,6}. - Penicillin is the antibiotics of choice for GBS in non-allergic individuals ^{2,4,5}. - Sensitivities to other antibiotics will only be determined for those allergic to penicillin³. Hence history of allergy must be stated in the order lab form. <table border="1"><thead><tr><th>Drugs</th><th>Dossage</th><th>Duration</th></tr></thead><tbody><tr><td>T. Amoxycillin</td><td>500mg TDS</td><td>5 -7 days</td></tr><tr><td>T. Penicillin V</td><td>500mg QID</td><td>5-7 days</td></tr><tr><td>T. Cephalexin</td><td>500mg QID</td><td>5-7 days</td></tr><tr><td>T. Erythromycin</td><td>800mg BD</td><td>5-7 days</td></tr></tbody></table> - For Penicillin allergy - May consider IAP by clinical decision of attending obstetrician. GBS cultured from High Vaginal Swab (asymptomatic) - Treatment during antenatal period is not required. - IAP will be required.	Drugs	Dossage	Duration	T. Amoxycillin	500mg TDS	5 -7 days	T. Penicillin V	500mg QID	5-7 days	T. Cephalexin	500mg QID	5-7 days	T. Erythromycin	800mg BD	5-7 days
Drugs	Dossage	Duration														
T. Amoxycillin	500mg TDS	5 -7 days														
T. Penicillin V	500mg QID	5-7 days														
T. Cephalexin	500mg QID	5-7 days														
T. Erythromycin	800mg BD	5-7 days														

Referral/ Shared Care	As per obstetric indication.
Delivery Plan	Mode and timing of delivery as per obstetric indication.
Postnatal Care	- Newborn of women with GBS should be referred to paediatric team. - Women with affected babies should be counselled regarding IAP for future pregnancies. - Breastfeeding should be encouraged irrespective of GBS status.

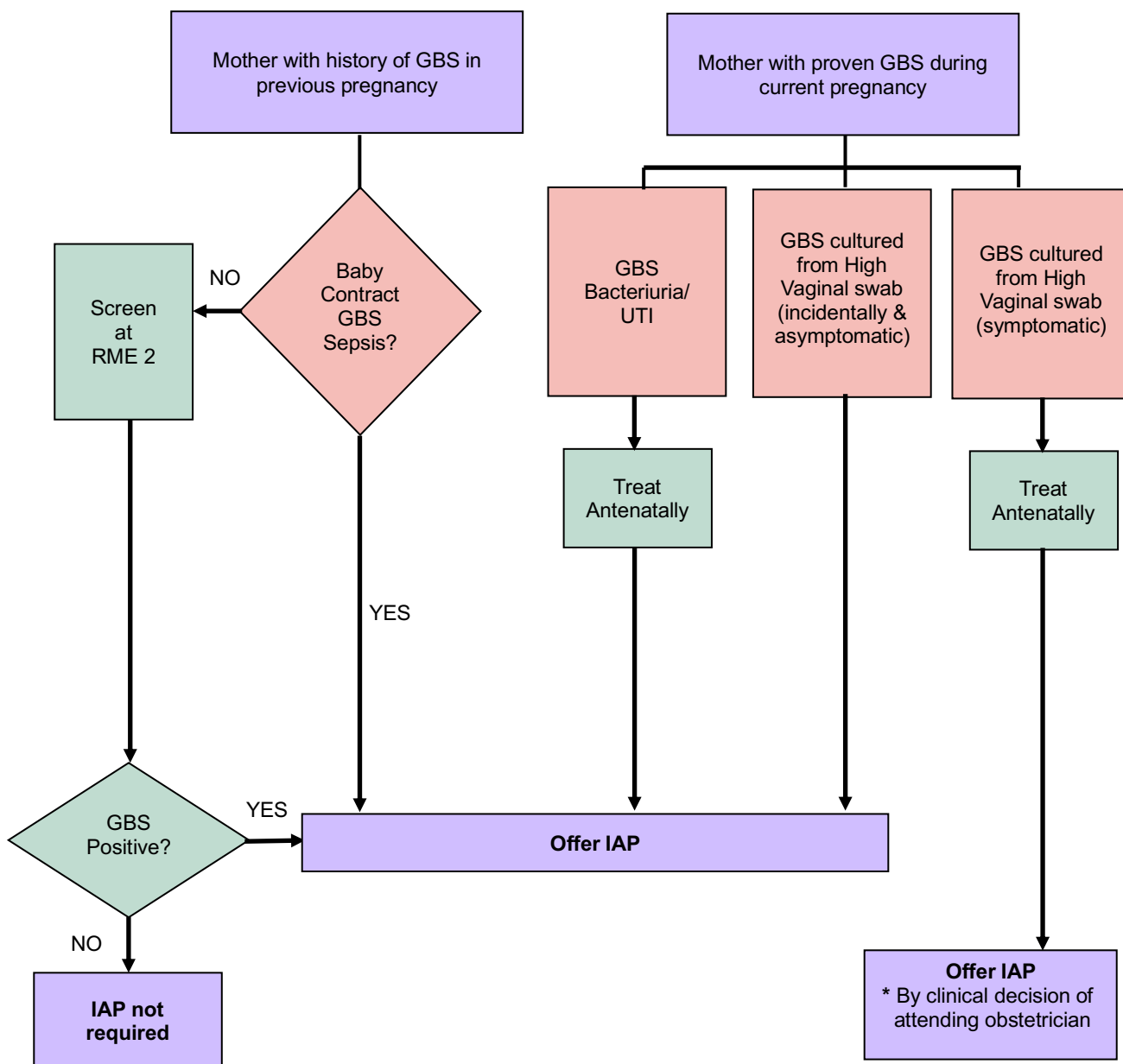
REMARKS

Clinical factors that are associated with increased risk of baby contracting **GBS sepsis**¹:

- Previous baby affected with GBS sepsis
- Maternal GBS carriage from bacteriological investigation e.g., urine or vaginal C&S
- Preterm birth
- Prolonged rupture of membranes
- Suspected intrapartum maternal infection including chorioamnionitis

APPENDIX

Figure 1: Management of GBS in Pregnancy



REFERENCES

1. Perinatal Care Manual 4th Edition; 2022
2. Royal College of Obstetricians & Gynecologists (Green Top Guideline No.36), September 2017
3. Group B Streptococcus Disease: AAP Updates Guidelines for the Management of At-Risk Infants *Am Fam Physician*. 2020;101(6):378-380
4. Asymptomatic GBS bacteriuria during antenatal visits: To treat or not to treat? By Kelly D. Rosenberger, DNP, WHNP-BC, CNM, FAANP; Amy Seibert, MS, RN; and Sara Hormig, DNP, AGACNP-BC
5. American Society for Microbiology: Guidelines for the Detection and Identification of Group B Streptococcus Updated: July 23, 2021 by Laura Filkins, PhD, D(ABMM), Jocelyn Hauser PhD, MLS(ASCP)CM, Barbara Robinson-Dunn, PhD, D(ABMM), FAAM, Robert Tibbetts, PhD, D(ABMM), F(CCM), Bobby Boyanton, MD, Paula Revell PhD, D(ABMM)
6. Local surveillance antibiotics susceptibility testing data from HSAH and HSB.

10.3 Retroviral Disease

PHASE	ASSESSMENT AND MANAGEMENT
Definition	Retroviral disease is caused by Human Immunodeficiency Virus (HIV) and management in pregnancy is aimed at reducing risk of vertical transmission.
Prepregnancy Care & Family Planning	- All HIV-positive women should be referred for prepregnancy counselling (refer <i>Section 1: Concept of Prepregnancy Care</i>). - Prepregnancy counselling for those who are keen to conceive: - Adherence to cART to achieve sustained undetectable viral load before attempting conception (2 recorded readings at least 3 months apart)¹. - STD screening for couples prior to conception. - Safe conception strategy: - ART for HIV-positive partner (Undetectable=Untransmissible) - Consider pre-exposure prophylaxis (PrEP) for HIV-negative partners of sero-discordant couple in situations where their HIV-positive partners have not achieved viral suppression yet or viral suppression status is not known. - Assisted reproductive techniques may be offered. - Women taking Dolutegravir who are trying to conceive or in the first trimester of pregnancy should be recommended to take folic acid 5mg OD². Contraception - Decisions of contraceptive methods should be discussed with patient based on WHO Medical Eligibility Criteria – in general, all contraceptive methods are safe with common cART used. - Efavirenz-based cART reduces efficacy of Etonogestrel (Implanon) and other progesterone-containing oral contraceptive pill. A reliable method of barrier contraception must be used in addition to hormonal contraceptives³. Vaccination - All HIV-positive women are encouraged to be vaccinated with COVID-19 vaccine, Hepatitis B (in non-immune persons), HPV (up to 26 years old), Influenza, and Pneumococcal vaccine¹. - Tdap is safe in pregnancy and is recommended for all adults whom 10 years or more have elapsed since completion of primary series¹.
Antenatal Care	At booking - Newly diagnosed women: - Notification - Screen partner - Baseline investigations: FBC/RP/LFT/UFEME/HBsAg/Anti-HCV Ab/RPR/CD4/Viral load¹ - To look for signs and symptoms of opportunistic infections - cART should be started immediately and continued lifelong regardless of CD4 count^{1,2}. - Preferred regime: Tenofovir (TDF) + Emtricitabine + Efavirenz

	○ In the event that RVD is diagnosed after 28 weeks of gestation – to discuss with ID physician regarding choice of ART. ▪ Preferred regime: Tenofovir (TDF) + Emtricitabine + Dolutegravir^{1,2}. ● Known case of RVD ○ Assess adherence to ART regime and to continue throughout pregnancy ○ cART should be started immediately for ART-naïve cases. ○ Baseline investigations: FBC/RP/LFT/UFEME/HBs Ag/AntiHCV Ab/RPR/CD4/viral load. Subsequent ANC visits ● Viral load should be repeated at 3 months after commencement of ART and repeated at 32-36 weeks of gestation for ART naïve cases¹. ● Monitor RP and LFT at week 4, 8, 12 upon initiation of cART and subsequently 4-6 monthly¹. ● OGTT at 24-28 weeks of gestation. ● Fetal surveillance as per obstetric indication.								
Referral/ Shared Care	● All women with RVD should be referred to FMS. ● Indications for referral to ID physician: ○ Newly diagnosed RVD after 28 weeks of gestation. ○ Detectable viral load 2-3 months after commencement of ART. ○ Usage of ART which is contraindicated in pregnancy (eg. tenofovir alafenamide). ○ Suspected treatment failure in women with known case of RVD. ○ Hep B/Hep C co-infection. ● Refer O&G clinic for shared care and decision on mode of delivery.								
Delivery Plan	Mode of delivery will be determined by viral load at 32-36 weeks^{1,2}. <table border="1"> <thead> <tr> <th>Viral load at 32-36 weeks</th><th>Mode of Delivery</th></tr> </thead> <tbody> <tr> <td><50 copies/mL</td><td>SVD</td></tr> <tr> <td>50-399 copies/mL</td><td>*PLCS recommended</td></tr> <tr> <td>>400 copies/mL</td><td>PLCS</td></tr> </tbody> </table> *PLCS: Pre-Labour Caesarean Section ● PLCS should take place between 38-39 weeks of gestation. ● Indications of intrapartum IV Zidovudine: ○ women with viral load copies >1000 copies/mL who present in labour or with ruptured membranes or who are admitted for planned PLCS. ○ women with RVD presenting in labour and has not received prior ART^{1,2}. ● All newborn of women with RVD should be admitted/reviewed by pediatricians and started on HIV prophylaxis immediately after delivery⁴.	Viral load at 32-36 weeks	Mode of Delivery	<50 copies/mL	SVD	50-399 copies/mL	*PLCS recommended	>400 copies/mL	PLCS
Viral load at 32-36 weeks	Mode of Delivery								
<50 copies/mL	SVD								
50-399 copies/mL	*PLCS recommended								
>400 copies/mL	PLCS								
Postnatal Care	● ART should be continued after delivery and adherence re-emphasized. ● Women should be given follow-up as per general population by FMS/ID clinic. ● Contraception – Refer <i>pre-pregnancy</i> column above								

	- Breastfeeding is not recommended due to risk of transmission (up to 14%). Refer nutritionist (PSP) for formula milk supplementation up till 2 years. - Newborn should be followed-up by paediatrician to assess status of HIV infection⁴. - HIV PCR should be done at: - Birth – 2 weeks 6 weeks of age 4-6 months of age - Immunization should be given as per national guideline with special precautions for live vaccine (e.g., BCG & MMR)⁴.
--	--

REMARKS

- Pneumocystis jiroveci* Pneumonia (PJP) prophylaxis may be initiated at any stage of pregnancy and continued throughout pregnancy¹.
- IPT can be delayed until postpartum period⁵.
- Cabergoline 1mg PO stat may be given for suppression of lactation².
- BCG may be given at birth for babies with maternal VL <50 copies/mL at 36 weeks gestation².
- Other live vaccines (e.g., MMR, rotavirus, varicella-zoster) should be omitted in HIV positive babies with severe immunosuppression⁴.
- PJP prophylaxis for infants should be initiated at 6 weeks of age until HIV status has been determined⁴.

REFERENCES

- Malaysian consensus guidelines on Antiretroviral Therapy 2022
- British HIV Association guidelines for the management of HIV in pregnancy and postpartum 2018 (2020 third interim update)
- European AIDS Clinical Society, Contraceptives & ARVs, (<https://eacs.sanfordguide.com/drug-drug-interactions-other-prescribing-issues/drug-drug-interactions/eacs-contraceptives-arvs-interactions>)
- Paediatric Protocols for Malaysian Hospitals 4th edition 2019
- Gupta A et al. Isoniazid preventive therapy in HIV-infected pregnant and postpartum women. *N Engl J Med* 2019 Oct 3; 381:1333. (<https://doi.org/10.1056/NEJMoa1813060>)

10.4 Syphilis

PHASE	ASSESSMENT AND MANAGEMENT													
Definition	Syphilis is a bacterial sexually-transmitted disease (STD) caused by <i>Treponema pallidum</i> that imposes risk of maternal-child transmission.													
Prepregnancy Care & Family Planning	- Women at risk of contracting STD should be screened for syphilis using RPR/RDT before planning for pregnancy. - Any woman with a history of fetal death after 20-weeks of gestation should be tested for syphilis¹. - Syphilis diagnosed prepregnancy should be adequately treated and monitored for treatment response before embarking on pregnancy. - Advise for contraception (refer MEC guidelines).													
Antenatal Care	Screening and diagnosis - All pregnant women should be screened for syphilis at booking using RPR/RDT. - If RPR testing is positive, a confirmatory test with TPPA should be sent. - Screening should be repeated at 28 weeks if the first screening at booking is negative². - In case of late booking (>28 weeks), screening should be done immediately at booking and repeated within 1 month². - If RDT is available, the use should be prioritized in high-risk mothers and late bookers >28 weeks, to fasten the diagnosis and treatment (refer <i>appendix figure 1</i>). If RDT is positive, treatment should be initiated in the same visit while waiting for the RPR result. - All newly diagnosed syphilis cases should be notified within seven days. Stages of Syphilis - Stages of syphilis infection should be determined through a thorough history and physical examination. - If timing of infection cannot be determined and the patient is asymptomatic, treat as late latent syphilis. <table><tr><th>STAGE</th><th>LATENCY</th><th>SYMPTOMS</th></tr><tr><td>Primary</td><td rowspan="3">Within 2 years</td><td>Non-itchy and painless genital ulcer (Chancre)</td></tr><tr><td>Secondary</td><td>Skin rash, fever, malaise, weight loss, joint pain, patchy hair loss, swollen lymph nodes</td></tr><tr><td>Early Latent</td><td>Asymptomatic</td></tr><tr><td>Late Latent</td><td>>2 years</td><td>Asymptomatic</td></tr></table>	STAGE	LATENCY	SYMPTOMS	Primary	Within 2 years	Non-itchy and painless genital ulcer (Chancre)	Secondary	Skin rash, fever, malaise, weight loss, joint pain, patchy hair loss, swollen lymph nodes	Early Latent	Asymptomatic	Late Latent	>2 years	Asymptomatic
STAGE	LATENCY	SYMPTOMS												
Primary	Within 2 years	Non-itchy and painless genital ulcer (Chancre)												
Secondary		Skin rash, fever, malaise, weight loss, joint pain, patchy hair loss, swollen lymph nodes												
Early Latent		Asymptomatic												
Late Latent	>2 years	Asymptomatic												

Treatment

STAGE	PREFERRED	ALTERNATIVE
Primary Secondary Early Latent	IM Benzathine Penicillin G, 2.4 MU single dose	For penicillin allergy: Desensitize and treat with penicillin as there are no proven alternatives. If failed desensitization: • Ceftriaxone 500mg IM OD for 10 days OR • Azithromycin 2g PO STAT
Late Latent	IM Benzathine penicillin, 2.4 MU weekly for 3 consecutive weeks (3 doses)	For penicillin allergy: Desensitize and treat with penicillin as there are no proven alternatives. If failed desensitization: • Erythromycin Ethyl Succinate 800mg PO QID for 28 days

** Adapted from Malaysian Guidelines Management of Sexually-Transmitted Infections Fifth Edition, Ministry of Health, 2024*

- Penicillin regimen is the only known effective treatment recommended during pregnancy.
- Pregnant women who have a history of penicillin allergy should be desensitized and treated with penicillin G¹. Discussion with dermatologist for inpatient desensitization should be done. Erythromycin and Azithromycin are not effective for syphilis. Ceftriaxone and other cephalosporins have limited data.
- If a pregnant woman does not return for the next dose on day 7, every effort should be made to contact her and link her to immediate treatment within 2 days to avoid retreatment¹.
- If a patient defaults to Benzathine Penicillin treatment by >9 days in between the weekly doses, the whole regime needs to be restarted¹.
- For patients who have been diagnosed and treated for syphilis pre-pregnancy, treatment may not be necessary in case of:
 - RPR titre remains low
 - no increment from prepregnancy titre
 - no risk of reinfection
 - asymptomatic
 However, this decision should be made after consulting an FMS.
- Sonographic fetal evaluation for congenital syphilis should be performed when syphilis is diagnosed during the second half of pregnancy.
- Patients and their partner should abstain from sexual activity or use condoms until 1 week after both have completed treatment.

Monitoring

- Monthly clinical and serological examination till delivery and thereafter follow up is as in non-pregnant patients².
- Majority of women will not achieve a fourfold decrease in titres before delivery, although this does not indicate treatment failure¹.

