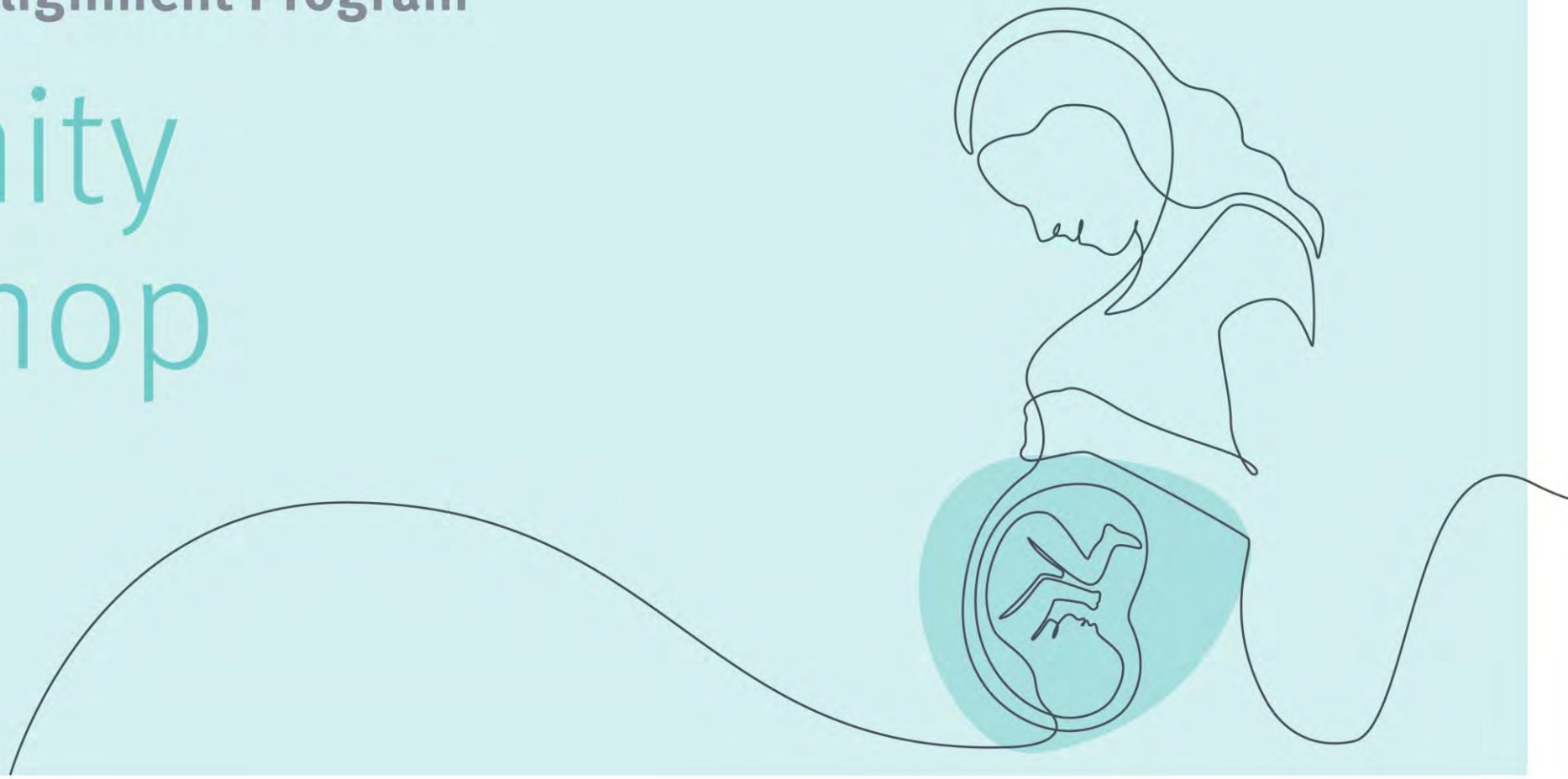
Metro North **GP Alignment Program**

# Maternity Workshop



## SATURDAY 1 MARCH 2025

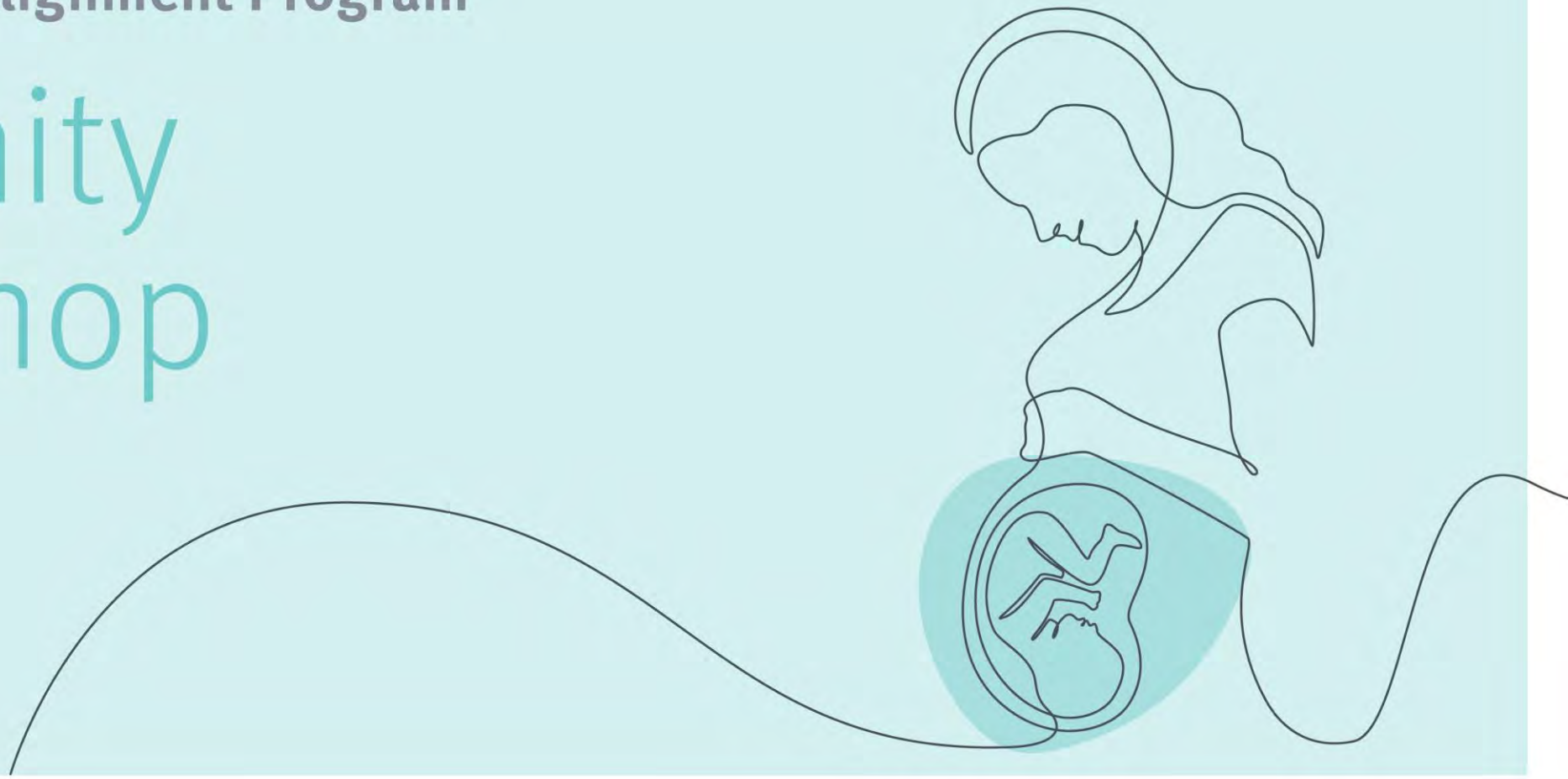
### Clinical Skills Development Service | RBWH

phn BRISBANE NORTH
An Australian Government Initiative

Queensland Government
Metro North Health

Metro North **GP Alignment Program**

# Maternity Workshop



## WELCOME

**Dr Meg Cairns**
**GPLO | Metro North Health & Brisbane North PHN**

phn BRISBANE NORTH
An Australian Government Initiative

Queensland Government
Metro North Health

***Metro North Hospital and Health Service and Brisbane North PHN respectfully acknowledge the Traditional Owners of the land on which our services and events are located. We pay our respects to all Elders past, present and future and acknowledge Aboriginal and Torres Strait Islander people across the State.***

# Acknowledgements


- ***Metro North Health***
- ***Brisbane North PHN***
- ***Caboolture Hospital, Redcliffe Hospital, Royal Brisbane & Women's Hospital***
- ***Metro North Health – Women, Children and Families Clinical Stream***
- ***Metro North Health - Outpatient Strategies***
- ***Mater Mothers Hospital GP Alignment Program***

