KEMENTERIAN KESIHATAN MALAYSIA
JABATAN KESIHATAN NEGERI TERENGGANU

CARING FOR PREGNANT WOMEN WITH MEDICAL CONDITIONS

Terengganu State Protocol for
Initial Care for Common Medical Conditions in
Pregnancy and When to Refer to the Antenatal
Combine Clinic

A COLLABORATIVE PUBLICATION BETWEEN MEDICAL AND PUBLIC HEALTH DIVISIONS

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First edition 2024

DISCLAIMER

As medicine is an ever-changing science, changes in treatment and drug therapy may happen as new research and clinical experience broaden our knowledge. The recommendations in this book are carefully compiled by the authors based on sources (international and local guidelines as well as expert opinion on best practises within the respective fields) believed to be reliable in their efforts to provide information that is complete and generally in accord with the standards accepted as of the date of publication.

While every effort has been made to ensure the information and drug doses in this book are correct and accurate as of the date of publication, the authors cannot be held responsible for errors or any undesirable consequences arising from the use of the information contained herein in view of the possibility of human error or changes in medical sciences.

The recommendations in this book do not take away the medical practitioner's responsibility to make decisions appropriate to the individual patient's circumstances in consultation with their families, caregivers, or guardians. Readers are encouraged to confirm the information contained herein with other sources. Always refer to the manufacturer's prescribing information before prescribing drugs cited in this book.

This is the first edition of this consensus, which is published in 2024. The next suggested review for new evidence and best current practises is in 2026 (a three-yearly review) in preparation for the publication of the second edition.

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FOREWORD

Managing pregnant patients, especially those with medical conditions, can be a challenge for both primary care doctors and hospitalists. Depending on the complexity of the case, the majority of these patients require shared care, at least among primary care medicine, internal medicine, and obstetrics, sometimes with further input from other specialties as well.

The availability of a guideline is crucial to ensuring the consistent provision of high-quality, evidence-based holistic care to pregnant women with medical conditions when they access services provided locally across hospitals and health clinics within the state of Terengganu.

In developed countries such as the United Kingdom (UK), the National Institute of Health and Care Excellence (NICE), in collaboration with the Royal College of Obstetricians and Gynaecologists (RCOG), developed the national Antenatal Care guideline back in 2021, and many local National Health Service (NHS) Trusts adapted it and developed local guidelines to suit the practices and available resources at their hospitals and clinics, yet making sure the recommendations that are implemented do not deviate from the national guidelines.

Similarly, we have a national guideline called the Perinatal Care Manual (4th Edition), which was published by the Division of Family Health Development, Ministry of Health of Malaysia, in 2020. I am very delighted that the authors from the Internal Medicine Department of Hospital Sultanah Nur Zahirah (HSNZ) and Hospital Kemaman have taken the initiative to collaborate with the obstetricians from HSNZ and family medicine specialists to come up with this consensus book.

The recommendations in this consensus are based on the Perinatal Care Manual (4th Edition), together with other local and international guidelines as well as articles tailored to local practices and available resources (yet do not deviate from the national guidelines).

In addition to that, this book features a few topics guiding the junior doctor to approach common symptoms when the pregnant women initially present to them.

I believe that this consensus book will prove to be useful and provide convenience to doctors managing pregnant women with medical conditions, as it provides a one-stop reference for recommendations from multiple national and international sources. It is my hope that the consensus will also be taken up by doctors in private practice within the state of Terengganu and eventually also be a source of reference for doctors practicing in other states.

Last but not least, I would like to congratulate the physicians, obstetricians, and family medicine specialists on the publication of 'Caring for Pregnant Women with Medical Conditions - Terengganu State Protocol for Initial Care for Common Medical Conditions in Pregnancy and When to Refer to the Antenatal Combine Clinic.'

DATO' DR.HJH KASEMANI BINTI EMBONG

Terengganu State Health Director

PREFACE

For many clinicians, having to manage pregnant patients can be a daunting task. This is due to the fact that the clinician's hands are tied in many circumstances while a patient is pregnant (two lives are involved, there are limited medications that are safe in pregnancy, procedures are delayed, etc.) and the preconception that managing obstetric cases carries a potentially higher medicolegal impact. To make things worse, pregnant patients who are suffering from concurrent medical conditions are even more challenging to manage.

Many junior colleagues (whether working in primary care medicine, internal medicine, or other departments) have provided feedback to us regarding the difficulty in managing pregnant patients with medical conditions, and some have shunned seeing such patients whenever the opportunity permits. Having served in the internal medicine department and particularly being in charge of the antenatal combine clinic, we face many inter-department and primary care referrals for obstetric cases with medical conditions. Despite that, to this day, we still find that managing such patients is more difficult compared to their counterparts who are in a non-pregnant state. Multidisciplinary involvement is one of the important aspects, as it draws upon the strengths of each specialty involved to provide better care for the pregnant mother.

Hence, it is our hope that through our efforts in compiling this consensus book, it will shed some light on the initial management and monitoring of pregnant women with medical conditions as well as when referral for multidisciplinary management is reasonable.

The project of compiling information from various sources into this useful resource book began in May 2022 and the process has been long and gruelling. We have tried to keep the headings for all the topics in the same format to make reading and referencing easier. When not specifically stated, counselling in the pre-pregnancy section applies to the antenatal period as well.

This book is designed to provide a framework to enable the consistent provision of high-quality, evidence-based holistic care to pregnant women with medical conditions when they access services provided locally within the state of Terengganu (both public and private sectors). It should be read in tandem with the national guideline - Perinatal Care Manual (4th Edition), published by the Division of Family Health Development, Ministry of Health Malaysia (2020). We have tried to standardise our recommendations in this book with the Perinatal Care Manual (4th Edition), but adjusted them to suit local practices. Further information on pre-pregnancy care can be found in the recently published Guidelines on Pre-Pregnancy Care in MOH Specialist Hospital, published in 2023 by Obstetrical & Gynaecological and Paediatric Services Unit of the Medical Services Development Section, Medical Development Division, Ministry of Health Malaysia in collaboration with Jawatankuasa Pengurusan dan Perkembangan O&G KKM (JPPOBG).

As this is the first edition of this book, feedback from readers is welcome. We will also post important updates (if any) from time to time on any particular topic or announcement. All these can be accessed via the respective QR code or link in the "Feedback Form & Updates and Announcements" section.

For healthcare practitioners practising in Terengganu, we have also compiled the workflow for referral and contact details of the physicians in-charge of the antenatal combine clinic for your convenience.

Finally, we hope that this book will come in handy and will be thought of as "the source of reference" whenever the reader faces problems managing pregnant women with medical conditions.

Happy reading, and do enjoy managing pregnant women with medical conditions!

Authors

September 2023,
Kuala Terengganu.

ACKNOWLEDGEMENT

The authors would like to thank Datin Dr. Zariah Abdul Aziz, former head of the Department of Medicine, Hospital Sultanah Nur Zahirah (HSNZ) for her support when we decided to initiate this project of compiling information from different sources into this useful resource book. This continued support was given by our current head of department, Dr. Zamri Bin Mohamed, who has supported us through the publication of this book.

At the same time, we are indebted heavily to the support of consultants of various subspecialties from the Department of Medicine of HSNZ, the Department of Obstetrics and Gynaecology of HSNZ, and family medicine specialists (FMS) from the state of Terengganu for reviewing the manuscript and providing valuable feedback to us that led to the final copy of this book.

We would also like to thank the Terengganu State Health Department (JKNT) for their support in publishing this consensus book.

This is indeed the fruit of a joint effort between physicians, obstetricians, and family medicine specialists, and the authors hope that co-managing pregnant patients with medical conditions among all specialties and departments involved will be as enjoyable as the collaborative process of compiling this book.

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September 2023,
Kuala Terengganu.

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A FEW WORDS REGARDING THE BOOK

I am happy to write a few words for the book entitled **'Caring for Pregnant Women with medical conditions'** prepared by a group of six physicians working at HSNZ (Hospital Sultanah Nur Zahirah). They have fulfilled a need required by most primary care physicians or doctors who have difficulty in managing pregnant patients with medical condition. Managing such patients can be a challenge for many reasons including lack of expertise, safety aspects, fear of litigation and many more.

There is a National Guideline prepared by the Ministry of Health of Malaysia called the Perinatal Care Manual (4th Edition) which was published by the Division of Family Health Development in 2020 but the section on medical conditions in pregnancy have been given little emphasis. There is a real need to further revamp and enhance the information provided. The publication of this book is therefore timely and relevant not just in the in the State of Terengganu but also in similar clinical settings observed throughout the country.

To their credit, the selected topics have been reviewed in detail by the relevant consultants especially those in Internal Medicine, Obstetrics and Gynaecology and Family Medicine. I would like to recommend that updates be included in the following editions of this book so that the contents of the book will remain relevant and current and hence cannot be challenged by any authority.

I would like to congratulate the six physicians for taking this initiative to publish this book. Being an author, an editor, and an experienced clinician myself, I am well aware that doing something noble like this is rewarding as long as it can be used beneficially by all our colleagues in the public and private sectors. The book itself is worthy but the effortsand the foresight by our sixphysicians are indeed commendable and they should be encouraged and given the honour they truly deserve.

TAN SRI DATO'SERI DR. HAJI MOHAMED ISMAIL BIN MERICAN

Former Director General of Heath and Senior Consultant Physician and Hepatologist

GLOSSARY

ABG – Arterial blood gas

ACEi – Angiotensin-converting enzyme inhibitors

AED – Anti-epileptic drug

ALT – Alanine aminotransferase

ARB – Angiotensin II receptor blockers

AST – Aspartate aminotransferase

ATD - Anti-thyroid drugs

BP – Blood pressure

BPM – Beats per minute

BSP – Blood sugar profile

CLD – Chronic liver disease

CPG – Clinical practice guidelines

CRP – C-reactive protein

CT – Computer tomography

CTPA – Computer tomography pulmonary angiogram

CV – Cardiovascular

CXR – Chest X-ray

DAA – Direct-acting antiviral

DM – Diabetes mellitus

DOTs – Directly observed therapy (for TB)

ECG – Electrocardiogram

EMTCT – Elimination of mother-to-child transmission

FBC – Full blood count

FDA – Federal Drug Administration

FMS – Family medicine specialist

GDM – Gestational diabetes mellitus

GGT – Gamma-glutamyl transferase

Hb – Haemoglobin

HBS – Hepatobiliary system

HELLP – Hemolysis, elevated liver enzymes and low platelets

HIV – Human immunodeficiency virus (infection)

HR – Heart rate

LFT – Liver function test

LMWH – Low molecular weight heparin

MCH – Maternal and child health

MOPD – Medical Out-Patient Department (Clinic)

MTCT – Mother-to-child transmission

NSAID – Non-steroidal anti-inflammatory drug

NYHA – New York Heart Association

OGDS – Oesophagogastroduodenoscopy

P.O. / PO – Per os (Latin: "by mouth")

PPH – Post partum haemorrhage

PPI – Proton pump inhibitors

PR – Pulse rate

PRN – Pro re nata (Latin "when necessary")

RR – Respiratory rate

SMBG – Self-monitoring of blood glucose

SpO_2 – Oxygen saturation

TB – Tuberculosis

TFT – Thyroid function test

TRAb – Anti-TSH receptor antibodies

TPN – Total parenteral nutrition

TPOAb – Thyroid peroxidase antibodies

TSH – Thyroid stimulating hormone

UFEME – Urine full examination, microscopic examination

UPCR – Urine protein creatinine ratio

VKA – Vitamin K antagonist

CONTENTS

CARDIOVASCULAR AND RESPIRATORY MEDICINE

HYPERTENSIVE DISORDERS IN PREGNANCY (HDP)

Remarks:

- Hypertension in pregnancy is defined as:
  - Blood Pressure of 140/90mmHg taken after a period of rest on two occasions

Mild	Characterised by SBP 140-149mmHg and or DBP 90-99 mmHg without albuminuria
Moderate	SBP 150-159mmHg and or DBP 100-109mmHg
Severe	Severe HDP is characterised by progressive deterioration in both maternal and foetal condition. It is characterised by: • SBP ≥160mmHg or DBP ≥110mmHg on two occasions 4-6 hours apart • Proteinuria of (3+) or >3g/L • Oliguria (<400ml/24 hours) • Headache • Cerebral or visual disturbances • Epigastric pain • Hyper-reflexia • Pulmonary oedema • Impaired liver function tests • Increased serum creatinine (>1.2mg/dl) • Retinal haemorrhage, exudates or papilloedema • Thrombocytopenia • IUGR (intrauterine growth restriction)

- Pregnancy-Induced Hypertension (PIH): Hypertension at and after the 20th weeks of pregnancy in a previously normotensive woman. The condition is expected to return to normal after 3 months post partum.
  - Gestational Hypertension (GH):PIH without proteinuria
  - Pre-eclampsia (PE):PIH with proteinuria and/or blood investigation abnormalities and/or IUGR
    - HELLP syndrome is a severe form of PE manifested by Haemolysis, Elevated Liver Enzymes and Low Platelets (Microangiopathic haemolytic anaemia on full blood picture, Thrombocytopenia≤100 x 10^9/L, AST or ASOT ≥70IU/L, LDH ≥600IU/L)
  - Eclampsia: PIH with convulsions
- Chronic Hypertension: Defined as the presence of hypertension of at least 140/90 before 20 weeks of pregnancy OR beyond 3 months postpartum.
- Chronic Hypertension with Superimposed PE: Refers to the development of PE in women who have pre-existing hypertension. Criteria used should include worsening hypertension, proteinuria and non-dependent oedema.
- Proteinuria is defined as 300mg/24 hours urine collection or 1g/L or more in two randomly collected urine samples collected 6 hours apart. Urinary tract infections must be excluded.

Standard urine dipstick test for freshly voided urine sample	
Urine dipstick	**Urine protein**
Negative	0 mg/dL
Trace	15 - 30mg/dL
1+	30 - 100mg/dL
2+	100 - 300mg/dL
3+	300mg - 1g/dL
4+	>1g/dL
Note: Urine dipstick test 1+ (30mg/dL) roughly equal to urine protein 300 mg/24 hours	

CHECKLIST FOR PRE-PREGNANCY COUNSELLING

- Screening question: Ask all women with chronic hypertension on follow-up if they wish to get pregnant during every clinic review
- Screen for secondary causes of hypertension
- Rule out secondary complications of hypertension
- Review medications and change medications to non-teratogenic options
- Advise and enforce contraception prior to disease optimization for patients with chronic hypertension
- Refer to Pre-Pregnancy Clinic for all women with chronic hypertension who express the wish to conceive

- Counselling
    - Lifestyle modifications such as weight management, exercise, healthy eating, and lowering the amount of salt in their diet
    - Compliance with medication (if any)
    - Effective contraception to avoid unplanned pregnancies
    - Importance of antenatal care and complications of HDP
        - Mother
            - Fits: this condition is called eclampsia
            - Risk of developing a stroke
            - Severe uncontrolled hypertension and heart failure
            - Collection of excessive fluid in the lungs (pulmonary oedema)
            - Kidney and liver function can be affected, resulting in loss of protein in the urine
            - Early separation of the placenta from the wall of the womb
            - Failure of blood to clot due to reduction of blood clotting factors
        - Baby
            - Failure of baby to grow satisfactorily (growth retardation in the womb)
            - Tendency for baby to die in the womb i.e. being stillborn

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

- Counselling
    - Regarding her condition, management options, need for regular antenatal care
    - Inform patient to notify doctor or nurse if
        - Abnormal weight gain
        - Oedema or swelling of hands, feet, and/or face e.g. puffy eyes, tight rings on fingers, tight shoes
        - Epigastric pain
        - Nausea and vomiting
        - Headache
        - Blurred vision

- Do not recommend salt restriction during pregnancy solely to prevent gestational hypertension or pre-eclampsia
- Give the same advice on rest, exercise and work to women with chronic hypertension or at risk of hypertensive disorders during pregnancy as healthy pregnant women

- Mild HDP in the absence of proteinuria may be managed on an outpatient basis
  - BP ≥140/90mmHg but less than 160/100mmHg
  - No proteinuria
  - No signs/symptoms of impending eclampsia
  - No excessive weight gain
  - No signs of intrauterine growth retardation
  - Normal biochemical investigation
- Withhold ACE-I (angiotensin-converting enzyme inhibitors), ARB (angiotensin II receptor blockers) and thiazides, replace them with anti-hypertensive medications that are safe in pregnancy
- Assessment by doctor
  - Maternal Surveillance
    - Blood Pressure, Weight gain, Urine for protein*.
    - Signs/symptoms of impending eclampsia should be elicited
    - Baseline biochemical investigations: Platelet count, Haematocrit, Serum Uric Acid, Serum Creatinine
    - ECG in chronic hypertension
    - 24-hour Urine Protein (if necessary)**
  - Foetal Surveillance
    - Fundal Height
    - Foetal Heart
    - Foetal Movement (Foetal Kick Chart)
    - Serial Ultrasound (if available):
      - growth parameters (BPD/FL/AC/HC)
      - Amniotic Fluid Index (AFI)
- Frequency of visits should be individualised (may be as frequent as daily BP review) depending on blood pressure control or in the presence of other complications
- Aim of treatment is to maintain a diastolic BP around 90-100mmHg
- Not all mild HDP requires antihypertensive treatment; the majority may benefit from adequate rest
- Antihypertensive therapy
  - May be started when diastolic BP ≥100mmHg, and / or systolic BP ≥160mmHg
  - Start with oral monotherapy, increase gradually until the maximum dose
    - Methyldopa (250-3000mg/day in divided doses) – preferred if less than 20 weeks gestation
    - Labetalol (100-2000mg/day in divided doses)

- May consult FMS / O&G specialist if there is a need to add a second medication

- Aspirin 150mg daily from 12 weeks of gestation and calcium carbonate 1g BD at 20 weeks of gestation until delivery are recommended in women at high risk or with ≥ two moderate risks for pre-eclampsia

High Risk (if 1 present)	Moderate Risk (if ≥2 present)
1. Diabetes mellitus (Type I or II)	1. Primigravida
2. Chronic / Essential hypertension	2. Age ≥40 years old
3. History of hypertensive disease in previous pregnancy especially if associated with an adverse event	3. Last child birth ≥10 years
	4. BMI ≥30 at booking
	5. Family history of pre-eclampsia
4. Chronic kidney disease	6. Multiple pregnancy
5. Autoimmune disease (e.g. SLE)	7. Assisted reproduction (e.g., IVF)

Remarks:

* Do not use first morning urine void to quantify proteinuria in pregnant women

** Use 30 mg/mmol as a threshold for significant proteinuria

- Management of severe HDP in a hospital without O&G specialist
  - Managed and monitored in a high-dependency area while awaiting transfer to a hospital with specialist (consult O&G specialist in the nearest hospital)
  - Maintain an IV drip of normal saline
  - IM MgSO4 10g (5g each buttock) stat or IV MgSO4 4g slow bolus over 10-15 minutes if not given earlier
  - Record maternal BP, PR, RR and foetal HR every 15 minutes
  - If diastolic BP ≥110mmHg, consider giving IV Hydralazine / Labetalol
  - Continue oral antihypertensive medication
  - Insert a Foley's catheter, send UFEME to test for proteinuria, and record urine output
  - Inform husband or next of kin, offer them to accompany the patient (with written consent form)while transfer to the next hospital
  - If foetus is preterm (36 weeks and below), dexamethasone (12mg 12 hourly x 2 doses) should be administered to improve lung maturity (provided there is no evidence of tuberculosis or intrauterine infection

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer O&G team urgently if
  - Failed ambulatory care (out-patient) management
    - Symptomatic patient
    - Maternal or foetal complications
    - Persistent diastolic blood pressure >100mmHg or systolic blood pressure>160mmHg, for stabilization
    - Abnormal biochemical PE profile
    - Presence of severe proteinuria >2+
  - For detailed scan at 22 - 24 weeks of gestation if exposure to ACEI, ARB or thiazides in first trimester
  - In severe HDP, arrange for transport and accompany the patient to hospital
    - Set up IV drip with normal saline for emergency administration of drugs for resuscitation if the need arises

        - Serve deep IM MgSO4 10g bolus(5g each buttock) to prevent eclampsia
        - Serve oral Nifedipine 10mg stat to lower blood pressure
        - Record maternal BP&PR and foetal HR every 15 minutes during transfer
- Antenatal Combine Clinic appointment arranged by O&G team (if needed)
    - If difficult to control hypertension (despite optimizing oral Methyldopa, Labetolol and Nifedipine dose)
    - Secondary cause for hypertension identified

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- Delivery in a facility with resident Obstetrician
- Timing of delivery
    - In the absence of maternal and foetal complications, pregnancy should not be allowed beyond dates (40 weeks)
    - If at any time the maternal and foetal conditions are compromised, early delivery is mandatory, and appropriate corticosteroid usage is necessary
- Mild HDP may become severe during labour; hence, close vigilance monitoring as per local labour ward protocol is essential
- Antihypertensives should be continued
- Intravenous line should be secured, strict input/output chart
- Watchout for eclampsia and manage accordingly
- If on IV MgSO4, monitor for magnesium toxicity
- Paediatrician to standby at delivery if needed
- Adequate analgesia is essential (preferably epidural)
- Use only Syntocinon during the third stage of labour

POSTPARTUM CARE

- BP may settle after delivery; however, the patient is still at risk of developing complications, and the continuation of maternal monitoring is essential
- If indicated for IV MgSO4 infusion, continue at least 24 hours postpartum or after the last fit
- In severe HDP / pre-eclampsia / HELLP syndrome / eclampsia, monitor in high-dependency area for at least 24 hours
- Antihypertensive drugs should be continued as dictated by BP
- Counselling
    - Compliance with medication and follow-up
    - Signs or symptoms of impending eclampsia
    - Offer effective contraception to avoid unplanned pregnancies
- Upon discharge, (1) prepare a plan of management in the patient's antenatal card & (2) notify nearest health clinic either by phone

- The patient has to be seen and examined by a doctor either in the hospital or at Klinik Kesihatan until 3 months post-natal period
- Pre-pregnancy counselling arranged for patients with chronic hypertension before next pregnancy
- Continue follow-up at Klinik Kesihatan (refer MOPD if indicated)
    - To continue long-term follow-up of chronic hypertension
    - PIH with hypertension and proteinuria beyond the 3 months postnatal period
    - Young hypertension previously not investigated before

REFERENCES / FURTHER READING

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OVERVIEW HEART DISEASE IN PREGNANCY

Note: This section provides a general overview for pregnant women with heart diseases such as, but not limited to, severe valvular lesions, grown-up congenital heart disease (GUCHD), severe pulmonary hypertension, ischaemic heart disease, cardiomyopathy, cardiac arrhythmias, and heart failure.