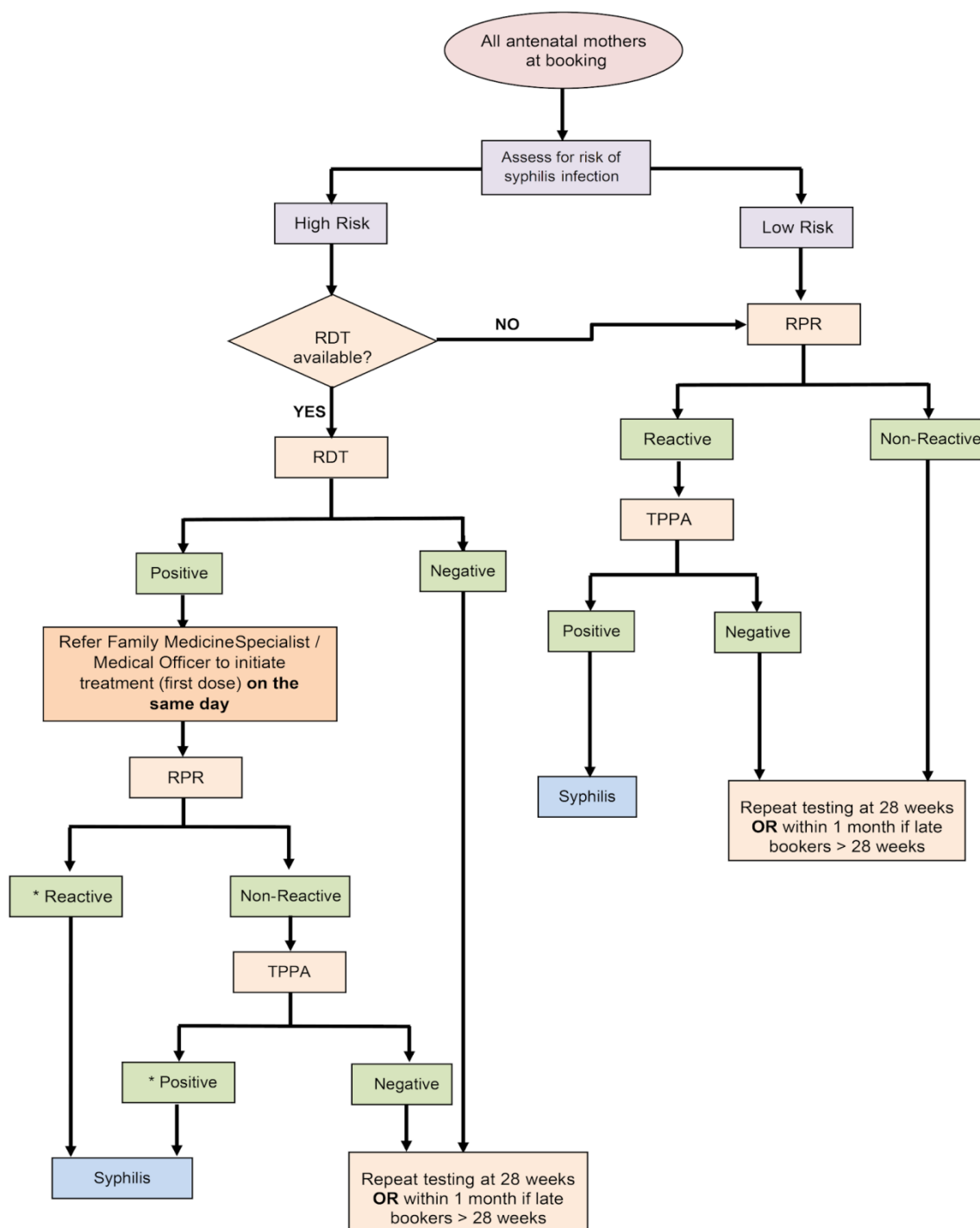
	• A fourfold increase in titre after treatment (e.g., from 1:8 to 1:32) that is sustained for >2 weeks is concerning for reinfection or treatment failure¹. Contact Tracing • Partner screening should be performed by sending RPR/RDT. • Epidemiological treatment with a single dose of IM Benzathine Penicillin G, 2.4 MU should be given to the partner on the same visit². • TCA partner within 1 week to review result: ○ If the partner is tested negative, the single dose of IM Benzathine penicillin previously given is adequate. ○ If the partner is tested positive for syphilis, treatment should be commenced according to the clinical staging of syphilis. • Alternative treatment option for partner with Penicillin allergy²: ○ Primary, Secondary, Early latent - Doxycycline 100mg PO BD for 14 days. ○ Late latent - Doxycycline 100mg PO BD for 28 days.
Referral/ Shared Care	• Refer FMS upon diagnosis. • Refer O&G at 28 weeks. • Refer Dermatologist for complicated syphilis.
Delivery Plan	• Delivery in hospital with specialist. • RPR titre must be performed for both mother and infant at the same time immediately postpartum to evaluate for congenital syphilis. • Mode and timing of delivery as per obstetric indication.
Postnatal Care	• Breastfeeding is generally not contraindicated. • Infant of a syphilis mother should be followed up by the Paediatric team. • Register PPC. • Postnatal follow up is as in non-pregnant patients with RPR at 3 months, 6 months and 12 months after completing treatment. Patients should be re-examined with RPR titre every 6 monthly until RPR negative or at serofast state².

REMARKS

- Criteria for adequate treatment:
 - Use of Penicillin based treatment.
 - Completed treatment at least before 30 days of delivery.
 - Resolution of clinical signs of infection.
 - Reduction of maternal titre > fourfold at delivery from the pre-treatment titre.
- If the mother is not adequately treated, the infant should be empirically treated as congenital syphilis.
- Sonographic abnormalities that might be present in congenital syphilis⁵:
 - Hepatomegaly
 - Placentomegaly
 - Polyhydramnios
 - Ascites
 - Abnormal middle cerebral arterial Doppler assessment
- Maternal risk for syphilis infection:
 - Sexual worker
 - HIV infected mother
 - Previous history of STD
 - History of multiple sexual partner
 - History of intrauterine death (IUD)
 - Premarital conception
 - Raped case
 - History of alcohol or substance abuse
 - Partner with HIV infection or STD infection
 - Other criteria according to assessment

APPENDIX

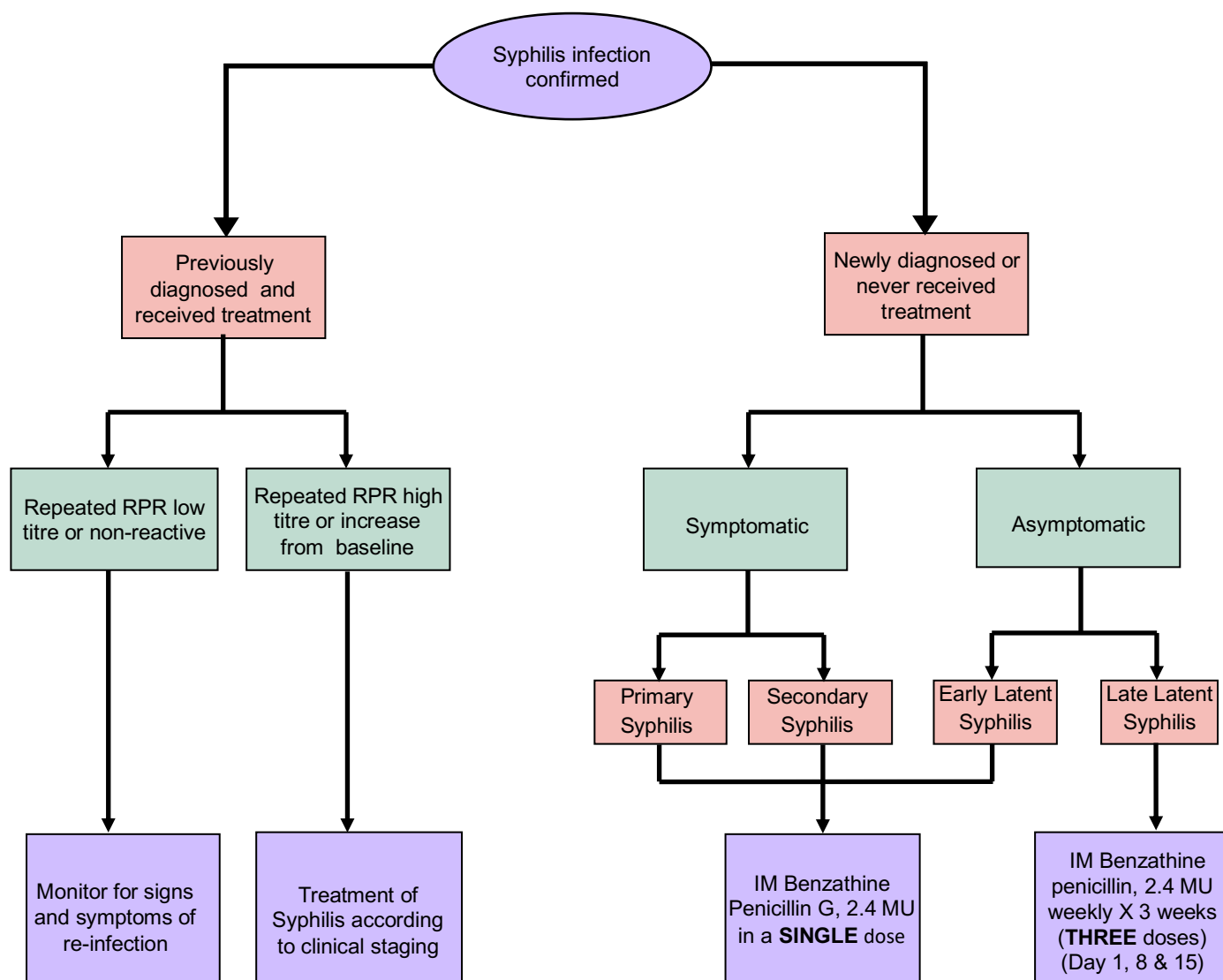
Figure 1: Flow Chart of Antenatal Syphilis Screening



* Continue treatment (second and third dose) according to stages of syphilis (refer Figure 2)

Adapted and modified from *Garis Panduan Pengukuhan Program Pencegahan Jangkitan HIV Dan Sifilis Dari Ibu-Ke-Anak*, Ministry of Health 2021 and *Surat Pekeliling Ketua Pengarah Kesihatan Malaysia Bil 15/2023 - Carta Alir Ujian Saringan Pengesanan Sifilis*

Figure 2: Treatment of Syphilis



REFERENCES

1. Sexually Transmitted Infections Treatment Guidelines, Centre for Disease Control and Prevention, 2021
2. Malaysian Guidelines Management of Sexually Transmitted Infections Fifth Edition, Ministry of Health, 2024
3. Garis Panduan Pengukuhan Program Pencegahan Jangkitan HIV Dan Sifilis Dari Ibu-Ke-Anak, Ministry of Health 2021.
4. Guidelines for the Management of Symptomatic Sexually Transmitted Infections, World Health organization, 2021
5. Rac, M. W. F., Bryant, S. N., McIntire, D. D., Cantey, J. B., Twickler, D. M., Wendel, G. D., & Sheffield, J. S. (2014). Progression of ultrasound findings of fetal syphilis after maternal treatment. *American journal of obstetrics and gynecology*, 211(4), 426.e1-426.e6. <https://doi.org/10.1016/j.ajog.2014.05.049>

10.5 Hepatitis B

PHASE	ASSESSMENT AND MANAGEMENT
Definition	Chronic Hepatitis B (CHB) is defined by the presence of Hepatitis B surface antigen (HBsAg) for at least six months.
Prepregnancy Care & Family Planning	• Register for PPC clinic. • All contraceptive methods are eligible. • For women with Hepatitis B intending to get pregnant: ○ Assess HBeAg, HBeAb, HBV DNA and LFT ○ Screen for Hepatitis C/HIV co-infections ○ Screen husband and family • To refer FMS/ Gastroenterology for pregnancy suitability and consideration for treatment.
Antenatal care	• Screening can be done either by Rapid Diagnostic Test (POCT) or immunoassay (lab-based). ○ If reactive, proceed with HBeAg, HBeAb and HBV DNA (refer <i>appendix figure 1</i>). Newly Diagnosed Hepatitis B • Thorough history and physical examination looking for CLD stigmata. • Investigations: ○ FBC, LFT, AST, RP, HBeAb, HBeAg ○ HBV DNA ○ Ultrasound HBS • Screen for HIV and HCV. • Assess for cirrhosis using APRI/FIB-4 score. • TCA 2-4 week to review results. • To notify within 7 days. • Monitor LFT every trimester. Known Case Hepatitis B • Investigations: ○ FBC, LFT, AST, RP • Monitor disease activity with HBeAb, HBeAg and HBV DNA (if not taken more than 6 months). • Assess for cirrhosis using APRI/FIB-4 score. • Ultrasound HBS for hepatoma surveillance (if not done within one year). • TCA 2-4 week to review results. • Monitor LFT every trimester. Prevention of mother-to-child transmission of Hepatitis B virus • Refer Gastroenterology for antiviral prophylaxis if HBV DNA >200 000 IU/ml or HBeAg positive. ○ Must be given at 28 – 32 weeks (if given more than 32 weeks may not be effective in preventing mother to child transmission). ○ Tenofovir disoproxil fumarate is the preferred antiviral.

	○ Monitor RP 1/12 post treatment. Fetal surveillance ● Fetal surveillance as per obstetric indications.
Referral/ Shared Care	● All cases of Hepatitis B should be referred to FMS upon diagnosis. ● Refer Gastroenterology/ MOPD for antiviral prophylaxis or treatment. ● Refer O&G at 3rd trimester for preparation for neonatal IVIG.
Delivery Plan	● Mode and timing of delivery are as per obstetric indication. ● Neonatal prophylaxis ○ Hepatitis B immunoglobulin should be given at birth within 12 hours post-delivery to all infants of mothers with Hepatitis B. ○ Hepatitis B vaccine should be given within 24 hours.
Postnatal Care	● Breastfeeding is not contraindicated. ● Monitor post-partum flare for all Hepatitis B cases up till 3 months (ALT and/or HBV DNA). ● Monitor baby's HBsAg, anti HBs at the age of 9 to 12 months. ● Refer for prepregnancy care clinic. ○ Contraception according to MEC. ○ Ensure continuity of care. ○ Monitor LFT and disease activity. ○ Advise for early booking next pregnancy.

REMARKS

APRI score

- Aspartate aminotransferase to platelet ratio (APRI) score uses two cut-off points for diagnosing specific fibrosis stages. Reported cut-off values for APRI for the detection of significant fibrosis and cirrhosis are as follows:
 - for significant fibrosis, low and high cut-offs for APRI are 0.5 and 1.5
 - for cirrhosis, low and high cut-offs for APRI are 1.0 and 2.0

Fibrosis-4 index

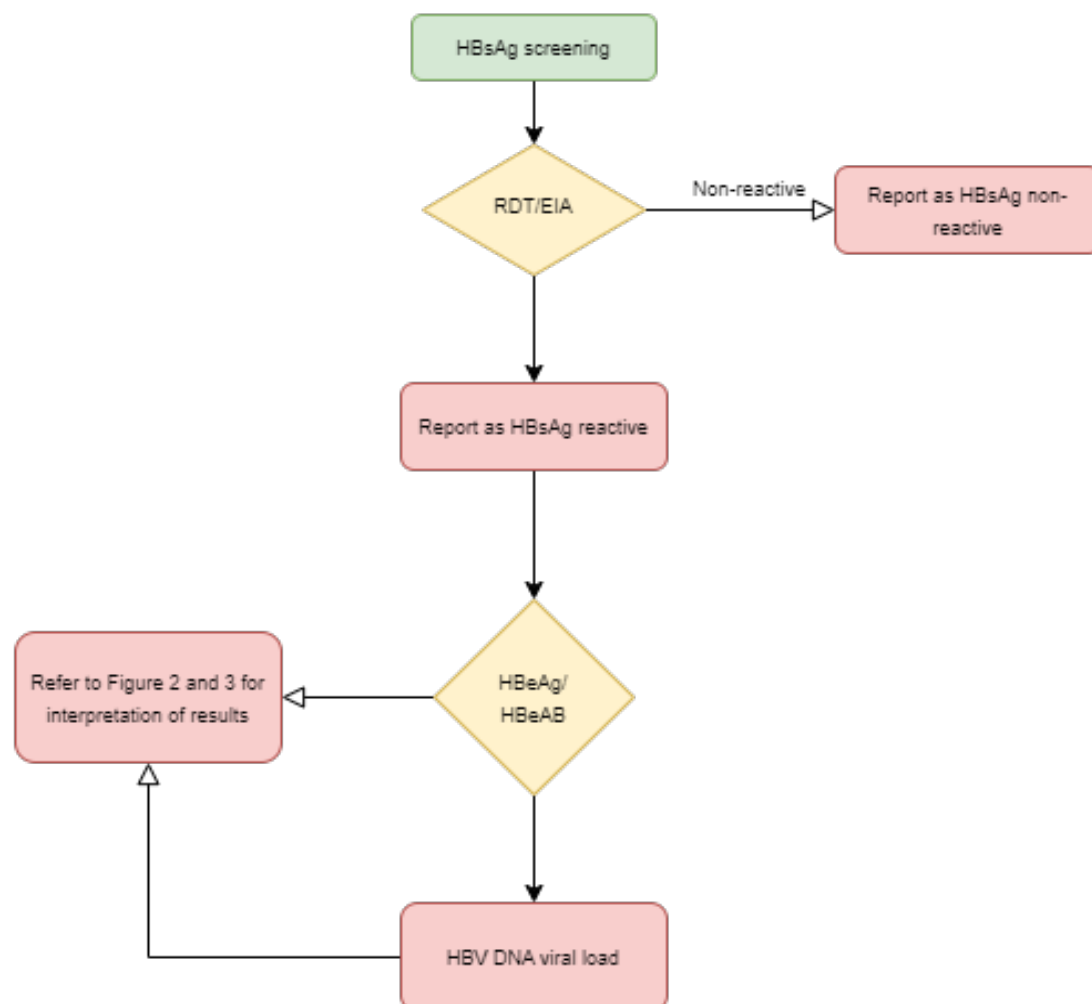
- A Fibrosis-4 index (FIB-4) <1.45 had a negative predictive value (NPV) of 94.7% to exclude advanced fibrosis or cirrhosis (F3 - F4) while a FIB-4 index >3.25 had a PPV of 82.1% to confirm the existence of advanced fibrosis or cirrhosis (F3 - F4).

Formula

- $$\text{APRI score} = \frac{\text{AST (IU/L)} / \text{AST (upper limit of normal) (IU/L)} \times 100}{\text{platelet (10}^9 \text{ /L)}}$$
- $$\text{FIB-4 index} = \frac{\text{age [(year) x AST (IU/L)]}}{\text{platelet (10}^9 \text{ /L) x } \sqrt{\text{ALT (IU/L)}}$$

APPENDIX

Figure 1: Laboratory Workflow for Diagnosis of Chronic Hepatitis B Infection



Adapted from CPG Management of Chronic Hepatitis B Infection in Adult 2022

Figure 2: Tests to Diagnose and Monitor Hepatitis B Virus Infection

HBsAg	Anti-HBc	IgM anti-HBc	Anti-HBs	HBeAg	HBeAb	HBV DNA	Interpretation
-	-	-	-	-	-	-	Not infected nor protected, suggest vaccination
+	-	-	-	-	-	-	Transient (up to 52 days) after vaccination
+	-	-	-	-	-	±	Early acute infection
+	+	+	-	+	-	+	Acute infection
-	+	+	±	-	±	±	Acute resolving infection
-	+	-	+	-	±	-	Recovered from past infection and immune
+	+	-	-	±	±	+	Chronic infection
-	+	-	-	-	-	±	False-positive; past infection; 'low level' chronic infection; or passive transfer of anti-HBc to an infant born to HBsAg-positive mother
-	-	-	+	-	-	-	Immune if the anti-HBs concentration is ≥ 10 IU/ml after vaccine series completion; passive transfer after hepatitis B immune globulin administration

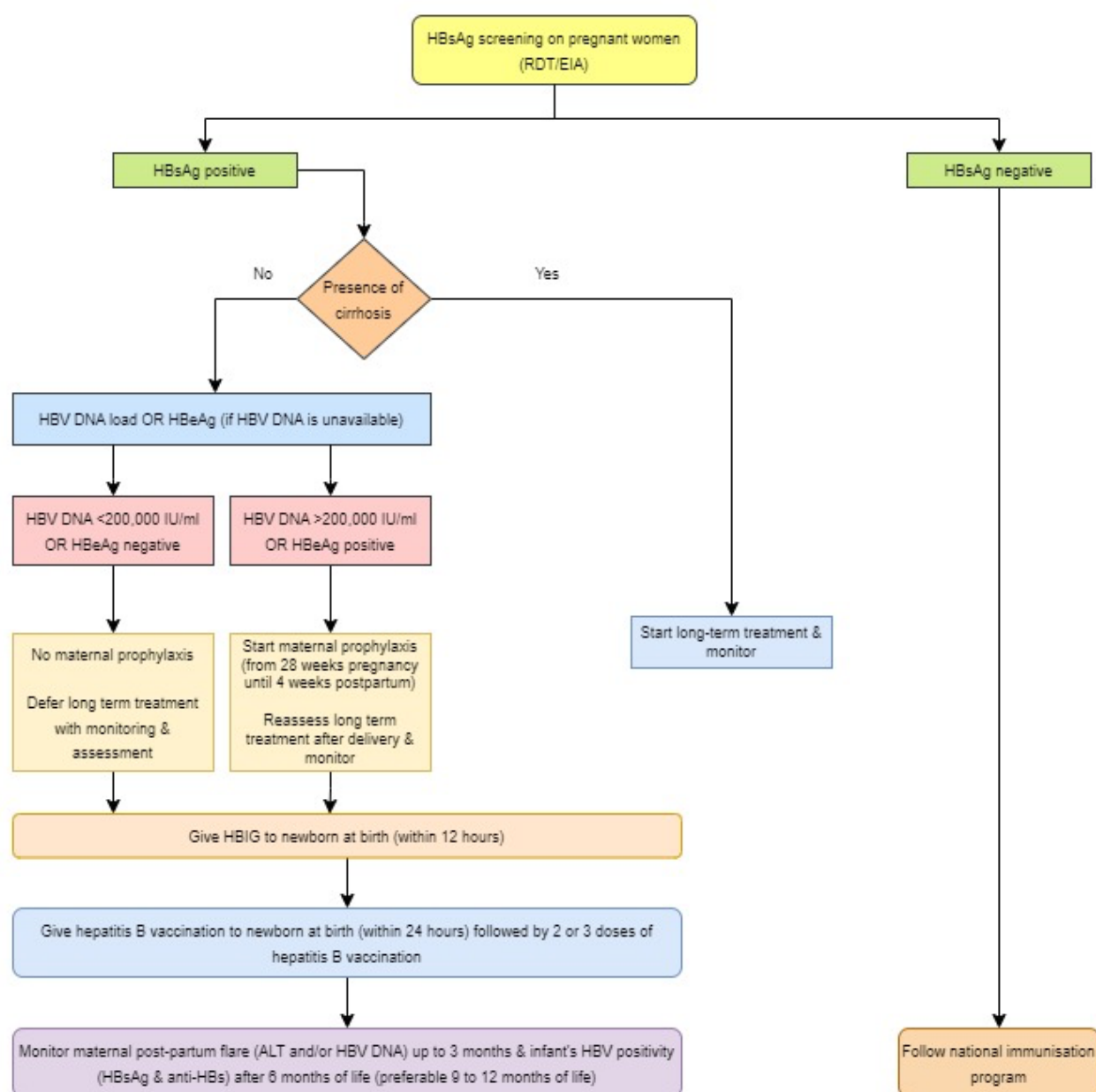
HBsAg = Hepatitis B surface antigen; Anti-HBc = Antibody to hepatitis B core antigen; IgM anti-HBc = Immunoglobulin M antibody to hepatitis B core antigen; Anti-HBs = Antibody to hepatitis B surface protein; HBeAg = Hepatitis B e antigen; HBeAb = Hepatitis B e antibody; HBV DNA = Hepatitis B virus deoxyribonucleic acid
 + implies positive; - implies negative; ± may be positive or negative

Figure 3: Natural History and Assessment of Patients with Chronic Hepatitis B Virus Infection

Investigation/ Terminology	HBeAg-positive		HBeAg-negative	
	Chronic infection	Chronic hepatitis	Chronic infection	Chronic hepatitis
HBsAg	High	High/intermediate	Low	Intermediate
HBeAg	Positive	Positive	Negative	Negative
HBV DNA	$>10^7$ IU/ml	$10^4 - 10^7$ IU/ml	$<2,000$ IU/ml	$>2,000$ IU/ml
ALT	Normal	Elevated	Normal	Elevated
Liver disease	None/minimal	Moderate/severe	None	Moderate/severe
Old terminology	Immune tolerant	Immune reactive HBeAg-positive	Inactive carrier	HBeAg-negative chronic hepatitis

Source: European Association for the Study of the Liver. EASL 2017 Clinical Practice Guidelines on the management of hepatitis B virus infection. J Hepatol. 2017;67(2):370-398.