Metro North **GP Alignment Program**

# Maternity Workshop

## Kindly sponsored by:

HAVEN

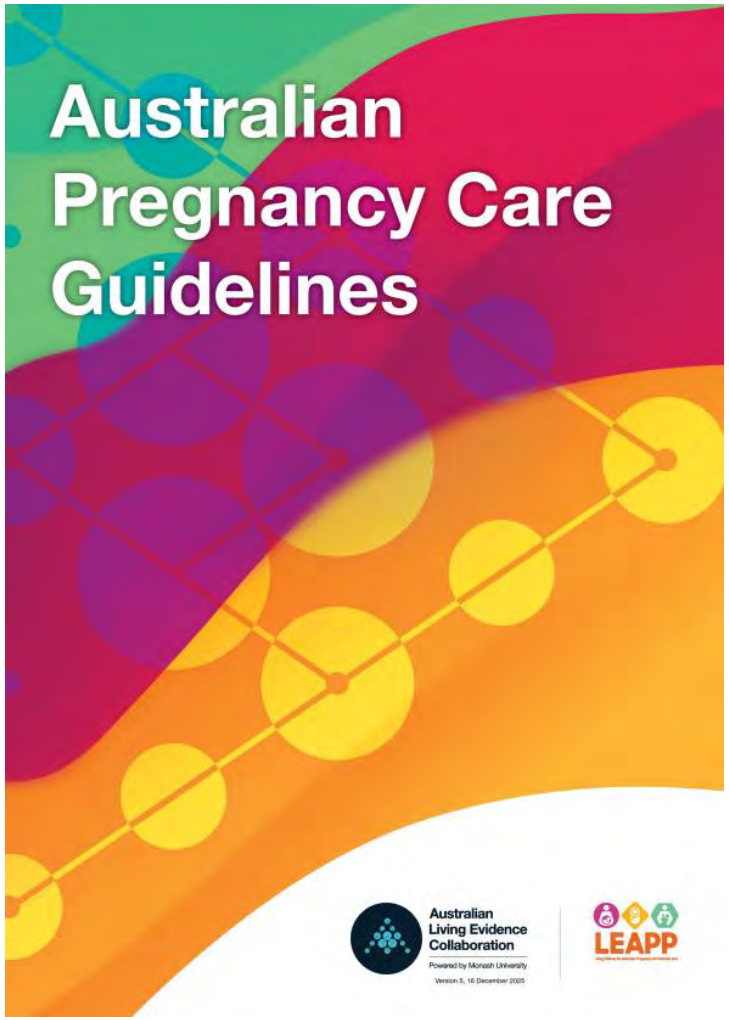
WOMENS ULTRASOUND CARE SPECIALISTS

qml pathology

# TODAY

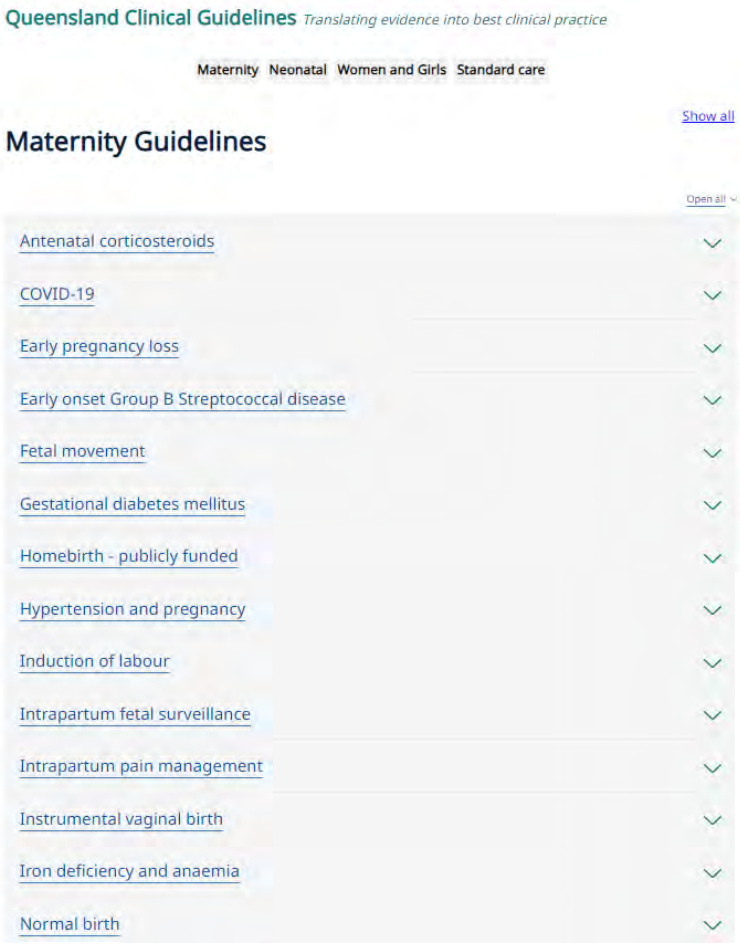
| | |
|---|---|
| **Session 1** | |
| 8:00am | • Welcome and Orientatation<br>• Referral pathways<br>• Diabetes in pregnancy<br>• Case studies: First trimester<br>• Epilepsy in pregnancy |
| 10:40am | *Morning Tea* |
| **Session 2** | |
| 11:00am | • Genetic Screening<br>• Multidisciplinary Panel<br>• Case studies: Complex presentations |
| 1:10pm | *Lunch* |
| **Session 3** | |
| 1:50pm | • Interactive skills stations<br>  • Breast feeding and newborn concerns<br>  • Healthy eating and exercise in pregnancy, weight gain charts<br>  • Abdominal palpation, SFH measurement & fetal growth charts<br>  • Perinatal Mental Health Q+A<br>• Paediatrics<br>• Case studies: Postnatal |
| 4:00pm | • Evaluation & workshop close |

## National Guidelines

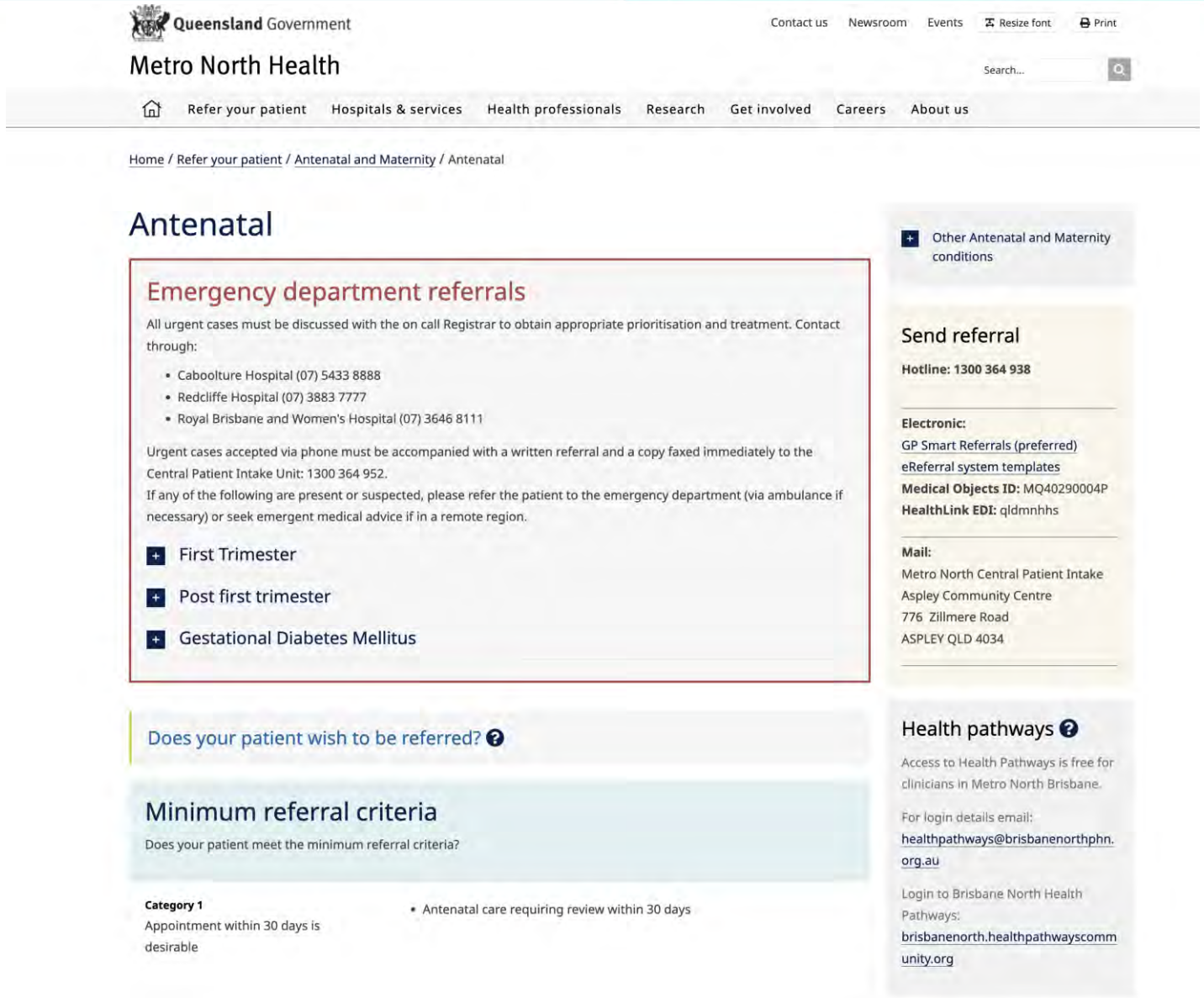



[Guideline Australian Pregnancy Care Guidelines]