CHECKLIST FOR PRE-PREGNANCY COUNSELLING

- Screening question: Ask all women in the reproductive age group with heart diseases on follow-up if they wish to get pregnant during every clinic review
- Refer to Pre-Pregnancy Clinic for all women with heart disease who express the wish to conceive

- Counselling should be initiated early at puberty and re-emphasised at ages 16-18 (with congenital heart disease) and prior to marriage, and should continue until they have completed their family
- Preconception clinical assessment
    - Thorough history focusing on current physical activity, past cardiac events or surgeries and any planned cardiac intervention
    - Assess for comorbidities
    - Detailed clinical examination: including facial oedema, lower limb swelling, BP, regularity of pulse, and heart murmur
    - Review medication (refer to Additional Information IV): switch or withhold medication which potentially harm the foetus (FDA class C / D / X) and substituting with safer alternative
    - Review past pregnancies
    - Advise against smoking, vaping and alcohol consumption
- Stratify risk using the modified WHO (mWHO) maternal cardiovascular risk assessment (refer to Additional Information II) and NYHA classification (refer to Additional Information III)

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

- Counselling
    - Contraception for patients with known case of heart disease pending evaluation, definite management, or prior disease optimisation
    - For long-acting reversible contraception until heart disease optimisation or treatment is completed
    - In mWHO class IV, family counselling with strong advice against pregnancy and for effective contraception
    - Appropriate optimisation of heart condition (± intervention) prior to pregnancy
    - Not to self-discontinue treatment if found pregnant; seek medical advice early

- Go to the nearest antenatal clinic (Klinik Kesihatan) for booking once pregnancy is confirmed
- Risk of genetic transmission to foetus (e.g., congenital heart disease, Marfan syndrome)
- If on lifelong warfarin, counsel on high risk of miscarriage and foetal demise
- Ensure compliance with follow-up in cardiac clinic / MOPD / Klinik Kesihatan

- T. Folic Acid 5mg daily

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

- Clinical assessment (same items as preconception clinical assessment mentioned in the section above)
- Review medication
- Baseline test: Renal profile, Fasting blood glucose, Lipid profile and ECG
- Further tests: CXR or Echocardiography if necessary
- Stratify risk using the mWHO and NYHA classification
  - Low risk: manage at local MCH after review by a family medicine specialist, physician or cardiologist
  - Moderate risk: co-managed at a tertiary centre
  - High risk: refer early to a tertiary centre for assessment, and termination of pregnancy is considered as soon as possible
- The following High-Risk patients should be offered termination of pregnancy (TOP)
  - Severe pulmonary hypertension, Eisenmenger syndrome, Marfan syndrome with aortic root dilatation > 4.5 cm, previous peripartum cardiomyopathy with residual impairment of left ventricular function, LVEF < 30%, NYHA Ill-IV, severe mitral stenosis (MVA < 1.0 cm^2), severe symptomatic aortic stenosis (AVA < 1.0 cm^2)
  - If patients offered TOP choose to continue pregnancy:
    - Detailed medical counselling and advice
    - Careful documentation in the medical records is mandatory
    - Close monitoring ± early hospitalisation (manage as per moderate risk)
- Monitoring: clinical assessment during review ± repeat ECG/echocardiogram
- If the patient is symptomatic or clinically unwell, refer for admission
- May need an anaesthesiology review and a detailed labour and delivery plan in advance (for certain conditions)
- Correct factors that may contribute to cardiac decompression, e.g., infection, arrhythmia, hypertension, and anaemia

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer Cardiology clinic
    - Patient beyond mWHO class II (moderate to severe CV risk)
    - Known severe valvular lesion / grown-up congenital heart disease (GUCHD) / severe pulmonary hypertension / ischaemic heart disease / cardiomyopathy / cardiac arrhythmia / heart failure patient with fertility desire lost to Cardiology follow-up
- Refer Antenatal Combine Clinic
    - Low CV risk cases
    - Suspicious murmur / ECG changes / suspicious heart failure symptoms
- Moderate to severe CV risk cases shall be followed up at antenatal combine clinic after being assessed at the tertiary centre (Cardiology Clinic / Antenatal Combine Clinic)

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- On a case-by-case basis, significant cardiac cases will have a detailed delivery plan from the multidisciplinary team
- Delivery plan as per obstetric indication if not discussed earlier
- Low CV risk cases: can be managed at district hospital with appropriate advice
- Moderate to high CV risk cases - deliver in a facility with resident Obstetrician
- May allow postdate unless specified otherwise
- Vaginal delivery is preferred with assisted second stage
- Syntometrine (synthetic oxytocin and ergometrine maleate) should be avoided during third stage; recommend to use Syntocinon (synthetic oxytocin)instead
- In preterm labour
    - If preterm delivery is warranted, corticosteroids should be considered
- During labour
    - Induction of labour may be achieved mechanically with a Foley catheter or PGE2
    - Spontaneous labour is usually quicker than induced labour and carries a higher chance of successful delivery
    - Prolonged and difficult labour should be avoided
    - Adequate analgesia (epidural analgesia is the analgesia of choice in labour) and appropriate care in labour
- Caesarean section should be reserved for:
    - Patients with Marfan syndrome and an aortic diameter > 45 mm
    - Patients with acute or chronic aortic dissection
    - Functional class NYHA Ill & IV
    - LVEF < 30%
    - Severe obstructive cardiac lesions
    - Severe pulmonary hypertension and Eisenmenger syndrome
    - Obstetric indications

POSTPARTUM CARE

- General postpartum care, if not discussed earlier
- High risk case will be admitted to a high-dependency area or ICU/HDW/CCU/CRW for close observation if necessary
    - Monitoring to detect signs of fluid overload: respiratory rate, oxygen saturation input-output charts
- Medication should be recommenced as indicated, with breastfeeding safety profile considered
- Oral anticoagulants, if indicated, should be recommenced and therapeutic INR should be achieved before discharge
- Continue pre-existing follow-up (if any)
- Offer effective contraception to avoid unplanned pregnancies
- Sterilisation should be offered if family completed
- Reiterate the need for preconception assessment and counselling if planning for future pregnancies

ADDITIONAL INFORMATION

I. CONTRACEPTION METHOD IN PATIENTS WITH HEART DISEASE

Method	Advantage	Disadvantage
Combined Oral Contraceptive Pill (COCP)	High efficacy	Higher risk of thrombosis (not to be given)
Progesterone Only Pill (POP)	Lower risk of thrombosis	Less efficacy than COCP Required strict discipline on taking drug at same time
Depo Provera (IM)	High efficacy	Risk of water retention
Implanon	High efficacy Lower risk of thrombosis	Lasts for 3 years
Intra-Uterine System (IUS)	High efficacy Lower risk of thrombosis	Lasts for 5 years
Intra-Uterine Contraceptive Device (IUCD)	High efficacy	Lasts for 5 years Risk of infection Risk of heavy menstrual bleed
Sterilisation	High efficacy	Irreversible measures
Barrier method	Less efficacy	Not reliable as sole contraceptive method

II. MODIFIED WORLD HEALTH ORGANIZATION (mWHO) MATERNAL CARDIOVASCULAR RISK ASSESSMENT

- Modified WHO classification of maternal cardiovascular risk: Principles

Risk class	Risk of pregnancy by medical condition
I	No detectable increased risk of maternal mortality and no / mild increase in morbidity
II	Small increased risk of maternal mortality or moderate increase in morbidity
III	Significantly increased risk of maternal mortality or severe morbidity.
IV	Extremely high risk of maternal mortality or severe morbidity; pregnancy contraindicated.

- Modified WHO classification of maternal cardiovascular risk: Application

Risk class	Conditions in Pregnancy	Maternal CV risk
I	Mild PS / PDS / MV prolapse; Successful repaired simple congenital heart lesion (ASD / VSD / PDA); Isolated PAC/PVC	Low risk
II	Unoperated ASD/VSD; Repair TOF; Most arrhythmias (AF, SVT, WPW syndrome)	Moderate risk
II-III	Mild LV impairment (EF 40-50%); HCM; Valvular heart disease not considered Class I / IV; Marfan syndrome without aorta dilatation; Repaired coarctation	
III	Moderate LV impairment (EF 35-40%); Mechanical valve; Fontan circulation; Systemic Right ventricular (cCTGA, post Senning / Mustard); Unrepaired cyanotic heart disease; Repaired TOF with severe PR / RV failure / RVOT obstruction; Other complex congenital heart disease; Marfan syndrome with aorta dilatation	
IV	Pulmonary arterial hypertension; Severe LV impairment (EF <30%), NYHA class III-IV; Previous peripartum cardiomyopathy with residual impaired LV function; Severe MS, severe symptomatic AS; Uncorrected severe coarctation	High risk

Remarks: PS: pulmonary stenosis; PDA: patent ductus arteriosus; MV: mitral valve
ASD: atrial septal defect; VSD: ventricular septal defect; TOF: Tetralogy of Fallot
AF: atrial fibrillation; SVT: supraventricular tachycardia; WPW: Wolff-Parkinson-White
PAC: premature atrial contraction; PVC: premature ventricular contraction
LV: left ventricular; EF: ejection fraction; HCM: hypertrophic cardiomyopathy
cCTGA: congenitally corrected transposition of the great arteries
PR: pulmonary regurgitation; RV: right ventricular
RVOT: right ventricular outflow tract; NYHA: New York Heart Association
MS: mitral stenosis; AS: aortic stenosis

III. NEW YORK HEART ASSOCIATION FUNCTIONAL CLASSIFICATION

Functional Class	Symptoms	Maternal CV risk
CLASS I	No limitation. Ordinary physical activity does not cause undue fatigue, dyspnoea or palpitation.	Low
CLASS II	Slight limitation of physical activity. Such patients are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnoea 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, dyspnoea 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

IV. MEDICATIONS TO AVOID IN PREGNANCY

Medication	FDA*	Adverse effect
High dose aspirin	D	May results in spontaneous abortion in 1st trimester
Clopidogrel	C	Unknown
Statin	X	Congenital Anomalies
Angiotensin Converting Enzyme inhibitor (ACEi)	D	Renal / tubular dysplasia Oligohydramnios Growth retardation
Angiotensin Receptor Blockers (ARB)	D	Renal / tubular dysplasia Oligohydramnios Growth retardation
Atenolol	D	1st trimester: hypospadias 2nd / 3rd trimester: bradycardia, hypoglycemia, low birth weight
Beta-blockers (Bisoprolol, Metoprolol, Propranolol)	C	Bradycardia and hypoglycemia in foetus
Labetalol	C	Foetal growth restriction (2nd and 3rd trimester)
Amlodipine	C	Unknown
Felodipine	C	Teratogenic effect
Nifedipine	C	Tocolytic
Frusemide	C	Oligohydramnios
Spironolactone	D	Anti-androgenic effect 1st trimester: oral clefts
Amiodarone	D	Thyroid insufficiency Hyperthyroidism Growth retardation
Digoxin	C	Digoxin toxicity if beyond therapeutic range
Nitrate (GTN, Isosorbide Dinitrate)	C	Tocolytic, bradycardia
Warfarin	D/X	Bleeding risk >5mg use in 1st trimester may results in teratogenicity / warfarin embryopathy
NSAIDs	C/D	Contraindicated at 3rd trimester
Aminoglycosides	D	Ototoxicity

Fluoroquinolones	C/D	Arthralgia
Tetracycline	D	Slow bone growth

*Federal Drug Administration (FDA) Pregnancy Categories

Category	Description
A	Adequate and well-controlled studies have failed to demonstrate a risk to the fetus in the first trimester of pregnancy (and there is no evidence of risk in later trimesters).
B	Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women.
C	Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.
D	There is positive evidence of human foetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.
X	Studies in animals or humans have demonstrated foetal abnormalities and/or there is positive evidence of human foetal risk based on adverse reaction data from investigational or marketing experience, and the risks involved in use of the drug in pregnant women clearly outweigh potential benefits.

* The new Pregnancy and Lactation Labelling Rule (PLLR) has taken effect on June 30th, 2015. This mandate from the FDA eliminated the standard pregnancy category letters for prescription medications (A, B, C, D and X). The new recommendations are now in the form of drug labelling that contains increased detail but also increased complexity.

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PERIPARTUM CARDIOMYOPATHY

Refer Clinical Practice Guidelines – Heart Disease in Pregnancy, Ministry of Health, 2nd Edition 2016.

APPROACH TO MATERNAL TACHYCARDIA / PALPITATIONS

INTRODUCTION

- Cardiovascular changes take place from the first trimester onwards; one large study found maternal heart rates rise progressively towards an average of 90 bpm (range 70–120) at around 34 weeks
    - A persistent tachycardia in early pregnancy is less likely to be physiological than later in pregnancy
- Differential diagnosis of tachycardia / palpitations in pregnancy (non-exhaustive)
    - Asymptomatic tachycardia
    - Secondary sinus tachycardia
    - Supraventricular tachycardia
    - Atrial tachycardia
    - Atrial fibrillation
    - Ventricular tachycardia
    - Structural heart diseases
    - Hyperthyroidism
    - Pulmonary embolism
    - Infection
    - Anxiety
    - Caffeine
    - Dehydration and electrolyte imbalances
    - Hypoglycemia

INITIAL APPROACH

- A thorough history and physical examination
- Important screening questions to assess for pathological causes of tachycardia
    - Palpitations with chest pain, breathlessness or feeling faint
    - Associated headache, sweating, or abdominal pain and/or hypertension
    - Any known heart conditions
    - Any history of an arrhythmia (or experiencing a fast and irregular heartbeat)
    - A family history of sudden or unexplained death in a young member of the family / cardiac disease
    - A temperature or symptoms of infection
    - Any venous thromboembolism (VTE) risk factors in pregnancy?
- Investigations
    - Electrocardiography (ECG)
        - Is the most important investigation in the context of a tachycardia
        - If it is performed at the time of an episode of palpitations or tachycardia and confirms a rhythm abnormality, other investigations may not be required
        - If normal at the time the tachycardia is noted, then a pathological arrhythmia as a cause for the tachycardia is unlikely

- Full blood count (FBC)
  - The threshold for anaemia in pregnancy is defined by the World Health Organization as haemoglobin (Hb) <110 g/L in the first trimester, <105 g/L in the second and third trimesters, and <100 g/L postpartum
- Thyroid function tests (TFT)
  - Using pregnancy-specific reference ranges for thyroid stimulating hormone (TSH), T3 and T4 when interpreting results
- Look for the source if infection is suspected
  - Inflammatory markers (CRP), blood cultures, UFEME, urine cultures, CXR, etc
- Further diagnostic tests include echocardiography and 24-hour Holter monitoring

Remarks:

1. Electrocardiography changes in pregnancy
   - Left axis deviation
   - Transient ST/T wave changes
   - Q waves in lead III and aVF
   - Inverted T waves in leads III, V1, V2 and sometimes V3

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- If there are no concerning features of the history and the patient has normal observations for pregnancy (other than tachycardia), a normal ECG and blood tests, then it is likely that the patient can be reassured after FMS review without further investigation
- Refer Antenatal Combine Clinic if
  - Diagnostic uncertainty or require further investigation
  - Pathological aetiology (if cardiac disease of low CV risk or non-cardiac disease); refer Cardiology clinic if cardiac disease is of moderate to high CV risk
- Refer physician on call for urgent admission and management
  - Severe symptoms or a life-threatening condition requiring inpatient management

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APPROACH TO HEART MURMURS

Note: This section focuses on new heart murmurs detected during pregnancy.

INTRODUCTION

- Cardiac auscultation is an essential part of physical examination during antenatal check-ups
- A heart murmur is not always associated with a pathologic process
- Valvular heart disease (may present as a murmur) may present for the first time during pregnancy
- Innocent or flow murmurs are usually caused by increased cardiac output
    - associated with no symptoms, typically seen in childhood and pregnancy, and resolves spontaneously
- Regardless of the underlying aetiology, all involve the creation of disturbed blood flow, which produces a murmur

Levine Grading Scale (grades of murmur intensity)	
Grade 1	Heard by an expert in optimum conditions
Grade 2	Heard by a non-expert in optimum conditions
Grade 3	Easily heard, no thrill
Grade 4	Loud murmur, palpable thrill
Grade 5	Very loud murmur, often heard over a wide area, palpable thrill
Grade 6	Extremely loud, heard without a stethoscope

INITIAL APPROACH

- A thorough history and physical examination
    - A thorough history focusing on current physical activity, past cardiac events/surgery and any planned cardiac intervention
    - Assess for comorbidities
    - Detailed clinical examination: including facial oedema, lower limb swelling, BP, regularity of pulse, heart murmur
- Normal flow murmur of pregnancy is typically
    - Soft (grade 1 or 2)
    - Located at the pulmonary region
    - Associated with a normal first and second heart sound
    - Not accompanied by a diastolic murmur
- Investigation is indicated for women with a history of
    - Angina
    - Resting or worsening dyspnoea
    - Any signs of heart failure
    - Sustained arrhythmia
    - A grade 3 or greater systolic murmur
    - Any diastolic murmur

- Investigations to consider (on a case-by-case basis)
    - Echocardiography
    - ECG
    - Cardiac catheterization: the most invasive form and is thus reserved if other modalities fail
- Management
    - Innocent or flow murmur: no active management
    - Pathological murmur: treatment based on the disease causing the murmur

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer to the Antenatal Combine Clinic if
    - Require further investigation (see above) or diagnostic uncertainty
    - Diagnosis established but which cannot be handled in a primary care setting
    - Pathological murmurs (low CV risk); refer to the Cardiology clinic if moderate to high CV risk
- Refer to the physician on call for urgent admission and management
    - Severe symptoms (e.g., decompensated heart failure)
    - Suspected infective endocarditis (for intravenous antibiotics)

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APPROACH TO PRESYNCOPAL AND SYNCOPAL ATTACK

INTRODUCTION

- Syncope and recurrent presyncope are common and poorly understood problems in pregnancy; very little systematic research has been done to evaluate these symptoms among pregnant women
- Differential diagnosis of presyncope and syncope in pregnancy(non-exhaustive)

○ Neurally mediated (vasovagal) syncope and presyncope (most common) ○ Situational syncope (cough syncope, micturition syncope, carotid sinus hypersensitivity, etc.) ○ Cardiac arrhythmias ○ Structural heart diseases	○ Pulmonary embolism ○ Hypoglycaemia ○ Hyperventilation ○ Seizures ○ TIA/CVA (rare) ○ Subclavian steal syndrome ○ Generalized anxiety disorders and panic attacks

INITIAL APPROACH

- A thorough history
  - Onset
  - Associated symptoms
  - Triggering factors including association with position
  - Underlying conditions e.g., diabetes mellitus, cardiac arrhythmias and anxiety
  - Drug history
- Comprehensive physical examination
  - Importantly: BP (lying/standing BP), regularity of pulse, heart murmur, facial oedema, lower limb swelling, neurological examination
- EGSYS (Evaluation of Guidelines in SYncope Study) Score for Syncope
- Consider doing the following investigations locally
  - 12-lead ECG
  - Glucometer recording
  - Full blood count, renal profile
- Further investigations to be considered in tertiary centre
  - Holter monitor
  - Echocardiography
  - Electroencephalogram (EEG)
  - CT/MRI brain
  - Arterial blood gas
  - CTPA

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer to the Antenatal Combine Clinic for new syncope / presyncope episodes
- Refer to emergency department for observation or physician on call for admission if clinically indicated

ADDITIONAL INFORMATION

Evaluation of Guidelines in SYncope Study (EGSYS)Score

Predictors	Point
Abnormal ECG and / or structural heart disease	+3
Palpitations	+4
Syncope during effort	+3
Syncope in supine position	+2
Precipitating and / or predisposing factors	-1
Autonomic neurovegetative prodromes	-1

A score of >3 indicates a high risk of cardiac syncope

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APPROACH TO BREATHLESSNESS IN PREGNANCY

INTRODUCTION

- Breathlessness is a common symptom during pregnancy, particularly in the third trimester (weeks 28 to 40)
- However, it is important to identify serious or life-threatening conditions
- Normal physiologic changes in pregnancy
    - Although respiratory rate in pregnancy remains unchanged at 10–18 breaths per minute, minute ventilation (a product of tidal volume and respiratory rate) is increased as a result of the rise in tidal volume
    - Oxygen consumption increases gradually in pregnancy
    - A certain degree of orthopnea is expected in late pregnancy because of diaphragmatic elevation
- Differential diagnosis of breathlessness in pregnancy (non-exhaustive)

○ Bronchial asthma ○ Anaemia ○ Heartburn and indigestion ○ Musculoskeletal and costochondritis ○ Congenital heart diseases ○ Left ventricular dysfunction ○ Pulmonary oedema ○ Venous thromboembolic disease / pulmonary embolism ○ Aortic dissection ○ Pericarditis	○ Lung infections i.e. pneumonia / tuberculosis ○ Pleural effusions ○ Pneumothorax / pneumomediastinum ○ Pulmonary vascular disease ○ Cardiac arrhythmia ○ Valvular heart diseases ○ Acute coronary syndrome ○ Diaphragmatic dysfunction/paralysis ○ Tumour ○ Trauma/mechanical obstruction (larynx, trachea, main bronchi) ○ Anxiety/panic disorder ○ Dyspnoea of pregnancy (diagnosis of exclusion)