Reference: Clinical Practice Guidelines Management of Chronic Hepatitis B in Adults Ministry of Health 2022

Figure 4: Prophylaxis and Treatment of Mother-To-Child Hepatitis B Virus Transmission

Adapted from CPG Management of Chronic Hepatitis B in Adult 2022

REFERENCES

1. CPG of Management of Chronic Hepatitis B in Adult 2022
2. 4th Edition Perinatal Care Manual 2021

10.6 Chicken Pox

PHASE	ASSESSMENT AND MANAGEMENT						
Definition	Primary Varicella Zoster Virus (VCV) infection is characterized by fever and a generalized painful, pruritic, vesicular rash.						
Prepregnancy Care & Family Planning	- Women of childbearing age are encouraged for varicella vaccination if they are seronegative (refer <i>remarks</i>). - Pregnancy should be avoided in the next 4 weeks after completing vaccine schedule.						
Antenatal Care	Maternal chickenpox - In general, hospitalization is not required. - Provide symptomatic treatment and emphasize on hygiene to prevent secondary bacterial infection of the lesions. - Educate women on prevention of disease transmission; they remain in infectious state until all lesions have crusted (usually about 5 days after onset of rash). - Antiviral therapy is based on onset of symptom. <table border="1"> <thead> <tr> <th colspan="2">Onset of symptom (gestation)</th></tr> <tr> <th>< 20 week</th><th>> 20 week</th></tr> </thead> <tbody> <tr> <td>Discuss risks and benefits of oral Acyclovir (refer <i>remarks</i>). Consider Acyclovir 800mg PO 5 times a day for 7 days if onset of rash is within 72 hours (Informed consent).</td><td>Treat with Acyclovir 800mg PO 5 times a day for 7 days if onset of rash is within 72 hours.</td></tr> </tbody> </table> - Intravenous Acyclovir may be required for severe disease.	Onset of symptom (gestation)		< 20 week	> 20 week	Discuss risks and benefits of oral Acyclovir (refer <i>remarks</i>). Consider Acyclovir 800mg PO 5 times a day for 7 days if onset of rash is within 72 hours (Informed consent).	Treat with Acyclovir 800mg PO 5 times a day for 7 days if onset of rash is within 72 hours.
Onset of symptom (gestation)							
< 20 week	> 20 week						
Discuss risks and benefits of oral Acyclovir (refer <i>remarks</i>). Consider Acyclovir 800mg PO 5 times a day for 7 days if onset of rash is within 72 hours (Informed consent).	Treat with Acyclovir 800mg PO 5 times a day for 7 days if onset of rash is within 72 hours.						
Referral/ Shared Care	- Indications for urgent referral to hospital (medical and O&G team): - Complications e.g pneumonia, encephalitis, hepatitis - Hemorrhagic or dense rash (>100 vesicles) - Presence of any risk factors or comorbidities below warrants consultation with O&G in case the need for admission, even in the absence of complications²: - Corticosteroids use in the preceding 3 months - Smokers - Chronic lung disease - In the second half of pregnancy - Refer O&G for detail scan if infection occur $\leq$ 20 weeks.						
Delivery Plan	- Hospital delivery. - Delay elective delivery for 7 days from onset of rash if possible. - Mode of delivery as per obstetric indication.						

Postnatal Care	• All newborn of women with varicella infection during pregnancy (regardless of gestation) should be referred to paediatric team after delivery. • Breastfeeding is encouraged except for women with varicella infection at the time of delivery. They should be isolated from their newborn and are encouraged to express breast milk for their babies. Direct breastfeeding is recommended only after all lesions have crusted³. • Advise for contraception (refer MEC guidelines).
-----------------------	--

REMARKS

- **Seronegative** is non-immune to varicella zoster; assessed from history of previous infection, varicella vaccination or serology testing if available.
- Maternal sequelae
 - Pneumonia (40% mortality rate)
 - Encephalitis
 - Hepatitis
- Fetal & neonatal complications:
 - Varicella can cause trans-placental infection of the fetus
 - Effect on the fetus depends upon the gestational age at which primary infection occurs

Gestational Age	Effect
< 20 weeks	Congenital Varicella Syndrome (0.4%-2%) ² • Skin scarring in dermatomal distribution • Eye defects (microphthalmia, chorioretinitis, cataracts) • Limb hypoplasia • Neurological abnormalities (microcephaly, cerebral cortical atrophy, mental retardation or dysfunction of bowel and bladder sphincters)
21-36 week	Low risk of fetopathy, good outcome
37 weeks to 7 days after delivery	Neonatal Varicella • In maternal infection (onset of rash) within 7 days before and 7 days after delivery, 17-30% develops neonatal varicella with lesions appearing 5-10 days of life. Mortality can be as high as 20% since these infants have not acquired maternal protecting antibodies³ • When maternal varicella occurs 7-21 days before delivery, lesions typically appear in the first 4 days of life and prognosis is good with no associated mortality. Mild course probably due to transplacental passage of maternal antibodies³

- Acyclovir is not licensed for use in pregnancy and the risks and benefits of its use should be discussed with patients:
 - Benefits: associated with faster healing of skin lesions and shorter duration of fever if initiated within 24 hour of symptom onset¹
 - Risks: cardiovascular effect, polydactyly, limb reduction & hypospadias²
 - Data are accumulating to suggest that there is no increase in the risk of major fetal malformation with acyclovir exposure in pregnancy¹
- Varicella zoster vaccination (attenuated live-virus vaccine) in pregnant women is **CONTRAINDICATED**

REFERENCES

1. Chickenpox in Pregnancy (Green-top Guideline No. 13), Royal College of Obstetricians & Gynaecologists (RCOG), 2015
2. Perinatal Care Manual, Release June 2022
3. Paediatric Protocol 2019

10.7 Anogenital Warts

PHASE	ASSESSMENT AND MANAGEMENT
Definition	Anogenital warts are common and 90% are caused by non-oncogenic Human Papilloma Virus Types 6 or 11.
Prepregnancy Care & Family Planning	- STI risk assessment, screening and treatment. - Promoting safe sex behaviours. - Preconception HPV Vaccination: - Anogenital warts can be prevented by HPV vaccination: 4vHPV and 9vHPV. - It can be administered regardless of the history of anogenital warts, abnormal pap smear test or HPV test, or anogenital precancerous lesions. - Condom usage can lower the chances of acquiring and transmitting HPV, however they may not offer full protection as HPV can infect areas which are not covered by condoms¹.
Antenatal Care	- Take medical, sexual history and assess risk for STI³ (≤ 25 years old, single parent, recent partner $<3/12$, multiple sexual partners, current partner with an STI). - Physical examination including abdominal examination, pelvic, genital, anal and speculum examination. - Diagnosis is usually made by visual inspection. - HPV testing is not recommended because the test result is not confirmatory and does not provide any guidance towards the management of anogenital warts¹. - Screen for HIV, Hep B, Hep C and Syphilis. - Treatment is not always warranted but aims to minimise the number of lesions present at delivery and reduce neonatal exposure to virus⁴. - Cryotherapy, excision, and ablative methods are safe options in pregnancy⁴. - Avoid podophyllotoxin and 5-fluoruracil because of possible teratogenic effects. - Imiquimod is not approved for use in pregnancy as no data is available. - Pregnant women should be counselled about the low risk of recurrent respiratory papillomatosis in their infants¹.
Referral/ Shared Care	- Refer Dermatology for management of genital warts. - Refer O&G if presence of genital warts at 36 weeks for timing and mode of delivery.
Delivery Plan	Caesarean Section is indicated for women with anogenital warts if the pelvic outlet is obstructed or if vaginal delivery would result in excessive bleeding ¹ .
Postnatal Care	Use of podophyllotoxin is not recommended in breastfeeding mother ⁴ .

REMARKS

- Anogenital warts can proliferate and become friable during pregnancy.
- Treatment of anogenital warts should be guided by wart size, number, and anatomical site; patient preference; cost of treatment; convenience; adverse effects; and provider experience.
- Caesarian section is not indicated to prevent vertical transmission of HPV infection⁴. The only serious, rare complication is recurrent respiratory papillomatosis in the infant, which occurs in about 4/100,000 births⁴.

REFERENCES

1. Workowski KA, Bachmann LH, Chan PA, Johnston CM, Muzny CA, Park I, Reno H, ZenilmanJM, Bolan GA. Sexually Transmitted Infections Treatment Guidelines, 2021. MMWR Recomm Rep. 2021 Jul 23;70(4):1-187
2. Malaysian Guideline in Management of Sexually Transmitted Infections Fifth Edition 2024.
3. Sugai S, Nishijima K, Enomoto T. Management of Condyloma Acuminata in Pregnancy: A Review. Sex Transm Dis. 2021 Jun 1;48(6):403-409.
4. UK National Guideline on the Management of Anogenital Warts 2015.
5. Lassi ZS, Imam AM, Dean SV, Bhutta ZA. Preconception care: preventing and treating infections. Reprod Health. 2014 Sep 26;11 Suppl 3(Suppl 3): S4.

10.8 Approach to Abnormal Vaginal Discharge

PHASE	ASSESSMENT AND MANAGEMENT				
Definition	- Vaginal discharge is a common condition among pregnant women. Abnormal vaginal discharge is characterized by change in colour, consistency, volume or odour and may be associated with symptoms such as itch, soreness, dysuria, pelvic pain, intermenstrual bleeding or postcoital bleeding¹. - Abnormal vaginal discharge is commonly caused by vaginitis and cervicitis. Vaginitis: Bacterial vaginosis, vulvovaginal candidiasis, and Trichomonas vaginalis. Cervicitis: Neisseria gonorrhoea and Chlamydia trachomatis.				
Prepregnancy Care & Family Planning	- STI risk assessment, screening, and treatment. - Promoting safe sex behaviours. - Provision of easily available contraception to plan their pregnancy until infection has been eradicated, controlled and/or their treatment regimen has been optimized². - IUCD should not be placed in the presence of active cervicitis.				
Antenatal Care	- Take medical, sexual history and assess risk for STIs^{3,4} (≤ 25 years old, single parent, recent partner $<3/12$, multiple sexual partners, current partner with an STI). - Physical examination including abdominal, pelvic and speculum examination. - Investigations³ (refer <i>appendix figure 2</i>) <table border="1"> <tr> <td>CERVICITIS (Cervical mucopurulent discharge, erosions, bleeding)</td><td> - Endocervical swab for gram stain - pus cells and intracellular gram-negative diplococci (Neisseria gonorrhoea). - Endocervical swab culture & sensitivity for Neisseria gonorrhoea. - NAAT test for N. gonorrhoea/ C. trachomatis (CTNG) if available. - Wet mount from posterior fornix for Trichomonas vaginalis. - Screen for HIV, Hep B, Hep C, Syphilis. </td></tr> <tr> <td>VAGINITIS (Vulval edema, erythema, or curd-like discharge)</td><td> - High vaginal swab from posterior fornix for gram stain for pus cells, clue cells and yeast. - High vaginal swab for C&S. - Wet mount from posterior fornix for Trichomonas vaginalis. - Proceed with endocervical swab for gram stain, C&S for N. gonorrhea, NAAT for CTNG and screen for HIV, Hep B, Hep C & Syphilis in the presence of risk factors for STI. </td></tr> </table> Treatment - In areas where laboratory facilities and investigations are limited, a modified syndromic approach (MSA) may be used³ (refer <i>appendix figure 1</i>).	CERVICITIS (Cervical mucopurulent discharge, erosions, bleeding)	- Endocervical swab for gram stain - pus cells and intracellular gram-negative diplococci (Neisseria gonorrhoea). - Endocervical swab culture & sensitivity for Neisseria gonorrhoea. - NAAT test for N. gonorrhoea/ C. trachomatis (CTNG) if available. - Wet mount from posterior fornix for Trichomonas vaginalis. - Screen for HIV, Hep B, Hep C, Syphilis.	VAGINITIS (Vulval edema, erythema, or curd-like discharge)	- High vaginal swab from posterior fornix for gram stain for pus cells, clue cells and yeast. - High vaginal swab for C&S. - Wet mount from posterior fornix for Trichomonas vaginalis. - Proceed with endocervical swab for gram stain, C&S for N. gonorrhea, NAAT for CTNG and screen for HIV, Hep B, Hep C & Syphilis in the presence of risk factors for STI.
CERVICITIS (Cervical mucopurulent discharge, erosions, bleeding)	- Endocervical swab for gram stain - pus cells and intracellular gram-negative diplococci (Neisseria gonorrhoea). - Endocervical swab culture & sensitivity for Neisseria gonorrhoea. - NAAT test for N. gonorrhoea/ C. trachomatis (CTNG) if available. - Wet mount from posterior fornix for Trichomonas vaginalis. - Screen for HIV, Hep B, Hep C, Syphilis.				
VAGINITIS (Vulval edema, erythema, or curd-like discharge)	- High vaginal swab from posterior fornix for gram stain for pus cells, clue cells and yeast. - High vaginal swab for C&S. - Wet mount from posterior fornix for Trichomonas vaginalis. - Proceed with endocervical swab for gram stain, C&S for N. gonorrhea, NAAT for CTNG and screen for HIV, Hep B, Hep C & Syphilis in the presence of risk factors for STI.				

	If CERVITIS is noted on speculum examination: - IM Ceftriaxone 500mg single dose (body weight>150kg, use 1g) PLUS - Azithromycin 1g PO single dose. If VAGINITIS is noted on speculum examination: - Metronidazole 400mg BD PO for 5-7 days. PLUS - Clotrimazole pessary 500mg single dose. - Below is the etiological treatment for specific organism if test results are available³: <table border="1"> <tr> <td>Vaginal candidiasis</td><td>Clotrimazole pessary 500mg single dose</td></tr> <tr> <td>Bacterial vaginosis</td><td>Metronidazole 400mg PO BD for 5-7 days</td></tr> <tr> <td>Trichomonas vaginalis</td><td>Metronidazole 400mg PO BD for 5-7days</td></tr> <tr> <td>Neisseria gonorrhoea</td><td>IM Ceftriaxone 500mg single dose PLUS Azithromycin 1g PO single dose</td></tr> <tr> <td>Chlamydia trachomatis</td><td>Azithromycin 1g PO single dose</td></tr> </table> - Test of cure is recommended only if the patient remains symptomatic following treatment or if symptoms recur. - Partner management includes³: - Contact tracing - Consider epidemiological treatment for: - Partners of women who had received MSA for cervicitis - Partners of women with confirmed N.gonorrhea, C. trachomatis or T. vaginalis infection - Sex partners should be instructed to abstain from condomless sexual intercourse for 7 days after they and their sex partners have been treated, and after resolution of symptoms³. - Notification of notifiable STIs eg. Gonorrhoea, HIV, Syphilis.	Vaginal candidiasis	Clotrimazole pessary 500mg single dose	Bacterial vaginosis	Metronidazole 400mg PO BD for 5-7 days	Trichomonas vaginalis	Metronidazole 400mg PO BD for 5-7days	Neisseria gonorrhoea	IM Ceftriaxone 500mg single dose PLUS Azithromycin 1g PO single dose	Chlamydia trachomatis	Azithromycin 1g PO single dose
Vaginal candidiasis	Clotrimazole pessary 500mg single dose										
Bacterial vaginosis	Metronidazole 400mg PO BD for 5-7 days										
Trichomonas vaginalis	Metronidazole 400mg PO BD for 5-7days										
Neisseria gonorrhoea	IM Ceftriaxone 500mg single dose PLUS Azithromycin 1g PO single dose										
Chlamydia trachomatis	Azithromycin 1g PO single dose										
Referral/ Shared Care	As per obstetric indication.										
Delivery Plan	As per obstetric indication.										
Postnatal Care	Newborns of mothers with STIs should be referred to paediatric team for assessment ⁶ .										

REMARKS

- Normal physiological discharge tends to be clearer with stretchable consistency around ovulation and becomes thicker and slightly yellow during luteal phase. It should not be associated with symptoms such as itchiness, redness, swelling and does not have strong odour¹.
- Single high dose of metronidazole is associated with gastrointestinal side effects and higher failure rate, especially if partners are not treated concurrently³.
- Pelvic inflammatory disease in pregnancy is associated with an increase in both maternal and fetal morbidity therefore hospitalization is recommended³.
- At least 50% of women with gonococcal infection of the cervix are asymptomatic and most women with chlamydial infection are asymptomatic⁴.

APPENDIX

Figure 1: Flowchart for the Syndromic Approach of Management of Women Presenting with Vaginal Discharge Based on Speculum Examination.

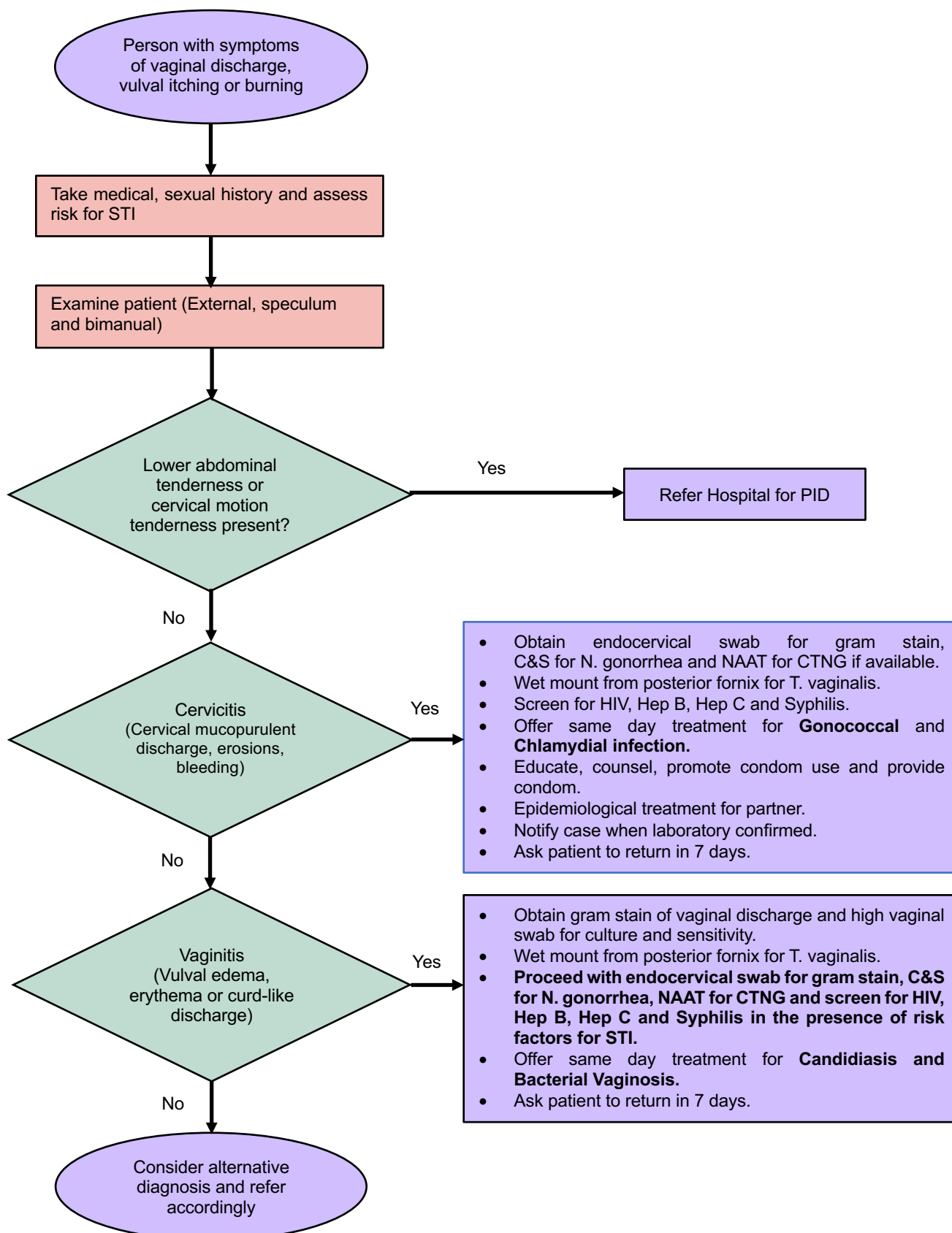


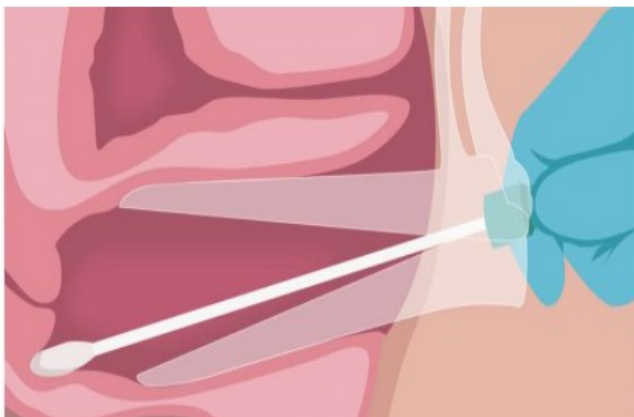
Figure 2: Taking cervical and vaginal swab

I. Endocervical swab:



1. With the speculum in situ, pass the tip of the swab through the speculum to the cervical os.
2. Insert swab gently into the cervical os.
3. Rotate the swab for 10-15 seconds in the endocervix.
4. Remove the swab and insert into tube.