## Queensland Clinical Guidelines




[Maternity and Neonatal Clinical Guidelines | Queensland Clinical Guidelines | Queensland Health | Queensland Health]



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Home / Refer your patient / Antenatal and Maternity / Antenatal

# Antenatal

## Emergency department referrals

All urgent cases must be discussed with the on call Registrar to obtain appropriate prioritisation and treatment. Contact through:

- Caboolture Hospital (07) 5433 8888
- Redcliffe Hospital (07) 3883 7777
- Royal Brisbane and Women's Hospital (07) 3646 8111

Urgent cases accepted via phone must be accompanied with a written referral and a copy faxed immediately to the Central Patient Intake Unit: 1300 364 952.
If any of the following are present or suspected, please refer the patient to the emergency department (via ambulance if necessary) or seek emergent medical advice if in a remote region.

+ First Trimester

+ Post first trimester

+ Gestational Diabetes Mellitus

Does your patient wish to be referred?

## Minimum referral criteria

Does your patient meet the minimum referral criteria?

**Category 1**
Appointment within 30 days is desirable

- Antenatal care requiring review within 30 days

+ Other Antenatal and Maternity conditions

### Send referral

**Hotline: 1300 364 938**

**Electronic:**
GP Smart Referrals (preferred)
eReferral system templates
**Medical Objects ID:** MQ40290004P
**HealthLink EDI:** qldmnhhs

**Mail:**
Metro North Central Patient Intake
Aspley Community Centre
776 Zillmere Road
ASPLEY QLD 4034

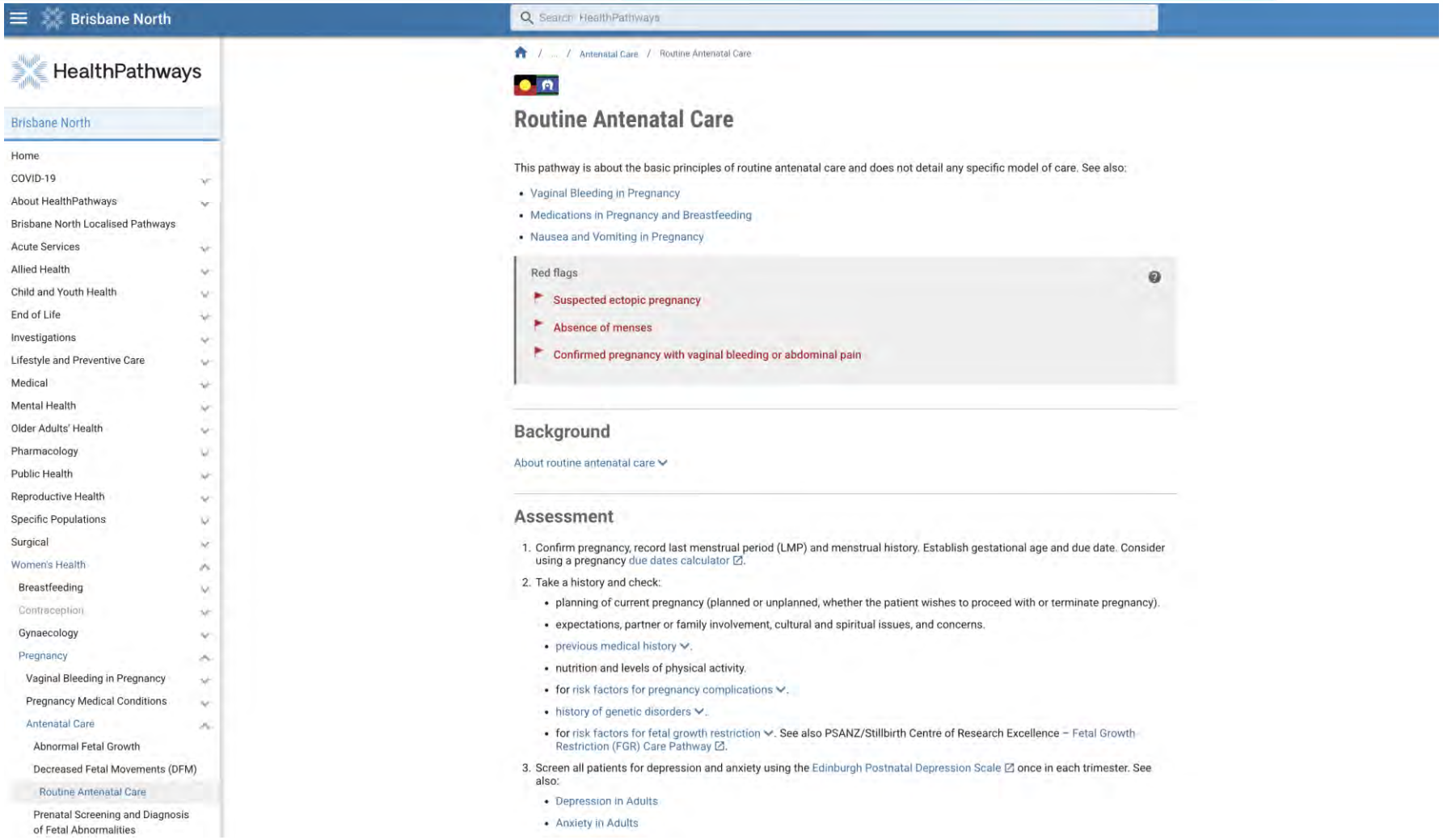
### Health pathways

Access to Health Pathways is free for clinicians in Metro North Brisbane.

For login details email:
healthpathways@brisbanenorthphn.org.au

Login to Brisbane North Health Pathways:
brisbanenorth.healthpathwayscommunity.org

Metro North Antenatal and Maternity Referral Guidelines [Antenatal and Maternity | Metro North Health]




**Brisbane North HealthPathways** [Home - Community HealthPathways Brisbane North]

**Username: *Brisbane***

**Password: *North***

# Useful resources

RACGP clinical guidelines

**RACGP - Clinical guidelines**

RANZCOG statements & guidelines

**Statements and guidelines directory – RANZCOG**

Australian Journal of General Practice

**RACGP – Home**

RACGP gplearning and check

**RACGP - Online learning**

RACGP Antenatal and Postnatal Specific Interests Group Maternity Moments Webinar Series