INITIAL APPROACH

- A thorough history and physical examination
- Important screening questions to assess for
    - Precipitating and relieving features
    - Sudden onset or progressively worsening symptoms
    - Occurs at rest or exertion
    - Associated symptoms
- Comprehensive physical examination
    - Vital signs (including respiratory rate), pulse oximeter, cardiovascular and respiratory examination, use of accessory muscles, jugular venous distension, peripheral oedema
- Consider doing the following investigations locally
    - ECG

    - FBC
    - CXR with abdominal shield if indicated
    - Peak flow if history of asthma
- Further investigations to be considered in tertiary centre
    - Echocardiography
    - CTPA or V/Q SCAN
    - Cardiac enzymes and troponin T
    - Arterial blood gases
    - Lung function tests
    - Coronary angiography

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer to the Antenatal Combine Clinic if
    - Poorly controlled comorbidities causing symptoms (i.e. bronchial asthma)
    - Diagnosis uncertain / require further investigation
- Refer to emergency department for observation or physician on call for admission if urgent medical attention required

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BRONCHIAL ASTHMA

CHECKLIST FOR PRE-PREGNANCY COUNSELLING

- Screening question: Ask all women in the reproductive age group with bronchial asthma on follow-up if they wish to get pregnant during every clinic review
- Refer to Pre-Pregnancy Clinic for all women with bronchial asthma who express the wish to conceive

All healthcare providers managing women with childbearing age should be aware that:

- Control of asthma should be optimised before conception
- Some studies suggest that the progression of asthma is consistent across subsequent pregnancies
- Women need to be informed in a simple manner that the risk of harm to the unborn child from severe or chronically untreated asthma outweighs any minor risk from asthma drugs.
- Commonly used asthma medication is safe in pregnancy
- Advised the patient not to self-discontinue asthma medication even if found pregnant, and to seek medical advice early

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

- Do not stop asthma medication
- Maintain the pre-existing therapy if asthma is well controlled
- Reinforce asthma education
- Serial growth scans for detection of small-for-gestational-age babies
- Regularly assess for risk factors for asthma attacks, which include allergens, irritants, infections, cold weather, and stress
- Advise compliance with medication
- Pregnant women are advised to have their asthma under regular review every 4 weeks, with their asthma control assessed at each visit by using the asthma control test (ACT)
- Comorbidities that can exacerbate asthma, including rhinitis or gastroesophageal reflux, should be recognised and treated

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer to the Antenatal Combine Clinic if uncontrolled asthma symptoms, which include
    - Daytime asthma symptoms in spite of titrated inhaled corticosteroids (ICS) therapy already commenced at primary care
    - Night-time waking (defined as waking with asthma symptoms one or more times per week)

- Need for additional preventer therapy: patients requiring add-on therapy beyond an inhaled short-acting β2 agonist (SABA) and ICS
- Patients with persistent poor control
- Asthma attacks and exacerbations requiring frequent oral corticosteroids or more than one hospitalisation in a year
- Limitation of daily activity
- FEV1< 80% of expected

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- Asthma attacks or exacerbations are exceedingly rare in labour due to endogenous steroids
- Hospital delivery
- Mode and time of delivery based on obstetric indication
- Women should not discontinue their inhalers during labour, as there is no evidence to suggest that β2-agonists inhalers will impair uterine contractions

POSTPARTUM CARE

- Most of the medications, including oral corticosteroids, are safe for breast-feeding mothers
- The risk of atopic disease developing in the child of a woman with asthma is about 1 in 10, or 1 in 3 if both parents are atopic; there is some evidence that breast feeding may reduce the risk of asthma in the baby

DRUG SAFETY

Asthma medication	Drug safety
Short acting β2agonists	• No significant association has been demonstrated between major congenital malformations or adverse perinatal outcome • Excessive doses can cause maternal and foetal tachycardia • There is no statistically significant reduction in frequency of uterine contractions with IV salbutamol
Inhaled corticosteroids (ICS)	• No significant association has been demonstrated between major congenital malformations or adverse perinatal outcome and exposure to ICS • Inhalers can be safely used in breastfeeding
Long acting β2 agonist (LABA)	• Human safety data for vilanterol (LABA used in combination inhaler Relvar) lacking, but adverse effects not noted in animal studies • Inhalers can be used safely during breastfeeding
Leukotriene receptor antagonists	• Safety data in pregnancy limited, but no increase in teratogenicity observed in animal studies with

	montelukast • Recommend continuing therapy in women who have demonstrated significant improvement in asthma control with these agents prior to pregnancy and during breastfeeding if benefits outweigh the risks
Theophyllines	• Can be used as preventer therapy or intravenously (IV) for management of acute severe asthma • Monitoring of levels is recommended as decreased protein binding in pregnancy leads to increased free drug levels
Oral / systemic glucocorticoids	• Studies have shown an association between glucocorticoid use and gestational diabetes and pregnancy induced hypertension • Studies have also shown an association between oral steroid use and pre-term labour and low birth weight (< 2500g) - however severe asthma may be a confounding variable in these studies and the benefit to the mother and foetus for treating a severe exacerbation justify the use of steroids in pregnancy • If high dose of steroids (Prednisolone >80mg/day) being administered avoid breast feeding for 4 hours after last dose
Antibiotics	• Doxycycline should not be used during pregnancy but short courses during breastfeeding is acceptable • For patients with severe asthma and a mucus phenotype on long term low dose Azithromycin, consider switching to nebulised hypertonic saline • Refer to local guidelines regarding appropriate antibiotics
Omalizumab	• The Xolair Pregnancy Registry (EXPECT) examined the safety of Omalizumab during pregnancy. EXPECT, a prospective, observational study of pregnant women exposed to ≥1 dose of Omalizumab within 8 weeks prior to conception or at any time during pregnancy, included 191 women and outcomes from 169. 14.5% were born prematurely and 3.2% of full-term infants had low birth weights. The incidence of congenital abnormalities was 4. 4% (compared with a background risk in all pregnancies of ~3%) • Data from the registry suggests that if women are already established on therapy when they get pregnant, they should continue treatment following a multidisciplinary discussion with the team and the patient but that Omalizumab shouldn't be started in pregnancy unless there are no alternatives • There is no information available on its use during breastfeeding
Magnesium sulphate	• Magnesium sulphate can safely be used in pregnancy as the dose uses in asthma is much lower than that used in preeclampsia prophylaxis or for neuroprotection in preterm labour

ADDITIONAL INFORMATION

ASTHMA CONTROL TEST

Asthma Control Test provides a numerical score to determine the control of asthma symptoms

1	In the past 4 weeks, how much of the time did your asthma keep you from getting as much done at work, school or at home?					**Score**
	All of the time (1)	Most of the time (2)	Some of the time (3)	A little of the time (4)	None of the time (5)	
2	During the past 4 weeks, how often have you had shortness of breath?					**Score**
	More than once a day (1)	Once a day (2)	3 to 6 times a week (3)	Once or twice a week (4)	Not at all (5)	
3	During the past 4 weeks, how often did your asthma symptoms (wheezing, coughing, shortness of breath, chest tightness or pain) wake you up at night or earlier than usual in the morning?					**Score**
	4 or more nights a week(1)	2 to 3 nights a week (2)	Once a week (3)	Once or twice (4)	Not at all (5)	
4	During the past 4 weeks, how often had you used your rescue inhaler of nebuliser?					**Score**
	3 or more times per day (1)	1 to 2 times per day (2)	2 or 3 times per week (3)	Once a week or less (4)	Not at all (5)	
5	How would you rate your asthma control in the last 4 weeks?					**Score**
	Not controlled at all (1)	Poorly controlled(2)	Somewhat controlled(3)	Well controlled(4)	Completely controlled(5)	
	TOTAL SCORE					

© Asthma Control Test™ (Available at: http://www.asthma.com/additionalresources/asthma-control-test.html?q=asthma+control+test)

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4. Global Initiative for Asthma - GINA. (2023, August 15). 2023 GINA Main Report - Global Initiative for Asthma - GINA. https://ginasthma.org/2023-gina-main-report/

TUBERCULOSIS (TB) IN PREGNANCY

CHECKLIST FOR PRE-PREGNANCY COUNSELLING

- The perinatal period is an important opportunity to screen, diagnose, and treat those at high risk for TB
- It is recommended to screen all women who are at high risk for TB at the initiation of antenatal care
- All women of childbearing age should be asked about current or planned pregnancy prior to starting anti-TB drugs.
- Women with TB on treatment should be enrolled in a pre-pregnancy clinic (PPC) and effective contraception should be given until the treatment course is completed

Remarks:

- Outcome and complications of TB in pregnancy: Adverse maternal and neonatal outcomes are increased with inadequate treatment, advanced disease, and late diagnosis of TB in pregnancy compared with earlier diagnosis
    - Maternal death
    - Increase in antenatal admission
    - Increased likelihood of maternal anaemia
    - Neonatal tuberculosis
    - Perinatal death

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

BOOKING

- Pregnant mothers in high-risk group should be evaluated for TB on initiating antenatal care by assessing symptoms, performing a physical examination, and ascertaining TB risk factors
- The diagnosis of active TB in pregnant patients consists of:
    - Clinical history (including epidemiological assessment)
    - Physical examination
    - Sputum AFB direct smear x 3 (induced sputum if unable to produce sputum)
    - Chest radiography (with written consent) is safe in pregnancy with an abdominal shield
    - Biopsy, if indicated (extrapulmonary tuberculosis)

IF DIAGNOSED WITH TUBERCULOSIS:

- Refer to the FMS / Respiratory medicine physician for follow-up
- Notify and ensure contact tracing is carried out
- Refer to an O&G specialist if there is any maternal or foetal complication

- Do VTE risk scoring for TB in pregnancy: equivalent to a risk score of 3, which indicates moderate risk
- Refer FMS at less than 26 weeks of gestation for counselling
- Refer to an O&G specialist at 28 weeks of gestation for VTE prophylaxis

TREATMENT REGIME:

- First line treatment regimens are similar for non-pregnant patient and are generally safe in pregnancy and breastfeeding
- Standard anti-tuberculosis (TB) regimen (2EHRZ/4HR*) may be used in pregnant and breastfeeding women with TB
- All four first-line medications used to treat TB (i.e., Isoniazid, Rifampicin, Ethambutol, and Pyrazinamide) were classified by the Federal Drug Administration as category C
- Oral Pyridoxine 30 mg daily should be given to all pregnant women on isoniazid to prevent peripheral neuropathy
- For second line anti-TB regime, to refer to Respiratory medicine team for opinion

ANTENATAL MONITORING

- Check on DOTs
- Consider inpatient DOTs if poor compliance
- Continue anti-TB treatment
- Monitor patient as per guidelines
- Ultrasound monthly after 28 weeks of gestation to look for foetal growth restriction

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- Hospital delivery
- Mode and time of delivery based on obstetric indication

POSTPARTUM CARE

- Refer the newborn to paediatrics team to consider initiating Isoniazid prophylaxis
- Once active TB in the newborn is ruled out, the baby should be given six months isoniazid prophylaxis, followed by BCG vaccination
- Defer giving BCG if:
    - Mother is diagnosed < 2 months before delivery
    - Mother is sputum positive just before delivery

- The newborn is at risk of perinatal TB until isoniazid prophylaxis is completed
- Inform health clinic upon discharge to ensure continuity of TB treatment
- Breastfeeding is not contraindicated

ANTI TUBERCULOSIS MEDICATION

Drug	Daily dose	Targeted site	Effects	Adverse Effects
1st Line drugs				
Isoniazid	5 mg/kg (≤300 mg)	Enoyl-acyl carrier protein reductase (also called InhA)	Inhibits the biosynthesis of mycolic acids	Rash, fever, jaundice, peripheral neuritis, hypersensitivity and haematological reactions
Rifampicin	10 mg/kg (≤600 mg)	Subunit of DNA-dependent RNA polymerase	Inhibition of RNA synthesis	Rash, fever, nausea, vomiting and hepatitis
Pyrazinamide	15-30 mg/kg (≤ 2 g)	S1 component of 30s ribosomal subunit	Inhibits translation and trans-translation	Jaundice, hepatitis and hyperuricemia
Ethambutol	15-25 mg/kg (≤1.2 g)	Arabinosyl transferases	Inhibits arabinogalactan biosynthesis	Optic neuritis, rash and GIT upset

REFERENCES

1. Clinical Practice Guidelines on Management of Tuberculosis, 4th edition. (2021). Ministry of Health Malaysia. https://www.moh.gov.my/moh/resources/Penerbitan/CPG/Respiratory/CPG-_Management_of_Tuberculosis_(4th_Edition).pdf
2. Sabah's Handbook on Management of Tuberculosis in Adults.

DERMATOLOGY

GENITAL HERPES IN PREGNANCY

CHECKLIST FOR PRE-PREGNANCY COUNSELLING

- Counselling (for symptomatic mothers / history of any sexually transmitted diseases)
  - Detailed explanation of the condition with long-term implications for the health of themselves and their partner
    - Symptoms & signs: Vesicular-ulcerative lesions (usually heal within 1-2 weeks), tender lymphadenopathy
    - Natural history of genital herpes: Following primary infection, the virus becomes latent in local sensory ganglia, periodically reactivating to cause symptomatic lesions or asymptomatic, but infectious viral shedding
    - Use of antiviral drugs (acyclovir) for symptom control
    - Complications: Difficulty urinating (10-15%), systemic illness (25%), rarely disseminate
    - Risk of neonatal herpes (risk of transmission from an infected mother is high at 30%–50% if genital herpes is acquired near the time of delivery)
  - Risks of transmission by sexual and perinatal means
    - Abstain from sexual contact during lesional recurrences or prodromes
    - Transmission may occur as a result of asymptomatic viral shedding
    - Seropositive patients with unrecognised recurrences can be taught to recognise symptomatic episodes and prevent onward transmission
  - Infected patients and partner(s) should be screened for genital herpes and other STDs and managed accordingly
  - The use of condoms may prevent transmission of HSV to uninfected partners and should be encouraged

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

- Counselling
  - All women should be asked at their first antenatal visit if their partner(s) have ever had genital herpes
    - Advise of the risk of acquiring HSV-1 as a result of oro-genital contact
    - Asymptomatic female partners of men with genital herpes should be strongly advised not to have sex during recurrences
    - Conscientious use of condoms throughout pregnancy, especially in the third trimester, may reduce the risk of acquisition

- Treatment and follow-up are essential to prevent/reduce neonatal herpes

- Investigation: Serum HSV Serology (Group specific antibodies / type specific antibody)
- Management categorised into first episodes and recurrent episodes: Accurate clinical classification is difficult (Viral isolation, typing & testing of paired sera may be helpful)
- First Episode Genital Herpes (First and second trimester acquisition)
  - Acyclovir in standard doses (either oral or intravenous) in line with clinical condition
  - Vaginal delivery should be anticipated
  - Continuous acyclovir starting in 36 weeks of pregnancy reduces the risk of both clinical recurrence at term and delivery by caesarean section
- First Episode Genital Herpes (Third trimester acquisition)
  - If a true first episode is confirmed, caesarean section should be considered for all women, particularly those developing symptoms after 34 weeks of gestation, as the risk of viral shedding is very high
    - Caesarean section for the prevention of neonatal herpes has not been evaluated in randomised controlled trials and may not be completely protective against neonatal herpes
  - Oral (or intravenous for disseminated HSV) Acyclovir in standard doses (400 mg t.d.s. P.O., for 7-10 days) in line with clinical condition, followed by daily suppressive dose of 400 mg t.d.s P.O. until delivery
- Recurrent Genital Herpes
  - Sequential cultures during late pregnancy do not predict viral shedding at term
  - If there are no genital lesions at delivery, a caesarean section to prevent neonatal herpes should not be performed
  - Symptomatic recurrences during the third trimester are likely to be brief; vaginal delivery is appropriate if no lesions are present at delivery
  - Treatment should be given within the first 24 hours of the onset of symptoms or during the prodromal phase
  - Continuous acyclovir 400 mg t.d.s. P.O. from 36 weeks of pregnancy may reduce the risk of clinical recurrence at term and the need for caesarean section
  - Recurrent clinical episodes that are frequent (e.g., 4–6 times a year or more), severe or cause distress, suggest suppressive therapy over episodic therapy, and reassessment after one year using acyclovir 400 mg orally twice daily (WHO / CDC)
- Supportive therapy
  - Saline/diluted potassium permanganate Sitz bath/dabs
  - Analgesia (systemic or local)
  - Treat any secondary infection
- Follow–up weekly until ulcers are healed

- Contact Tracing: Awareness of the diagnosis in a partner or ex-partner may prevent further onward transmission
- Refer to the infectious disease team if a genital herpes patient is diagnosed with HIV

Remarks

- Acyclovir is not licensed for use in pregnancy; however, there is substantial clinical experience supporting its safety, i.e., the benefits of antiviral therapy outweigh the risk of withholding treatment (Pregnancy category B)
    - First episode of genital herpes: Acyclovir 400 mg t.d.s for P.O (WHO / CDC / Malaysia) for 7-10 days
    - Recurrent genital herpes (episodic therapy): Acyclovir 400 mg t.d.s. P.O. for 5 days (WHO / Malaysia)
- Acyclovir reduces, but does not eliminate, viral shedding

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer to the Dermatology clinic if in doubt about diagnosis or persistent lesion despite management of herpes given
- Refer to the O&G specialist for the option of delivery if the patient has a first episode of genital herpes in the 3rd trimester of pregnancy, a recurrent lesion, or an active lesion during the onset of labour
- If severe disease involving other organs or systems (e.g., disseminated infection, pneumonitis, hepatitis, meningitis or encephalitis), refer urgently to the physician on call for admission

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- Delivery in a facility with a resident Obstetrician
- Timing of delivery: according to obstetric indication; may allow postdate
- All women, not just those with a history of genital herpes, should undergo careful vulval inspection at the onset of labour to look for clinical signs of herpes infection
- Genital lesions at the onset of labour
    - Current practice is for delivery by Caesarean section
    - If vaginal delivery is unavoidable, acyclovir treatment for the mother and baby may be indicated
    - The risks of vaginal delivery for the foetus are small and must be balanced against the risks to the mother of Caesarean section
    - Prolonged rupture of membranes and invasive procedures, e.g., scalp electrodes, should be avoided
- First Episode Genital Herpes (First and second trimester acquisition) and Recurrent Genital Herpes
    - Vaginal delivery should be anticipated if there are no genital lesions at delivery
- First Episode Genital Herpes (Third trimester acquisition)

- If a true first episode is confirmed, a Caesarean section should be considered for all women, particularly those developing symptoms after 34 weeks of gestation

POSTPARTUM CARE

- Mothers, staff, and other relatives/friends with active oral lesions should be advised about the risk of postnatal transmission
- Refer to the paediatrician for management of perinatal infection

Infants exposed	At birth	• Follow-up • Some culture mucosa but if asymptomatic, the risk is low
	Near term	• Risk of neonatal herpes • Treat with acyclovir
Neonatal herpes	IV acyclovir 20mg/kg 8hrly	• 21 days for disseminated / CNS disease • 14 days for disease limited to skin & mucous membranes

REFERENCES / FURTHER READING

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SYPHILIS IN PREGNANCY

Refer Garis Panduan Pengukuhan Program Pencegahan Jangkitan HIV dan Sifilis dari Ibu-ke-Anak, Kementerian Kesihatan Malaysia, 2021.