II. High vaginal swab:



1. With the speculum in situ, pass the tip of the swab through the speculum to the posterior fornix of the vagina.
2. Rotate the swab for 10-15 seconds in the posterior fornix.
3. Remove the swab and insert into tube.

Source of photos: Google (free images)

REFERENCES:

1. Sim M, Logan S, Goh LH. Vaginal discharge: evaluation and management in primary care. Singapore Med J. 2020 Jun;61(6):297-301.
2. Lassi ZS, Imam AM, Dean SV, Bhutta ZA. Preconception care: preventing and treating infections. Reprod Health. 2014 Sep 26;11 Suppl 3(Suppl 3): S4.
3. Malaysian Guidelines in Management of Sexually Transmitted Infections Guide, Fifth Edition 2024.
4. Guidelines for the management of symptomatic sexually transmitted infections. Geneva: World Health Organization; 2021. Licence: CC BY-NC-SA 3.0 IGO
5. Perinatal care manual 4th Edition
6. Workowski KA, Bachmann LH, Chan PA, Johnston CM, Muzny CA, Park I, Reno H, Zenilman JM, Bolan GA. Sexually Transmitted Infections Treatment Guidelines, 2021. MMWR Recomm Rep. 2021 Jul 23;70(4):1-187

10.9 Approach to Vaginal Ulcers

PHASE	ASSESSMENT AND MANAGEMENT						
Definition	- Common causes of vaginal ulcers: - Genital herpes (<i>Herpes Simplex Type 1 & 2</i>) - Syphilis (<i>Treponema pallidum</i>) - Chancroid (<i>Hemophilus ducreyi</i>) - Lymphogranuloma venereum (<i>Chlamydia trachomatis</i> serovars L1, L2 and L3)¹.						
Prepregnancy Care & Family Planning	- STI risk assessment, screening, and treatment. - Promote safe sex behavior. - Provision of easily available contraception until infection has been fully eradicated².						
Antenatal Care	- Take medical, sexual history and assess risk for STI. (≤ 25 years old, single parent, recent partner $<3/12$, multiple sexual partners, current partner with an STI). - Physical examination including genital and anal region. - Diagnosis is often made clinically (refer <i>appendix figure 1</i>) - Screen for HIV, Hep B, Hep C and Syphilis. - Treatment of ulcers is based on clinical description and morphology of the ulcers. However, the following investigations can be done for definitive diagnosis, whenever available: <table border="1"> <tr> <td>Chancroid</td><td> - Gram stain of ulcer base or pus aspiration from bubo- Gram negative coccobacilli with “school of fish” appearance. - Culture of ulcer base – using Amies transport media - PCR – multiplex PCR detecting <i>H. ducreyi</i>, <i>T. pallidum</i> and <i>HSV</i> direct from genital ulcer specimen. </td></tr> <tr> <td>LGV</td><td> - NAAT using genital or extragenital specimens - detection of <i>C. trachomatis</i> </td></tr> <tr> <td>Genital Herpes</td><td> - HSV nucleic acid by NAAT – from vesicular fluid - Tzank smear – from base of ulcer - Viral culture – traditionally gold standard - Type specific serological test – take 8-12 weeks to develop following primary infection. </td></tr> </table> Management Primary Syphilis Refer <i>Section 10.4: Syphilis</i>. Chancroid - Refer <i>remarks</i> for diagnostic criteria. - Notify.	Chancroid	- Gram stain of ulcer base or pus aspiration from bubo- Gram negative coccobacilli with “school of fish” appearance. - Culture of ulcer base – using Amies transport media - PCR – multiplex PCR detecting <i>H. ducreyi</i>, <i>T. pallidum</i> and <i>HSV</i> direct from genital ulcer specimen.	LGV	NAAT using genital or extragenital specimens - detection of <i>C. trachomatis</i>	Genital Herpes	- HSV nucleic acid by NAAT – from vesicular fluid - Tzank smear – from base of ulcer - Viral culture – traditionally gold standard - Type specific serological test – take 8-12 weeks to develop following primary infection.
Chancroid	- Gram stain of ulcer base or pus aspiration from bubo- Gram negative coccobacilli with “school of fish” appearance. - Culture of ulcer base – using Amies transport media - PCR – multiplex PCR detecting <i>H. ducreyi</i>, <i>T. pallidum</i> and <i>HSV</i> direct from genital ulcer specimen.						
LGV	NAAT using genital or extragenital specimens - detection of <i>C. trachomatis</i>						
Genital Herpes	- HSV nucleic acid by NAAT – from vesicular fluid - Tzank smear – from base of ulcer - Viral culture – traditionally gold standard - Type specific serological test – take 8-12 weeks to develop following primary infection.						

	• Treatment^{3,4} <table border="1"> <tr> <th>Preferred</th><th>Alternative</th></tr> <tr> <td>Azithromycin 1g PO single dose</td><td>IM Ceftriaxone 250mg single dose OR EES 800mg PO TDS for 7 days</td></tr> </table> • Analgesic PRN. • Fluctuant buboes- Needle-aspirate from adjacent healthy skin or I&D. • Treat partners with recent exposure; 10 days prior to patient's symptoms onset. • Avoid unprotected sexual intercourse until they and their partners have completed treatment and follow-up. • Reexamine 3-7 days after initiation of therapy. If treatment was successful, ulcers should improve symptomatically within 3 days and re-epithelization occurs within 7 days. 3. Lymphogranuloma Venerum (LGV) • Treatment^{3,4} ○ Azithromycin 1g PO weekly for 3 weeks OR EES 800mg PO QID for 21 days. • Fluctuant buboes- aspirate through healthy adjacent skin. • Surgical incision is not recommended due to potential complication such as chronic sinus formation. • Sex partner within the past 60 days should be evaluated and treated. ○ Treat symptomatic partners with Doxycycline 100mg PO BD for 21 days. ○ Treat asymptomatic partners empirically with Doxycycline 100mg PO BD for 7 days. 4. Genital Herpes • Physical supportive measures^{3,5} ○ saline bathing, analgesia (paracetamol), local anesthetics (lidocaine 2% gel). • Psychological support. • Regular review to ensure improvement. • Specific antiviral treatment. a) First episode of genital herpes^{3,5} • First or second trimester acquisition (until 27+6 weeks) ○ Treatment ▪ Acyclovir 400mg PO TDS for 7-10 days ▪ Alternative: Valacyclovir 500mg PO BD for 7-10 days • Third trimester acquisition (from 28 weeks onwards) ○ Treatment ▪ Acyclovir 400mg PO TDS ▪ Continue treatment till delivery (suppressive therapy) b) Recurrent genital Herpes • Treatment	Preferred	Alternative	Azithromycin 1g PO single dose	IM Ceftriaxone 250mg single dose OR EES 800mg PO TDS for 7 days
Preferred	Alternative				
Azithromycin 1g PO single dose	IM Ceftriaxone 250mg single dose OR EES 800mg PO TDS for 7 days				

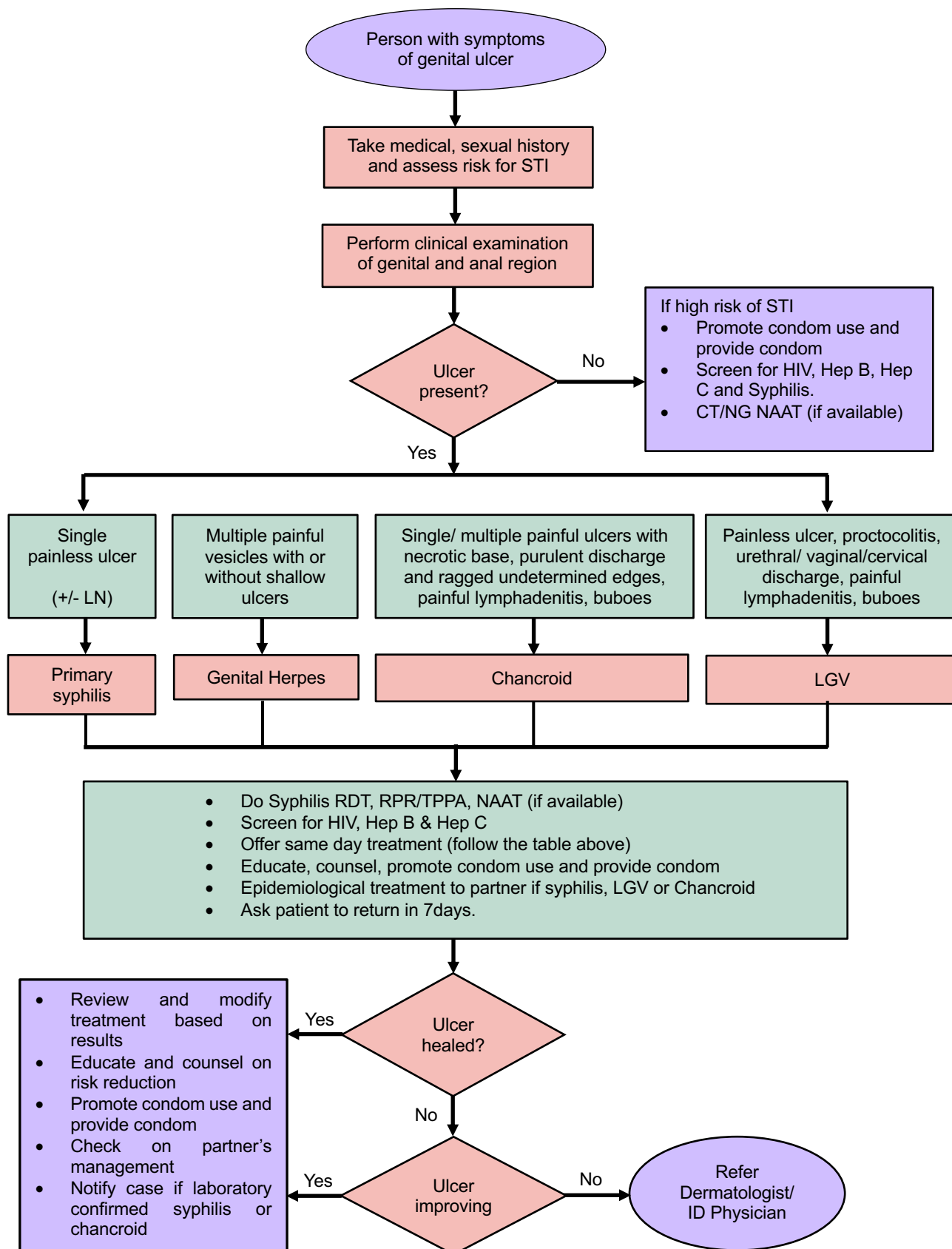
	○ Majority of recurrent episodes of genital herpes are short-lasting and resolve within 7-10days without antiviral treatment. Supportive treatment measures will usually suffice. ○ Daily suppressive Acyclovir 400mg PO TDS can be considered from 36 weeks of gestation till delivery.
Referral/ Shared Care	● Refer O&G for mode and timing of delivery in the event of³: ○ First episode of genital herpes in third trimester ○ Recurrent genital herpes in third trimester ● Hospitalization required for urinary retention, meningism, and severe constitutional symptoms³.
Delivery Plan	● First episode of genital herpes in first and second trimester: ○ Provided that delivery does not ensue within the next 6 weeks, the pregnancy should be managed expectantly, and vaginal delivery is anticipated³. ● First episode genital herpes in third trimester: ○ Caesarean Section is recommended³. ● Recurrent genital herpes: ○ Vaginal delivery should be anticipated³.
Postnatal Care	● All neonates of women with vaginal ulcers should be referred to paediatric team upon delivery. ● Parents should be warned to report any early sign of infection such as poor feeding, lethargy, fever, or any suspicious lesions.

REMARKS

- DO NOT use doxycycline and quinolones (e.g., ciprofloxacin) in pregnancy^{3,4}.
- Probable diagnosis of chancroid can be made if all the following criteria are met (CDC):
 - The patient has one or more painful genital ulcers.
 - The clinical presentation, appearance of genital ulcers, and if present, the presence of lymphadenopathy is typical for chancroid.
 - The patient has no evidence of *T. Pallidum* infection by darkfield examination or NAAT (i.e., ulcer exudate or serous fluid) by serological tests for syphilis performed at least 7-14 days after the onset of ulcers.
 - HSV-1 or HSV-2 NAAT or HSV culture performed on the ulcer exudates or fluid negative.
- Acyclovir is not licensed for use in pregnancy but is considered safe and has not been associated with an increased incidence of birth defects⁵.
- The risk of neonatal transmission of HSV is very high at 41% in those patients developing genital herpes within 6 weeks of expected delivery⁵.
- Rarely, congenital herpes may occur as a result of transplacental intrauterine infection.
- In recurrent genital herpes, the risk of neonatal herpes is low, even if lesions are present at the time of delivery (0-3% for vaginal delivery).
- It can be difficult to distinguish clinically between primary and recurrent genital HSV infection, as in up to 15% of cases where a woman presents with a first episode of clinical HSV infection may be a recurrent infection. Thus, the plan of delivery should be based on the assumption that all first episode lesions are primary genital herpes³.

APPENDIX

Figure 1: Flow Chart for Syndromic Approach to Management of Women Presenting with Genital ulcer



Types of Genital Ulcers

Primary Syphilis

Chancre



Solitary and non-tender indurated base

Chancre



Perianal ulcer

Genital Herpes



Multiple painful vesicles with or without shallow ulcers

Chancroid



Single/ multiple painful ulcers with necrotic base, purulent discharge, ranged undetermined edges.

LGV



Tender Bubo with groove sign

LGV



Painless ulcer

Source of photos: Google (free images)

REFERENCES

1. Roett MA. Genital Ulcers: Differential Diagnosis and Management. Am Fam Physician. 2020 Mar 15;101(6):355-361.
2. Lassi ZS, Imam AM, Dean SV, Bhutta ZA. Preconception care: preventing and treating infections. Reprod Health. 2014 Sep 26;11 Suppl 3(Suppl 3): S4.
3. Malaysian Guidelines Management of Sexually Transmitted Infections Guidelines Fifth Edition 2024.
4. Sexually Transmitted infections Treatment Guideline 2021: Centre for disease Control And Prevention (CDC)
5. Management of Genital Herpes in Pregnancy. RCOG/BASHH 2014.
6. Obstetrics And Gynaecology Protocol State of Kedah 2019.

SECTION 11

NEUROLOGICAL DISORDERS

11.1 Epilepsy

PHASE	ASSESSMENT AND MANAGEMENT
Definition	A brain disorder that is characterised by recurrent, unprovoked seizures resulting from excessive neuronal discharge. Sudden, unexpected, witnessed, or unwitnessed, nontraumatic and non-drowning death in patients with epilepsy (SUDEP) is the most common cause of maternal mortality in women with epilepsy (WWE)¹.
Prepregnancy Care & Family Planning	Registration criteria for PPC • All WWE in reproductive age. Management • Assessment ○ Seizure and aura control ○ Medication adherence • Educate patients on ○ Importance of compliance to AEDs. ○ Risk of uncontrolled seizures and teratogenicity. ○ Risk of epilepsy in offspring was 26%, a 4-fold increase over estimated population risks. Genetic counselling may be beneficial⁴. • If plan to conceive ○ Aim seizure control at least 6 months before conception⁶. ○ Avoid use of sodium valproate ○ Folic acid 5mg daily supplementation at least 3 months prior to conception^{1,3,6}. ○ Refer neuromedical/medical. ○ Refer PPC Hospital ○ Early booking once pregnant. Contraception • Copper IUCD or the levonorgestrel-releasing intrauterine system (LNG-IUS) is the preferred method of long-acting reversible contraception (LARC). • If patient on enzyme inducing AEDs (refer <i>appendix figure 1</i>), certain contraceptive consideration should be as follows: ○ Medroxyprogesterone acetate injections are reliable method of contraception. IM Depo Provera at a dose of 150 mg should be given at a shorter interval, i.e., from 12 weeks to 10 weeks³ (in view of reduced efficacy with enzyme inducing AEDs). ○ Increased risk of hormonal contraceptives failure (e.g., combined oral contraceptive pills, progesterone-only pill, vaginal ring, etonogestrel implant) with enzyme inducing AEDs¹.

	▪ If opting for hormonal contraception, higher dose is required (at least 50mcg oestradiol). ▪ Progesterone-only pill is not recommended as a reliable contraception. ○ For emergency contraception, dose of levonorgestrel should be increased to 1.5mg and 750mcg PO 12 hours apart (3). <i>* Advise according to Medical Eligibility Criteria for Contraception Use, WHO 2015</i>
Antenatal Care	At booking • Folic acid 5mg daily continue to at least until the end of first trimester¹. • Maintain pre-existing AEDs if the seizure is well controlled. Assessment • Seizure control • Neurological examination • Investigations: FBC, LFT (depends on types of AEDs) • Routine TDM level monitoring is not recommended, although individual circumstances may be considered, e.g., suspicion of non-adherence, poorly controlled seizure, or suspect overdose^{1,6}. Antenatal follow-up • Assess seizure control and compliance to AEDs. • Advise to avoid triggers of seizures such as stress and sleep deprivation. • Watch for signs of depression, anxiety, and neuropsychiatric symptoms in mothers on AEDs¹. • Fetal surveillance: ○ For detailed scan at 18 to 24 weeks gestation. ○ Perform serial growth scan monthly from 28-week gestation.
Referral / Shared Care	• Early referral to FMS. • Refer physician/neuromedical. • Refer combine clinic for shared care. <i>*Early referral if uncontrolled seizures.</i>
Delivery Plan	• Timing and mode of delivery as per obstetric indications. • Hospital delivery. • Provide adequate analgesia. • Continue AED in labour.
Postnatal Care	Postnatal review • Notification of high-risk discharge. • MO review within 2 weeks post-delivery. • Continue AEDs. • Re-register PPC. • Provide neurology / medical clinic appointment. • Advise on safety issues and strategies to prevent accidental injury while caring for newborns with involvement of family members^{1,3,6}. ○ Nurse baby on the floor. ○ Use very shallow baby baths and do not bathe the baby unaccompanied. ○ Lay the baby down if there is a warning aura.

	○ Avoid co-sleeping with baby in parent's bed. ○ Avoid sleep deprivation and alcohol. Lactation ● Generally safe. ● Neonates need to be monitored for side effects of AEDs e.g., drowsiness, jitteriness and hypotonia.
--	---

REMARKS

- Seizure frequency in pregnancy^{1,3,6}:
 - 60% - no change
 - 30% - increase
 - 10% - decrease

*Risk greatest during labour (due to pain, emotional stress, and hyperventilation).
- Factors contributing to increased seizure frequency:
 - Fall in plasma drug concentration
 - Sleep deprivation
 - Poor compliance to antiepileptic drugs (AEDs)
 - Inappropriate reduction in AEDs
 - Vomiting in pregnancy
- First episode of seizures during pregnancy, other diagnosis must be considered and ruled out¹:
 - Eclampsia
 - Enlarging meningioma
 - Enlarging arteriovenous malformation
 - Ischaemic stroke
 - Cerebral venous or venous sinus thrombosis
 - Vasculitides
 - Subarachnoid hemorrhage

Effects of epilepsy and AEDs on pregnancy^{1,5}

a. **Mother** – increased risk of

- hypertensive disorders (37% higher odds),
- antepartum hemorrhage (49% higher odds),
- fetal growth restriction (26% higher odds),
- premature delivery (16% higher odds),
- caesarean delivery (40% higher odds).