**RACGP - Specific Interests Groups Resources**

# Online resources

## Therapeutic guidelines

**Therapeutic Guidelines | Therapeutic Guidelines**

## Choosing Wisely Australia

**Recommendations - Choosing wisely**

## Royal College of Obstetricians and Gynaecologists

**Guidance | RCOG**

## Royal Women's Hospital Victoria

**For GPs | The Royal Women's Hospital**

## Society of Obstetric Medicine of Australia and New Zealand

**Guidelines - Society of Obstetric Medicine Australian and NZ**

# Online resources

## Australasian Diabetes in Pregnancy Society

**ADIPS**

## Australasian Society for Infectious Diseases

**ASID | Australasian Society for Infectious Diseases**

## Stillbirth Centre for Research Excellence

**Stillbirth CRE Home | The Centre of Research Excellence in Stillbirth**

## Safer Baby Bundle

**Home | Stillbirth CRE eLearning**

## Australian Preterm Birth Alliance

**The Australian Preterm Birth Prevention Alliance - APBPA**

# Online resources

## Genetic Health Queensland

**Genetic Health Queensland Resources for Health Professionals**

## RACGP Guidelines Genomics in General Practice

**RACGP Guidelines | Genomics in General Practice**

## NSW Health Centre for Genetics Education

**NSW Health | Centre for Genetics Education**

## Australian Preterm Birth Alliance

**The Australian Preterm Birth Prevention Alliance - APBPA**

# Online resources

## COPE Centre of Perinatal Excellence

**COPE | Perinatal Mental Health Resources for Health Professionals**

## SMS4Dads

**sms4dads**

## PANDA Perinatal Anxiety & Depression Australia

**Home | Perinatal Anxiety & Depression Australia**

## Peach Tree Perinatal Wellness

**Home | Peach Tree Perinatal Wellness**

## GP Psychiatry Support Line

**GP Psychiatry Support Line**

## Gidget Foundation Australia

**Home | Gidget Foundation Australia**

Metro North **GP Alignment Program**

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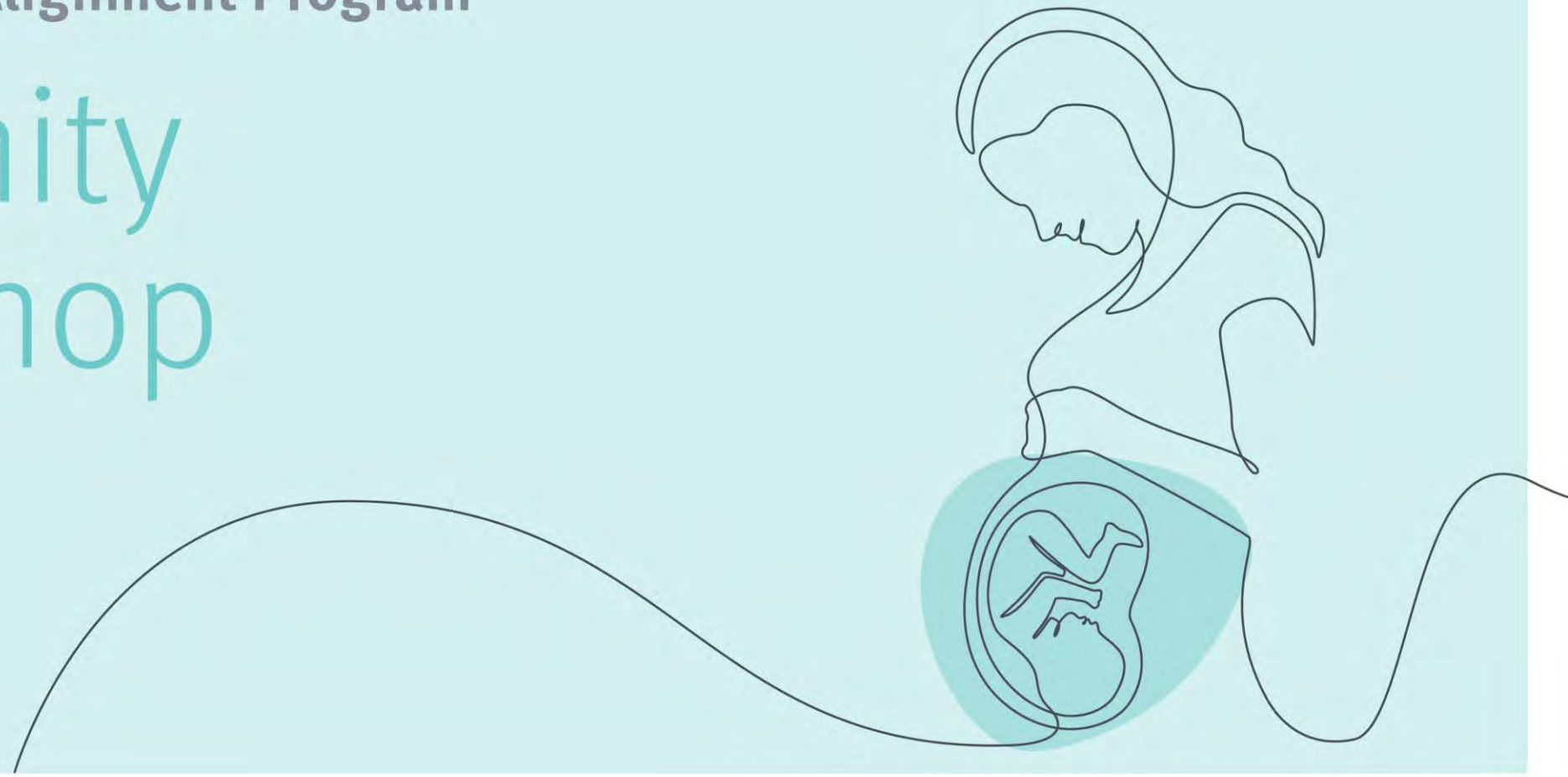

## REFERRAL PATHWAYS

**Dr Meg Cairns**
**GPLO | Metro North Health & Brisbane North PHN**

phn BRISBANE NORTH
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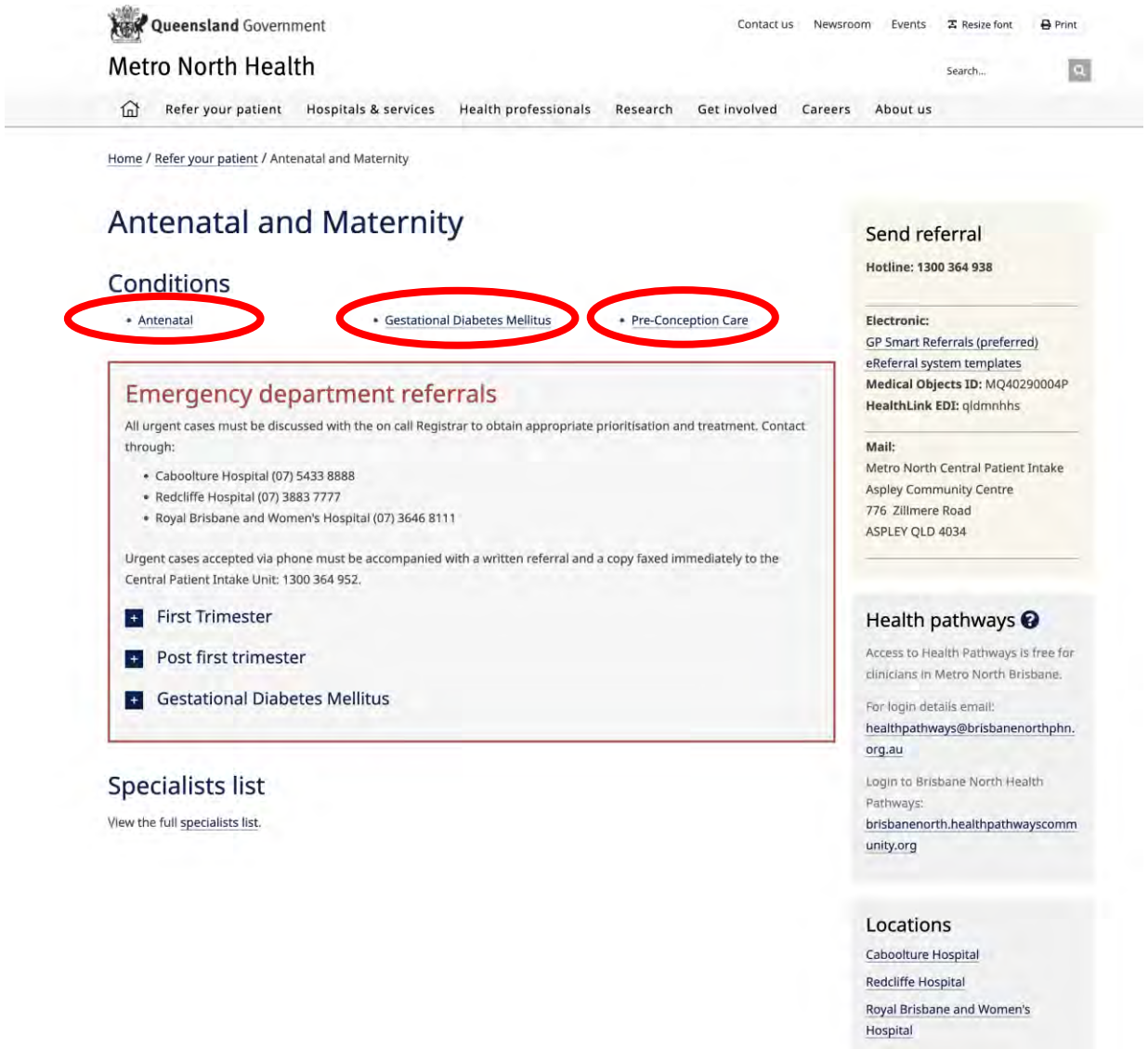
Queensland Government
Metro North Health