ENDOCRINOLOGY

DIABETES MELLITUS (DM)

CHECKLIST FOR PRE-PREGNANCY COUNSELLING IN PRE-EXISTING DM

- Screening question: Ask all women in the reproductive age group with DM on follow-up if they wish to get pregnant during every clinic review
- Refer to Pre-Pregnancy Clinic for all women with DM who express the wish to conceive

- All female in reproductive age with pre-existing DM (type 1 or type 2 DM) should be identified, and those with uncontrolled disease should be referred for appropriate contraception
- Those with multiple cardiovascular risk factors on contraception should undergo cardiovascular risk assessment before withdrawal of contraception, e.g., ASCVD/SCORE2
- Benefits from preconception care include:
    - Reduce the incidence of congenital malformation
    - Avoid preterm delivery
    - Reduce perinatal mortality
- Preparation for conception includes:
    - Discussion on the timeline of pregnancy planning
    - Weight loss with a target BMI of at least less than 30
    - Regular exercise at least 150 minutes per week
    - Optimal BP <130/80 mmHg
    - Optimal HbA1c <6.5%
    - Establish the latest status of retinopathy, nephropathy
    - Relevant blood investigations
    - Cardiac assessment
    - T. Folic Acid 5 mg daily to be commenced 3 months prior to withdrawal of contraception
    - Medications review; discontinue any potential teratogenic medications, e.g., ACEi, ARB, Statin

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

- SMBG or clinic-based BSP should be done at least once a fortnight and aim for
    - Fasting sugar : 4.0-5.3 mmol/L
    - 2hour post prandial : 4.0-6.7 mmol/L
- Emphasise compliance, injection technique, and medication review during each visit
- Any abnormal SMBG or BSP should be identified, and appropriate action must be done
- T. Aspirin 150mg daily should be given to women with pre-existing DM from 12weeks of gestation until term

- Retinal assessment: at booking & at 28weeks; An Ophthalmologist referral should be made if any retinopathy is detected
- Nephropathy assessment: serum creatinine, urine ACR or PCR or 24-hour urine protein; Nephrology referral is required if any abnormality is detected (serum creatinine >120mcmol/l; UPCR>30mg/mmol; 24hour urine protein>0.5g/d)
- Foetal surveillance using the ultrasound scan should be offered
- The mode of delivery is individualised based on the type of diabetes and the presence of any diabetic sequalae or other uncontrolled co-morbidities

WHEN TO REFER

- Most uncomplicated DM can be managed in a Klinik Kesihatan with FMS
- Refer MFM for detailed scan if HbA1c≥ 10% or diabetic complications irrespective of HbA1c
- Cases that should be referred to the Antenatal Combine Clinic:
    - Poorly controlled DM: poor SMBG/BSP/HbA1c
    - Frequent hypoglycaemia
    - Require analogue insulin (if no stock is available in primary care)
    - DM with nephropathy as listed above
    - DM with progressive retinopathy
    - High-risk pregnancy with multiple uncontrolled co-morbidities

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- Hospital delivery and not to allow post date
- Mode and time of delivery are individualised based on estimation of foetal weight and obstetric indications
- Close blood glucose monitoring must be done if any corticosteroid is given for foetal lung maturity
- Capillary blood glucose (CBG) target during labour and delivery: 4-7mmol/l
- CBG monitoring during labour and delivery: 1-2hourly in women with insulin; 4hourly if not on insulin

POSTPARTUM CARE

- In GDM, most insulin can be safely discontinued in postpartum
- Arrange for OGTT at 6 weeks postpartum for all women with GDM prior to discharge
- In pre-existing DM, appropriate dose reduction must be done with close CBG monitoring
- Contraception must be discussed and initiated post delivery

REFERENCES / FURTHER READING

1. CPG Management of Diabetes in Pregnancy (1st Ed, 2017)
2. NICE Guideline for Diabetes in Pregnancy: Management from Preconception to the postnatal period (Published 25th February 2015)

THYROID DISEASES

- Thyroid diseases are common in child-bearing women
- It is not recommended to screen thyroid function test in all pregnant ladies
- All women of reproductive age with thyroid disorders should undergo pre-conception counselling
- The underlying cause of thyroid disorder should be addressed in the notes; any autoantibodies/ ultrasound thyroid have been performed previously
- Consider performing a TRAb test in patients post-total thyroidectomy / RAI for Graves' disease

CHECKLIST FOR PRE-PREGNANCY COUNSELLING

- Screening question: Ask all women in the reproductive age group with thyroid diseases on follow-up if they wish to get pregnant during every clinic review
- Refer to Pre-Pregnancy Clinic for all women with thyroid diseases who express the wish to conceive

- Ideally, all patients should have a planned conception
- Advise and enforce appropriate contraception prior to disease optimisation
- Re-emphasise the impact of an uncontrolled thyroid disorder on the pregnancy outcome
- Review medications and do appropriate optimisation
- Emphasise compliance
- Women who are well-controlled on carbimazole and who desire pregnancy could switch to PTU before trying to conceive
- Women taking ATD should be instructed to perform a pregnancy test as soon as possible, after a missed period – seek medical attention immediately if pregnancy test is positive

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

A. Hypothyroidism

- Target of therapy:
  - TSH levels should be maintained <2.5 mIU/L prior to conception and during the 1st trimester; <3.0 mIU/L in the 2nd & 3rd trimesters
  - L-thyroxine dose should be increased 30–50% at conception; a higher increment in post-ablative and a lower increment in autoimmune
  - TFT can be repeated 4 weeks after dose adjustment
  - TFT should be performed every 4 weeks from conception until mid-gestation and at least once during the middle of the third trimester
- Always emphasise regarding Do's and Don'ts while on L-thyroxine therapy:
  - Must be taken with an empty stomach, ideally upon waking up in the early morning; 1-2 hours pre-breakfast
  - Should be taken with plain water
  - Avoid flavour drinks (especially caffeinated drinks); other drugs / supplements (e.g., haematinics/ calcium tablets) should be taken at least 4-6 hours after ingestion of L-thyroxine

B. Subclinical Hypothyroidism

- The reason for recommending L-thyroxine treatment is:
  - Reduce risk of miscarriage & preterm delivery
- TPOAb must be screened:
  - If positive: L-thyroxine recommended if TSH >4mIU/L OR should be considered if TSH >2.5 mIU/L
  - If negative: L-thyroxine is recommended if TSH >10mIU/L OR consider if TSH >4mIU/L
- Target of therapy: same as in hypothyroidism

C. Hyperthyroidism

- Two most common causes of hyperthyroidism in pregnancy are gestational transient thyrotoxicosis (GTT) and Graves' disease
  - Graves' disease
    - Can be differentiated by clinical examination (goitre, ophthalmopathy, etc.)
    - Thyroid auto-antibodies, e.g., TRAb / anti-TPO / anti-thyroglobulin can be sent to support the diagnosis if in doubt
      - Presence of TRAb is highly suggestive of Graves' disease
      - Anti-TPO can be present in both Graves' disease & GTT
  - GTT
    - Non-autoimmune transient disorder that occurs in the first trimester of pregnancy and is caused by the peak in hCG levels during early pregnancy, leading to biochemical hyperthyroidism
    - Is not associated with adverse pregnancy outcomes
    - More severe degrees of GTT are associated with hyperemesis
    - Can be treated symptomatically, including with rehydration and low-dose beta-blocker therapy for a short period (e.g., Tab Propranolol)
    - ATD is not recommended
- In a pregnant woman taking ATDs, FT4 and TSH should be monitored approximately every 4 weeks
- Target of therapy: FT4 at ULN range; repeat TFT 4-6 weeks post dose adjustment
- Radioiodine therapy is contraindicated in pregnancy

<u>First Trimester</u>

- A thorough clinical history and physical examination should be done if a suppressed TSH and elevated FT4 are detected in the first trimester
- Exclude GTT based on history and clinical examination; points that favours diagnosis of GTT are:
  - No symptoms of hyperthyroid prior to pregnancy
  - No clinical sign of Graves' Disease prior to pregnancy

- Symptoms of hyperemesis gravidarum
- Self- limited and mild disorder

- ATD used in first trimester of pregnancy:
  - Drug of choice (ATD) during the first trimester is Propylthiouracil (PTU) (due to risk of teratogenicity of CBZ)
  - The ratio of PTU:CBZ is 10:1
  - Potential side effects include acute liver injury, especially in PTU-treated patient
- Discontinuation of ATD during early pregnancy
  - For patients on a low dose of ATD (carbimazole 10 mg/day or PTU ≤100 mg/day), consider discontinuing ATD in patients who are euthyroid (a stable euthyroid state can be indicated by two sets of normal thyroid function tests, at least one month apart with no change of therapy within the tests)
  - Factors to be considered before discontinuation of ATD include disease history, goitre size, duration of treatment, recent thyroid function test results, TRAb measurement and other clinical factors.
  - Following cessation of ATD, repeat thyroid function and clinical examination should be performed every 1–2 weeks to assess maternal and foetal thyroid status

<u>Second Trimester</u>

- TFT should be repeated in the second trimester, and it will be normalised in gestational transient thyrotoxicosis (GTT), serum T4 returns to normal by 14–18 weeks of gestation
- ATD used in second trimester of pregnancy:
  - After the first trimester, no recommendation can be made as to whether PTU should be continued or changed to CBZ (may be changed to CBZ for better compliance)
  - Carbimazole (CBZ) can be safely used in the second trimester onwards
  - Potential harm of CBZ if taken in a higher dose is *aplasia cutis* or *embryopathy*
  - Patient should be educated about symptoms of side effects, e.g., rash, sore throat, fever, and should be advised to get an immediate medical check-up (e.g., FBC to look for any agranulocytosis-0.2%) if these symptoms are present after initiation of therapy
- If ATD discontinued during early pregnancy
  - Thyroid function and clinical examination should be performed every 1–2 weeks to assess maternal and foetal thyroid status
  - If the pregnant woman remains clinically and biochemically euthyroid, test intervals may be extended to 2–4 weeks during the second and third trimester
- Surgery for thyrotoxicosis is rarely performed in pregnancy, but it is not contraindicated and is best performed in the second trimester

<u>Third Trimester</u>

- Discontinuation of all ATD therapy is feasible in 20%–30% of patients in the last trimester of gestation

Discontinuation of ATD

- ATD withdrawal is an option if Graves' disease is considered to be in remission based on:
  - Recent TFT and TRAb measurement
  - On low dose of ATD
  - Clinical condition in euthyroid state
- ATD should not be stopped in some pregnant women with:
  - On ATD therapy recently (< 6 months)
  - Suppressed TSH
  - High FT3
  - High levels of TRAb
  - Large goiter
  - Active ophthalmopathy
  - Signs of active disease

D. Subclinical Hyperthyroidism

- Has not been associated with adverse pregnancy outcome
- TFT may be monitored in 4-6weeks
- To send TRAb

WHEN TO REFER

- Any complicated cases should be referred to the Antenatal Combine Clinic
  - Overt hypothyroidism/hyperthyroidism does not respond to standard therapy
  - Suspected patients with complications either from the uncontrolled thyroid disease or the treatment

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- All uncomplicated cases must be delivered in hospital
- Complicated cases, e.g., thyroid disease with its sequelae, must be managed in a tertiary hospital with resident specialist

POSTPARTUM CARE

- ATD should be continued postpartum in persistently hyperthyroid patients
- Appropriate follow-up should be arranged (MOPD for complicated cases; otherwise, uncomplicated cases may be managed in Klinik Kesihatan with FMS
- Both appear safe in breastfeeding up to doses of 450mg of PTU and 20mg of CBZ
- Appropriate contraception should be planned prior to discharge

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GASTROENTEROLOGY& HEPATOLOGY

APPROACH TO ABNORMAL LIVER FUNCTION TEST (LFT) IN PREGNANCY

INTRODUCTION

- Any abnormality seen in transaminases and bilirubin needs further evaluation

Blood Parameter	Changes in Pregnancy
Bilirubin	Same
Albumin	Reduced
Alkaline phosphatase	Increased
GGT	Reduced or same
Alpha-fetoprotein	Increased

Blood Parameter	Changes in Pregnancy
AST/ALT	Same
International normalized ratio	Same
Prothrombin time	Same
Platelet count	Same
Uric acid	Reduced

Table: Normal biochemical changes during pregnancy

INITIAL APPROACH

- A thorough history taking
  - Onset symptoms if any
  - Associated symptoms: pruritus, jaundice, etc
  - Recent medications (up to last 6 months)
  - Comorbidities: DM/ Obesity/ dyslipidaemia
  - Drugs: Paracetamol, NSAIDs, supplements, traditional medications
  - Recent travelling
  - High risk behaviours
  - Blood transfusions
  - Occupation
  - Family history
- Comprehensive physical examination including
  - Stigmata of chronic liver disease: jaundice, spider naevi, palmar erythema, bruises, gynaecomastia, etc
  - Hepato +/- splenomegaly
  - Ascites/ pedal oedema
  - Obesity
  - Palpable lymph nodes

- Consider doing the following investigations locally
    - LFT: all parameters within LFT presumably already done
    - FBC
    - Renal profile
    - Screening for viral hepatitis (Hepatitis B & C)
    - TFT
- Further investigations to be considered in tertiary centre
    - Second-line hepatitis workup
    - Ultrasound HBS and other advanced imaging
    - Diagnostic procedures such as ERCP
- Common LFT patterns in some pregnancy related liver diseases

Condition	Trimester	Amino - transferases	Bile acids	Bilirubin	Uric acid	Platelets	PT / PTT	Urine protein
Hyperemesis gravidarum	First through 20 weeks	1-2x	Normal	<85 umol/l	Normal	Normal	Normal	Normal
Intrahepatic cholestasis of pregnancy	Second/Third	1-4x	30-100x	<85 umol/l	Normal	Normal	Normal	Normal
Acute fatty liver of pregnancy	Third	1-5x	Normal	<171 umol/l	Increased	Same / reduced	Same / increased	Same / increased
Pre-eclampsia / eclampsia	After 20 weeks	1-100x	Normal	<85 umol/l	Increased	Same / reduced	Same / increased	Increased
HELLP syndrome	After 22 weeks	1-100x	Normal	<85 umol/l	Increased	Reduced	Same / increased	Same / increased

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer to Gastroenterology & Hepatology team (antenatal combine clinic under Gastroenterology & Hepatology Clinic) if
    - Diagnosis certain of chronic liver disease (viral hepatitis, autoimmune hepatitis, etc)
- Refer for admission if urgent medical attention required
    - O&G specialist on call if obstetric-related condition (i.e., HELLP syndrome)
    - Physician on call if condition related to internal medicine
    - Other specialties (i.e., general / hepatobiliary surgery) if condition relevant to that speciality

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APPROACH TO NAUSEA & VOMITING IN PREGNANCY

INTRODUCTION

- Diagnosis of nausea and vomiting in pregnancy (NVP)
    - NVP should only be diagnosed when onset is in the 1st trimester of pregnancy
      AND
      Other causes of nausea and vomiting have been excluded, e.g., PUD, cholecystitis, AGE, hepatitis, pancreatitis, UTI, drug-induced
    - Typically, it starts between the 4th and 7th weeks of gestation, peaks at approximately the 9th week, and resolves by the 20thweek of gestation
- Diagnosis of Hyperemesis gravidarum (HG)
    - HG can only be diagnosed when there is protracted NVP with the following triad:
        - > 5% pre-pregnancy weight loss
        - Dehydration
        - Electrolyte imbalance

** Severe abdominal pain is unusual in NVP/ HG – may warrant further investigation, e.g., amylase/ ultrasound/ OGDS

INITIAL APPROACH

- A thorough history taking
    - Previous history of NVP/HG
    - Quantify severity using PUQE score: nausea, vomiting, hypersalivation, spitting, loss of weight, inability to tolerate food and fluids, effect on quality of life
    - History to exclude other causes:
        - Abdominal pain
        - Urinary symptoms
        - Infection
        - Drug history
        - Chronic Helicobacter pylori infection
- Comprehensive physical examination including
    - Vital signs
    - Oxygen saturations
    - Abdominal examination
    - Weight
    - Signs of dehydration
    - Signs of muscle wasting
    - Other examination as guided by history

- Consider doing the following investigations locally
    - Urine dipstick / UFEME: quantify ketonuria as 1+ ketones or more
    - Urea and electrolytes: hypokalaemia / hyperkalaemia, hyponatraemia, dehydration, renal disease
    - FBC: infection, anaemia, haematocrit
    - Blood glucose monitoring: exclude diabetic ketoacidosis if diabetic
    - Ultrasound scan
        - Confirm viable intrauterine pregnancy
        - Exclude multiple pregnancy and trophoblastic disease
    - In refractory cases or history of previous admissions, check:
        - TFTs: hypothyroid/hyperthyroid
        - LFTs: exclude other liver disease such as hepatitis or gallstones, monitor malnutrition
        - Calcium and phosphate
        - Amylase: exclude pancreatitis
        - ABG: exclude metabolic disturbances to monitor severity
- OGDS is safe in pregnancy and indicated if there is haematemesis or severe refractory epigastric pain
- Classify the severity of NVP
    - Pregnancy-Unique Quantification of Emesis (PUQE) (refer Appendix)

INITIAL MANAGEMENT

- Initial assessment
    - Exclude other causes
    - Assess for clinical complications (dehydration, electrolyte imbalance, weight loss)
    - Offer advice and support
    - Calculate PUQE score
        - Score 3-12 and no complications: Outpatient care
        - Score ≥ 13, no complications, and not refractory to antiemetics: Inpatient management until no ketonuria
        - Any score with complications: Inpatient management
- Mild NVP
    - Managed in the community/ as outpatient, with antiemetics
    - If failed, and PUQE score is<13, may consider admission
- Antiemetics
    - 1st line: antihistamines (H1 receptor antagonists), Phenothiazines
        - H1 antagonists
            - Veloxin (Meclozine 25mg / Pyridoxine 50mg) 1-2 tablets daily
            - Other examples: Promethazine, Cinnarizine
        - Phenothiazines
            - Stemetil (Prochlorperazine) 5–10 mg tablets 6–8 hourly PO
            - Other examples: Chlorpromazine, perphenazine

        - Combinations of different drugs should be used in those who do not respond to single antiemetic
    - 2nd line
        - Metoclopramide 5–10 mg 8 hourly PO (maximum 5 days' duration)
        - Domperidone 10 mg 8 hourly PO
        - Ondansetron 4–8 mg 6–8 hourly PO
    - Corticosteroids: should be reserved for cases where standard therapies have failed
    - Pyridoxine: not recommended for NVP / HG
- Other medications
    - Histamine H2 receptor antagonists or PPI may be used in women developing GERD/ gastritis/ oesophagitis
    - **Thiamine** (oral / IV) should be given to all women admitted with prolonged vomiting, especially before administration of dextrose or parenteral nutrition(correct all electrolyte imbalances before administration of dextrose or parenteral nutrition)
    - Women admitted with HG should be offered VTE prophylaxis, with LMW Heparin, unless there are contraindications, e.g., bleeding
    - VTE prophylaxis can be discontinued on discharge
    - Iron-containing preparations: if these exacerbate NVP/HG symptoms, then they should be discontinued
    - TPN: last resort when all other treatments have failed, as it is inconvenient, expensive and can be associated with serious complications such as thrombosis, metabolic disturbances and infection
- Rehydration regime
    - Normal saline with additional potassium chloride in each pint alternate with Hartman solution, with administration guided by daily monitoring of electrolytes
    - ** Dextrose infusions are not suitable, unless sodium levels are normal and thiamine has been administered
- Complementary therapies
    - Ginger (including ginger biscuits): may be used in mild to moderate NVP, for those who are not keen on anti-emetics
    - Acustimulations (Acupressure, Acupuncture)
    - Hypnosis: not recommended for NVP/ HG
- Those with severe and continued symptoms into the late second or the third trimester should be offered serial scans to monitor foetal growth
- Early use of lifestyle/dietary modifications and anti-emetics that were found to be useful in the index pregnancy is advisable to reduce the risk of NVP and HG in the current pregnancy (or next pregnancy)

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer to the O&G specialist on call for admission if urgent medical attention required

ADDITIONAL INFORMATION

PREGNANCY-UNIQUE QUANTIFICATION OF EMESIS (PUQE) INDEX

Total score is the sum of replies to each of the three questions.

PUQE-24 score: Mild ≤ 6; Moderate = 7–12; Severe = 13–15

Motherisk PUQE-24 scoring system					
In the last 24 hours, for how long have you felt nauseated or sick to your stomach?	Not at all (1)	1 hour or less (2)	2–3 hours (3)	4–6 hours (4)	More than 6 hours (5)
In the last 24 hours have you vomited or thrown up?	7 or more times (5)	5–6 times (4)	3–4 times (3)	1–2 times (2)	I did not throw up (1)
In the last 24 hours how many times have you had retching or dry heaves without bringing anything up?	No time (1)	1–2 times (2)	3–4 times (3)	5–6 times (4)	7 or more times (5)

PUQE-24 score: Mild ≤ 6; Moderate = 7–12; Severe = 13–15.

How many hours have you slept out of 24 hours? _____ Why? _____

On a scale of 0 to 10, how would you rate your wellbeing? _____

0 (worst possible) → 10 (the best you felt before pregnancy)

Can you tell me what causes you to feel that way? _____

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APPROACH TO DYSPEPSIA IN PREGNANCY

[With focus on gastro-oesophageal reflux disease (GERD)]

INTRODUCTION

- GERD is defined as symptoms or complications resulting from the reflux of gastric contents into the oesophagus or beyond, into the oral cavity (including larynx) or lung.
- GERD can be further classified as the presence of symptoms without erosions on endoscopic examination (non-erosive disease or NERD) or GERD symptoms with erosions present (ERD).
- Common during pregnancy: 30-50% of pregnant women
- May begin in any trimester: 52% in the 1st trimester; 40% in the 2nd trimester; 8% in the 3rd trimester
- Severity increased throughout pregnancy
- Usually resolves after delivery

INITIAL APPROACH

- A thorough history taking
    - Symptoms: Heartburn (most common symptom), regurgitation, epigastric pain, early satiety, belching and bloating
    - Risk factors:
        - Increasing gestational age
        - Pre-existing heartburn before pregnancy
        - Number of parity
        - Increasing maternal age
        - Weight gain
- Comprehensive physical examination focusing on abdomen
- Diagnosis of GERD during pregnancy: based on symptoms, additional diagnostic test is generally not required
- Further investigations to be considered in tertiary centre
    - OGDS may be required, but only reserved for patients whose symptoms are refractory to medical therapy, or who have suspected complications
    - If possible, try to delay OGDS until after the 1st trimester
    - It is uncommon to require ambulatory pH monitoring during pregnancy

INITIAL MANAGEMENT

- First line: lifestyle modifications
    - Eating smaller meals
    - Avoid eating late at night, i.e., within 3 hours of bedtime

    - Avoidance of caffeine/acidic drinks/spicy food, although not much data to support
    - May elevate bed-head, if having night time GERD symptoms
- Medications
    - For mild-to-moderate GERD, should use antacids first
    - If severe, then may use PPI (e.g., Pantoprazole)
        - Except for Omeprazole (pregnancy category C), all PPI (pregnancy category B) are safe for use during pregnancy
        - There is no evidence associating PPI exposure during pregnancy with congenital malformations/ spontaneous abortions / premature deliveries
        - May start PPI on a PRN basis first, just enough for symptomatic control
    - If not responding to PPI, may use prokinetic agent (Metoclopramide – pregnancy category B)

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer to the Antenatal Combine Clinic if symptoms of dyspepsia do not resolve with PPI given for an adequate duration (4–8 weeks).