**Phenytoin, carbamazepine, sodium valproate, lamotrigine and levetiracetam can cross the placenta*

b. **Fetus** – Major congenital malformation

Teratogenic effects of AEDs³

AED	FDA category	Reported major teratogenic effects
Valproate	X	Neural tube defects, cardiac defects, urogenital malformation.
Phenytoin	D	Cleft lip and palate, cardiac defects, Craniofacial defects, digital hypoplasia *Recent evidence suggests no increased risk.
Carbamazepine	D	Neural tube defects
Phenobarbitone	D	Cleft palate

Ethosuximide	C	Cleft palate
Lamotrigine	C	Oro-facial cleft
Levetiracetam	C	No increased risk

- Teratogenicity risks depend on types of AED and dose^{1,3}:
 - Monotherapy: 4-8% (compared with 1-3% in the general population)
 - Polytherapy: 15%
 - Combination of valproate, carbamazepine, and phenytoin: 50%
 - Valproate >1000mg daily: high risk for fetal malformation (>25%), 501-1000mg daily (10%)

Long-term neurodevelopmental outcomes of exposure to AEDs and maternal seizure in infants born to WWE⁶.

- Possible adverse impact on long-term neurodevelopment of the newborn following in utero exposure to sodium valproate (lower intelligence quotient).
- Based on limited evidence, in utero exposure to carbamazepine and lamotrigine does not appear to adversely affect neurodevelopment of the child.
- Very little evidence for levetiracetam and phenytoin.

AED and breastfeeding

- Phenytoin and valproate have very low concentration in breast milk due to their extensive protein binding properties.
- **Special precaution** should be taken in patient on AEDs with no protein binding e.g., levetiracetam and gabapentin which have nearly equivalent concentrations in breast milk and maternal serum (transfers into breast milk in clinically important amount).
- If AEDs are secreted in breast milk, the infant may become sedated or hypotonic if breastfed (occurring in 5-10% of babies). If this happens, breastfeeding can be reduced or supplemented with formula milk.

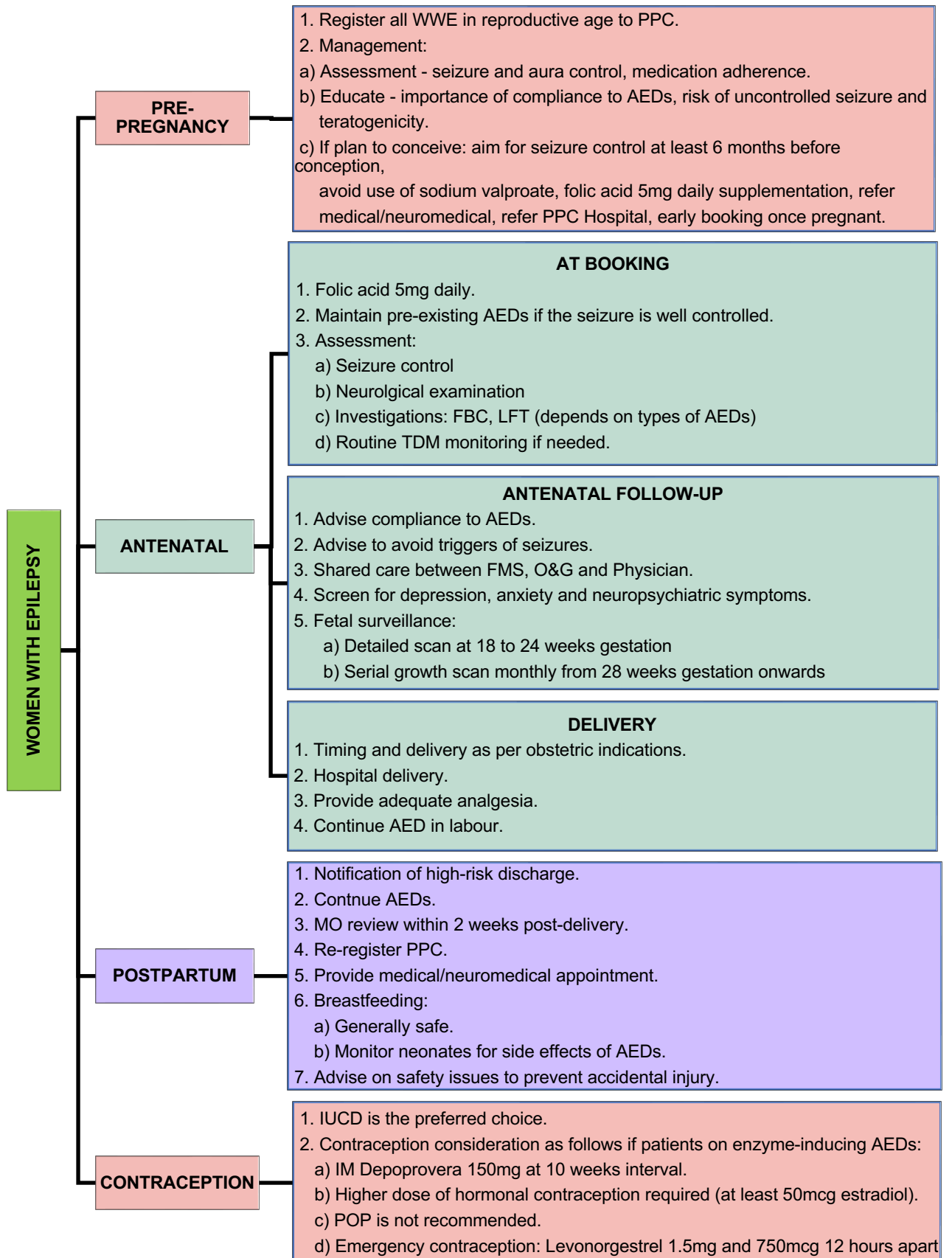
APPENDIX

Figure 1: Table on Antiepileptic Drug (AED) Effects

Strong inducer (Decrease efficacy of hormonal contraception)	Carbamazepine Phenobarbital Phenytoin Oxcarbazepine
Weak inducer (Potential to decrease efficacy of hormonal contraception)	Lamotrigine Topiramate
Non-inducers (No interaction)	Clonazepam Ethosuximide Gabapentin Levetiracetam Pregabalin Valproate

APPENDIX

Figure 2: Flow Chart Management of women with Epilepsy



REFERENCES

1. Green-top Guideline No. 68: Epilepsy in Pregnancy. *Royal College of Obstetricians & Gynecologists (RCOG)*. (2016).
2. Perinatal Care Manual Fourth Edition. Ministry of Health, Malaysia. (2020).
3. Consensus Guideline on The Management of Epilepsy. *Malaysian Society of Neurosciences*. (2017).
4. Helbig KL, Bernhardt BA, Conway LJ, Valverde KD, Helbig I, Sperling MR. Genetic risk perception and reproductive decision making among people with epilepsy. *Epilepsia*. Sep, **51**, 5. (2010).doi: 10.1111/j.1528-1167.2009.02507.x. PMID: 20163441
5. Viale L, Allotey J, Cheong-See F, Arroyo-Manzano D, Mccorry D, Bagary M, Mignini L, Khan KS, Zamora J, Thangaratinam S. EBM CONNECT Collaboration. Epilepsy in pregnancy and reproductive outcomes: a systematic review and meta-analysis. *Lancet*. Nov 7;386(10006):1845-52. (2015) doi: 10.1016/S0140-6736(15)00045-8.
6. Bromley R, Weston J, Adab N, Greenhalgh J, Sanniti A, McKay AJ, Tudur Smith C, Marson AG. Treatment for epilepsy in pregnancy: neurodevelopmental outcomes in the child. *Cochrane Database Syst Rev*. CD010236, Oct, Vol. 10. (2014).

SECTION 12

MENTAL DISORDERS

12.1 Perinatal Mental Health

12.1.1 Perinatal Depression

PHASE	ASSESSMENT AND MANAGEMENT												
Definition	Major depressive disorder (MDD) with peripartum onset i.e., when symptoms onset occurs during pregnancy or in the 4 weeks following delivery ¹ , some research defined postpartum period is up to one year ² . Women who is diagnosed with MDD is also included.												
Prepregnancy Care & Family Planning	Registration criteria for PPC • Previous history of depression (recurrence risk is about 25%) • Women diagnosed with current/recent perinatal depression (PND). Aims • To achieve remission with optimization of treatment. • To ensure completion of maintenance and continuance therapy. • To prevent relapse and recurrence. Management • Counsel on risk and benefit of continuing antidepressant, compliance, consequences of stopping or changing treatment abruptly (informed decision making)^{2,3}. • Most antidepressants are safe (refer <i>appendix figure 12</i>). • Continue antidepressants at least 6 to 9 months after remission and at least 2 years if there is history of relapse/recurrent or past history of MDD or very severe depressive episode. • Psychoeducation on importance of achieving remission prior to pregnancy, if not possible, do risk-benefit assessment (refer <i>remarks</i> for untreated depression). • Aim for lowest effective dose if plan to conceive. • Advise early booking once pregnant. • Criteria for referral to psychiatry²: <table border="1"> <tr> <td>Unsure of diagnosis</td><td>Clinical deterioration</td></tr> <tr> <td>Attempted suicide</td><td>Recurrent episode within one year</td></tr> <tr> <td>Active suicidal ideas</td><td>Psychotic symptoms</td></tr> <tr> <td>Failure of treatment</td><td>Severe agitation</td></tr> <tr> <td>Advice on further treatment</td><td>Self-neglect</td></tr> <tr> <td>Recurrent deliberate self-harm</td><td></td></tr> </table>	Unsure of diagnosis	Clinical deterioration	Attempted suicide	Recurrent episode within one year	Active suicidal ideas	Psychotic symptoms	Failure of treatment	Severe agitation	Advice on further treatment	Self-neglect	Recurrent deliberate self-harm	
Unsure of diagnosis	Clinical deterioration												
Attempted suicide	Recurrent episode within one year												
Active suicidal ideas	Psychotic symptoms												
Failure of treatment	Severe agitation												
Advice on further treatment	Self-neglect												
Recurrent deliberate self-harm													

	Contraception • Provide contraception while optimizing treatment. • Advise contraception (refer MEC guidelines).
Antenatal Care	Screening • Screening for depression by using PHQ 9 within 1 month after booking, 28-34 weeks, and 4-6 weeks postnatal or at any times if clinically indicated² (refer <i>appendix figure 2 and 3</i>). • Screening to be done by nurses, early assessment by MO if PHQ ≥ 10 or positive item 9 (suicidal ideation). Assessment History taking • Symptoms- onset, duration, severity, past episodes. • Assessment of daily, social, or work impairment. • Assessment of psychosocial risk related to PND: ○ Women at risk for PND (refer <i>remarks</i>) ○ Psychosocial stressor/support. ○ Difficulties in parenting and childcare ○ High risk behaviour, substance use ○ Suicidal risk (refer <i>remarks</i>) ○ Risk of infanticide Physical Examination • TRO medical/ surgical cause of depression Mental State Examination Investigations • Exclude other organic causes – FBC, RP & TFT Diagnosis • Established the diagnosis of PND by using DSM-5 MDD, with peripartum onset (refer <i>appendix figure 1</i>). • Assess severity and categorized PND to mild, moderate, or severe (refer <i>remarks</i>). Treatment (refer <i>appendix figure 4 and 5</i>) 1. Newly diagnosed PND <u>Mild depression²:</u> • Provide psychosocial intervention (refer <i>appendix figure 6</i>). <u>Moderate to severe depression²:</u> • Start antidepressant, SSRI, e.g., Sertraline, Fluvoxamine, Escitalopram. (refer <i>appendix figure 12</i>). • To document patient's preference form of treatment. • Emphasize on adherence. • Reassess patient in 2 weeks to assess response of treatment (refer <i>remarks</i>). If partial response, to optimize the dose. • Provide psychosocial intervention/nondirective counselling. • Refer Psychiatrist if: ○ Moderate-Severe PND ○ High risk of suicide ○ Depression with psychosis

	○ Worsening of symptoms despite of treatment 2. Pre-existing depression² ● Continue current treatment. ● Continue psychosocial intervention/nondirective counselling.
Referral/ Shared Care	● Refer/discuss all cases PND with FMS. ● Shared care with Psychiatrist (moderate-severe) or O&G if indicated. ● Counsellor, Occupational Therapist, Medical Social Workers, or Pharmacist if indicated.
Delivery Plan	● Can allow post-date unless obstetric indication. ● Hospital delivery.
Postnatal Care	Postnatal review ● MO to review in 2 weeks or earlier if indicated. ● FMS review within 4 weeks or earlier if indicated. ● PHQ-9 to repeat at 4-6 weeks postnatal. ● Assessment of psychosocial risk related to PND as above, including: ○ Mother-infant interaction ● Look for symptoms of postpartum depression / psychosis (sudden onset of psychosis needs urgent referral – change in behaviour, agitation, suspiciousness, confusion, and hallucination) ● Review family support. ● Ensure compliance with treatment & follow up. Lactation All antidepressants are safe. Relative infant dose less than 10% of maternal level of medication⁴. Contraception Refer MEC guidelines. PPC Register PPC & continue treatment optimization.

REMARKS

Untreated depression in pregnancy is associated with^{2,3}:

Effect to mother	Effect to fetus
Premature delivery	Fetal hyperactivity and irregular heart rate
Postnatal depression	Low birth weight
Risk of suicide/infanticide	Premature deaths

Women at risk for PND²:

- Previous history of PND
- Recent stressful life events and daily stressors, such as childcare, lack of social support
- Unintended pregnancy
- Socioeconomic disadvantages
- Younger age
- Unmarried
- Intimate partner violence/ unsupportive
- Hostile in-laws
- Complicated pregnancy, fetal anomaly, prenatal diagnosis

Protective factors were²:

- longer education
- being of the ethnic majority
- having a kind, trustworthy intimate partner

The **suicide risk factors** are²:

loss of relationship	other medical co-morbidities
financial or occupational difficulties	suicidal ideations
poor social support	severity of depression
past suicide attempt	psychomotor agitation
family history of suicide	low self-esteem
alcohol abuse/dependence	hopelessness

Severity of suicide risk:

- Mild : Fleeting thoughts of self-harm or suicide but no current plan or means.
- Moderate : Suicidal thoughts and intent but no current plan or immediate means
- Severe : Continual/specific suicidal thoughts, intent, plan or means

Definition of term

Response	≥50% reduction in depressive symptoms and at least a moderate degree of global improvement Non-response : ≤25% decrease in baseline symptom severity Partial response : >25% and <50% decrease in baseline symptom severity
Remission	absence of signs and symptoms in the current episode of depression and restoration of function
Relapse	the return of symptoms of the current episode within 6 months following remission
Recovery	when an individual is fully functional and has returned to premorbid functioning
Recurrence	a new episode of depression after recovery

Postpartum Blues

- The prevalence of postpartum blues is up to 50%.
- It is a normal presentation, mild and transient condition. Commonly starting 2 to 3 days after birth, peak around 1 week and resolve by the end of the second week of postpartum.
- Symptoms include being tearful, emotionally labile insomnia
- Postpartum blues can be associated with:
 - discomfort from breast engorgement and birth pain,
 - stress of parenthood and childcare,
 - isolation,
 - sleep deprivation
 - exhaustion
- Management: Reassurance and observation towards resolution/ supportive therapy.
Further evaluation is necessary if symptoms persist longer than 2 weeks.

APPENDIX

Figure 1: Major Depressive Disorder (MDD) DSM 5

Major Depressive Disorder (MDD) DSM 5:
A. ≥5 of the following symptoms presents during the same 2-week period and represent a change from previous functioning; at least one of the symptoms is either (1) depressed mood or (2) loss of interest or pleasure. • Depressed mood most of the day, nearly every day • Markedly diminished interest or pleasure • Significant weight loss • Insomnia or hypersomnia nearly every day. • Psychomotor agitation or retardation • Fatigue or loss of energy nearly every day. • Feelings of worthlessness or excessive or inappropriate guilt • Diminished ability to think or concentrate. • Recurrent thoughts of death B. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning. C. The episode is not attributable to the physiological effects of a substance or to another medical condition. D. The occurrence of the major depressive episode is not better explained by schizoaffective disorder, schizophrenia, schizophreniform disorder, delusional disorder, or other specified and unspecified schizophrenia spectrum and other psychotic disorders. E. There has never been a manic episode or a hypomanic episode.

Severity of MDD^{1,2} can be classified into;

- Mild : five or more symptoms are present which cause distress but they are manageable and result in minor impairment in social or occupational functioning.
- Severe : most of the symptoms are present with marked impairment in functioning with or without psychotic symptoms.
- Moderate: both symptoms presentation and functional impairment lies between the above two severities.

Figure 2: Patient Health Questionnaire-9 (PHQ-9) (Malay Version)

Dalam tempoh 2 minggu yang lalu , berapa kerapkah anda telah terganggu oleh sebarang masalah yang berikut? (Gunakan tanda betul “✓” untuk menyatakan jawapan anda)		Tiada Langsung	Beberapa Hari	Lebih daripada 7 hari	Hampir setiap hari
1	Kurang berminat atau keseronokan dalam melakukan sesuatu perkara				
2	Rasa sedih, tidak gembira atau putus asa				
3	Masalah untuk tidur atau tidur nyenyak atau tidur berlebihan				
4	Rasa letih atau mempunyai sedikit tenaga				
5	Kurang selera atau makan berlebihan				
6	Rasa buruk mengenai diri anda — atau anda seorang yang gagal atau anda telah menyebabkan diri anda atau keluarga anda kecewa				
7	Masalah untuk menumpukan perhatian ke atas sesuatu perkara seperti membaca surat khabar atau menonton televisyen				
8	Bergerak atau bercakap terlalu perlahan sehinggakan orang lain perasan? Atau sebaliknya — menjadi sangat resah atau gelisah sehinggakan anda telah bergerak dengan banyak daripada biasa				
9	Memikirkan adalah lebih baik saja jika anda mati atau mencederakan diri sendiri dalam beberapa cara				
JUMLAH					
JUMLAH KESELURUHAN					