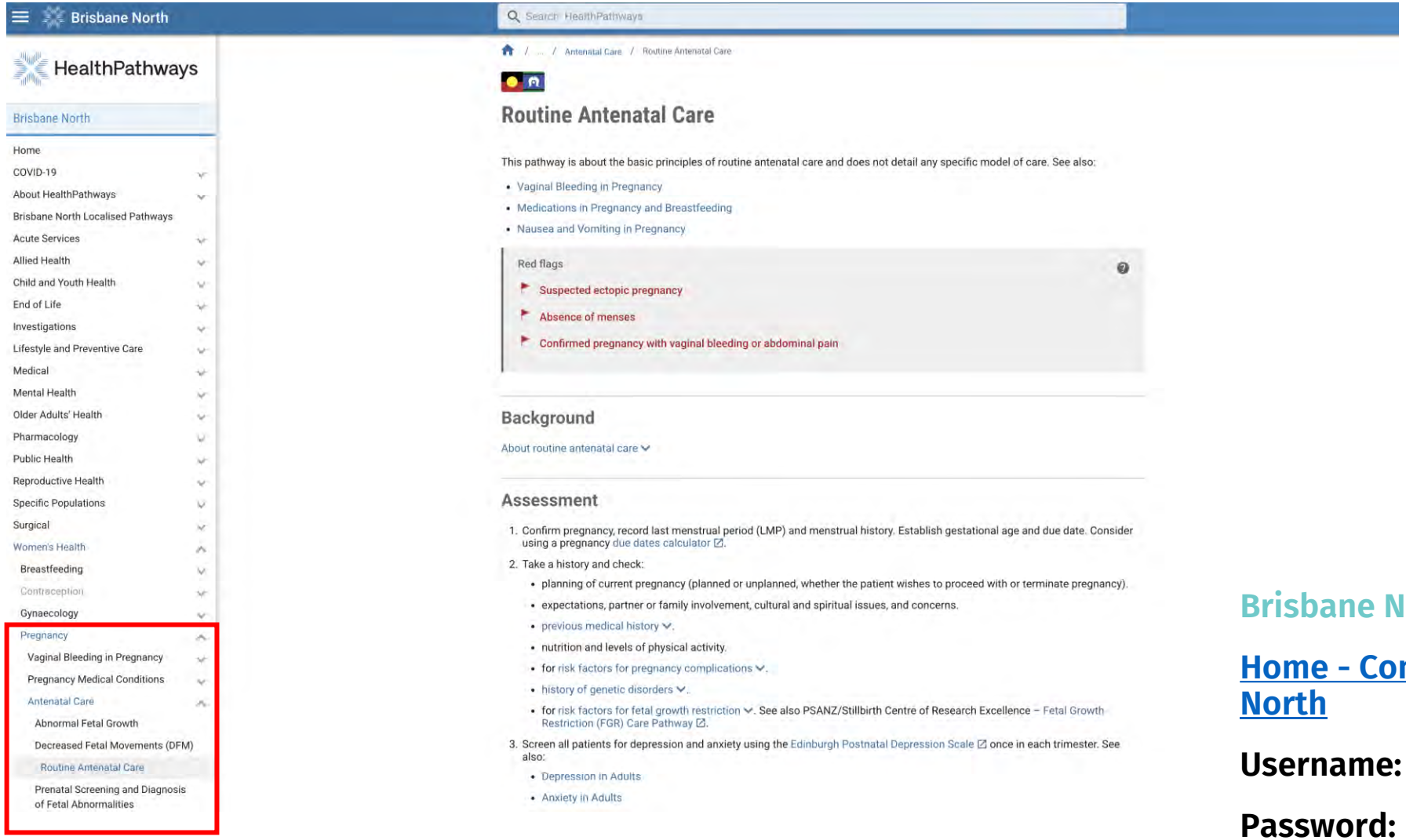
# Refer Your Patient




## Metro North Antenatal and Maternity Referral Guidelines

[Antenatal and Maternity | Metro North Health]

# Brisbane North HealthPathways




## Brisbane North HealthPathways

[Home - Community HealthPathways Brisbane North]

**Username:** ***Brisbane***

**Password:** ***North***

# Metro North Antenatal Shared Care

### Pre-conception

- Folate and iodine supplementation
- Rubella serology +/- vaccination
- Varicella serology if no history +/- vaccination
- COVID-19 vaccination
- Influenza vaccination
- Cervical Screening Test if due
- Chlamydia if age <30
- Smoking cessation
- Alcohol cessation
- Discuss genetic carrier screening
- If significant medical, genetic, psychological illness that impacts pre-conception, gestation or birth refer to preconception clinic &/or genetics service

### First GP Visit(s)

*(may require more than one consultation)*

- Confirm pregnancy and dates
- Scan if dates uncertain or risk of ectopic (previous ectopic, tubal surgery)
- Folate and iodine supplementation for all
- Review medical/surgical/psych/family/obstetric history, medications, allergies etc + update GP records
- Identify risk factors for pregnancy
- Discuss genetic carrier screening
- Order first trimester screening tests
- Perform physical examination as per Pregnancy Health Record (PHR)
- Weight, BMI – discuss healthy weight gain, nutrition and physical activity
- Discuss smoking, alcohol, other drugs, Listeria, Toxoplasmosis etc.
- COVID-19 vaccination
- Influenza vaccination
- Discuss models of care
- **Complete referral early** – indicate if high risk, you wish to share care, or preference for Birth Centre (RBWH) or Midwifery Group Practice
- Send GP Smart Referral or eReferral to Central Patient Intake (CPI)
- Ask woman to complete online registration

### First Trimester screening tests (GP)

*(cc ANC on all request forms) – all requests to be reviewed and actioned by referring clinician*

- FBC, ferritin, blood group and antibodies, Rubella, Hep B, Hep C, HIV, syphilis serology + dry swab (PCR) if lesions/chancre present, MSU (treat asymptomatic bacteriuria)
- Chlamydia if <30 or area of high prevalence
- If risk factors for GDM, OGTT (or HbA1c if OGTT not tolerated)
- ELFTs, TFT, Vit D for specific indications only
- Varicella serology (if no history of Varicella or vaccination)
- Cervical Screening Test if due
- Discuss/offer genetic carrier screening
- Discuss/offer prenatal screening
  1. Nuchal translucency scan + first trimester screen (free B-hCG, Papp-A) K11-13+6 or
  2. Triple test (AFP, estriol, free B-hCG) K15-20 if desired or if presents too late for first trimester testing (not twins or diabetes)
  3. NIPT > K10 (not Medicare funded); anatomical scan at K13 still recommended
- Discuss and refer for CVS/amniocentesis if appropriate

### Uncomplicated Pregnancy

- Rh D NIPT to predict fetal RhD status in non-alloimmunised RhD negative pregnant women from K15
- 18-20 week morphology scan including cervical length measurement
- Arrange to see woman after scan
- Cervix length - if TA cervix length <35mm, a TV USS should be performed. If TV cervix length <25mm, commence vaginal progesterone (200mg nocte from 16-36 weeks) and refer to MFM
- First ANC visit with midwife K16-20
- Obstetrician review if required
- All investigations to be reviewed and followed up by referring clinician
- Other referrals if applicable

### GP visits

- Schedule as per PHR or specific facility
- More frequent if clinically indicated
- Record in PHR
- Assessment/education as per PHR
- K24-28: OGTT, (if + refer to ANC), FBC. If Rh negative: blood group/antibodies screen; offer Anti-D
- K26-28: repeat syphilis serology
- Pertussis vaccine K20-32 in each pregnancy
- K28-36: RSV vaccine
- K34: If Rh neg – offer Anti-D
- K36: FBC, repeat syphilis serology
- Dry swab (syphilis PCR) at any stage if lesions/chancre present

### ANC visits

- K36
- K41

| Contacts | RBWH | Caboolture | Redcliffe |
|---|---|---|---|
| **For referral or advice** | | | |
| GP Liaison Midwife | 3647 3960<br>3646 1305 | 5433 8800 | 3049 2301 |
| O&G Registrar on call | 3646 8111 | 5433 8120 | 3883 7777 |
| Obstetric Medicine Registrar | 3646 8111 | - | - |
| Perinatal Mental Health (Metro North) | 3146 2525 or perinatal-mental-health@health.qld.gov.au | | |
| **Pregnancy complications** | | | |
| <20 weeks: Care of complications e.g. bleeding, pain, threatened or incomplete miscarriages | 3646 8111<br>O&G Registrar on call | 5433 8120<br>O&G Registrar on call | 3883 7777<br>Early Pregnancy Assessment |
| <20 weeks: haemodynamically unstable women | 3646 8111<br>DEM | 5433 8888<br>ED | 3883 7777<br>ED |
| >20 weeks: complications (RBWH > K14) | 3647 3931<br>Obstetric Review Centre | 5433 8670<br>Birth Suite | 3883 7714<br>Birth Suite |

## Additional Information

### High risk for GDM?

- Previous GDM or baby >4500g or >90th centile; previous elevated BGL; PCOS; FHx; BMI >30; maternal age ≥40; previous perinatal loss; multiple pregnancy; high risk ethnicity; medications: corticosteroids, antipsychotics
- First Trimester OGTT or HbA1C
- Post bariatric surgery OGTT not suitable. First trimester HbA1c or fasting BGL if diabetes history or risk factors
- Urgent hospital ANC referral if abnormal
- Specify reason and include results in referral. Send GP Smart Referral or eReferral to CPIU

### Rh negative?

- RhD NIPT to predict fetal RhD status through Lifeblood or SNP
- Offer Anti-D:
  - 28 and 34 weeks
  - Sensitising events
- For details and dosages, refer to https://www.blood.gov.au/guideline-prophylactic-use-rh-d-immunoglobulin-pregnancy-care