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HEPATITIS B & C IN PREGNANCY

CHECKLIST FOR PRE-PREGNANCY COUNSELLING

- Screening question: Ask all women with chronic Hepatitis B or C on follow-up if they wish to get pregnant during every clinic review
- Refer to Pre-Pregnancy Clinic for all women with Hepatitis B / C who express the wish to conceive

- Advise and enforce contraception prior to disease optimisation
- Review medication
- T. Folic Acid 5mg daily
- Aim for disease control / remission before conception
    - For women of reproductive age with known HCV infection, antiviral therapy is recommended before considering pregnancy, whenever practical and feasible, to reduce the risk of HCV transmission to future offspring.
- Advise the patient not to self-discontinue treatment (if on any), even if found pregnant, seek medical advice early

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

GENERAL (BOTH HEPATITIS B & C)

- Newly diagnosed Hepatitis B or C (confirmed)
    - Notify
    - Clinical assessment, including risk factors (HIV, DM, CLD, ESRF, IVDU, spouse/family with Hepatitis B, multiple sexual partners)
    - Screen husband / partner
    - Send full blood count (FBC), liver function test (LFT), coagulation profile, renal profile (prior to Gastroenterology & Hepatology clinic appointment)
    - Screen for Hepatitis B (HBsAg), hepatitis C (anti-HCV) and HIV (whichever not done yet)
    - To get ultrasound HBS appointment
    - Counselling
        - Risk of transmission to baby
        - Treatment indication, when
        - To deliver in hospital with resident Obstetrician
        - Management of placenta
        - Breastfeeding
- To do LFT monitoring (every trimester) at health clinic and monitor closely for hepatic flares / deranged liver enzyme

A. HEPATITIS B

- Screen for HBV infection with HBsAg on booking, in every pregnancy
  - Test with Rapid Test Kit-RTK HBsAg on booking
- If Rapid Test Kit-RTK HBsAg on booking positive
  - Confirmation test: HBsAg EIA via venous blood sample (give a MCH appointment in 2 weeks to review results)
    - Laboratory will proceed with HBeAg and anti-Hbe with the same sample (for pregnant cases only)
  - Hepatitis B viral load (HBV DNA)
  - To get ultrasound HBS in 1-month time - form to have stamp of "EMTCT Hepatitis B"
  - Refer to Gastroenterology & Hepatology Clinic before 24 weeks of gestation
- For most patients (no hepatitis / cirrhosis/ no previous child with Hep B/ low HBV DNA < 200,000 IU/ml), no treatment with antiviral is required
  - Periodical assessment
  - LFT in every trimester, &post partum (1,3, 6 months)
  - Once notice flare/ active hepatitis/ cirrhosis, to start treatment as per non-pregnant patient
- Antiviral
  - Antiviral prophylaxis should be initiated at 28 - 32 weeks of gestation in hepatitis B e antigen-positive mothers or viral load >200,000 IU/ml
  - Tenofovir disoproxil fumarate (TDF) is the preferred antiviral
  - If the mother is already on antiviral before pregnancy - to continue AVT (Tenofovir)
  - If on Entecavir (ETV), to change to Tenofovir (TDF) during pregnancy
  - If used as prophylaxis for high viraemia in pregnancy, may stop up to 3 months postpartum
  - By providing treatment during pregnancy, can lower MTCT from >90% to <10%

B. HEPATITIS C

- Antiviral
  - No large-scale data on safety & efficacy of HCV DAAs in pregnant women
  - No data for use of DAAs on EMTCT purpose, HCV treatment during pregnancy cannot currently be recommended
    - To consider treatment after delivery
    - In case of accidental conception during DAA treatment, case-by-case basis through discussion with the patient, about potential risks and benefits, and co-managed by Hepatology and Obstetrics teams
- In HCV-infected pregnant women with pruritus or jaundice, there should be a high index of suspicion for intrahepatic cholestasis of pregnancy (ICP) with subsequent assessment of alanine aminotransferase (ALT), aspartate aminotransferase (AST), and serum bile acids

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer to Gastroenterology & Hepatology team (antenatal combine clinic under Gastroenterology & Hepatology Clinic)if
    - Chronic hepatitis B or C not on / defaulted follow-up
    - Newly diagnosed B or C

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- Delivery in a facility with resident Obstetrician
- May allow postdate unless specified otherwise
- The diagnosis of Hepatitis B or C per se is not an indication for planned caesarean section or induction of labour (may allow vaginal delivery)
- Reassure of uncomplicated labour and delivery most of the time
- Healthcare workers to observe universal precaution protocol
- Refer to the Paediatrics team
- Baby born to an HbsAg-positive mother should be given prophylactic Hep B Ig (HBIG) within 12 hours post birth, latest by 48 hours of life
    - Both HBIG and 1st dose Hepatitis B vaccine can be given simultaneously, but to inject at different thighs
    - Without prophylaxis
        - Highest risk of transmission is in pregnant mothers with HBsAg positive + HBeAg positive (transmission rate 70-90%)
        - Lowest risk in pregnant mothers with HBsAg Positive + HBeAg negative (transmission rate 10-40%)
    - With Post Exposure Prophylaxis (HepB Immunoglobulin + 3 doses of Hep B vaccines): can prevent MTCT 85-95%
        - Still has a risk of transmission, especially in groups with a high HBV viral load (>107 copies/mL), and HBeAg positive

POSTPARTUM CARE

- Continue pre-existing follow-up (if any)
- To refer to Gastroenterology & Hepatology team before discharging the patient, after delivery
- Offer effective contraception to avoid unplanned pregnancies
- Both hepatitis B (HBsAg positive not on treatment / while on antiviral) and hepatitis C mothers can breastfeed
    - However, advice to stop breastfeeding if nipple cracked/ injured as there is a risk of transmission from blood exposure
- To provide complete Hepatitis B vaccines to all babies
- Advice the patient on the importance of early booking in her next pregnancy

For further information to refer to CPG on Management of Chronic Hepatitis B in Adults 2023

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INTRAHEPATIC CHOLESTASIS IN PREGNANCY (ICP)

Remarks:

- Intrahepatic cholestasis of pregnancy (ICP) is present in bile acid levels > 10 µmol/L (fasting) or > 14 µmol/L (postprandial). The diagnosis of ICP may also be raised if bile acid levels are unremarkable and the patient has both pruritus and elevated transaminase levels.
- The rate of ICP recurrence in subsequent pregnancies is high, reportedly at 45–70%.
    - In fasting blood, the upper reference range of bile acid levels is 6–10 µmol/L and in postprandial blood 10–14 µmol/L.
    - Sometimes it may take up to four weeks after the initial pruritus for laboratory results to become abnormal.
    - Normal bile acid levels in pruritus do not rule out the diagnosis of ICP.
- Maternal prognosis during pregnancy is favourable. The mainly nocturnal pruritus can be quite distressing. However, the severity of the pruritus does not correlate with the maternal bile acid serum level.
- ICP is associated with increased risks for adverse perinatal outcomes, including stillbirth. The highest risk of stillbirth occurred in women with a total bile acid level ≥ 100 µmol/L, regardless of the time of measurement.

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

- History
    - Pruritus, especially at night and starting on the palms of the hands and soles of the feet, is considered the cardinal symptom of ICP
    - Accompanying symptoms may include pain in the upper abdomen, nausea, loss of appetite, sleep deprivation, and steatorrhea
- Investigations to order
    - Fasting bile acid (indication to repeat based on clinical judgement)
    - Consider doing the following investigations locally: FBC, Renal profile, LFT, GGT, Coagulation profile, UFEME
- Treatment – can be initiated after discussed with Gastroenterology & Hepatology team
    - If ICP is suspected clinically, oral treatment with ursodeoxycholic acid (UDCA) should be initiated irrespective of bile acid levels, with the goal of alleviating maternal symptoms
    - Ursodeoxycholic acid can improve both maternal symptoms and liver function in ICP; According to current evidence, the therapy does not change the perinatal outcome
    - UDCA can be stopped once the patient is in labour
    - If pruritus persists during UDCA therapy, additional administration of rifampicin may be considered in individual cases

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer to Gastroenterology & Hepatology team (antenatal combine clinic under Gastroenterology & Hepatology Clinic) if suspected case of ICP

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- Timing of delivery based on bile acid level
    - ≥ 100 μmol/L:induction of labour may be recommended between 34 + 0 and 36 + 6 weeks of gestation
    - < 100 μmol/L:induction of labour should be recommended at 37 + 0 weeks of gestation
- The mode of delivery should follow obstetric criteria

POSTPARTUM CARE

- Postpartum monitoring and follow-up of LFT should be done in 4-6 weeks to ensure resolution
    - Laboratory and clinical changes normalise completely postpartum
    - In cases of persistence beyond a period of 4–8 weeks, the diagnosis of ICP should be questioned
- Subsequent pregnancies are at elevated risk of recurrence

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HAEMATOLOGY

ANEMIA

(MAINLY FOCUSING ON IRON DIFICIENCY ANEMIA IN PREGNANCY)

CHECKLIST FOR PRE-PREGNANCY COUNSELLING

- If known to have anaemia, investigate (if not done before) and perform pre-pregnancy counselling
  - Treatment based on the diagnosis / cause of anaemia
- In a confirmed thalassemia carrier, screen husband
- Advise and enforce contraception prior to disease optimisation
- T. Folic Acid 5mg daily
- Counselling
  - Anaemia has implications for maternal, pregnancy and foetal outcomes
  - Many women lack the sufficient amount of iron needed for the second and third trimesters, leading to anaemia
  - Compliance with prescribed vitamins, iron supplements and folic acid
  - Good nutrition is the best way to prevent anaemia if pregnant or trying to get pregnant (Once women become iron-deficient in pregnancy, it is not possible to ensure repletion through diet alone and oral supplementation is needed)
  - Eating foods high in iron content (such as dark green leafy vegetables, red meat, fortified cereals, eggs, and peanuts)

Remarks

- Anaemia is defined as low haemoglobin concentration (Hb); lower limit of current reference ranges is 2 standard deviations below the mean in a healthy population [World Health Organization (WHO), 2011]
- Hb thresholds defining anaemia in pregnancy (British Committee for Standards in Haematology, 2012)
  - 1st trimester - Hb <11.0 g/dl
  - 2nd& 3rd trimester - Hb <10.5 g/dl
  - postpartum - Hb <10.0 g/dl

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

- Non-anaemic women at risk of iron deficiency (see remarks below) should be identified and either started on prophylactic iron empirically or have serum ferritin checked first
- Assessment during review
  - Clinical symptoms: non-specific and may include fatigue, pallor, weakness, headache, palpitations, dizziness, dyspnoea, irritability and poor concentration
  - Physical examination: pallor, maternal tachycardia, overt bleeding sources
- Differential diagnosis of anaemia in pregnancy (not extensive)

- Haemodilution (physiological expansion of plasma volume beginning in the first trimester and plateauing by the third, which exceeds the increased production of red blood cells and haemoglobin)
- Iron, vitamin B12 and folate deficiency
- Presence of a variant haemoglobin or thalassaemia
- Inflammatory disorders
- Haemolysis
- Blood loss

- Investigations to consider (not extensive; depending on patient's presentation)
  - FBC
    - At least during booking appointment
    - Low Hb, mean cell volume (MCV), mean cell haemoglobin (MCH) and mean cell haemoglobin concentration (MCHC) are suggestive of iron deficiency (may also occur in haemoglobinopathies)
  - Serum ferritin
    - If low (serum ferritin level <30 µg/l) is diagnostic of iron deficiency in pregnancy; however, a normal ferritin level does not exclude iron deficiency
    - Other biomarkers of iron status are not currently recommended for screening as there is insufficient validation in pregnancy
    - Serum ferritin should be measured in women with a known haemoglobinopathy to identify concomitant iron deficiency and exclude iron loading states
  - Case-to-case basis (may discuss with FMS or physician)
    - Peripheral blood film
    - Haemoglobinopathy testing: Hb electrophoresis, Hb DNA analysis
    - ANA, LDH, Coomb's test, reticulocyte count, UFEME
    - BFMP
    - Stool for ova & cyst
- Initial treatment for IDA
  - Hb 8 to 10.9 g/dl irrespective of gestational age, or Hb < 8 g/dl where < 36 weeks of gestation - continue follow-up at Klinik Kesihatan
  - If anaemia without an obvious other cause is detected, a diagnostic trial of oral iron should be given without delay, with a repeat full blood count in 2–3 weeks
    - Taken with an empty stomach, 1 hour before meals with a source of vitamin C to maximise absorption
  - Indications for parenteral iron therapy:
    - Unable to tolerate oral iron therapy or non-compliance
    - Approaching term (> 34 weeks) with insufficient time for oral iron to be effective (moderate IDA with Hb 7-9 g/dL)
    - IDA should be confirmed by serum ferritin < 15 ng/ml prior to parenteral use

        - Total iron deficits can be estimated via the Ganzoni formula (target Hb 12) or using the simplified method ([desired Hb – actual Hb] x 200) + 500
        - After completing parenteral iron, repeat Hb at 1-2 weeks and resume oral iron therapy after 1 week
        - Avoid parenteral iron therapy in active infection
    - May consider blood transfusion in severe anaemia
- Foetal growth monitoring at Klinik Kesihatan
- Counselling (refer to the pre-pregnancy section above)
- May need a dietitian referral (for detailed education and counselling)

Remarks:

- Non-anaemic women at risk of iron deficiency in pregnancy
    - Previous anaemia
    - Multiparity ≥P3
    - Twin or higher order multiple pregnancy
    - Interpregnancy interval <1 year
    - Women who have poor dietary habits
    - Those following a vegetarian/vegan diet
    - Pregnant teenagers
    - Recent history of clinically significant bleeding

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer to the O&G team if
    - Hb <7 g/dl and > 34 weeks of gestation
    - Symptomatic anaemia, irrespective of gestational age & Hb level
- Refer to the Antenatal Combine Clinic if
    - Anaemia in pregnancy where the cause is less likely due to haemodilution, iron deficiency, or diagnostic uncertainty (may require Haematology follow-up on a case-by-case basis)

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- Keep Hb ≥ 10.0 g/dl
- May allow postdate unless specified otherwise
- PPH prophylaxis

POSTPARTUM CARE

- Treatment for IDA should be continued for a further 3 months and until at least until 6 weeks postpartum to replenish iron stores
- Offer effective contraception to avoid unplanned pregnancies
- Refer to the MOPD / Haematology clinic if there is diagnostic uncertainty or persistent anaemia (despite adequate iron supplementation) after the postpartum period

ADDITIONAL INFORMATION

- The average daily iron intake from food for women in Great Britain is 10 mg (no available data in Malaysia), of which 10–15% (1 – 1.5mg) is absorbed
- The recommended daily intake (RDA) of iron for the latter half of pregnancy is 27 mg, twice that of a non-pregnant woman
- Prevention of maternal anaemia - Daily oral iron and folic acid supplementation with 30 mg to 60 mg of elemental iron and 400 mcg (0.4 mg) of folic acid is recommended
- If diagnosed with anaemia - Daily iron (120 mg of elemental iron) and folic acid (400 µg or 0.4 mg) supplementation until Hb concentration rises to normal; then switch to the standard antenatal dose (as above) to prevent recurrence of anaemia
- Common oral iron supplements in Malaysia

Iron Preparation	Dose per pill	Elemental iron	Folic acid per pill
Ferrous fumarate 200mg tablet	Ferrous fumarate 200mg	65 mg	Nil
Maltofer tablet	Ferric hydroxide polymaltose 370mg	100 mg	350 mcg
Iberet-Folic 500 tablet	Ferrous sulfate (controlled release) 525mg	105 mg	800 mcg
Zincofer capsule	Ferrous fumarate 350mg	115 mg	1000 mcg
Obimin tablet	Ferrous fumarate 90mg	30 mg	1000 mcg
Sangobion	Ferrous gluconate 250mg	30 mg	1000 mcg

REFERENCES / FURTHER READING

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4. Product leaflets for oral iron supplements

THROMBOCYTOPENIA

CHECKLIST FOR PRE-PREGNANCY COUNSELLING

- If known to have persistent thrombocytopenia (inherited or acquired), investigation (if not done before) and pre-pregnancy counselling from a multidisciplinary specialist team with expertise in platelet function disorders (including Haematologist/ Physician and O&G specialist)
- Advise and enforce contraception prior to disease optimisation
- Counselling
    - Thrombocytopenia in pregnancy is relatively common, occurring in 7 to 10% of unselected pregnancies, and needs further investigation
    - Epidural anaesthesia may not be possible if platelet counts are low
    - Idiopathic Thrombocytopenia (ITP)
        - May relapse or worsen during pregnancy, most commonly around the time of delivery
        - Serious adverse outcomes for mothers with ITP are rare
        - Corticosteroids, if used, are considered safe with regards to potential teratogenicity and foetal toxicity

Remarks:

- Normal serum levels of platelets in pregnancy are 150–400 x 10^9/L
    - Mild thrombocytopenia if platelet count is >100
    - Moderate thrombocytopenia if platelet count is at 50–100
    - Severe thrombocytopenia if platelet count is at <50
- During pregnancy there is a general downward drift in platelet count, particularly during the last trimester
- Clinical features
    - It is unusual to have any clinical signs or symptoms when the platelet count is >50, unless platelet function is also defective
    - Most common manifestation is mucocutaneous bleeding with purpura, epistaxis, gingival bleeding and menorrhagia
    - Platelet counts below 10 x 10^9/L are at greatest risk of bleeding, including intracranial haemorrhage

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

- Differential diagnosis of thrombocytopenia in pregnancy
    - Gestational or incidental thrombocytopaenia of pregnancy (74%)
    - Hypertensive disorders of pregnancy: Pre-eclampsia & HELLP syndrome (21%)
    - Idiopathic Thrombocytopenia (ITP) (3%)
    - Thrombotic thrombocytopenic purpura (TTP)
    - Disseminated intravascular coagulation (DIC)
    - Antiphospholipid syndrome
    - Folate deficiency
    - Viral: Dengue, HIV, HCV

- Drug-related
- Leukaemia/lymphoma
- Hereditary thrombocytopenia
- Spurious due to platelet clumping or macrothrombocytes

- Investigations to consider (not extensive; depending on patient's presentation)
  - FBC
  - Full blood picture / Peripheral blood film
  - Coagulation screen: PT, APTT, fibrinogen, D-dimer
  - Liver function tests
  - Viral screening: HIV, HBV, HCV
  - ANA, C3, C4
  - Lupus anticoagulant/ anti-cardiolipin antibody: past history of unexplained pregnancy losses/thrombosis
  - Bone marrow examination: unnecessary unless suspicion of myelodysplastic syndrome, leukaemia or lymphoma
- Enquire if any bleeding tendency during every review
- Monitor platelet counts closely
  - 1st & 2nd trimester - monthly
  - 3rd trimester - 2 weekly
  - At term - weekly
- 'Safe' Platelet Thresholds for delivery
  - Vaginal delivery > 30 x 10^9/L
  - Caesarean section > 50 x 10^9/L
  - Epidural anaesthesia> 80 x 10^9/L
- For Idiopathic Thrombocytopenic Purpura (ITP)
  - Threshold for treatment
    - Platelet count <20 x 10^9/L before 36 weeks
    - Platelet count <50 x 10^9/L after 36 weeks
    - Symptomatic bleeding at any trimester
  - Treatment
    - FBC monitoring if platelet count > 30 x 10^9/L (unless a higher platelet count is required for procedures)
    - Oral prednisolone 1mg/kg/day with rapid taper to keep <30mg/day
    - If after 36 weeks gestation or platelet count <10 x 10^9/L, consider admission for pulsed IVIG or high dose corticosteroid (Methylprednisolone/Dexamethasone)
    - Admit earlier for patients who prefer epidural analgesia for IVIG infusion to raise the platelet counts >80 x 10^9/L

Remarks:

- ITPL: The diagnosis remains clinical and is based principally on the exclusion of other causes of thrombocytopenia by the history, physical examination, full blood count, peripheral blood film and autoimmune screen
- Features of gestational thrombocytopenia
  - Diagnosis of exclusion: no tests are available to distinguish from immune thrombocytopenic purpura (Many of the features are similar to mild ITP and it is difficult to distinguish between the two disorders)

    - Mild thrombocytopenia, platelet count usually >70 x 10^9/L
    - No associated maternal bleeding
    - No past history of thrombocytopenia outside pregnancy
    - Occurrence in third trimester
    - No associated foetal thrombocytopenia
    - Spontaneous resolution after delivery
    - May recur in subsequent pregnancies
- Heparin-induced thrombocytopenia can, rarely, occur with the administration of unfractionated heparin in pregnancy, but has not been described with the use of low molecular weight heparin in pregnancy.
- Peripheral blood film
    - To exclude platelet clumping and red cell fragmentation (in TTP, pre-eclampsia, HELLP or DIC)
    - Thrombocytopenia with small platelets is suggestive of a defect in platelet production, whereas the presence of large platelets is more likely to be associated with enhanced platelet turnover or hereditary thrombocytopenias
    - Giant platelets: most of them are due to acquired disorders such as idiopathic thrombocytopenic purpura (ITP) and myelodysplastic syndrome (MDS); inherited giant platelet disorders are rare; occasionally observed as an incidental finding in routine blood smear examinations

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer Antenatal Combine Clinic if
    - Platelet count <100 x 10^9/L
    - Episode of symptomatic bleeding at any trimester
    - Thrombocytopenia requiring further investigation (diagnostic uncertainty)
    - Diagnosis established but which cannot be handled in a primary care setting
- May require Haematology follow-up (on a case-by-case basis)

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- Delivery in a facility with a resident Obstetrician (if platelet count <150 x 10^9/L)
- May allow postdate unless specified otherwise
- Caesarean section should be reserved for obstetric indications only
- Platelet counts above 50 x 10^9/L are safe for Caesarean section under general anaesthesia but not epidural anaesthesia
- For ITP with platelet counts <50 x 10^9/L requiring immediate Caesarean delivery, administer IVIG and Methylprednisolone, and request for platelet transfusion just prior to surgery
- Where maternal platelet counts are low, precautions/avoidance of foetal scalp electrodes or sampling and high- or mid-cavity operative delivery

POSTPARTUM CARE

- When maternal counts are <80 x 10^9/L during pregnancy, a cord sample should be taken to ensure that the baby's counts are normal

    - Consider taking further neonatal samples on days 1 and 4, as neonatal thrombocytopenia can be present by then
- Review FBC 6 weeks postpartum: in gestational thrombocytopenia, platelet counts should have normalised by 6 weeks postpartum
- Offer effective contraception to avoid unplanned pregnancies
- Refer Haematology clinic / MOPD if there is diagnostic uncertainty or persistent thrombocytopenia after the postpartum period

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THROMBOEMBOLISM

Remarks:

- Pregnancy is a hypercoagulable state; these changes are observed from the first trimester and for at least 6 postpartum weeks
- **All women should have a documented thromboembolism risk assessment (refer to VTE Risk Assessment in the Additional Information section below) during (1) pre-pregnancy, (2) booking, (3) admission / new illness, and (4) immediate postpartum**
- LMWH is the agent of choice for thromboprophylaxis - more convenient administration, proven safety profile in pregnancy and the fact that it does not require frequent monitoring of platelets