Figure 3: Flow Chart for Management of Perinatal Depression

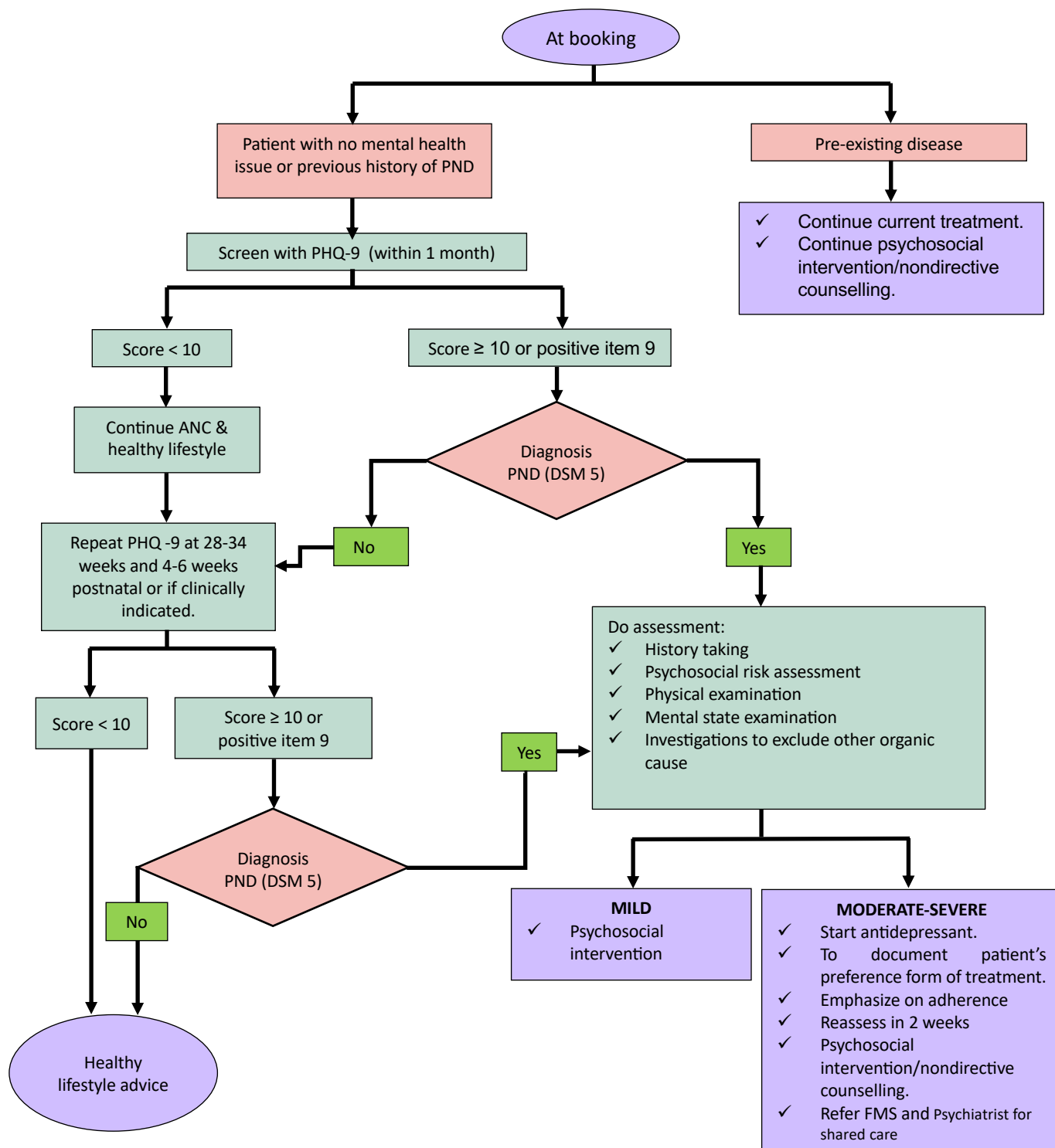
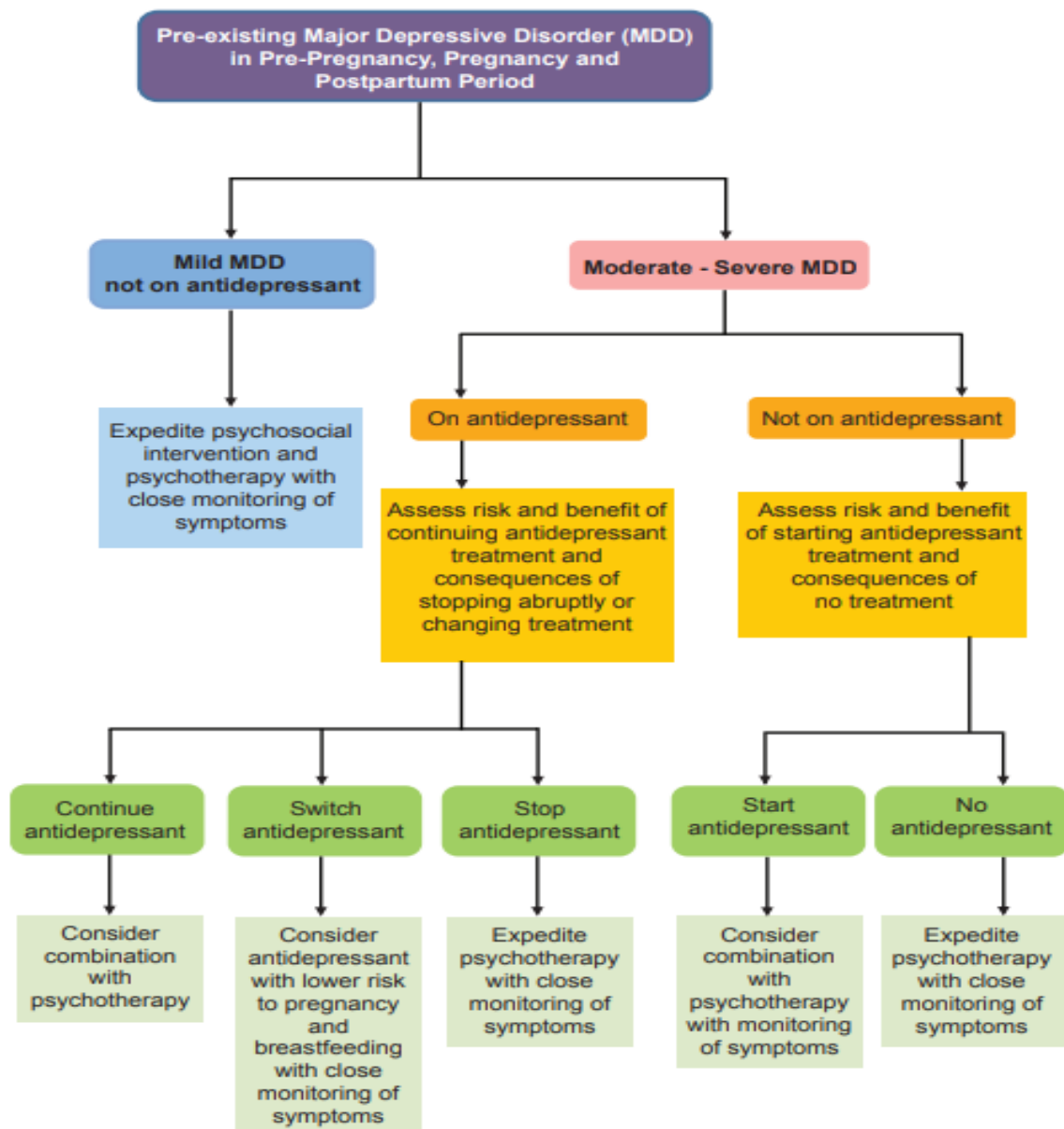
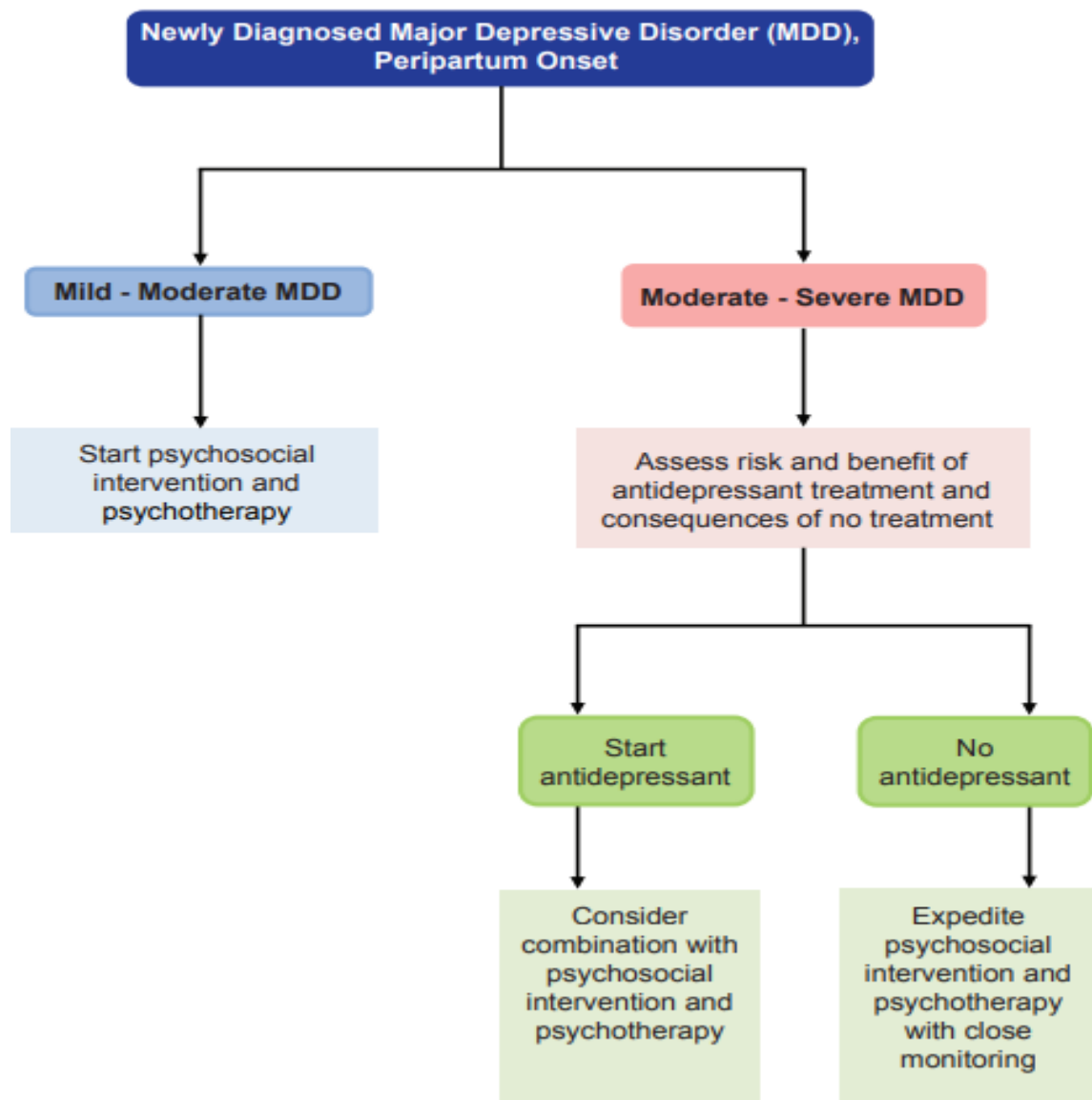


Figure 4: Flow Chart Tor Treatment of Pre-existing Major Depressive Disorder in Pre-pregnancy, Pregnancy & Postnatal Period



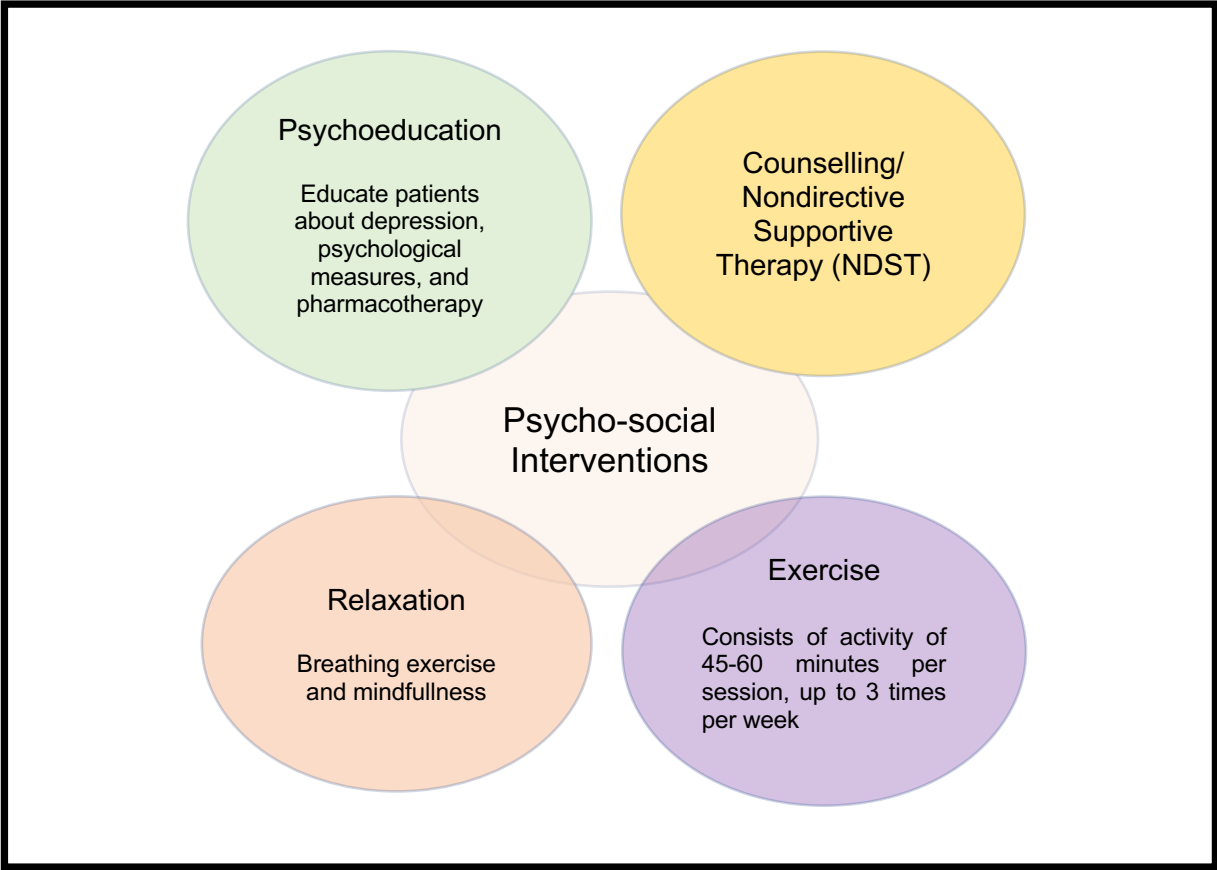
Reference: Clinical Practice Guidelines Management of Major Depressive Disorder Ministry Of Health 2019 (Second Edition)

Figure 5: Treatment of Newly Diagnosed Major Depressive Disorder in Pregnancy and Postnatal



Reference: Clinical Practice Guidelines Management of Major Depressive Disorder Ministry Of Health 2019 (Second Edition)

Figure 6: Example of Psychosocial Intervention



Reference: Clinical Practice Guidelines Management of Major Depressive Disorder Ministry Of Health 2019 (Second Edition)

12.1.2 Postpartum Psychosis

PHASE	ASSESSMENT AND MANAGEMENT
Definition	- Classified as “short psychotic disorder” in DSM 5 section of the Schizophrenia Spectrum. - Severe episode of mental illness which begins suddenly in the days or weeks (48 hours up to 12 weeks) postnatal. Symptoms vary and can change rapidly⁶ (refer <i>remarks</i>).
Prepregnancy care & Family Planning	Registration criteria for PPC - Register all women diagnosed with postpartum psychosis. Management - Psychosocial intervention such as encourage social support, sleep hygiene, and mobilise help for new mothers. Contraception - Provide contraception while optimizing treatment. - Advise contraception - refer MEC guidelines.
Referral/Shared Care	Refer to FMS or Psychiatrist if present of any psychotic symptoms.
Postnatal care	Postnatal review - Assess psychotic symptoms or sign of relapse. - Urgent referral to FMS and Psychiatrist if presence of psychotic symptoms such as persecutory delusions, commanding auditory hallucination. - Initiation of anti-psychotic medication after discussion with psychiatrist. - Assess patient and child safety (high risk for suicide and infanticide). - To provide and identify psychosocial support. - Ensure follow-up with psychiatric clinic. Lactation Breastfeeding is encouraged with infant monitoring of possible adverse effects (e.g., over-sedation, jittery)⁴. Contraception & PPC - Refer MEC guidelines. - Register PPC & treatment optimization.

REMARKS
Women at high risk for postpartum psychosis: • Primiparous mothers who are single. • Women with a past psychiatric history and family history of schizophrenia or bipolar disorder. • Prenatal depression. • Prior episode of postpartum psychosis (recurrence 25 % to 75%). • Sleep loss.
Clinical Features of Postpartum Psychosis⁶: • Disorganization • Confusion • Depersonalization • Bizarre delusion (often concerning the child or childbirth) • Insomnia • Irritability • Abnormal thought content (delusions and/or hallucinations) • Abnormal mood (mania or agitation; depression; mixed)
Screening Questions for Patient and/or Family⁶: • Is this the patient's first psychiatric presentation? • If she has a psychiatric history, is it of depression, mania, or both? • Is there any family history of bipolar disorder? • Has the patient been using any substances? • Does the patient have thoughts of harming herself or the child? <i>Important to ask this in a non-judgmental fashion, for example: "It can be very overwhelming to be a new mother. Sometimes women have scary thoughts; they might think about hurting themselves or hurting their babies. Has that ever happened to you?"</i>

12.1.3 Generalized Anxiety Disorder

PHASE	ASSESSMENT AND MANAGEMENT				
Definition	A clinical entity distinct from feelings of anxiety associated with PND; characterised by excessive, uncontrollable worry that can cause functional impairment ⁵ . (refer <i>remarks</i>)				
Pre-pregnancy Care & Family Planning	Registration criteria for PPC Register all women with GAD in reproductive age. Management • Provide information on: ○ Benefits and risks of pharmacological treatment. ○ Risk of relapse during perinatal period. ○ Risk of poor fetal outcome if untreated maternal anxiety. • Advise early booking once pregnant. • Refer FMS/Psychiatry if no improvement or worsening of symptoms. Contraception • Provide contraception while optimizing treatment. • Advise contraception - refer MEC guidelines.				
Antenatal Care	Screening • GAD 7 if clinically suspected anxiety women. (refer <i>appendix figure 9</i>) Diagnosis • Diagnosis of GAD as per DSM 5. (refer <i>appendix figure 8</i>) Assessment History taking and psychological assessment: • Clinical symptoms including duration and intensity • Assess possible stressors such as fears of fetal wellbeing, illness in the partner, intimate partner violence, and financial issues. • Functional impairment and daily activities • Differential diagnosis e.g., MDD, panic disorder, OCD. • To identify support system and present coping mechanism. Physical Examination • Relevant systems e.g., CVS, Neck examination etc. • Mental State Examination Investigations⁵ • TRO organic causes if indicated – FBC, RP, LFT, TFT, urine toxicology (if history warranted), ECG. Treatment <table border="1"> <thead> <tr> <th>Mild GAD⁵</th><th>Moderate to Severe GAD⁵</th></tr> </thead> <tbody> <tr> <td> Psychosocial intervention – relaxation technique, mindfulness Refer FMS Refer Counsellor, OT </td><td> Pharmacotherapy (SSRI) and psychotherapy (CBT) Refer Psychiatrist for collaborative management. </td></tr> </tbody> </table>	Mild GAD ⁵	Moderate to Severe GAD ⁵	Psychosocial intervention – relaxation technique, mindfulness Refer FMS Refer Counsellor, OT	Pharmacotherapy (SSRI) and psychotherapy (CBT) Refer Psychiatrist for collaborative management.
Mild GAD ⁵	Moderate to Severe GAD ⁵				
Psychosocial intervention – relaxation technique, mindfulness Refer FMS Refer Counsellor, OT	Pharmacotherapy (SSRI) and psychotherapy (CBT) Refer Psychiatrist for collaborative management.				

Referral/ Shared Care	• Shared care between FMS/ Psychiatrist/ O&G. • Counsellors, Occupational Therapist, Medical Social Worker, or Pharmacist if indicated.
Delivery Plan	• Allow post-date unless obstetric indication. • Hospital delivery.
Postnatal Care	Postnatal review • Review by MO in 2 weeks or earlier if indicated. • Assess symptoms of: ○ postpartum depression / psychosis (co-morbid) - needs urgent referral. ○ relapse GAD - high risk during postpartum. • FMS review within 4 weeks or earlier if indicated. • Review family support. Lactation • Breastfeeding is encouraged with infant monitoring of possible adverse effects (e.g., over-sedation, jittery)⁴. Contraception Refer MEC guidelines. PPC Register PPC & continue disease optimization.

REMARKS

Perinatal anxiety disorders with co-morbid depression are very high. GAD is one of the sub-types of anxiety disorder (refer *appendix figure 7*)

Anxiety disorders during pregnancy may have a negative influence on obstetric, fetal and perinatal outcomes, including²:

• more severe nausea and vomiting	• pre-eclampsia and preterm birth
• increased alcohol or tobacco consumption	• postnatal depression and mood disorders

APPENDIX

Figure 7: Other Types of Anxiety Disorder

Social Anxiety Disorder	Panic Disorder	GAD	Specific Phobia	Agoraphobia
A. Marked fear or anxiety about one or more social situations in which the individual is exposed to possible scrutiny by others. Examples include social interactions (e.g., having a conversation, meeting unfamiliar people), being observed (e.g., eating or drinking), and performing in front of others (e.g., giving a speech) B. The individual fears that the anxiety symptoms that will be negatively evaluated (i.e., will be humiliating or embarrassing; will lead to rejection). C. The social situations almost always provoke fear or anxiety. D. The social situations are avoided or endured with intense fear or anxiety. E. The fear or anxiety is out of proportion to the actual threat posed by the social situation and to the socio-cultural context. F. The fear, anxiety, or avoidance is persistent, typically lasting for 6 months or more. G. The fear, anxiety, or avoidance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning. H. The fear, anxiety, or avoidance is not attributable to the physiological effects of a substance. I. The fear, anxiety, or avoidance is not better explained by the symptoms of another mental disorder. J. If another medical condition (e.g., Parkinson's disease, obesity) is present, the fear, anxiety, or avoidance is clearly unrelated or is excessive. K. Specify if: Performance only: If the fear is restricted to speaking or performing in public.	A. Unexpected and recurrent panic attacks (+/- situationally bound). B. At least ≥ 1 attack has been followed by 1 month or more or both, the person fearing that there will be more attacks and causing them to change their behaviour, which often includes avoiding situations that might induce an attack. C. Not due to other disorders (substance or medical condition)	A. Excessive anxiety and worry occurring ≥ 6 months about a number of events or activities. B. Difficult to control the worry. C. Associated with ≥ 3 out of 6 symptoms. ▪ Restlessness ▪ Easily fatigued. ▪ Difficulty concentrating or mind going blank. ▪ Irritability ▪ Muscle tension ▪ Sleep disturbance D. Cause clinically significant distress or impairment in social, occupational, or other important areas of functioning. E. The disturbance is not attributable to the physiological effects. F. The disturbance is not better explained by another mental	A. Marked fear or anxiety about a specific object or situation (e.g., flying, heights, animals, receiving an injection, seeing blood). B. The phobic object or situation almost always provokes immediate fear or anxiety. C. The phobic object or situation is actively avoided or endured with intense fear or anxiety. D. The fear or anxiety is out of proportion to the actual danger posed by the specific object or situation and to the socio-cultural context. E. The fear, anxiety, or avoidance is persistent, typically lasting for 6 months or more. F. The fear, anxiety, or avoidance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning. G. The disturbance is not better explained by the symptoms of another mental disorder.	A. Marked fear or anxiety about two (or more) of the following five situations: ▪ Using public transportation. ▪ Being in open spaces. ▪ Being in enclosed places. ▪ Standing in line or be in a crowd. ▪ Being outside of the home alone. B. The individual fears or avoids these situations because of thoughts that escape might be difficult or help might not be available in the event of developing panic-like symptoms or other incapacitating or embarrassing. C. The agoraphobic situations almost always provoke fear or anxiety. D. The agoraphobic situations are actively avoided, require the presence of a companion. E. The fear or anxiety is out of proportion to the actual danger posed by the agoraphobic situations and to the socio-cultural context. F. The fear, anxiety, or avoidance is persistent, lasting for ≥ 6 months G. The fear, anxiety, or avoidance causes clinically significant distress or impairment in social, occupational, functioning. H. If another medical condition (e.g., Parkinson's disease) is present, the fear, anxiety, or avoidance is clearly excessive. I. The disturbance is not better explained by the symptoms of another mental disorder.