### Medical condition or obstetric complications?

### Early/urgent hospital ANC referral?

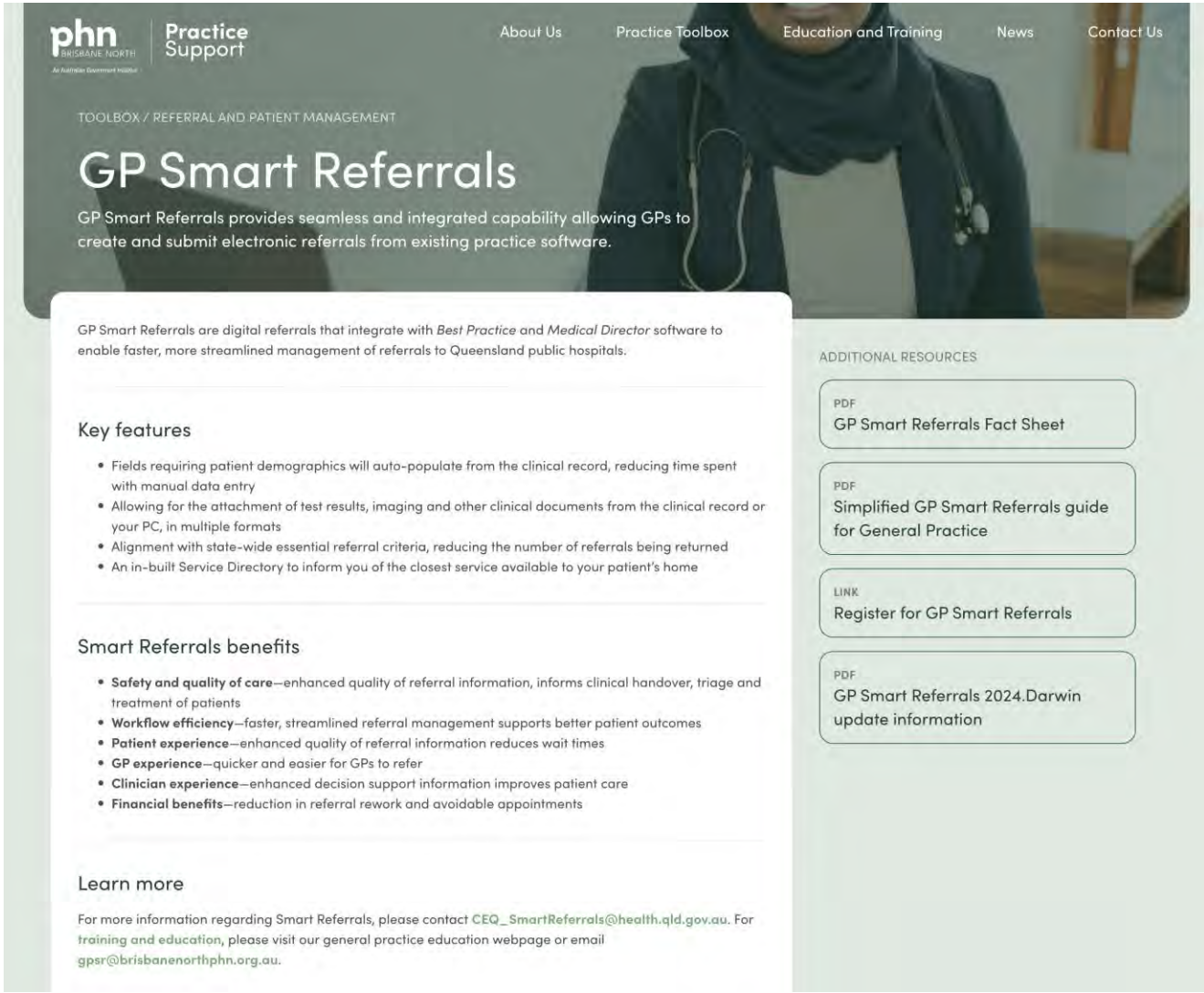
- GP referrals are promptly triaged
- Please specify urgency and reasons in referral
- Send GP Smart Referral or eReferral to CPIU

Modified by Brisbane North PHN, MNHHS and Mater Mothers' Hospital from an original created by Drs Michael Rice, Mano Haran and Heng Tang.
This is a joint initiative between Metro North Hospital and Health Service and Brisbane North PHN
Version 7 Effective: 02/2025 Review: 02/2026

phn BRISBANE NORTH An Australian Government Initiative | Metro North Health | Queensland Government

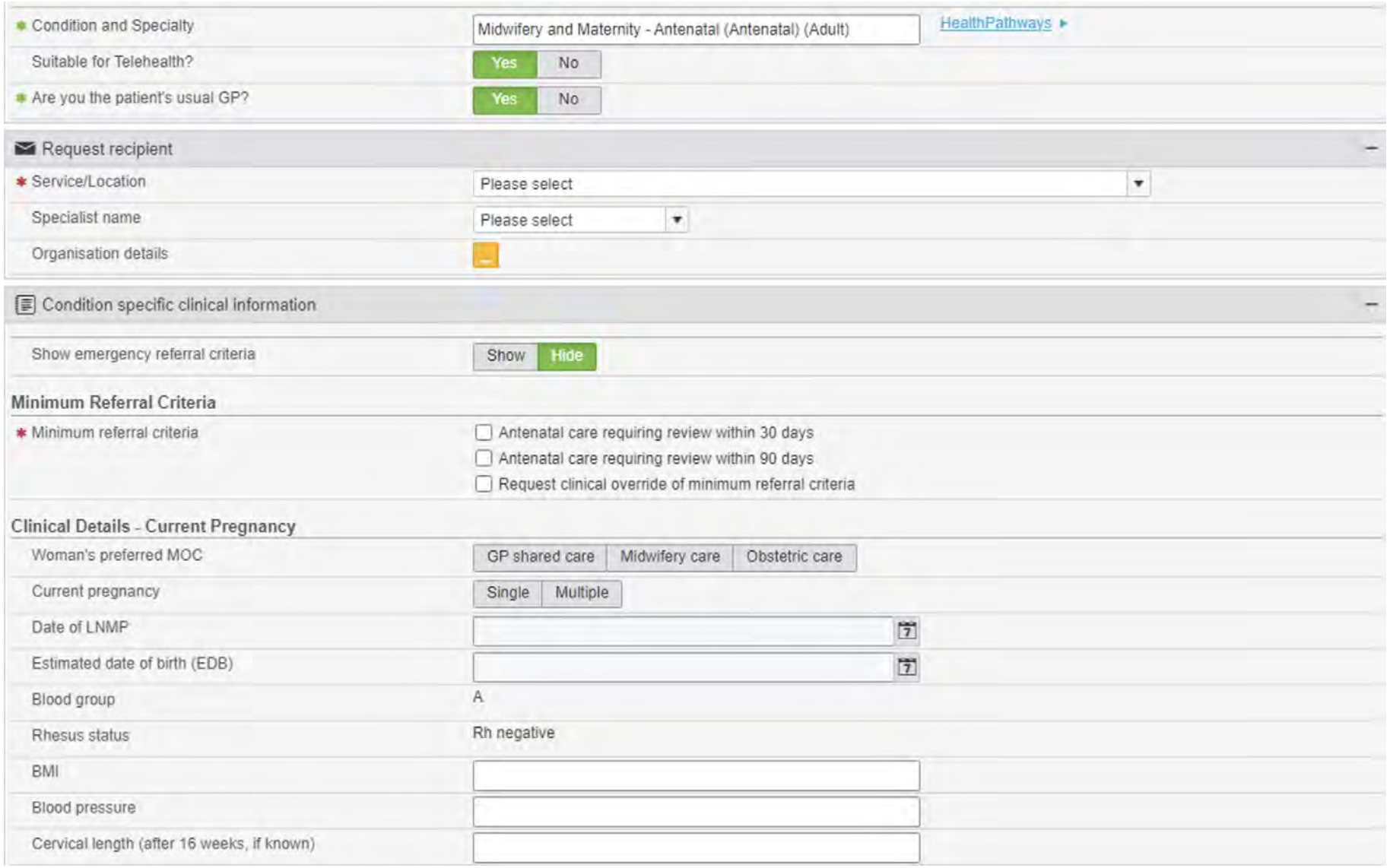
**Metro North Antenatal Shared Care**
**Metro North Health GP and Primary Care Education Resources**