CHECKLIST FOR PRE-PREGNANCY COUNSELLING

- ☐ Perform VTE Risk Assessment
- ☐ Women who have a significant risk of thromboembolism (previous history of VTE/PE, thrombophilia, Antiphospolipid Syndrome, and other risk factors) should be ideally seen in the pre-pregnancy clinic and managed in collaboration by a haematologist or physician
- ☐ Counselling
    - All patients at risk should be advised on non-pharmacological thromboprophylactic measures such as anti-embolic stockings, avoidance of dehydration and early ambulation
    - Women on long-term warfarin or other oral anticoagulants should be informed of the risks of these agents to the foetus and advised to stop oral anticoagulant therapy and change to LMWH as soon as pregnancy is confirmed, ideally within 2 weeks of the missed period and before the sixth week of pregnancy
    - Advise the patient that once in labour, do not inject any further heparin
    - Teach patients to self-inject subcutaneous anticoagulant and the safe disposal of needles and syringes

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

- ☐ Performa VTE Risk Assessment (see Additional Information section below) during booking, during hospital admission or whenever a new risk factor occurs
    - Consider prophylactic anticoagulant if the criteria are fulfilled (women with anti-thrombin III deficiency and anti-phospholipid syndrome require higher prophylactic dose)
    - Offer thromboprophylaxis with LMWH throughout the antenatal period if previous VTE (except those with a single previous VTE related to major surgery and no other risk factors)
    - If previous VTE prior to current pregnancy was provoked by major surgery from which the patient has completed treatment, thromboprophylaxis with LMWH can be withheld provided no additional risk factors are present

- Thromboprophylaxis using LMWH (using current body weight)

Body weight	Enoxaparin	Dalteparin	Tinzaparin
< 50 kg	20mg OD	2,500 units OD	3,500 units OD
50 – 90 kg	40mg OD	5,000 units OD	4,500 units OD
91 – 130 kg	60mg OD	7,500 units OD	7,000 units OD
131 – 170 kg	80mg OD	10,000 units OD	9,000 units OD
> 170 kg	0.6mg/kg OD	75 units/kg OD	75 units/kg OD

- Counselling: refer above section for counselling points
- Acute thromboembolism in pregnancy suspected?
  - If yes, refer to Additional Information section (section 2) below

Remarks:

- Safety of anticoagulant in pregnancy and breastfeeding

Anticoagulant	Safe during pregnancy	Safe during breastfeeding
Heparins	Yes	Yes
VKAs	No	Yes
DOACs	No	No
Fondaparinux	Probably yes	Yes

Fondaparinux: still insufficient evidence regarding safety in pregnancy; current recommendations suggest use only in cases where there is hypersensitivity towards heparins

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer urgently to the on call physician if
  - Acute VTE is suspected
  - Severe bleeding due to anticoagulant that require urgent admission
- Refer to the Antenatal Combine Clinic
  - All cases of established VTE during the current pregnancy (if no appointment is given)
  - Previous thromboembolism or underlying thrombophilia
  - Anticoagulants are indicated but not available (in the local clinic setting)
  - A haemorrhagic problem develops while on anticoagulant (early clinic appointment or referral to the physician on call for urgent admission depending on severity of bleeding)
- Refer to the FMS / O&G specialist - LMWH for thromboprophylaxis can be started in Klinik Kesihatan after consulting a FMS / O&G specialist

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- Advise the patient that once in labour, do not inject any further heparin
- Discontinue LMWH maintenance therapy 24 hours prior to the planned delivery
- For elective caesarean section in women receiving antenatal LMWH, serve the thromboprophylactic dose of LMWH on the day prior to delivery, omit the morning dose on the day of delivery, and have the operation performed that morning

- Do not undertake regional anaesthetic or analgesic techniques until at least 24 hours after the last dose of therapeutic LMWH
- Active management of the 3rd stage of labour
- PPH prophylaxis should be instituted: Blood grouped and saved, IV access and 40 units of Oxytocin infused after delivery of the placenta
- If receiving therapeutic doses of LMWH, consider wound drains (abdominal and rectus sheath) at caesarean section and close the skin incision with interrupted sutures to allow drainage of any haematoma
- Any woman who is considered to be at high risk of haemorrhage, and for whom continued heparin treatment is considered essential, should be managed with intravenous unfractionated heparin until the risk factors for haemorrhage have resolved

POSTPARTUM CARE

- Do not give LMWH 4 hours after the use of spinal anaesthesia or after the epidural catheter has been removed
- Do not remove the epidural catheter within 12 hours of the most recent LMWH injection
- Perform VTE Risk Assessment
- The first dose of LMWH can be given as soon as possible after delivery (as soon as 4 hours postpartum), provided there is no postpartum haemorrhage and regional analgesia has not been used
- Offer a choice of LMWH or oral anticoagulant (for treatment of thromboembolism or certain high-risk patients who need longer thromboprophylaxis) for postnatal therapy
- Heparins, VKAs and Fondaparinux are safe during breastfeeding
- Avoid warfarin until at least the fifth day postpartum and for longer in women at increased risk of postpartum haemorrhage
- Get a MOPD follow-up appointment for VTE developed in pregnancy
- Contraception
    - Avoid combined hormonal contraception (COC and CIC) if higher risk of VTE or a history of thromboembolism
    - Progestogen-only contraception (Progestogen-only pill, depot Medroxyprogesterone Acetate (DMPA) and Norethisterone, LNG implants) are safe
    - Intrauterine devices are safe (once the uterus has returned to normal size or in post miscarriage patients)
    - Barrier methods are safe
- If started on an anticoagulant
    - For acute VTE, treat with therapeutic doses of anticoagulant during the remainder of the pregnancy, for at least 6 weeks postnatally, and until at least 3 months of treatment have been given in total
    - Before discontinuing treatment, the continuing risk of thrombosis should be assessed

- Teach patients to self-inject subcutaneous anticoagulant and the safe disposal of needles and syringes
- If a haemorrhagic problem develops while on LMWH, the treatment should be stopped and physician or haematologist advice sought

ADDITIONAL INFORMATION

SECTION 1. VTE RISK ASSESSMENT FORM

VTE Risk Assessment in Pregnancy and Puerperium (KKM 2017)

VTE risk factors	VTE score	Tick		
		Pre-pregnancy/ Booking	Admission/ New Illness	Post delivery
Date				
Pre-existing risk factors				
Previous VTE	**4**			
High risk thrombophilia	**3**			
Medical comorbidities (malignancies, cardiac failure, active SLE, IVDU/TB, nephrotic syndrome, DM with nephropathy, thalassemia major or intermedia post splenectomy)	**3**			
BMI ≥ 40kg/m2 BMI 30-39 kg/m2	**2** **1**			
Family history of VTE	**1**			
Low risk thrombophilia	**1**			
Current smoker (≥10 per day)	**1**			
Obstetric risk factors				
Caesarean section (emergency & elective)	**2**			
Pre-eclampsia	**1**			
Mid-cavity rotation instrumental delivery	**1**			
Prolonged labour (> 24hours)	**1**			
Postpartum haemorrhage (> 1000mls or requiring blood transfusion	**1**			
Stillbirth(current)	**1**			
IVF (first trimester only)	**1**			
Transient risk factors*				
Surgical procedures (except episiotomy repair, repair of 1st and 2nd degree perineal tear, evacuation of products of conception)	**4**			
Hyperemesis gravidarum/OHSS	**4**			
Admission beyond 3 days	**1**			
Systemic infection/infection requiring IV antibiotics	**1**			
Long distance travel (> 4 hours)	**1**			
Immobility/ dehydration	**1**			

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

Who should be given VTE prophylaxis?

Period	Score	Duration of thromboprophylaxis
Antenatal	≥ 4	Consider giving from 1st trimester up to 6 weeks postnatal (Give up to 6 weeks postnatal if there is a single risk with a score of 4. If a combination score of ≥ 4, give up to 3 weeks postnatal then to be reviewed by an O&G specialist to decide if a further 3 weeks of prophylaxis is warranted.)
Antenatal	3	Consider prophylaxis from 28 weeks gestation until 3 weeks postnatal
Postnatal	2	Consider prophylaxis for 10 days
Postnatal	≥ 2	Consider prophylaxis for 10 days or longer, specialist to decide

SECTION 2. ACUTE THROMBOEMBOLISM IN PREGNANCY

- If symptoms / signs suggestive of acute VTE are present, expedite objective testing and treat with low-molecular-weight heparin (LMWH) until the diagnosis is excluded by objective testing, unless treatment is strongly contraindicated
    - DVT: Unilateral swelling or heavy ache in the limb, claudication pain, increased warmth of lower limb, reduced capillary filling, fever
    - PE: Sudden onset of shortness of breath, dull chest pain worsened on inspiration, non-productive cough (occasionally blood stained), tachypnoeic, tachycardia, cyanosis (if severe), cardiorespiratory compromise or sudden collapse
- Investigations
    - D-dimer testing should not be performed in pregnancy
    - No evidence to support the use of pretest probability assessment for acute VTE in pregnancy
    - FBC, coagulation screen, renal profile, and LFT (before anticoagulant therapy is commenced)
    - ECG
    - Pulse oximetry
    - DVT
        - Compression duplex ultrasound if clinical suspicion of DVT (or suspected PE with symptoms and signs of DVT)
        - If DVT confirmed, no further investigation is necessary and treatment for VTE should continue
        - If ultrasound is negative and a high level of clinical suspicion exists, anticoagulant treatment should be discontinued but the ultrasound should be repeated on days 3 and 7
    - PE
        - ABG
        - Chest radiograph
        - Computerised tomography pulmonary angiogram (CTPA) - if suspected for PE without symptoms and signs of DVT
    - Women with an unprovoked VTE should be tested for the presence of antiphospholipid antibodies (lupus anticoagulant and/or anticardiolipin and/or β2-glycoprotein 1 antibodies)
- Treatment (therapeutic dose anticoagulant)

- Anticoagulant treatment should be commenced upon clinical suspicion of VTE and continued until VTE is definitively excluded
- LMWH should be given in doses titrated against the woman's booking or early pregnancy weight (when haemodynamically stable)
- Intravenous unfractionated heparin infusion should be started instead of LMWH when cardiovascular compromise or collapse
- When VTE occurs at term, consider intravenous unfractionated heparin which is more easily manipulated
- Decision for thrombolysis (massive pulmonary embolism or cardiorespiratory compromise) should be discussed with a physician
- Performing a thrombophilia screen prior to therapy is not recommended
- After initiating LMWH, no routine monitoring of anti-Xa activity unless extreme of weight, develops new thrombus or renal impairment

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THALASSAEMIA IN PREGNANCY

Refer Perinatal Care Manual, Page 166.

Division of Family Health Development, Ministry of Health Malaysia (2020). Perinatal Care Manual, 4th Ed.

RHESUS ISOIMMUNISATION IN PREGNANCY

Refer Perinatal Care Manual, Page 169.

Division of Family Health Development, Ministry of Health Malaysia (2020). Perinatal Care Manual, 4th Ed.

INFECTIOUS DISEASE

HIV (HUMAN IMMUNODEFICIENCY VIRUS INFECTION) IN PREGNANCY

CHECKLIST FOR PRE-PREGNANCY COUNSELLING

- Screening question: Ask all women with HIV on follow-up if they wish to get pregnant during every clinic review
- Refer to Pre-Pregnancy Clinic for all women with HIV who express the wish to conceive
- **Confidentiality should be maintained at all times regarding the patient's diagnosis**

- Women with HIV on anti-retroviral therapy (ART) before pregnancy
  - If stable on ART before pregnancy, continue the existing ART throughout pregnancy and after delivery
- Counselling
  - The risk of vertical transmission is 25–35% without any intervention
  - Use of antiretroviral therapy, elective caesarean delivery and avoidance of breastfeeding can reduce MTCT rates to <2%
  - Advise getting pregnant only when the viral load is suppressed
  - Harm reduction counselling (contraception, safe sex, compliance with ART)

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

- All pregnant women attending antenatal follow-up should be screened for HIV (with Pre -Test Counselling done)
  - Under the Infectious Disease Act 342 (1988), health care providers are legally bound to notify HIV positive patients
- Screen spouse / partner if not done previously
- Check baseline investigations: FBC, LFT, RP, CD4, Viral load, RBS, UFEME, screen for co-infections (Hep B, Hep C, RPR)
- All pregnant women with HIV should initiate ART as early in pregnancy as possible, regardless of their viral load or CD4 count, to maximise their health and prevent perinatal HIV transmission and secondary sexual transmission.
  - The decision about the ART regimen should be discussed with the person and individualised, taking into account tolerability, possible adherence issues, as well weighed against potential risk coming from ART exposure or suboptimal pharmacokinetics in pregnancy
  - ID Physician / FMS consulted on choice of ART
  - Women who present after 28 weeks of gestation must commence ART without delay
- Women with HIV on ART before pregnancy: continue ID Clinic / FMS for follow-up
- Patients on ART: determine the current CD4 and viral load during the early stages of pregnancy

- In the event that a woman who has initiated ART during pregnancy has not suppressed plasma viral load to <50 HIV RNA copies/mL, the following interventions are recommended:
    - Review adherence (including a full exploration of potential impacting factors) and concomitant medication
    - Perform resistance test if appropriate
    - Consider therapeutic drug monitoring (TDM)
    - Optimise to best regimen
    - Consider intensification
- MOGTT at 24-28 weeks if ART regime contains protease inhibitor
- Screen clinically for presence of opportunistic infections
- All HIV-positive women should be examined for genital infections and treated appropriately
    - If negative, the examination should be repeated at 28 weeks
- A detailed anomaly ultrasound should be performed for all foetuses exposed to HAART during the first trimester
- Viral load between weeks 32–36 determines the ongoing risk of transmission to the foetus and the mode of delivery

Viral load at 32 – 36 weeks	**Mode of delivery**
< 50 copies/mL	SVD
50 – 399 copies/mL	Pre-labour Elective Caesarean Section (PLCS) recommended* * Take into account the trajectory of viral load leading up to time of delivery, length of time on ART, adherence issues, obstetric factors and patient's views * PLCS has been proven to further reduce the risk of transmission, should be at 38- and 39-weeks' gestation
>400 copies/mL or unknown viral load	PLCS

- Time of delivery as per obstetric indication

Remarks:

- Invasive procedures (e.g., amniocentesis, chorionic villus sampling) and instrumental delivery are no longer as risky with regards to MTCT as previously thought in pregnant ladies with a suppressed viral load < 50 copies/mL. Data from different sources has failed to identify instrumental delivery as a cause of vertical transmission. The choice of instrument should be based on it, causing minimal foetal trauma.
- A repeat HIV test is necessary in high-risk patients who were first screened negative (repeat test preferably after 12 weeks of the first test or before 36 weeks of gestation)
    - Women whose past or present sexual partners were HIV infected, bisexual or IVDU
    - Women seeking treatment for sexually transmitted disease (STD)
    - Commercial sex worker
    - Women with past or present history of intravenous drug use (IVDU)
    - Women with history of blood transfusion before 1986
    - Unprotected vaginal or anal intercourse with more than one sex partner
- 3 test strategies are required for diagnosis of HIV
    - For screening, Rapid test/ Enzyme immunoassay (EIA) / Enzyme linked immunosorbent immunoassay (ELISA)
    - A positive screening test should be followed by a Particle Agglutination (PA)
    - Final confirmation with HIV PCR / HIV RNA Viral load

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer Infectious Disease (ID) Clinic for
    - Newly diagnosed HIV in pregnancy
    - HIV patients not on any follow-up / ART before pregnancy
    - Opportunistic infection
    - Women failing HAART
    - Antenatal Combine Clinic appointment arranged by ID clinic (if needed)
    - Women with HIV on ART before pregnancy can continue existing follow-up with ID Clinic / FMS
    - Refer to the O&G specialist for detailed anomaly ultrasound for all foetuses exposed to HAART during the first trimester

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- Delivery in the hospital with specialist
- Women in labour whose HIV status is unknown
    - Perform Rapid HIV Test: if positive, treat first and perform a confirmatory test immediately after delivery
- Woman diagnosed with HIV presenting in labour who has not received prior ART
    - IV Zidovudine should be given immediately
    - Discuss with ID Physician for immediate commencement of ART (fixed-dose AZT and 3TC with Raltegravir)
    - After delivery, switch to the recommended first-line ART regimen
- Women receiving ART before pregnancy or antenatally, who have achieved maximal viral load suppression, have a choice between PLCS or SVD
    - *Refer section above* for mode of delivery depending on viral load between weeks 32–36
- Women with a viral load of >1000 copies/mL who present in labour / ruptured membranes / planned PLCS
    - Intrapartum IV Zidovudine (AZT) infusion (2 mg/kg for the 1st hour followed by 1 mg/kg/h subsequently) is recommended
    - Current evidence suggests that intrapartum IV AZT has no additional benefit in prevention of vertical transmission in pregnant women on ART with viral load ≤1000 copies/mL during late pregnancy and near delivery
- After ROM, there is an increased risk of perinatal HIV transmission of 2% per hour
    - Delivery should be expedited for women with pre-labour ROM at term, either with induction of labour or a Caesarean section
    - When premature rupture of membrane (PPROM) occurs at <34 weeks, IM steroids administered, multidisciplinary discussion (Obstetrician,

Paediatrician and ID Physician) about the timing and mode of delivery after PPROM

- Notify the paediatrician regarding an HIV-exposed infant
    - Should receive 6 weeks of oral AZT and 3 doses of NVP at birth, 48 hours later, and 96 hours after the 2nd dose

POSTPARTUM CARE

- Offer effective contraception to avoid unplanned pregnancies / transmission of HIV to partner
    - The condom is the only contraceptive method proven to prevent both pregnancy and the sexual transmission of HIV
    - If an intrauterine device or hormonal contraception is to be considered, they must be used together with the condom
- Breast-feeding is not recommended as it is associated with transmission risks of up to 14%
    - Suppression of lactation (Cabergoline 1mg stat dose)
- Advise the patient on the importance of early booking in her next pregnancy
- ART should be continued for life after delivery, regardless of presenting CD4
    - Discontinuation of ART after delivery is only considered **after discussion with a FMS or ID Physician** if the woman is not motivated to be on lifelong ART and her CD4 >350 cells/µL
- Refer to the ID clinic / FMS for long term follow-up
- Staff nurse / community nurses (JM) should be informed when a mother is discharged to their area, and they should ensure the mother and her baby attend their follow-up visits to the Infectious Diseases Clinic and Paediatric Clinic

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CHICKENPOX IN PREGNANCY

Refer Perinatal Care Manual, Page 192.

Division of Family Health Development, Ministry of Health Malaysia (2020). Perinatal Care Manual, 4th Ed.

GROUP B STREPTOCOCCUS IN PREGNANCY

Refer Perinatal Care Manual, Page 194.

Division of Family Health Development, Ministry of Health Malaysia (2020). Perinatal Care Manual, 4th Ed.

DENGUE IN PREGNANCY

Refer Clinical Practice Guidelines – Management of Dengue Infection in

Adults, Ministry of Health, 3rd Edition 2015

MALARIA IN PREGNANCY

Refer to Management Guidelines of Malaria in Malaysia 2013

NEUROLOGY

EPILEPSY

CHECKLIST FOR PRE-PREGNANCY COUNSELLING

- Screening question: Ask all women with epilepsy on follow-up if they wish to get pregnant during every clinic review
- Refer to Pre-Pregnancy Clinic for all women with epilepsy who express the wish to conceive

- Advise and enforce contraception prior to disease optimisation
- Reinforce seizure education
- Review medication
    - Refer to the Neurology team if changes in medication need to be done
    - Whenever possible, keep the lowest effective dose of a single anticonvulsant
- T. Folic Acid 5mg daily
- Aim for seizure control at least 1 year before conception
- Advise the patient not to self-discontinue anti-epileptic treatment, even if found pregnant, and seek medical advice early

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

- Do not stop antiepileptic drug
- Maintain the pre-existing therapy if seizure is well controlled
- Reinforce seizure education
- T. folic acid 5mg daily until delivery
- Foetal anomaly scan / detailed scan at 22-24 weeks of gestation can identify major cardiac defects in addition to neural tube defects
- Serial growth scans for detection of small-for-gestational-age babies
- Regularly assess for risk factors for seizures such as sleep deprivation and stress
- Advise compliance with AEDs

Remarks:

- Seizure frequency in pregnancy: approximately 60% no change, 30% increase, 10% decrease
- Discontinuation or withdrawal of AEDs during pregnancy may lead to increase seizure risk, risk to baby (foetal intracranial haemorrhage, transient foetal bradycardia), miscarriage, trauma, SUDEP (sudden unexpected death in epilepsy)
- All AEDs are associated with teratogenicity risks, but higher risk with valproic acid and phenytoin. Inform risk of congenital abnormalities in the foetus is dependent on the type, number and dose of AEDs
- In cases of seizures in the second half of pregnancy that cannot be clearly attributed to epilepsy, immediate treatment should follow existing protocols for eclampsia management until a definitive diagnosis is made
- Routine monitoring of serum AED levels is not recommended during pregnancy

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer Neurology clinic if
    - On anti-epileptic medication – discussion on therapy and review the need to adjust medications
    - Change in seizure type and frequency
- Antenatal Combine Clinic appointment arranged by Neurology clinic (if needed)
- Patients who are seizure-free without AEDs over 1 year generally will not need tertiary care referral
- Urgent referral if red flags (as above), first epileptic seizure (in any trimester) or seizures in the second half of pregnancy which cannot be clearly attributed to epilepsy

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- Delivery in a facility with resident Obstetrician
- May allow postdate unless specified otherwise
- The diagnosis of epilepsy per se is not an indication for planned caesarean section or induction of labour (may allow vaginal delivery)
- Reassure of uncomplicated labour and delivery most of the time
- Adequate analgesia and appropriate care in labour to minimise risk factors for seizures such as insomnia, stress and dehydration
    - TENS, Entonox and regional analgesia are all safe
- AEDs intake continued during labour, administer parenteral alternative if not tolerated orally

POSTPARTUM CARE

- Advise to continue AEDs postnatally
- Continue pre-existing follow-up (if any)
- Offer effective contraception to avoid unplanned pregnancies
- Screen mothers for depression
- Refer to the Neurology team if
    - Anticipated high risk of seizures in the peripartum period
    - The AED dose was increased in pregnancy; it should be reviewed within 10 days of delivery to avoid postpartum toxicity
- Refer to the Paediatrics team
    - Neonatal monitoring for adverse effects associated with AEDs exposure in utero
- Encourage breastfeeding even if taking AEDs in pregnancy
    - Risk of adverse cognitive outcomes in children is not increased

Notes on contraception

- The efficacy of oral contraceptives, transdermal patches, vaginal rings and progestogen-only implants may be affected if taken with enzyme-inducing AEDs (e.g., carbamazepine, phenytoin, phenobarbital)

- All methods of contraception may be offered to women taking non-enzyme-inducing AEDs (e.g., sodium valproate, levetiracetam, gabapentin, vigabatrin, tiagabine and pregabalin)
- If taking lamotrigine monotherapy and oestrogen-containing contraceptives, inform of the potential increase in seizures due to a fall in the levels of lamotrigine

ADDITIONAL INFORMATION

Reported teratogenic effects of AEDs

AEDs								
	CBZ (n=1957)	LTG (n=2514)	LEV (n=599)	OXC (n=333)	PB (N=294)	PHT (n=125)	TPM (n=152)	VPA (n=1381)
Cardiac	28 (1%)	15 (1%)	5 (1%)	4 (1%)	8 (3%)	5 (4%)	3 (2%)	34 (2%)
Cleft lip or palate	2 (<1%)	3 (<1%)	1 (<1%)	1 (<1%)	1 (<1%)	0	0	6 (<1%)
Hypospadias	10 (1%)	6 (<1%)	1 (<1%)	0	1 (<1%)	0	1 (1%)	22 (2%)
Neural tube defects	7 (<1%)	1 (<1%)	0	0	2 (1%)	1 (1%)	0	16 (1%)
Polydactyly	2 (<1%)	0	0	1 (<1%)	2 (1%)	0	0	8 (1%)
Gastrointestinal	7 (<1%)	8 (<1%)	1 (<1%)	0	0	0	0	2 (<1%)
Renal	12 (<1%)	8 (<1%)	1 (<1%)	0	1 (<1%)	0	0	7 (1%)
Other major congenital malformations	31 (<2%)	27 (<1%)	8 (1%)	4 (1%)	4 (1%)	2 (2%)	2 (1%)	30 (2%)
Multiple major congenital malformations	8 (<1%)	6 (<1%)	0	0	0	0	0	17 (1%)
Total number of major congenital malformations	107 (5%)	74 (3%)	17 (3%)	10 (3%)	19 (6%)	8 (6%)	6 (4%)	142 (10%)
No major congenital malformations reported	1850 (95%)	2440 (97%)	582 (97%)	323 (97%)	275 (94%)	117 (94%)	146 (96%)	1239 (90%)

Data are n (%) of affected offspring, unless stated otherwise.