Figure 8: Generalized Anxiety Disorder- DSM 5

Diagnosis of GAD	
A. Excessive anxiety and worry occurring ≥ 6 months about a number of events or activities. B. Difficult to control the worry. C. Associated with ≥ 3 out of 6 symptoms. ▪ Restlessness ▪ Easily fatigued. ▪ Difficulty concentrating or mind going blank. ▪ Irritability ▪ Muscle tension ▪ Sleep disturbance D. Cause clinically significant distress or impairment in social, occupational, or other important areas of functioning. E. The disturbance is not attributable to the physiological effects F. The disturbance is not better explained by another mental * Some researchers define perinatal GAD if the illness meets other DSM criteria for a minimum duration of one month.	

Figure 9: Generalized Anxiety Disorder- 7 (GAD -7)

Dalam tempoh 2 minggu lepas, berapa kerap kali anda terganggu oleh masalah berikut? (Gunakan tanda betul "✓" untuk menyatakan jawapan anda)		Tiada Langsung	Beberapa Hari	Lebih daripada 7 hari	Hampir setiap hari
1	Berasa resah, gelisah atau tegang.				
2	Tidak dapat menghentikan atau mengawal kebimbangan				
3	Terlalu bimbang mengenai pelbagai perkara yang berlainan				
4	Mempunyai masalah untuk tenang				
5	Terlalu resah sehingga susah untuk berdiam diri				
6	Mudah menjadi rimas dan menjengkelkan				
7	Berasa takut bahawa sesuatu yang buruk akan terjadi.				
JUMLAH					
JUMLAH KESELURUHAN					

12.1.4 Severe Mental Illness (SMI) – Schizophrenia and Bipolar Disorder (BPD)

PHASE	ASSESSMENT AND MANAGEMENT
Definition	Includes psychotic disorders such as schizophrenia, and BD.
Prepregnancy Care & Family Planning	Registration criteria for PPC Register all women with SMI. Management ✓ Discussed with patient and partner on: ○ Important of contraception. ○ Risk and benefits of psychotropic medications on pregnancy. ○ Risk of relapse if dose of medication is reduced or stopped^{3,7,8}. ○ To refer FMS/ Psychiatrist if plan to conceive, especially those on mood stabilizer (sodium valproate, carbamazepine and lithium). ✓ Refer for substance and smoking abstinence if indicated. ✓ Folic acid supplementation 5 mg/day preconception and first trimester of pregnancy. ✓ Advise for early booking if pregnant^{3,7}. Contraception • IUCD is favourable option, due to drug interactions between hormonal contraceptives and antimanic agents⁸. • Alternatively: ○ Carbamazepine and topiramate (cytochrome P-450 inducer) – provide injections or oral contraceptives containing 50µg (more pill to be taken) or more of the oestrogenic component⁸. ○ Lamotrigine (weak inducer) – dose adjustment of medication may be required when an oral contraceptive is added⁸.
Antenatal Care	Diagnosis According to DSM-5. (refer <i>appendix figure 10</i>) Assessment (refer <i>appendix figure 11</i>) • Monitor early sign of relapse (refer <i>remarks</i>). • Smoking, substance use and high-risk behaviour. • Family and social support especially unplanned pregnancy. Treatment^{3,7,8} (refer <i>appendix figure 12</i>) • Ensure adherence on medications. • Majority of antipsychotics are safe including depot antipsychotics and clozapine. • To discuss with psychiatrist for women on mood stabilizer. • Monitoring risk of: ○ anaemia ○ diabetes (OGTT especially patient on anti-psychotic) ○ hypertension

	○ premature contraction ● To review monthly if stable or earlier if indicated.
Referral/ Shared Care	● Shared care between FMS/ Psychiatrist/ O&G. ● Counsellors, Occupational Therapist, Medical Social Worker, or Pharmacist if indicated.
Delivery Plan	● Allow postdate unless obstetric indication. ● Hospital delivery.
Postnatal Care	Postnatal review ● Review by MO in 2 weeks or earlier if indicated. ● Monitor early relapse symptoms (refer <i>remarks</i>) ● Identify and encourage psychosocial support. ● Assess: ● Mother-infant interaction. ● Risk of infanticide ● Refer to social worker or child protector if welfare of baby is of concern. ● FMS review within 4 weeks or earlier if indicated. Lactation^{7,8} ● Breastfeeding is encouraged with infant monitoring of possible adverse effects (e.g., over-sedation, jittery)⁴. ● Lithium and clozapine are contraindicated for breastfeeding Contraception ● Refer MEC guidelines. ● IUCD is favourable option, due to drug interactions between hormonal contraceptives and antimanic agents⁸. PPC Register PPC & treatment optimization.

REMARKS

- Medication discontinuation in pregnancy may increase risk of mood episodes. In addition, the risk of recurrence of mood symptoms and psychosis appears higher during postpartum than in pregnancy.

Symptoms of relapse:

Schizophrenia	Bipolar disorder
Unable to sleep Less eating Unable to concentrating. Irritability Stay away from people	More energetic Feeling high Easily distracted Sadness Ideas feel slow More anxiety

APPENDIX

Figure 10: Diagnosis of Schizophrenia and Bipolar Disorder according to DSM 5

Schizophrenia (DSM-5): A. The individual experiences two or more of the following for a significant portion of time during a 1-month period. And at least one of these must be (1), (2), or (3): 1. Delusions 2. Hallucinations 3. Disorganized speech (incoherence or derailment) 4. Completely disorganized or catatonic behaviour 5. Negative symptoms, such as diminished emotional expression B. For a significant amount of time since the disturbance began, level of functioning in one or more major areas (e.g., work, interpersonal relations, or self-care) is clearly below the level achieved prior to onset. C. Signs of the disturbance continue for 6 months or longer. This period must include at least 1 full month of symptoms that meet the first criteria and may include periods of residual symptoms. During these residual periods, the signs of the disturbance may be manifested only by negative symptoms or by two or more symptoms outlined in the first criteria, only in a lesser form. D. The disturbance cannot be better explained by schizoaffective disorder, depressive or bipolar disorder because either: E. The disturbance cannot be attributed to the physiological effects of a substance (e.g., a drug of abuse or medication) or another medical condition. F. If there is a history of autism spectrum disorder or a communication disorder of childhood onset, the additional diagnosis of schizophrenia is made only if prominent delusions or hallucinations, in addition to the other required symptoms of schizophrenia, are also present for at least 1 month (or less if successfully treated).
Bipolar Disorder (BD) (DSM 5): <u>Bipolar I disorder.</u> A. Criteria have been met for at least one manic episode (Criteria A–D under “Manic Episode” above). B. At least one manic episode is not better explained by schizoaffective disorder and is not superimposed on schizophrenia, schizophreniform disorder, delusional disorder, or other specified or unspecified schizophrenia spectrum and other psychotic disorder. <u>Bipolar II disorder.</u> A. Criteria have been met for at least one hypomanic episode (Criteria A–F under “Hypomanic Episode” above) and at least one major depressive episode (Criteria A–C under “Major Depressive Episode” above). B. There has never been a manic episode. C. At least one hypomanic episode and at least one major depressive episode are not better explained by schizoaffective disorder and are not superimposed on schizophrenia, schizophreniform disorder, delusional disorder, or other specified or unspecified schizophrenia spectrum and other psychotic disorder. D. The symptoms of depression or the unpredictability caused by frequent alternation between periods of depression and hypomania causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Manic Episode

- A. A distinct period of abnormally and persistently elevated, expansive, or irritable mood and abnormally and persistently increased activity or energy, lasting at least **1 week and present most of the day, nearly every day**.
- B. During the period of mood disturbance and increased energy or activity, three (or more) of the following symptoms (four if the mood is only irritable) are present to a significant degree and represent a noticeable change from usual behaviour:
 - 1. Inflated self-esteem or grandiosity.
 - 2. Decreased need for sleep
 - 3. More talkative than usual or pressure to keep talking.
 - 4. Flight of ideas or subjective experience that thoughts are racing.
 - 5. Distractibility
 - 6. Increase in goal-directed activity (either socially, at work or school, or sexually) or psychomotor agitation (i.e., purposeless non-goal-directed activity).
 - 7. Excessive involvement in activities that have a high potential for painful consequences (e.g., engaging in unrestrained buying sprees, sexual indiscretions),
- C. The mood disturbance is sufficiently severe to cause marked impairment in social or occupational functioning.
- D. The episode is not attributable to the physiological effects of a substance.

Note: Criteria A–D constitute a manic episode. At least one lifetime manic episode is required for the diagnosis of bipolar I disorder.

Hypomanic Episode

- A. A distinct period of abnormally and persistently elevated, expansive, or irritable mood and abnormally and persistently increased activity or energy, **lasting at least 4 consecutive days and present most of the day, nearly every day**.
- B. During the period of mood disturbance and increased energy and activity, three (or more) of the following symptoms (four if the mood is only irritable) have persisted, represent a noticeable change from usual behavior, and have been present to a significant degree:
 - 1. Inflated self-esteem or grandiosity.
 - 2. Decreased need for sleep
 - 3. More talkative than usual or pressure to keep talking.
 - 4. Flight of ideas or subjective experience that thoughts are racing.
 - 5. Distractibility
 - 6. Increase in goal-directed activity (either socially, at work or school, or sexually) or psychomotor agitation.
 - 7. Excessive involvement in activities that have a high potential for painful consequences (e.g., engaging in unrestrained buying sprees, sexual indiscretions).
- C. The episode is associated with an unequivocal change in functioning that is uncharacteristic of the individual when not symptomatic.
- D. The disturbance in mood and the change in functioning are observable by others.
- E. The episode is not severe enough to cause marked impairment in social or occupational functioning.
- F. The episode is not attributable to the physiological effects of a substance.

Note: Criteria A–F constitute a hypomanic episode. Hypomanic episodes are common in bipolar I disorder but are not required for the diagnosis of bipolar I disorder.

Major Depressive Episode

1. Five (or more) of the following symptoms have been present during the same 2- week period and represent a change from previous functioning; at least one of the symptoms is either (1) depressed mood or (2) loss of interest or pleasure. Note: Do not include symptoms that are clearly attributable to another medical condition.
 1. Depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g., feels sad, empty, or hopeless) or observation made by others (e.g., appears tearful).
 2. Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day
 3. Significant weight loss when not dieting or weight gain or decrease or increase in appetite nearly every day.
 4. Insomnia or hypersomnia nearly every day.
 5. Psychomotor agitation or retardation nearly every day
 6. Fatigue or loss of energy nearly every day.
 7. Feelings of worthlessness or excessive or inappropriate guilt nearly every day
 8. Diminished ability to think or concentrate, or indecisiveness, nearly every day
 9. Recurrent thoughts of death, recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide.
2. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.
3. The episode is not attributable to the physiological effects of a substance or another medical condition.

Note: Criteria A–C constitute a major depressive episode. Major depressive episodes are common in bipolar I disorder but are not required for the diagnosis of bipolar I disorder.

Reference: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5).

Figure 11: Flow Chart for Management of Women with Severe Mental Illness

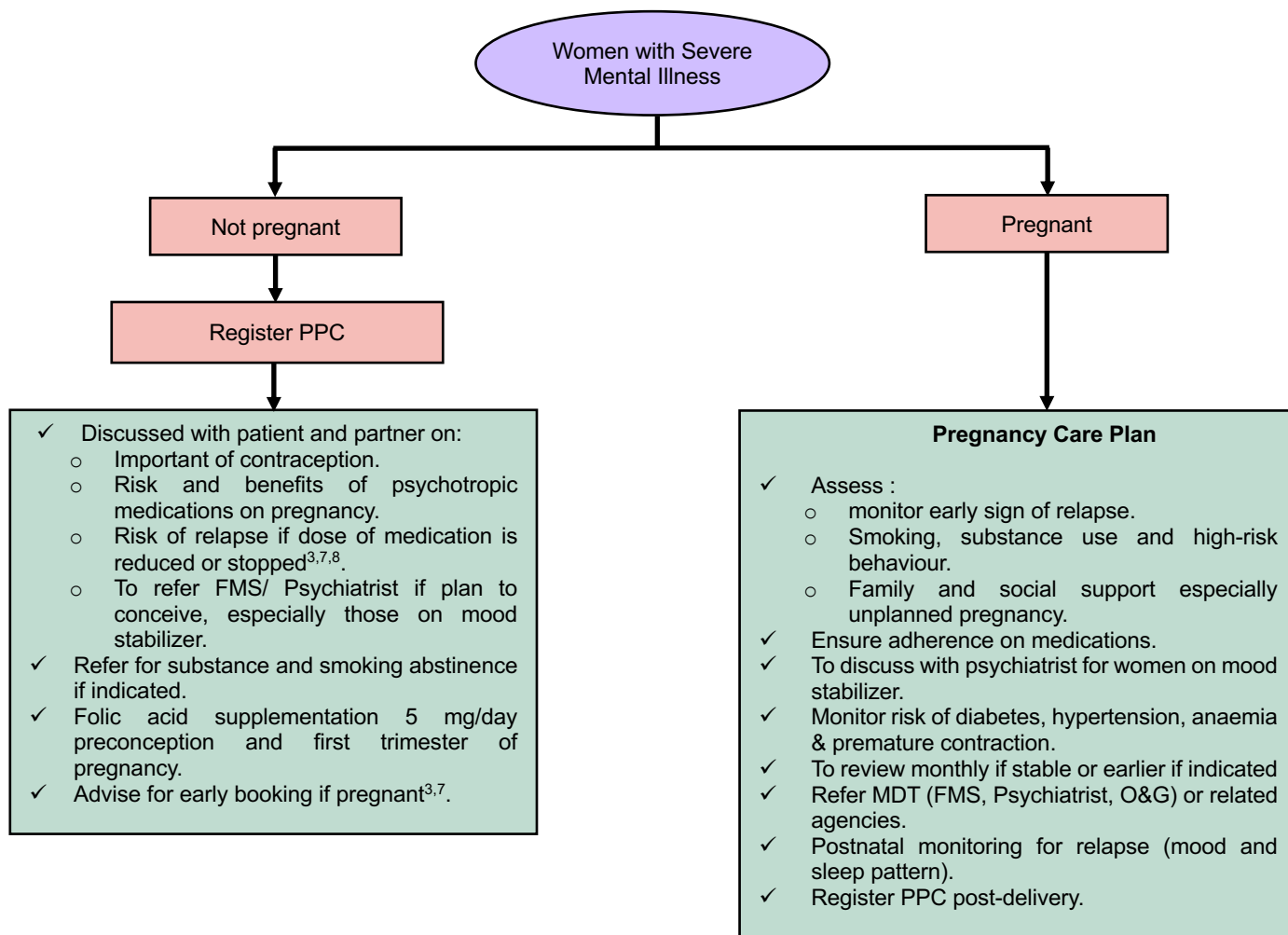


Figure 12: Psychotropic Medications

Groups/ Drugs	Dose range	Regimen frequency	Pregnancy safety category	Lactation risk
Antipsychotic				
Chlorpromazine	Starting dose: 20mg/day Maximum dose: 50 – 100mg/day	TDS	C	L3
Haloperidol	Starting dose: 2-5mg/day Maximum dose: 20mg/day	OD/TDS	C	L2
Sulpiride	Starting dose: 200 – 400mg/day Maximum dose: 2400mg/day	BD	NA	NA
Amisulpiride	Starting dose: 50-100mg/day Maximum dose: 1200mg/day	BD	NA	NA
Aripiprazole	Bipolar I Disorder Monotherapy 15 - 30mg/day Adjunct to lithium/valproate: 10 - 15mg/day	OD	C	L3
Asenapine	Acute mania/mixed episodes: Monotherapy: 20mg/day sublingually in divided doses As adjunctive with lithium or valproate: 10 - 20mg/day sublingually in divided doses	BD	C	NA
Clozapine	Starting dose: 12.5mg/day Maximum dose: 900mg/day	OD/BD	B	L3
Olanzapine	Acute mania/mixed episodes: Monotherapy: 10 - 20mg/day Maintenance therapy: 5 - 20 mg/day	OD	C	L2
Paliperidone	Oral: 6 - 12mg/day	OD	C	NA
Quetiapine	Acute depression: 50 - 300mg/day in divided doses Acute mania: 300 - 80 mg/day in divided doses Maintenance (monotherapy or adjunctive therapy) 400 - 800mg/day in divided doses	IR: BD ER: OD	C	L4
Risperidone	Bipolar I Disorder 2 - 6mg/day in divided doses	OD/BD	C	L3
Mood Stabilizer				
Lithium	Acute mania: 600 – 1800mg/day in divided doses Maintenance dose: 300 – 1200mg/day in divided doses	OD/BD	D	L4

KEDAH CONSENSUS GUIDELINES ON PRIMARY CARE MANAGEMENT OF MEDICAL DISORDERS IN PREGNANCY

	(Desired serum level : 0.6 - 1.2 mEq/L not exceeding 1.5 mEq/L) To be used with caution and correlate clinically			
Valproate	Acute Mania: 600 - 2500mg/day in divided doses Maintenance dose: 400 - 2000mg/day in divided doses (Desired serum level 50-100 µg/mL @ 347-693 µmol/L)	OD/BD	D	L2
Carbamazepine	Mania/mixed episodes 200 to 1600mg/day in divided doses (Desired serum level 4-12 mg/L @ 17- 50 µmol/L)	OD/BD	D	L2
Lamotrigine	Bipolar I Disorder: Maintenance dose: 100 – 400mg/day in divided doses. a) For patients not taking enzyme inducing drugs or valproate: Initial dose: 25mg/day Maintenance dose: 200mg/day b) For patients with valproate regimen : Initial dose: 25mg/day EOD Maintenance dose: 100mg/day. c) For patients with enzyme inducing antiepileptic drug regimen (e.g. carbamazepine) without valproate: Initial dose: 50mg/day Maintenance dose: 400mg/day in divided dose.	OD	C	L3
Selective Serotonin Reuptake Inhibitors (SSRIs)				
Escitalopram	Starting dose: 10mg/day Usual dose: 10-20mg/day	OD	C	L3 in older infants
Sertraline	Starting dose: 50mg/day Usual dose: 50 - 200mg/day	OD	C	L2
Fluoxetine	Starting dose: 20mg/day Usual dose: 20 - 60mg /day	OD	C	L2 in older infants; L3 in neonates
Fluvoxamine	Starting dose: 50-100mg/day Usual dose: 50 mg - 300mg/day	OD/BD	C	L2
Other Antidepressant				
Venlafaxine	Starting dose: 37.5 – 75mg/day Usual dose: 37.5 - 225mg/day (up to 375mg for in-patients)	OD/BD/TDS	C	L3
Duloxetine	Starting dose: 20-60mg/day Usual dose: 60-120mg/day	OD/BD	C	NA
Mirtazapine	Starting dose: 15mg/day Usual dose: 15-45mg/day	OD	C	L3
Agomelatine	Starting dose: 25mg/day Usual dose: 25-50mg/day	OD	B	
Vortioxetine	Starting dose: 10mg/day Usual dose: 10-20mg/day	OD	B	Limited data

KEDAH CONSENSUS GUIDELINES ON PRIMARY CARE MANAGEMENT OF MEDICAL DISORDERS IN PREGNANCY

Anxiolytic and hypnotics				
Alprazolam	Starting dose: 0.25mg/day Usual dose: 4mg/day	OD/BD/TDS	D	L3
Clonazepam	Starting dose: 0.25mg/day Usual dose: 4mg/day	OD/BD	D	L3
Diazepam	2 to 10mg orally 2 to 4 times a day	OD/BD/TDS/QID	D	L3; L4 if used chronically
Lorazepam	Initial dose: 2 to 3mg orally per day Maintenance dose: 1 to 2mg orally	BD/TDS	D	L3
Zolpidem	Initial dose: - Women: 5mg prior to bedtime - Men: 5 to 10mg prior to bedtime Maximum dose: 10mg/day	OD	B	L3
Tricyclics and heterocyclics				
Amitriptyline	Starting dose: 50-75mg/day Usual dose: Starting dose: 10mg/day Usual dose: 10-20mg/day	OD	C	L2
Clomipramine	Starting dose: 25mg/day Usual dose: 100 -250mg/day	OD	C	L2
American College of Obstetricians and Gynaecologists lactation risk categories: L1=Safest; L2=Safer; L3=Moderately safe; L4=Possibly hazardous.				
The FDA classifies drug safety using the following categories: A = controlled studies show no risk; B = no evidence of risk in humans; C = risk cannot be ruled out; D = positive evidence of risk; X = contraindicated in pregnancy				
Common drugs use in mental illness.				

12.2 Substance Use Disorder

PHASE	ASSESSMENT AND MANAGEMENT
Definition	Includes stimulant, opioid, cannabis, and hallucinogen, inhalant, sedatives, hypnotics or anxiolytic, alcohol, caffeine, stimulants and tobacco ¹ .
Prepregnancy Care & Family Planning	Registration criteria for PPC Register all women diagnosed with history of substance abuse. Management • Counsel women on impact of³: (refer <i>remarks</i>) ○ drug addiction on pregnancy. ○ pregnancy on drug addiction. • Refer: ○ FMS/Psychiatrist for further assessment: ▪ Evaluation of the therapeutic option. ▪ Optimization of treatment- counselling, psychological support. ▪ Review, modify or plan therapy- quit smoking clinic, OSCA, methadone clinic, detoxification. ○ Social worker and counsellor if necessary. ○ Related agencies (NGOs/AADK/JKM). • Defer pregnancy until remission. • For early booking if pregnant. Contraception • Provide contraception while optimizing treatment. • Offer long-acting reversible contraception (LARC).
Antenatal Care	Screening Selective screening in high-risk women with suspected/ high risk or pre-existing of substance abuse by using⁴: • ASSIST questionnaire: substance use (refer <i>appendix figure 15</i>). • AUDIT-10 questionnaire: alcohol abuse (refer <i>appendix figure 16</i>). • Fagerstrom questionnaire: nicotine addiction (refer <i>appendix figure 17</i>). Assessment (refer <i>appendix figure 14</i>) History taking • Symptoms of sedation/ intoxication/ withdrawal • History of imprisonment or drug rehabilitation center detention • Psychosocial support • Screen for other related problem: ○ medical or psychiatric comorbidities ○ STI ○ mental disorder ○ domestic violence Physical Examinations⁴ • Sign of chronic substance use: ○ poor dentition, disheveled, scabies, head lice, malnutrition

	○ injection mark ○ GIT/abdomen, CNS • Sign of sedation/intoxication/withdrawal or erratic behavior Investigations (with informed consent) • Urine drugs if suspected substance use • Hepatitis B & C, HIV, STI work-up • TB Screening • Carbon Monoxide analyzer (ex or current smoker) Diagnosis and severity (refer <i>appendix figure 13</i>) • Established the diagnosis using DSM-5. • Assess level of severity of substance abuse 2 or 3 symptoms: Mild 4 or 5 symptoms: Moderate 6 or > symptoms: Severe Management at booking⁴ • Continue methadone if women on Methadone Maintenance Therapy (MMT). • Refer psychiatrist if: ○ Other than opioids/nicotine use ○ Dual diagnosis (co-morbid psychiatric illness) • Counsel patient impact of drug addiction on pregnancy and pregnancy on drug addiction. Antenatal Follow-Up • Monitor symptoms of withdrawal and relapse (refer <i>remarks</i>). • Detailed scan by MFM at 18-20 weeks if patient on Opioids (Increased risk of birth defect before and during the first trimester of pregnancy). • Fetal growth scan monitoring monthly starting at 28 weeks. • Monitoring of nutrition & referral to dietician if required¹⁰. • Shared care between FMS/Psychiatrist/ O&G. Treatment 1. Non-Pharmacology^{4,9,10} • Brief Intervention • Psychosocial intervention: ○ Family-based treatment modalities – to increase support system ○ Cognitive Behavioral Therapy ○ Contingency Management ○ Motivational interviewing • Social Support: ○ Accommodation ○ Vocational Training ○ Parenting Training ○ Life skills training • Antenatal Home visit 2. Pharmacology^{4,9} • Benzodiazepine/Alcohol/Opioids withdrawals are common – if suspected refer for admission. • Opiate's addiction, provide Substitution treatment - MMT.
--	--

	- Nicotine Replacement Therapy: Nicotine Gum preferably. <i>*Varenicline and Nicotine patch are contraindicated.</i> - Counsel risk and benefit towards mother and fetus in initiating pharmacological treatment.
Referral/Shared Care	- Shared care between FMS/Psychiatrist/O&G - District Mental Health Committee (multidisciplinary) if indicated. - Social worker or other related agencies if indicated (e.g., NGO/AADK/JKM). - Counsellor.
Delivery plan	- Hospital delivery. - Timing and mode of delivery as per obstetric indication.
Postnatal Care	Postnatal review - Neonatal assessment by Pediatrician for Neonatal Abstinence Syndrome for Opiates abuse. - Psychiatry assessment prior to hospital discharge. - High risk discharge from hospital. - TCA MO 2 weeks post discharge. - Assess: - Mental health - Mother-child interaction - family support - Withdrawal symptoms - Care of the baby and vaccinations. Lactation¹¹ - If the patient is in abstinence, breastfeeding is encouraged and not contraindicated. - If patient is still actively using drugs, breastfeeding is not encouraged. Contraception Refer MEC guidelines. PPC Register PPC & continue disease optimization.

REMARKS

Impact of substance use:

- Spending more time getting and using drugs and recovering from substance use
- Neglecting responsibilities at home, work, and school because of substance use
- Continue to use even it causes relationship problems
- Giving up important or desirable social and recreational activities due to substance use
- Using substances in risky settings and dangerous situation
- Continue to use despite substance causing physical and mental health.

Effect of drug addiction

Mother	Baby
•miscarriage •placenta previa •placenta abruptio •impaired fertility	•stillbirth, •intrauterine growth retardation •birth defects •low birth weight •infant respiratory tract infection •sudden infant death syndrome •fetal alcohol syndrome •central nervous syndrome abnormalities •cognitive and behavioral problems

Withdrawal symptoms

Benzodiazepines	Cocaine
•anxiety •agitation •sweating •increase heart rate •trouble sleeping •nausea &/ vomiting •hallucinations •seizures	•depressed mood •ongoing tiredness/lethargy •insomnia/hypersomnia •anxiety •irritability •paranoia •increased appetite •problems with concentration •slowed thoughts and movement •intense drug craving
Alcohol	Opiod
•elevated blood pressure •racing pulse •sweating •insomnia •tremors •anxiety •agitation •headache •nausea/vomiting •hallucinations •seizures	•nervousness/anxiety •trouble sleeping •frequent yawning •nausea •diarrhea •flu-like symptoms •muscle cramps/body aches •excessive sweating •hot and cold flashes •goosebumps

APPENDIX

Figure 13: Criteria for Substance Use Disorders DSM-V Substance Use Disorders

Criteria for Substance Use Disorders DSM-V Substance use disorders span a wide variety of problems arising from substance use, and cover 11 different criteria:

1. Taking the substance in larger amounts or for longer than you're meant to.
2. Wanting to cut down or stop using the substance but not managing to.
3. Spending a lot of time getting, using, or recovering from use of the substance.
4. Cravings and urges to use the substance.
5. Not managing to do what you should at work, home, or school because of substance use.
6. Continuing to use, even when it causes problems in relationships.
7. Giving up important social, occupational, or recreational activities because of substance use.
8. Using substances again and again, even when it puts you in danger.
9. Continuing to use, even when you know you have a physical or psychological problem that could have been caused or made worse by the substance.
10. Needing more of the substance to get the effect you want (tolerance).
11. Development of withdrawal symptoms, which can be relieved by taking more of the substance.

Severity of Substance Use Disorders The DSM-V allows clinicians to specify how severe or how much of a problem the substance use disorder is, depending on how many symptoms are identified.

- Two or three symptoms indicate a mild substance use disorder.
- Four or five symptoms indicate a moderate substance use disorder, and
- Six or more symptoms indicate a severe substance use disorder.

Clinicians can also add:

- "in early remission,"
- "in sustained remission,"
- "on maintenance therapy,"
- "in a controlled environment."

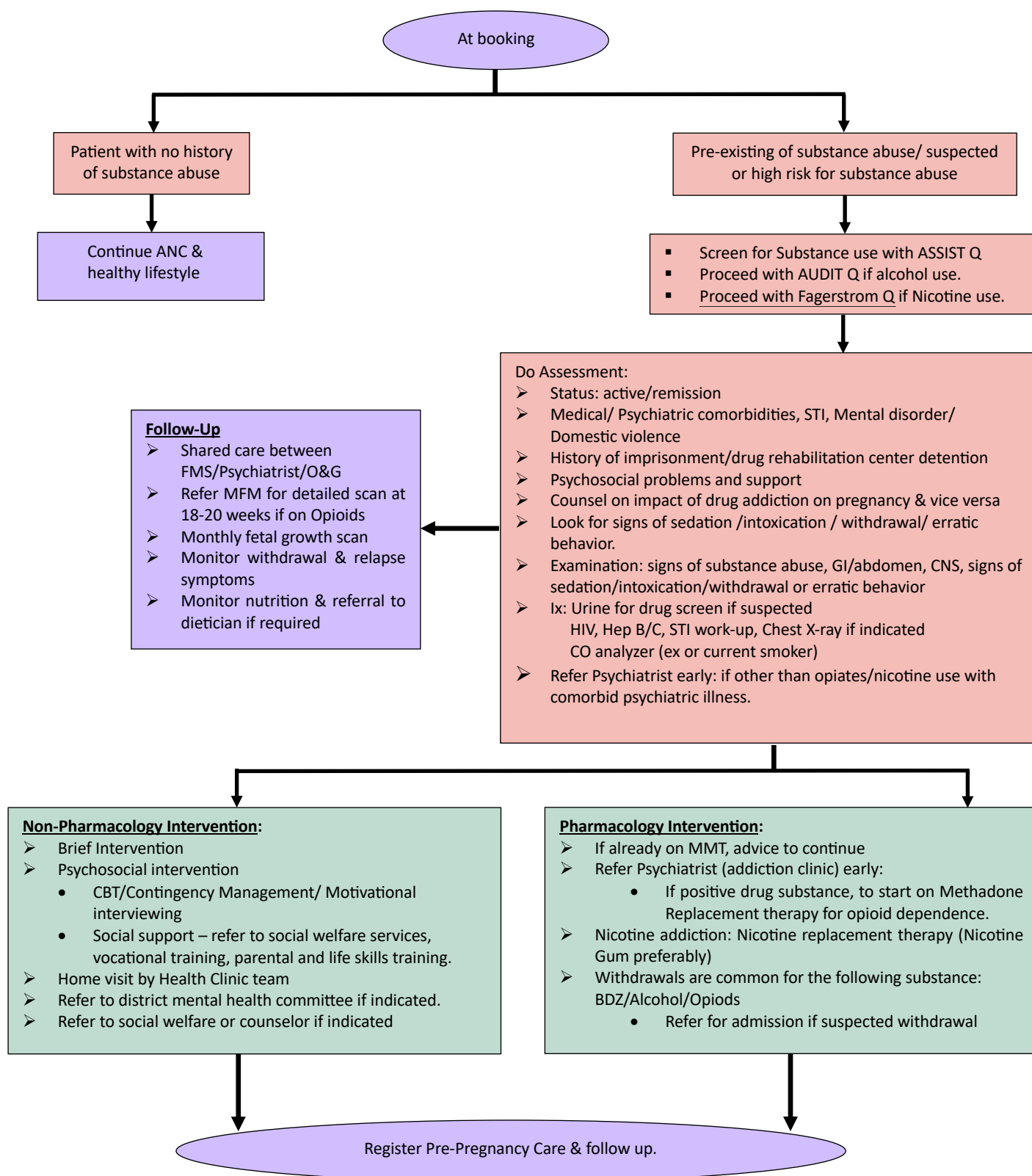
Figure 14: Management of Perinatal Substance Use

Figure 15: ASSIST Screening

A. The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)**Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST) Questionnaire**

1. In your life, which of the following substances have you ever tried (non-medical use only)											
• Tobacco products	Yes	☐	No	☐	• Inhalants	Yes	☐	No	☐		
• Alcoholic beverages	Yes	☐	No	☐	• Sedatives/ sleeping pills	Yes	☐	No	☐		
• Cannabis	Yes	☐	No	☐	• Hallucinogens	Yes	☐	No	☐		
• Cocaine	Yes	☐	No	☐	• Opioids	Yes	☐	No	☐		
• Amphetamine type stimulants	Yes	☐	No	☐	• Others	Yes	☐	No	☐		
2. During the past 3 months, how often have you used the substances you mentioned (first drug, second drug etc.											
Never (0)	☐	Once/Twice (2)	☐	Monthly (3)	☐	Weekly (4)	☐				
Daily/Almost Daily (6)	☐										
3. During the past 3 months, how often have you had a strong desire or urge to use (first drug, second drug, etc)?											
Never (0)	☐	Once/Twice (3)	☐	Monthly (4)	☐	Weekly (5)	☐				
Daily/Almost Daily (6)	☐										
4. During the past 3 months, how often has your use of (first drug, second drug etc) led to health, social, legal or financial problems											
Never (0)	☐	Once/Twice (4)	☐	Monthly (5)	☐	Weekly (6)	☐				
Daily/Almost Daily (7)	☐										
5. During the past 3 months, how often have you failed to do what was normally expected of you because of your use of (first drug, second drug etc)?											
Never (0)	☐	Once/Twice (5)	☐	Monthly (6)	☐	Weekly (7)	☐				
Daily/Almost Daily (8)	☐										
6. Has a friend or relative or anyone else ever expressed concern about your use of (first drug, second drug etc)?											
Never (0)	☐	Yes, in the past 3 months (6)	☐	Yes, but not in the past 3 months (3)	☐						
7. Have you ever tried and failed to control, cut down or stop using of (first drug, second drug etc)?											
Never (0)	☐	Yes, in the past 3 months (6)	☐	Yes, but not in the past 3 months (3)	☐						
8. Have you ever used any drug by injection (non-medical use only)											
Never (0)	☐	Yes, in the past 3 months (6)	☐	Yes, but not in the past 3 months (3)	☐						

Assist Risk Score and Associated Risk Level and Intervention

Alcohol	Other Substances	Risk Level	Intervention
0-10	0-3	Lower risk	• General health Advice
11 – 26	4 – 26	Moderate risk	• Brief intervention • Take home booklet & information
27 +	27 +	High risk	• Brief intervention • Take home booklet & information • Referral to specialist assessment and treatment
Injected drugs in last 3 months		Moderate and high risk	• Risk of injecting card • Brief intervention • Take home booklet & information • Referral for testing for blood-borne virus (BBV) • Referral to specialist assessment and treatment

Figure 16: AUDIT-10 questionnaire: Alcohol Abuse

The Alcohol Use Disorders Identification Test : Interview Version	
Read questions as written. Record answers carefully. Begin the AUDIT by saying 'Now I am going to ask you some questions about your alcoholic beverages during this past year'. Explain what is meant by 'alcoholic beverages' by using local examples of beer, wine, vodka etc. Code answers in terms of 'standard drinks'. Place the correct answer number in the box at the right.	
1. How often do you have a drink containing alcohol? (1) Never [skip to Questions 9-10] (2) Monthly or less (3) 2 to 4 times a month (4) 2 to 3 times a week (5) 4 or more times a week	6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session? (1) Never (2) Less than monthly (3) Monthly (4) Weekly (5) Daily or almost daily
2. How many drinks containing alcohol do you have on a typical day when you are drinking? (1) 1 or 2 (2) 3 or 4 (3) 5 or 6 (4) 7, 8 or 9 (5) 10 or more	7. How often during the last year have you had a feeling of guilt or remorse after drinking? (1) Never (2) Less than monthly (3) Monthly (4) Weekly (5) Daily or almost daily
3. How often do you have six or more drinks on one occasion? (1) Never (2) Less than monthly (3) Monthly (4) Weekly (5) Daily or almost daily Skip to Question 9 – 10 if Total Score for Questions 2 and 3 is 0	8. How often during the last year have you been unable to remember what happened the night before because you had been drinking? (1) Never (2) Less than monthly (3) Monthly (4) Weekly (5) Daily or almost daily
4. How often during the last year have you found that you were not able to stop drinking once you had started? (1) Never (2) Less than monthly (3) Monthly (4) Weekly (5) Daily or almost daily	9. Have you or someone else been injured as a result of your drinking? (1) No (2) Yes, but not in the last year (3) Yes, during the last year
5. How often during the last year have you failed to do what was normally expected from you because of drinking? (1) Never (2) Less than monthly (3) Monthly (4) Weekly (5) Daily or almost daily	10. Has a relative or friend or a doctor or another health worker been concerned about your drinking or suggested you cut down? (1) No (2) Yes, but not in the last year (3) Yes, during the last year

Figure 17: Modified Fagerstrom Test for Nicotine Dependence Questionnaire (Malay Version)

Ujian Fagerstrom bagi Ketagihan Nikotin		Skor
1. Bilakah anda mula menghisap rokok selepas bangun dari tidur? ☐ Dalam 5 minit ☐ 6 – 30 minit ☐ 31 – 60 minit ☐ 61 – 90 minit	3 2 1 0	
2. Adakah anda menghadapi masalah untuk mengelakkan diri dari merokok apabila anda berada di dalam kawasan larangan merokok? ☐ Ya ☐ Tidak	1 0	
3. Pada waktu bilakah paling sukar bagi anda untuk tidak merokok? ☐ Awal pagi ☐ Waktu lain	1 0	
4. Berapakah batang rokok yang anda hisap dalam sehari? ☐ 10 batang atau kurang ☐ 11 – 20 batang ☐ 21 – 30 batang ☐ 31 batang atau lebih	3 2 1 0	
5. Adakah anda merokok lebih kerap dalam tempoh satu jam selepas bangun dari tidur berbanding waktu lain? ☐ Ya ☐ Tidak	1 0	
6. Adakah anda merokok walaupun di waktu sakit? ☐ Ya ☐ Tidak	1 0	
Jumlah skor		

Penilaian Dan Penentuan Tahap Ketagihan

Skor Fagerstrom	Bilangan Rokok Dihisap	Tahap Ketagihan
0 – 3	< 10	Rendah
4 – 6	10 – 25	Sederhana
7 – 10	> 25	Tinggi

REFERENCES

1. Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5). *American Psychiatric Association*. (2013).
2. Clinical Practice Guideline: Management of Major Depressive Disorder, (second edition). *Ministry of Health Malaysia*. (2019).
3. Guidelines on Pre-Pregnancy Care in MOH Specialist Hospital. *Ministry of Health Malaysia*. (2023).
4. Perinatal Care Manual 4th Edition. Ministry Of Health Malaysia. (2020).
5. Shaila Misri et al. Perinatal Generalized Anxiety Disorder: Assessment and Treatment. *Journal of women's health*, vol.24. (2015).
6. Osborne, Lauren M. 3. R (Harris, Revised 2023) recognizing and Managing Postpartum Psychosis: A Clinical Guide for Obstetric Providers. *Obstet Gynecol Clin North Am*. Sep, Vol. 45. (2018)
7. Clinical Practice Guideline: Management of Schizophrenia (Second Edition). *Ministry of Health Malaysia*. (2021).
8. Clinical Practice Guideline: Management of Bipolar Disorder in Adults. *Ministry of Health Malaysia*. (2014).
9. Guidelines for identification and management of substance use and substance use disorders in pregnancy. *World Health Organization (WHO)*. (2014).
10. Team, A. S. A. M., Team, A. A. A. P., & Team, I. R. E. T. A. The ASAM/AAAP Clinical Practice Guideline on the Management of Stimulant Use Disorder. (2024).
11. Harris, M., Schiff, D. M., Saia, K., Muftu, S., Standish, K. R., & Wachman, E. M. Academy of Breastfeeding Medicine Clinical Protocol# 21: Breastfeeding in the Setting of Substance Use and Substance Use Disorder (Revised 2023). *Breastfeeding Medicine*, 18(10), 715-733. (2023).