CBZ - carbamazepine; LTG - lamotrigine; LEV - levetiracetam; OXC - oxcarbazepine; PB - phenobarbital; PHT - phenytoin; TPM - topiramate; VPA - valproate

Adapted from Tomson T, et al. *Lancet Neurol* 2018;17:530–538

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HEADACHE IN PREGNANCY

CLASSIFICATION OF HEADACHE

- Primary headache is not a symptom of an underlying disease; it is caused by overactivity of or problems with pain-sensitive structures in your head

Defining characteristics of headache disorders; *Adapted from* [2]

Disorder type	Characteristics	

Migraine	At least 5 attacks that	• Last 4-72 hours (untreated or unsuccessfully treated)
		• Has at least 2 of the following 4 features
		  ○ Unilateral location
		  ○ Pulsating quality
		  ○ Moderate or severe pain
		  ○ Aggravation by or causing avoidance of routine physical activity (i.e., walking or climbing stairs)
		• Includes 1 of the following
		  ○ nausea or vomiting or both
		  ○ photophobia and phonophobia

Tension	At least 10 episodes of headache that last 30 minutes to 7 days associated with	• At least 2 of the following 4 features
		  ○ Bilateral location
		  ○ Pressing or tightening (non-throbbing) quality
		  ○ Mild to moderate intensity
		  ○ Not aggravation by routine activity
		• Both of the following
		  ○ No nausea or vomiting
		  ○ Photophobia or phonophobia (1 not both)

Cluster	At least 5 attacks with	• Severe or very severe unilateral, orbital, supraorbital or temporal pain lasting 15-180 minutes (untreated)
		• Either or both of the following
		  ○ At least 1 of these symptoms ipsilateral to the headache: conjunctival injection or lacrimation or both; nasal congestion or rhinorrhoea or both; eyelid oedema; forehead and facial sweating; sensation of fullness in the ear; miosis or ptosis or both
		  ○ A sense of restlessness or agitation
		• Attack frequency of between 1 every other day and 8 a day for more than half the time the disorder is active

- Secondary headache is a symptom of a disease that can activate the pain-sensitive nerves of the head

SNNOOP10 list of red flags; *Modified from* [3]

Sign or symptom	Related secondary headaches
Systemic symptoms including fever	Headache attributed to infection or nonvascular intracranial disorders, carcinoid or pheochromocytoma
Neoplasm in history	Neoplasms of the brain; metastasis
Neurologic deficit or dysfunction (Including decreased consciousness)	Headaches attributed to vascular, nonvascular intracranial disorders; brain abscess and other infections
Onset of headache is sudden or abrupt	Subarachnoid haemorrhage and other headaches attributed to cranial or cervical vascular disorders
Older age (after 50 years)	Giant cell arteritis and other headache attributed to cranial or cervical vascular disorders; neoplasms and other nonvascular intracranial disorders
Pattern change or recent onset of headache	Neoplasms, headaches attributed to vascular, nonvascular intracranial disorders
Positional headache	Intracranial hypertension or hypotension
Precipitated by sneezing, coughing, or exercise	Posterior fossa malformations; Chiari malformation
Papilledema	Neoplasms and other nonvascular intracranial disorders; intracranial hypertension
Progressive headache and atypical presentations	Neoplasms and other nonvascular intracranial disorders
Pregnancy or puerperium	Headaches attributed to cranial or cervical vascular disorders; postdural puncture headache; hypertension-related disorders (e.g., preeclampsia); cerebral sinus thrombosis; hypothyroidism; anaemia; diabetes
Painful eye with autonomic features	Pathology in posterior fossa, pituitary region, or cavernous sinus; Tolosa-Hunt syndrome; ophthalmic causes
Posttraumatic onset of headache	Acute and chronic posttraumatic headache; subdural hematoma and other headache attributed to vascular disorders
Pathology of the immune system such as HIV	Opportunistic infections
Painkiller overuse or new drug at onset of headache	Medication overuse headache; drug incompatibility

INITIAL APPROACH

- Assess history and neurological examination similar to non-pregnant patients, paying attention to
    - Rule out secondary headache; go through the SNNOOP10 (as described above)
    - Conditions more common in pregnancy
        - Physiologic changes induced by pregnancy increase the risk of cerebral venous thrombosis, dissection, and pituitary apoplexy
        - Preeclampsia is a serious condition unique to pregnancy
        - Reversible Cerebral Vasoconstriction Syndrome (RCVS) is significantly associated with puerperium

    - Identify if headache fulfils criteria for any of the primary headache
- Refer to the nearest hospital with a resident physician (discuss if urgent admission or outpatient review is required) and imaging facilities (CT / MRI) if further investigation or management is required

INITIAL MANAGEMENT

- Encourage good sleep, adequate hydration, and avoidance of potential precipitants
- First line management
    - Migraine & Tension headache
        - T. Paracetamol 1g TDS-QID (preferred)
        - T. Ibuprofen 200-400mg TDS (NSAIDs; use with caution, consider for short course)
        - T. Naproxen 250-500mg BD (NSAIDs; use with caution, consider for short course)
    - Cluster headache
        - SC Sumatriptan 6mg stat, may repeat once after >1 hour from first dose (max 12mg in 24 hours)
        - Oxygen therapy

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer Antenatal Combine Clinic if
    - Features of secondary headaches
    - Primary headaches are severe or persistent despite first-line medication or require prophylaxis therapy
    - Require further investigation such as imaging facilities (CT / MRI)
- Refer Physician on call for urgent/same day opinion of
    - Marked change in a previously stable headache pattern
    - Sudden onset at peak of severity
    - Described as the “worst ever” headache
    - Pain takes longer to resolve than usual or persists for longer than 48 hours
    - Focal neurological signs/symptoms
    - Seizures
    - Fever suspicious of CNS infection (petechial rash, signs of meningism)
    - Trauma
    - Visual changes, diplopia or papilloedema
    - Associated loss of consciousness/reduced GCS
    - Severe headache despite first line treatments

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RENAL MEDICINE

APPROACH TO PROTEINURIA AND HEMATURIA IN PREGNANCY

CHECKLIST FOR PRE-PREGNANCY COUNSELLING

- Identify the underlying medical problem: chronic kidney disease, underlying primary and systemic disease with glomerulonephritis, nephrolithiasis
- Identify past histories of preeclampsia and pregnancy-induced hypertension
- Glomerular disease may flare or worsen during pregnancy, as evidenced by worsening proteinuria or haematuria
- Systemic diseases such as Systemic Lupus Erythematosus (SLE) can flare at any trimester
- Predictors of flare-up of SLE determined by evidence of disease and renal activity
- In SLE, pregnancy can be considered after 6–12 months of disease-sustained quiescence

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

- History:
  - Frothy urine, haematuria and other evidence of systemic disease
- Clinical examination:
  - Facial oedema, lower limb swelling, BP
- Screening test:
  - urine dipstick test
  - BUSE & Creatinine
  - connective tissue disease screening with ANA and complement levels (C3, C4)
- Further test:
  - urine Protein Creatinine Ratio (PCR) or urine Albumin Creatinine ratio (ACR) or 24-hour urine protein
- Degree of proteinuria and presence of Hypertension have adverse outcome in pregnancy
- Preeclampsia and premature delivery were higher in patients with heavy proteinuria (>1 g/24 hours)
  - To screen with ultrasound KUB
  - May consider Aspirin 150mg OD to prevent pre-eclampsia (for nephrology team to decide)
- Persistent isolated microscopic haematuria should have urological causes excluded
- Monitoring test: urine dipstick test, renal profile
- BP monitoring throughout pregnancy for persistent proteinuria is crucial

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer nephrology for any chronic kidney disease in pregnancy

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- Deliver plan as per obstetrician indication
- Watch out for eclampsia

POSTPARTUM CARE

- Risk of eclampsia up to 6 weeks postpartum
- Repeat the urine dipstick test at least 6 weeks postpartum; refer to Nephrology team for further evaluation to rule out glomerulonephritis if persistent proteinuria ± haematuria

ADDITIONAL INFORMATION

- Proteinuria in pregnancy: urine albumin >300mg/24hours at anytime during gestation

Standard urine dipstick test for freshly voided urine sample	
Urine dipstick	**Urine protein**
Negative	0 mg/dL
Trace	15 - 30mg/dL
1+	30 - 100mg/dL
2+	100 - 300mg/dL
3+	300mg - 1g/dL
4+	>1g/dL
Note: Urine dipstick test 1+ (30mg/dL) roughly equal to urine protein 300 mg/24 hours	

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CHRONIC KIDNEY DISEASE (CKD)

Remarks:

- Pregnancy Outcome:
  - Pregnancy in CKD is associated with an increased risk of maternal and foetal outcomes
  - The risk increases in stepwise fashion with the degree of renal insufficiency at the time of pregnancy, the presence of hypertension, and the degree of proteinuria
  - Baseline hypertension, baseline proteinuria >1g/day and active systemic disease are significant predictors of adverse maternal foetal outcomes.
  - Renal function deteriorates more in CKD stages 3 and 4 compared to CKD stage 2 (60 % vs. 14.3 %)
  - Doubling of proteinuria occurs as CKD progresses in order from 20.5%, 86.5%, and 70% in stages 1-3 and 4-5respectively
  - Adverse foetal maternal outcomes correlate with progressing CKD stage and proteinuria
- Pregnancy may be considered in mild renal impairment (Creatinine< 124 umol/L, controlled blood pressure without significant proteinuria <1g/day)
- Pregnancy should be avoided:
  - In moderate to severe renal impairment
  - Poorly controlled hypertension
  - Poorly controlled diabetes mellitus
  - Heavy proteinuria > 1g/day
  - Active systemic diseases
- Thus, decision to continue pregnancy should be individualised and co-managed with multidisciplinary team
- Adverse maternal outcomes
  - CKD progression
  - Gestational Hypertension
  - Preeclampsia and Eclampsia
  - Maternal death
  - Premature delivery and Caesarean section
- Adverse Foetal outcomes:
  - Premature birth
  - Intrauterine Growth Restriction (IUGR)
  - Small for Gestational Age (SGA)
  - Low Birth weight
  - Still Birth
  - Neonatal Morbidity and mortality

CHECKLIST FOR PRE-PREGNANCY COUNSELLING

- Screening question: Ask all child bearing age women with CKD on follow-up if they wish to get pregnant during every clinic review
- Refer to Pre-Pregnancy Clinic for all child bearing age women with CKD

- Identify underlying medical history and disease activity
  - For example, Chronic kidney disease, Hypertension, Diabetes Mellitus, Primary Glomerular disease and SLE
- Assessment of disease activity, disease control as evidence from clinical history, examination and investigation
- Identify drug history

- Advise for contraception (Progesterone Only Pill) for active glomerulonephritis, renal transplant within 1 year, patient taking teratogenic drugs
- Advise patient not to self-discontinue medications prior to doctor consultation
- Assessment of medications suitability in pregnancy and breast feeding
- List of medication contraindicated and acceptable in pregnancy
- List immunosuppressive drugs that are safe to be continued
    - Safe in pregnancy
        - Hydroxychloroquine
        - Prednisolone
        - Azathioprine
        - Calcineurin Inhibitors (CNIs) e.g., Cylosporine, Tacrolimus
    - For breastfeeding, all agents recommended during pregnancy are considered to be safe in breastfeeding; Only a small amount of drugs detected in the breast milk
- List immunosuppressive drugs that are **unsafe in pregnancy**
    - MMF
        - This drug is associated with high-rate spontaneous pregnancy loss and highly teratogenic
        - Advised to withhold Mycophenolate Mofetil (MMF) for at least 3 months prior to conceive
    - Cyclophosphamide
        - Teratogenic and risk of foetal loss
    - Methotrexate
    - Chlorambucil
    - ACEi / ARB is usually used for anti-proteinuric agent and hypertension
        - Discontinue ACEi / ARB upon confirmation of pregnancy
        - Risk of foetal malformations such as renal dysgenesis, perinatal renal failure, intrauterine growth retardation, pulmonary hypoplasia
- Refer to Obstetrician for further counselling (Pre-Pregnancy Clinic)

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

- History:
    - As mentioned above
- Clinical examination:
    - Facial oedema, lower limb swelling, BP
- Screening test: urine dipstick test, full blood count, iron study, renal profile, venous blood gas
- Further test: urine albumin:creatinine ratio (uACR), ultrasound KUB if not done before
- Monitoring test: urine dipstick test, renal profile
- BP monitoring throughout pregnancy for persistent proteinuria is crucial
    - Target: <140/90 mmHg (<130/80 mmHg if urine protein >1g/24hr)
    - To avoid BP <110/70mmHg
- Monitor creatinine level change (instead of eGFR)
- GDM screening for patient on steroid or calcineurin inhibitor (Tacrolimus) treatment
- Aspirin 150mg OD are recommended to prevent pre-eclampsia

- Prophylaxis LMWH in cases with high risk of thrombosis, such as severe nephrotic syndrome, obesity, and immobilisation

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer to Nephrology clinic whenever
  - Pregnant CKD patient
  - All ESRD, post renal transplant and kidney donor
- Subsequent follow-up at Nephrology clinic or the Antenatal Combine Clinic (arranged by Nephrology team)

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- Deliver plan as per obstetrician indication
- Watchout for eclampsia

POSTPARTUM CARE

- Avoid NSAIDs
- Safe and effective contraception postpartum

ADDITIONAL INFORMATION

- Known teratogenic drug used in CKD:
  - Mycophenolate Mofetil (MMF)
  - Methotrexate
  - Cyclophosphamide
- Drug to avoid whenever patient on Tacrolimus / Cyclosporine
  - Erythromycin
  - Clarithromycin
- Degree of renal impairment in pregnancy

	Mild	Moderate	Severe
Creatinine level (umol/L)	<125	125-220	>220
Prognosis	Good outcome	Risk of progression to renal failure Increased foetal mortality risk	High foetal / maternal mortality / morbidity

  - eGFR calculation during pregnancy are not useful (may underestimate renal condition in pregnancy)

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7. Jones, David C., and John P. Hayslett. "Outcome of pregnancy in women with moderate or severe renal insufficiency." New England Journal of Medicine 335.4 (1996): 226-232. https://pubmed.ncbi.nlm.nih.gov/8657238/

URINARY TRACT INFECTION

Refer Consensus Guidelines on the Management of Urinary Tract Infections in Pregnancy, MOH 2021.

RHEUMATOLOGY

SYSTEMIC LUPUS ERYTHEMATOSUS (SLE)

Remarks:

- Pregnancy carries a higher maternal and foetal risk compared with pregnancy in healthy women
  - increased incidence of disease flares as well as adverse pregnancy outcomes including increased hospital stay, hypertension, IUGR and Caesarean section
  - SLE also increases the risk of pre-eclampsia, preterm birth and stillbirth, maternal death, infection, and thrombosis during pregnancy
- Physiological pregnancy changes may resemble SLE disease activity, including arthralgia, fatigue, rashes, and swelling; laboratory changes also occur during a healthy pregnancy.
- Distinguishing which changes are physiological versus pathological may be difficult, but understanding normal pregnancy physiology is essential.

CHECKLIST FOR PRE-PREGNANCY COUNSELLING

- Screening question: Ask all women with SLE on follow-up if they wish to get pregnant during every clinic review
- Refer to Pre-Pregnancy Clinic for all women with SLE who express the wish to conceive

- Prenatal Counselling
  - Advise and enforce contraception prior to disease optimisation; the prognosis for both mother and child is best when SLE has been quiescent for at least six months prior to the pregnancy
  - Advise the patient not to self-discontinue treatment even if found pregnant; seek medical advice early
- Monitoring
  - Ensure low disease activity or remission at least 6 months
  - Blood pressure monitoring
  - SLE clinical assessments
  - Routine laboratory investigations (in rheumatology clinic) with addition of anti-Ro/SSA, anti-La/SSB, antiphospholipid antibodies, lupus anticoagulant
- Review medications: Switch to pregnancy compatible medications
  - Refer Rheumatology team if changes in medication need to be done (refer Additional Information II)
- T. Folic Acid 5mg daily
- Discontinue NSAIDS in those having difficulties conceiving
- Start on or continue with hydroxychloroquine (HCQ) if not contraindicated

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

- Regular assessments during pregnancy are necessary to identify potential complications and receive early intervention
- Refer to the Rheumatology clinic for assessment when found to be pregnant
- Monitoring
    - Blood pressure monitoring
    - SLE clinical assessment: be vigilant for disease flares
    - Laboratory investigations*
    - Assessment for gestational diabetes
- Review medication adherence
- Start T. Aspirin 150mg daily from 12 weeks until delivery
- Patients with obstetric antiphospholipid syndrome (OB-APS) should be started on prophylactic heparin (refer Additional Information I for OB-APS)
- Patients with thrombotic APS should be started on full dose heparin for active SLE disease, increase or add pregnancy compatible disease-modifying antirheumatic drug (DMARD)
- NSAIDs need to be used with caution, particularly in the third trimester
- Foetal ultrasound
    - For detailed scan and foetal echocardiogram at 22-24 weeks of gestation for mothers with positive anti-Ro/SSA or anti-La/SSB
    - To monitor foetal growth, adequacy of amniotic fluid, placental insufficiency every trimester
- In foetuses with evidence for 1st or 2nd degree heart block, start oral Dexamethasone 4 mg daily for several weeks then assess response
- For foetuses with 3rd degree heart block without cardiac inflammation, avoid Dexamethasone
- Review preparations for labour and delivery

Remarks:
*Routine laboratory investigation: FBC, renal profile, LFT, urinalysis and morning urine protein to creatinine ratio (UPCR), complement levels (C3 and C4), serum uric acid, coagulation profile

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer to the Rheumatology clinic
    - All pregnant women with SLE: discussion on therapy, review the need to adjust medications and regular monitoring
- Refer to Obstetric Clinic as early as possible
- Antenatal Combine Clinic appointment arranged by Rheumatology clinic (if needed)
- Urgent referral if confirmed / suspected SLE flare

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- Delivery in a facility with resident Obstetrician
- Not to allow postdate
- Timing and mode of delivery based on obstetric indication
- Reassure of uncomplicated labour and delivery most of the time

POSTPARTUM CARE

- Advise to continue medications postnatally
- Continue pre-existing follow-up (if any)
- Offer effective contraception to avoid unplanned pregnancies
- Be vigilant for disease flares
- Switch to lactation compatible medications if breastfeeding is desired
- For prednisone ≥20 mg/day, avoid breastfeeding 4 hours after dosing

ADDITIONAL INFORMATION

I - CO-EXISTING ANTIPHOSPHOLIPID SYNDROME (APS)

APS is characterized by venous or arterial thrombosis and/or an adverse pregnancy outcome in the presence of persistent laboratory evidence of antiphospholipid antibodies (aPL).

The revised classification criteria for APS define vascular manifestations and obstetric complications; APS can occur by itself or in the setting of SLE.

- Thrombotic APS (T-APS) is defined by one or more episodes of arterial, venous, or small vessel thrombosis in any tissue or organ.
- Obstetric APS is defined by:
    1. three or more consecutive spontaneous abortions before 10 weeks of gestation,
    2. one or more unexplained foetal losses beyond 10 weeks of gestation, or
    3. one or more premature births of a morphologically normal neonate before 34 weeks of gestation due to eclampsia or preeclampsia.
- The presence of aPL must occur on two or more occasions, separated by at least 12 weeks

The ACR Reproductive Health Guidelines indicate prophylactic therapy is not indicated to prevent pregnancy loss in healthy, non-SLE patients with aPL but no prior history of thrombosis or pregnancy complications; however, aspirin 81–100 mg daily is conditionally recommended by the ACR Reproductive Health Guidelines.

In women with obstetric APS, aspirin with prophylactic doses of heparin (usually LMWH) is recommended. Continue anticoagulation for 6–12 weeks postpartum, as this is a vulnerable period for clotting.

Pregnant women with T-APS should be prescribed aspirin and therapeutic-dose heparin throughout pregnancy and postpartum. HCQ may help reduce the risk of thrombosis and APS-related poor outcomes.

II - SAFETY OF COMMON SLE TREATMENTS DURING PREGNANCY AND LACTATION

Medication	Pre-Conception	During Pregnancy	Lactation
Compatible			
Hydroxychloroquine	+	+	+
Sulfasalazine	+	+	+
Azathioprine	+	+	+
Cyclosporine	+	+	+
Tacrolimus	+	+	+
Prednisone	Keep dose <20mg/day	Keep dose <20mg/d	Keep dose <20mg/d
NSAIDs	Discontinue w/difficulty conceiving	Stop at week 20	+
Stop at conception			
Belimumab	Stop with positive pregnancy test		+
Rituximab	Stop with positive pregnancy test		+
Abatacept	Stop with positive pregnancy test		+
Not compatible			
Cycophosphamide	Stop 3 mos before conception	X	x
MMF/mycophenolic acid	Stop 6 wks before conception	X	x
Leflunomide	Cholestyramine washout	X	x
Methotrexate	Stop 1 –3mos before conception	x	x- low transfer into breast milk

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2. Sammaritano LR, Bermas BL, Chakravarty EE, et al. 2020 American College of Rheumatology Guideline for the Management of Reproductive Health in Rheumatic and Musculoskeletal Diseases. Arthritis Care Res (Hoboken). 2020;72(4):461-488. doi:10.1002/acr.24130
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RHEUMATOID ARTHRITIS (RA)

CHECKLIST FOR PRE-PREGNANCY COUNSELLING

- Screening question: Ask all women with RA on follow-up if they wish to get pregnant during every clinic review
- Refer to pre-pregnancy Clinic for all women with RA who express the wish to conceive

- Prenatal Counselling
  - Explain disease course and medication safety during pregnancy and lactation
    - RA is a lifelong, systemic autoimmune disease that affects women three times more frequently than men, often in their most productive and childbearing years
    - Recent studies have confirmed that only 20%–40% of patients with RA achieve remission by the third trimester; although 50% may be considered to have low disease activity, nearly 20% will have worse or moderate-to-high disease activity during pregnancy and may require further therapeutic intervention
    - Counsel about the potential safety, risks, or teratogenicity of medications they are on for RA treatment
    - Many women also experience postpartum flares impairing their ability to take care of themselves and their infant
  - Advise and enforce contraception prior to disease optimisation
  - Advise the patient not to self-discontinue treatment even if found pregnant; seek medical advice early
- Assess disease activity using Disease Activity Score in 28 points and C-Reactive Protein (DAS28-CRP)
  - No / low disease activity: start / adjust therapy, symptom control (paracetamol, glucocorticoids), DMARDs (hydroxychloroquine, sulfasalazine; can consider anti-TNF and/or Azathioprine)
  - Moderate to high disease activity: postpone pregnancy until low disease activity / remission
- Review medication
  - Refer to the Rheumatology team if changes in medication need to be done (refer Additional Information I)
  - Discontinue therapy unsafe for pregnancy such as methotrexate, leflunomide (perform washout procedure), abatacept, tocilizumab, rituximab, tofacitinib and anakinra
  - For leflunomide, in the event of pregnancy, it is recommended that patients receive cholestyramine to eliminate the drug (washout procedure)
  - NSAIDs should be discontinued during periconception period and used sparingly
- T. Folic Acid 5mg daily

CHECKLIST FOR ANTENATAL BOOKING AND SUBSEQUENT MONITORING

- ☐ Refer to the Rheumatology clinic for assessment when the RA patient is found to be pregnant
- ☐ Continue calcium supplementation during pregnancy
- ☐ Monitor for RA flares
- ☐ Screen for pregnancy complications such as gestational diabetes (mOGTT) especially for patients on prednisolone, pregnancy-induced hypertension, as well as preeclampsia and follow-up accordingly based upon usual obstetric practice
- ☐ Patients with anti-Ro/SSA and anti-La/SSB antibodies should be screened and managed accordingly (due to their associated increase in risk for neonatal lupus)
- ☐ Detailed foetal scan
- ☐ Recommendations for exercise and physical activity do not differ for most patients with RA from other pregnant women, except when modifications may be required because of limitations due to active arthritis or prior joint injury or deformity
- ☐ If RA flare
    - Corticosteroids are an initial first step in pregnancy, and when possible, intra-articular administration is indicated to limit systemic side effects
    - NSAIDs can also be another option, but they need to be used with caution particularly in the third trimester

WHEN TO REFER (AND WHICH CLINIC TO REFER)

- Refer to the Rheumatology clinic
    - All pregnant women with RA: discussion on therapy, review the need to adjust medications and regular monitoring
- Antenatal Combine Clinic appointment arranged by Rheumatology clinic (if needed)
- Urgent referral if confirmed / suspected RA flare

WHEN TO DELIVER AND PRECAUTIONS IN DELIVERY

- Delivery in a facility with resident Obstetrician
- Not to allow postdate
- Timing and mode of delivery based on obstetric indication
- Reassure of uncomplicated labour and delivery most of the time
- Usual management is performed for patients who require a Caesarean delivery, with particular attention paid to the risks of intubation in patients with cervical spine disease

POSTPARTUM CARE

- Offer effective contraception to avoid unplanned pregnancies
- Be vigilant for disease flares
- If clinically quiescent in the postpartum period, the pregnancy medication regimen can be continued
- For women who flare postpartum or who have a high likelihood of flaring, their pre-pregnancy regimen can be resumed with adjustment to medications for women who are breastfeeding
    - Attention should be given to the use of medications compatible with nursing
    - In patients who choose not to breastfeed, their pre-pregnancy medications can be resumed
- For prednisone ≥20 mg/day, avoid breastfeeding 4 hours after dosing

ADDITIONAL INFORMATION

MEDICATION COUNSELLING DURING PREGNANCY AND LACTATION

DRUGS	PREGNANCY AND LACTATION
NSAIDS	**Pregnancy** • Traditional NSAIDs can be used if needed to control symptoms but use is restricted to first and second trimester • Selective cyclooxygenase-2 (COX-2) inhibitors should be avoided in pregnancy **Lactation** NSAIDs are compatible with lactation. Celecoxib is compatible with lactation, other COX-2 inhibitors should be avoided
Corticosteroids	**Pregnancy** • Can be continued at lowest effective dose **Lactation** • Compatible with breastfeeding* *Breastfeeding after 4 hours from the last dose if taking prednisolone more than 20 mg daily

Disease Modifying Anti-Rheumatic Drugs (DMARDs)	
Conventional Synthetic DMARDs	
Methotrexate	**Pregnancy** • Contraindicated in pregnancy • Stop at least three months in women prior to conception **Lactation** • Avoid in lactation
Sulfasalazine	**Pregnancy** • Compatible in pregnancy with folate supplementation **Lactation** • Breastfeeding is safe in a healthy, full-term infant • Caution in premature infant, hyperbilirubinemia, and glucose-6-phosphate dehydrogenase (G6PD) deficiency
Hydroxychloroquine	• Compatible in pregnancy and lactation
Leflunomide	• Avoid in pregnancy and lactation • Pregnancy should be avoided in patients on LEF until undetectable serum concentrations This can be achieved by discontinuation of this medication two years prior to conception, or by the use of an enhanced drug elimination procedure using cholestyramine pre-conception (washout procedure)

Targeted Synthetic DMARDs	
Tofacitinib	**Pregnancy** • Avoid in pregnancy • Should be stopped 2 months before conception **Lactation** • Insufficient data to support safety
Baricitinib	• Insufficient data to support safety in pregnancy and lactation

Biologic DMARDs	
Infliximab	**Pregnancy** • Can be continued up to gestational week 20; if indicated can be used throughout pregnancy **Lactation** • Compatible with lactation
Etanercept	**Pregnancy** • Can be continued up to gestational week 30-32; if indicated can be used throughout pregnancy **Lactation** • Compatible with lactation

Adalimumab	**Pregnancy** • Can be continued up to gestational week 20; if indicated can be used throughout pregnancy **Lactation** • Compatible with lactation
Golimumab	**Pregnancy** • Limited evidence; consider alternative treatments **Lactation** • Compatible with lactation
Tocilizumab	• Contraindicated in pregnancy and lactation
Rituximab	**Pregnancy** • Can be used in exceptional cases in early gestation; if used at later stages of pregnancy, clinician should be aware of risk of B cell depletion and other cytopaenias in the neonate **Lactation** • Avoid in lactation

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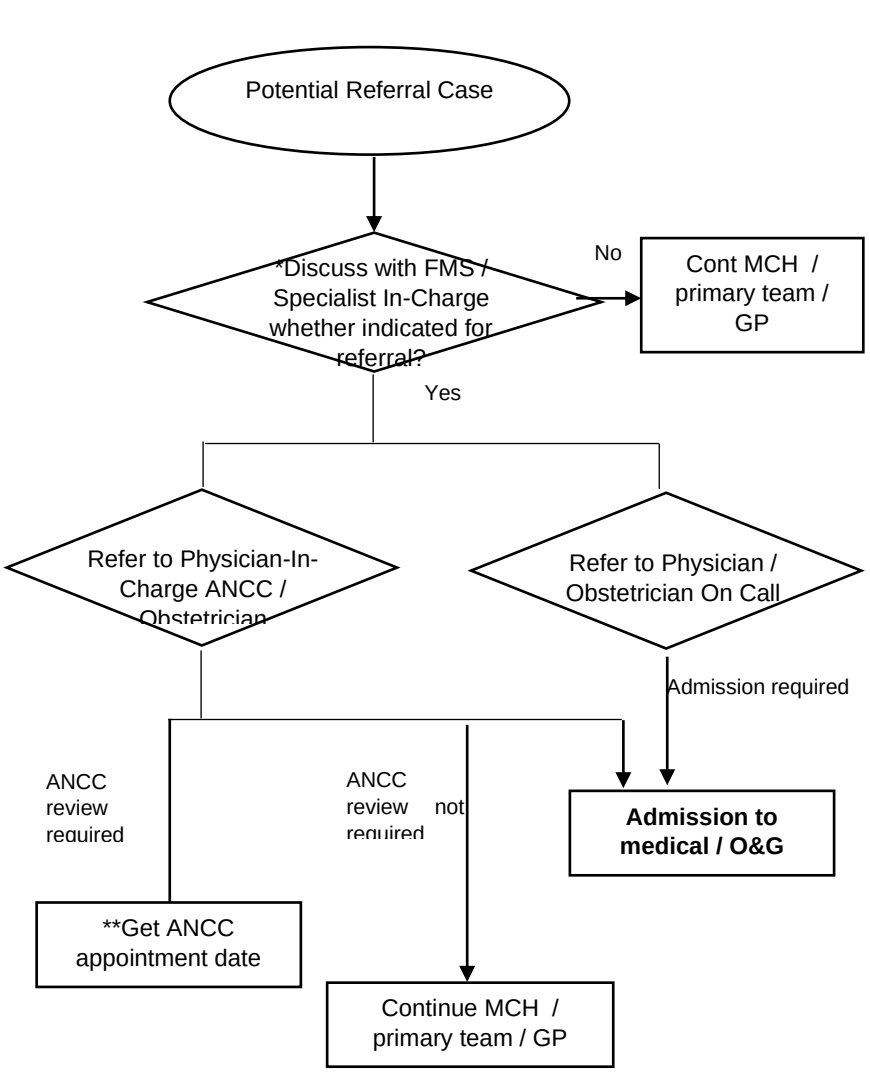
APPENDIX

REFERRAL TO ANTENATAL COMBINE CLINIC (ANCC)

CLINIC DETAILS

Clinic	Antenatal Combine Clinic HSNZ (Internal Medicine and Obstetric Medicine)
Clinic Hours	08.00 am to 01.00 pm on Thursdays
Address	Tingkat 1, Bangunan Klinik Pakar & ACC Hospital Sultanah Nur Zahirah (HSNZ) Jalan Sultan Mahmud, 20400 Kuala Terengganu.
Contact Number (to get appointment date during office hours)	+609 - 621 2121 (Ext 2699) +609 - 621 2053 *** Please call specialist-in-charge (Physician or Obstetrician) and discuss referrals before getting appointment date**

FLOWCHART FOR REFERRAL TO ANCC (FROM KLINIK KESIHATAN / INTER-FACILITY / INTER-DEPARTMENT /PRIVATE)



Action

Medical Officer / Specialist from Government/Private Hospitals/Clinics / GP

Specialist from Government/Private Hospitals/Clinics / GP

***If indication is stated in this book for referral, leeway is given to directly refer to Physician-In-Charge ANCC / Obstetrician without discussing with FMS / Specialist In-Charge**

Physician-In-Charge ANCC / Physician On Call / Obstetrician On Call

Referring team to handover to Medical Officer In-Charge of the ward

Referring team to get appointment date from ANCC nurse

****Kindly attach referral letter +/- relevant investigations to the antenatal book**

Do consider referring to nearest MOPD / Visiting MOPD (Besut / Setiu / HHT/ Dungun / Kemaman) if appropriate (discuss with specialist in-charge of the respective MOPD) if patient has logistic issue.

PHYSICIAN IN-CHARGE OF ANCC HSNZ

Please call Hospital Sultanah Nur Zahirah operator to contact physician in-charge of ANCC HSNZ.

Alternatively, you may contact ANCC (HSNZ MOPD direct line) to obtain the information.

USEFUL NUMBERS TO CONTACT (HSNZ DIRECTORY)

https://hsnzkt.moh.gov.my/en/2014-12-11-01-20-44

SAFETY OF IMAGING IN PREGNANCY

POINTS FOR COUNSELING REGARDING IMAGING IN PREGNANCY

- Imaging studies are important adjuncts for diagnosis and guide management
- Concerns over safety of imaging in pregnancy can result in avoidance of useful diagnostic tests in pregnancy and the potential for delayed diagnosis (such as for pulmonary embolism or pneumonia)
- There are no significant effects of ultrasound unless foetal exposure is prolonged (longer than 60 minutes)
- The embryo/foetus is most susceptible to radiation during organogenesis (2 to 7 weeks gestational age) and in the first trimester
- The foetal radiation dose below 50 mGy is considered safe and does not cause any harm
    - According to the Center for Disease Control (CDC), doses above 100 mGy(especially doses above 150 mGy) are viewed as the minimum amount of dosage at which negative foetal consequences will occur, based on observation
    - The majority of the diagnostic studies performed during pregnancy are below the threshold level
- The use of shielding techniques significantly reduces the dose of ionising radiation to which the foetus is exposed
- When medically indicated in pregnant women, imaging should not be withheldfor fear of excessive radiation exposure to the fetus
- Remember to fill up imaging consent for pregnant patients and document the discussion with the patient +/- husband in your clinical notes

Summary of deterministic effects by gestational age; *Modified from*[1]

Gestational age (weeks)	Effect of <50 mGy	Effect of 50–100 mGy	Effect of >100 mGy	Estimated threshold dose
0–2	None	None	None	50–100 mGy
3–4	None	Probably none	Possible spontaneous miscarriage	50–100 mGy
5–10	None	Uncertain	Possible congenital anomaly, IUGR	200–250 mGy
11–17	None	Uncertain	Risk of diminished IQ, microcephaly	60–310 mGy 25 IQ point loss per 1000 mGy
> 18	None	None		

Foetal radiation dose for common radiological investigations; *Modified from*[1]

Type of Examination	Foetal Radiation Dose (mGy)
Very low dose examinations (<0.1mGy)	
Cervical spine X-ray (AP and lateral views)	<0.001
Chest X-ray (two views)	0.0005–0.01
Head and neck CT	0.001–0.01
Low to moderate dose examination (0.1–10 mGy)	
CT chest or pulmonary angiography	0.01–0.66
Low-dose perfusion scintigraphy	0.1–0.5
Abdominal X-ray	0.1–3.0
Technetium-99m bone scintigraphy	4–5
Lumbar spine X-ray	1.0–10
Higher dose examinations (10–50 mGy)	
Abdominal CT	1.3–35
Pelvic CT	10–50
^{18}F-FDG PET/CT whole-body scinitigraphy	10–50

REFERENCES / FURTHER READING

1. Eastwood, K., & Mohan, A. R. (2019, October). Imaging in pregnancy. The Obstetrician &Amp; Gynaecologist, 21(4), 255–262. https://doi.org/10.1111/tog.12604
2. Yoon I, Slesinger TL. Radiation Exposure In Pregnancy. [Updated 2022 May 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK551690/

PRE-PREGNANCY CLINIC REFERRAL

PRE-PREGNANCY CARE SCREENING & FEEDBACK FORM

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/m2)* ☐
- 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/m2

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 : _____

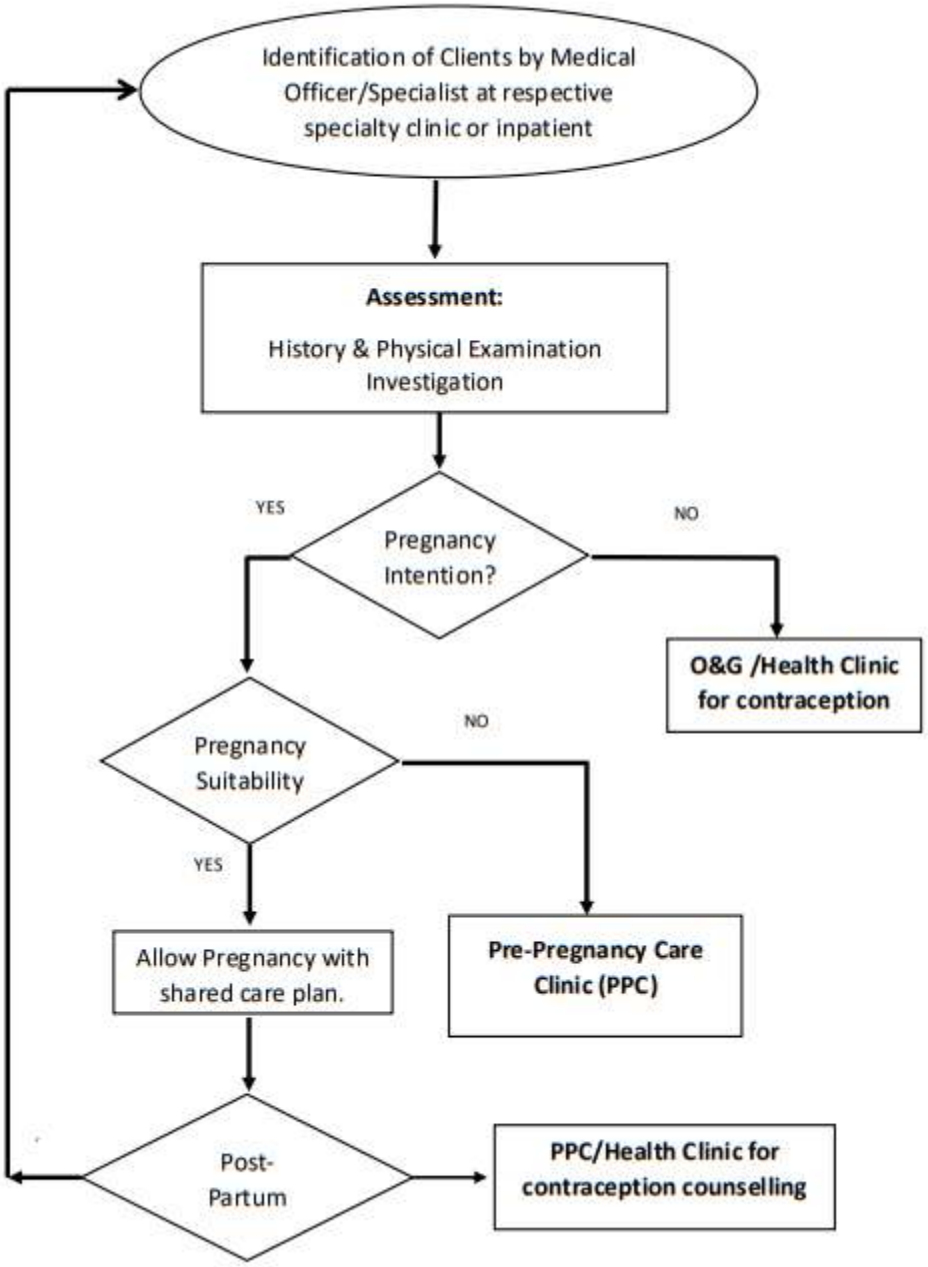
PATIENT'S NAME : _____ IC NO : _____

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:

FLOW CHART FOR PRE-PREGNANCY CARE CLINIC RECRUITMENT



USEFUL FORMS AND TABLES

FEEDBACK FORM, UPDATES AND ANNOUNCEMENTS

Thank you for using this book. While every care has been made to ensure accuracy of information delivered as of date of publication, medicine is an ever-changing field with advances happening from time to time.

Should there be any suggestions for improvement for future editions or any mistakes found, we deeply appreciate your valuable feedback which can be conveyed to us by filling the form below.

https://forms.gle/eTx2xw5uknXAxVXa6

Any updates to the current information and announcements can be accessed using the link below.

https://docs.google.com/document/d/13ctF6gUZW_nOuFzBMEkHCXQ-JopKcr8sveo5JNPFY-g/edit?usp=sharing

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Caring for Pregnant Women with Medical Conditions

Terengganu State Protocol for Initial Care for Common Medical Conditions in Pregnancy and When to Refer to the Antenatal Combine Clinic

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