# GP Smart Referrals



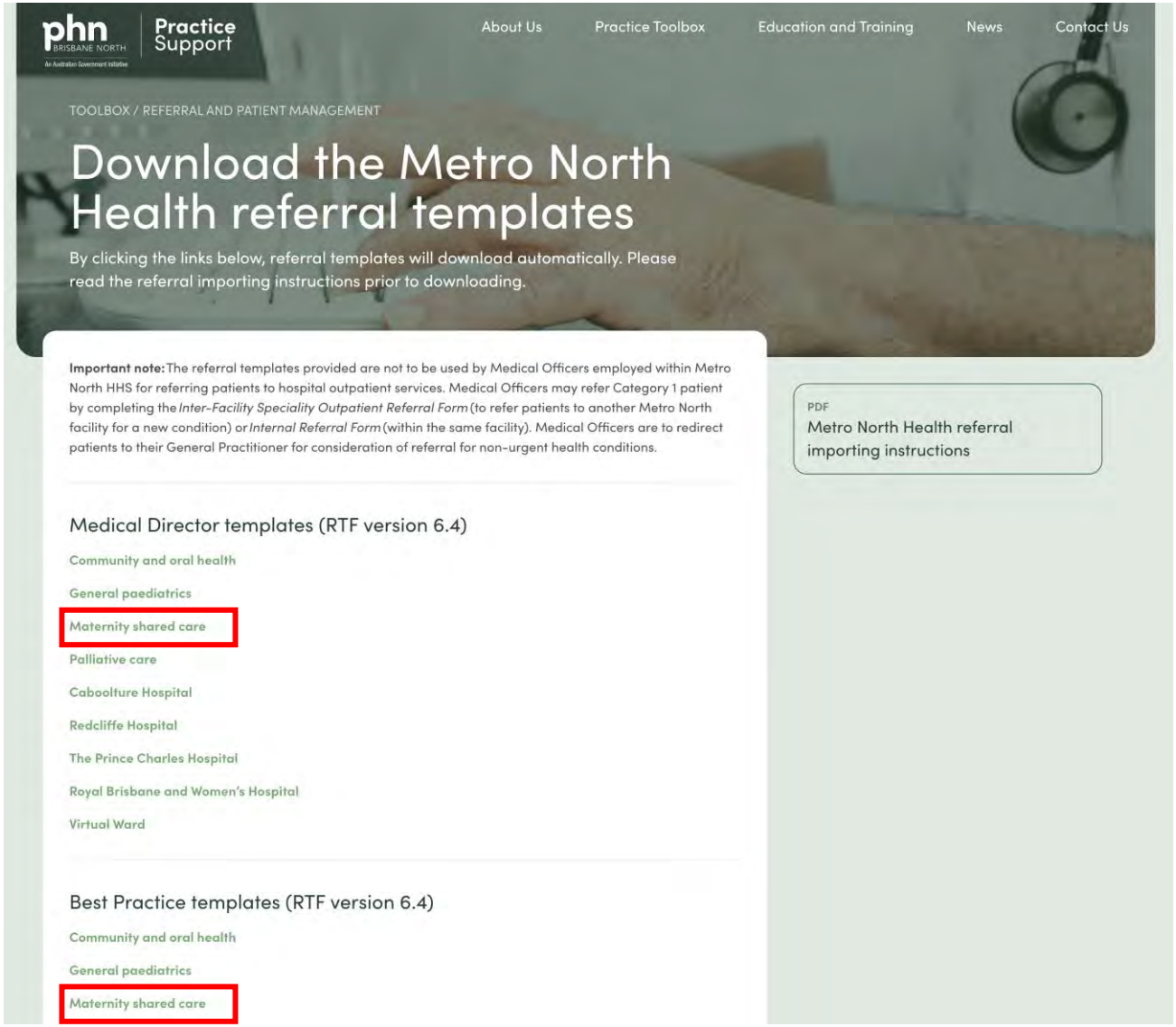

[Practice Support | Toolbox | GP Smart Referrals]

# GP Smart Referrals




**Practice Support | Toolbox | GP Smart Referrals**

# Metro North eReferral Template




[Practice Support | Toolbox | GP Referral Templates]

# Antenatal Referrals

- Confirm pregnancy and EDB
- Confirm Medicare eligibility
- Indicate preferred Maternity Care Option on referral
  - if requesting Birth Centre (RBWH) or Midwifery Group Practice, include in referral
- Send referral to CPI
  - GP Smart Referral
  - eReferral
  - enquiries 1300 364 938

# Antenatal Referrals

- **Include copies of available results with referral**
- **All pathology & USS results must be reviewed and actioned by requesting practitioner**
- **Advise woman to follow-up results with you and attend regularly for antenatal visits (every 4 weeks in Trimesters 1 & 2)**

# Antenatal Referrals

- Advise woman to visit Hospital websites for more information regarding maternity services
  - RBWH | Pregnant - what to do next
  - Redcliffe Hospital | Pregnant - what to do next
  - Caboolture Hospital | Pregnant - what to do next
- Online registration is available at all Metro North Maternity Facilities
- First Appointment
  - “booking-in” appointment will be completed prior to 18 weeks

# Pregnancy Health Record

Queensland Government

## Pregnancy Health Record

(Affix identification label here)

URN:
Family name:
Given name(s):
Address:
Medicare number:
Date of birth:

### Clinician's section

Attach ADR Sticker

**ALLERGIES AND ADVERSE DRUG REACTIONS (ADR)**
☐ Nil known ☐ Unknown (tick appropriate box or complete details below)

| Drug (or other) | Reaction / Date | Initials |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

Sign: ..... Print: ..... Date: .....

**Model of care** (complete details page a10):

**Rh D negative?** ☐ Yes ☐ No
*See page a10 for Rh D immunoglobulin*

☐ **Medicare ineligible** – comments:

**Religious, ethnic or cultural considerations important to antenatal care** (e.g. birth practices, blood products, dietary, etc.):

### Woman's Information

Preferred name: | Age: years | Marital status:

Country of birth: ☐ Australia ☐ Other: ..... If *Other*, what year did you arrive in Australia?

Do you have refugee status experience? ☐ Yes ☐ No

Interpreter required? ☐ Yes ☐ No
If *Yes*, Language: ..... | Ethnicity:

Do you have any problems reading English and understanding the content of this Pregnancy Health Record? ☐ Yes ☐ No

Are you of Aboriginal and/or Torres Strait Islander origin?
☐ Yes, Aboriginal ☐ Yes, Torres Strait Islander ☐ No ☐ Prefer not to say
| Occupation:

Date of first pregnancy appointment with GP or healthcare provider: ____ / ____ / ____

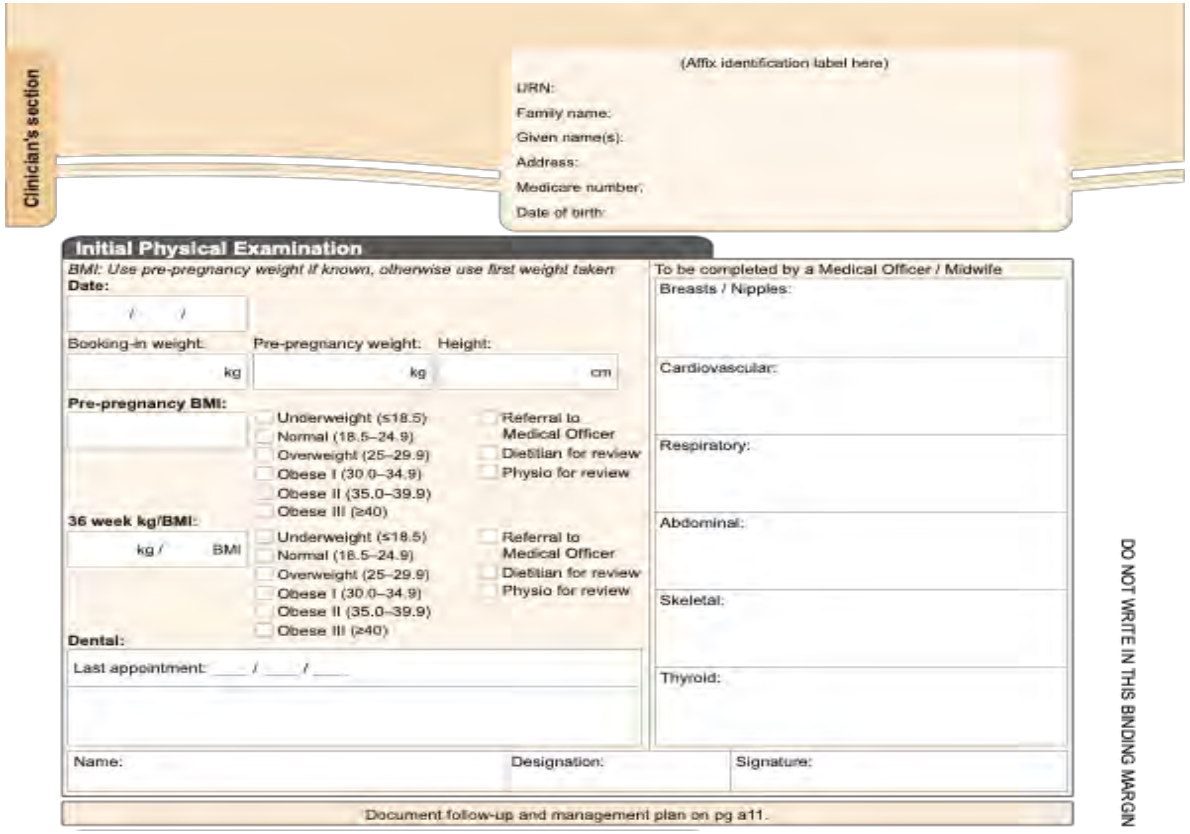
Email address: | Contact number:

IS BINDING MARGIN

[Clinical Excellence Queensland | Pregnancy Health Record]

# Pregnancy Health Record

## Initial Physical Examination (PHR Page a8 of 20)



Clinician's section

(Affix identification label here)

URN:
Family name:
Given name(s):
Address:
Medicare number:
Date of birth:

**Initial Physical Examination**

*BMI: Use pre-pregnancy weight if known, otherwise use first weight taken*

**Date:** / /

Booking-in weight: kg | Pre-pregnancy weight: kg | Height: cm

**Pre-pregnancy BMI:**

- Underweight (≤18.5)
- Normal (18.5–24.9)
- Overweight (25–29.9)
- Obese I (30.0–34.9)
- Obese II (35.0–39.9)
- Obese III (≥40)

Referral to Medical Officer
Dietitian for review
Physio for review

**36 week kg/BMI:** kg / BMI

- Underweight (≤18.5)
- Normal (18.5–24.9)
- Overweight (25–29.9)
- Obese I (30.0–34.9)
- Obese II (35.0–39.9)
- Obese III (≥40)

Referral to Medical Officer
Dietitian for review
Physio for review

**Dental:**

Last appointment: ___ / ___ / ___

To be completed by a Medical Officer / Midwife

Breasts / Nipples:
Cardiovascular:
Respiratory:
Abdominal:
Skeletal:
Thyroid:

Name: | Designation: | Signature:

Document follow-up and management plan on pg a11.

DO NOT WRITE IN THIS BINDING MARGIN

**Responsibility of referring GP regardless of woman's requested maternity care option**

[Clinical Excellence Queensland | Pregnancy Health Record]

# Routine Antenatal Tests

## Metro North Antenatal Shared Care

### Pre-conception

- Folate and iodine supplementation
- Rubella serology +/- vaccination
- Varicella serology if no history +/- vaccination
- COVID-19 vaccination
- Influenza vaccination
- Cervical Screening Test if due
- Chlamydia if age <30
- Smoking cessation
- Alcohol cessation
- Discuss genetic carrier screening
- If significant medical, genetic, psychological illness that impacts pre-conception, gestation or birth refer to preconception clinic &/or genetics service

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*(may require more than one consultation)*

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- Scan if dates uncertain or risk of ectopic (previous ectopic, tubal surgery)
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- Post bariatric surgery OGTT not suitable. First trimester HbA1c or fasting BGL if diabetes history or risk factors
- Urgent hospital ANC referral if abnormal
- Specify reason and include results in referral. Send GP Smart Referral or eReferral to CPIU

#### Rh negative?

- RhD NIPT to predict fetal RhD status through Lifeblood or SNP
- Offer Anti-D:
  - 28 and 34 weeks
  - Sensitising events
- For details and dosages, refer to https://www.blood.gov.au/guideline-prophylactic-use-rh-d-immunoglobulin-pregnancy-care.

#### Medical condition or obstetric complications?

#### Early/urgent hospital ANC referral?

- GP referrals are promptly triaged
- Please specify urgency and reasons in referral
- Send GP Smart Referral or eReferral to CPIU

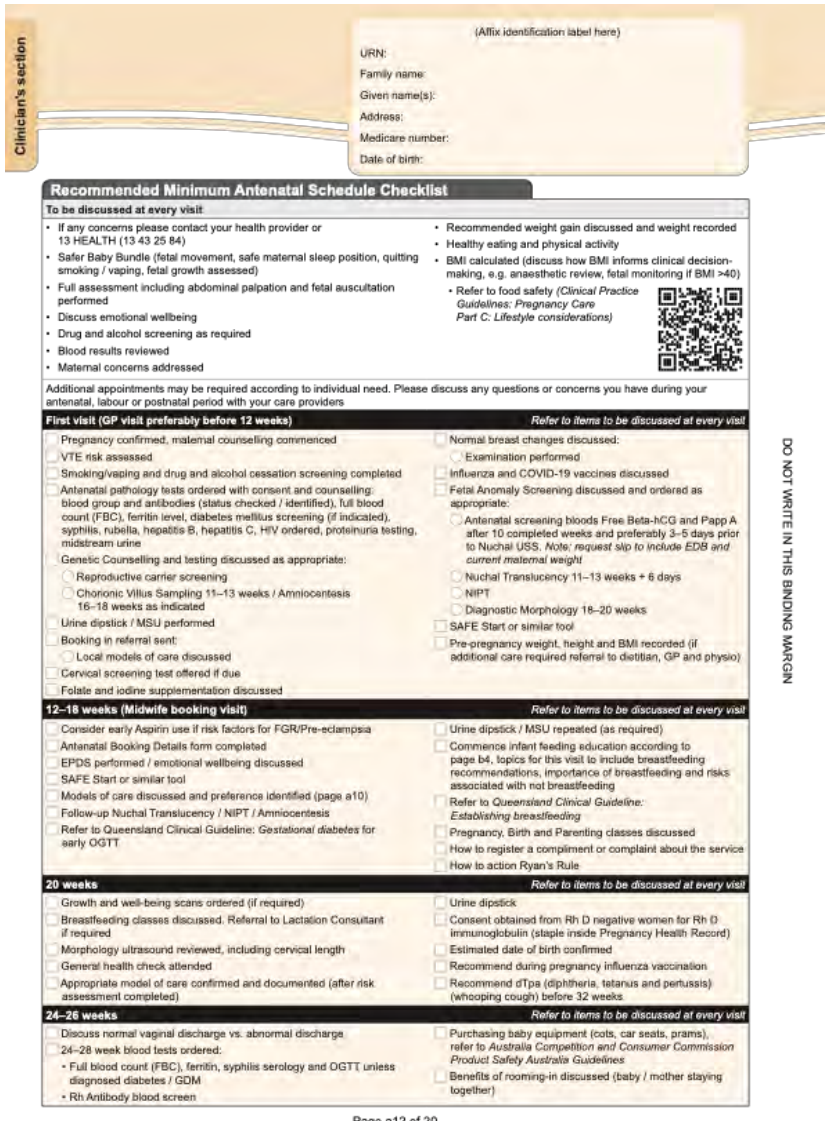
Modified by Brisbane North PHN, MNHHS and Mater Mothers' Hospital from an original created by Drs Michael Rice, Mano Haran and Heng Tang.
This is a joint initiative between Metro North Hospital and Health Service and Brisbane North PHN
Version 7 Effective: 02/2025 Review: 02/2026

phn BRISBANE NORTH An Australian Government Initiative | Metro North Health | Queensland Government

[Metro North Antenatal Shared Care]

[Metro North Health GP and Primary Care Education Resources]

# Antenatal Visit Schedule



Clinician's section

(Affix identification label here)

URN:
Family name:
Given name(s):
Address:
Medicare number:
Date of birth:

**Recommended Minimum Antenatal Schedule Checklist**

**To be discussed at every visit**

- If any concerns please contact your health provider or 13 HEALTH (13 43 25 84)
- Safer Baby Bundle (fetal movement, safe maternal sleep position, quitting smoking / vaping, fetal growth assessed)
- Full assessment including abdominal palpation and fetal auscultation performed
- Discuss emotional wellbeing
- Drug and alcohol screening as required
- Blood results reviewed
- Maternal concerns addressed
- Recommended weight gain discussed and weight recorded
- Healthy eating and physical activity
- BMI calculated (discuss how BMI informs clinical decision-making, e.g. anaesthetic review, fetal monitoring if BMI >40)
  - Refer to food safety *(Clinical Practice Guidelines: Pregnancy Care Part C: Lifestyle considerations)*

Additional appointments may be required according to individual need. Please discuss any questions or concerns you have during your antenatal, labour or postnatal period with your care providers

**First visit (GP visit preferably before 12 weeks)** — *Refer to items to be discussed at every visit*

- Pregnancy confirmed, maternal counselling commenced
- VTE risk assessed
- Smoking/vaping and drug and alcohol cessation screening completed
- Antenatal pathology tests ordered with consent and counselling: blood group and antibodies (status checked / identified), full blood count (FBC), ferritin level, diabetes mellitus screening (if indicated), syphilis, rubella, hepatitis B, hepatitis C, HIV ordered, proteinuria testing, midstream urine
- Genetic Counselling and testing discussed as appropriate:
  - Reproductive carrier screening
  - Chorionic Villus Sampling 11–13 weeks / Amniocentesis 16–18 weeks as indicated
- Urine dipstick / MSU performed
- Booking in referral sent:
  - Local models of care discussed
- Cervical screening test offered if due
- Folate and iodine supplementation discussed
- Normal breast changes discussed:
  - Examination performed
- Influenza and COVID-19 vaccines discussed
- Fetal Anomaly Screening discussed and ordered as appropriate:
  - Antenatal screening bloods Free Beta-hCG and Papp A after 10 completed weeks and preferably 3–5 days prior to Nuchal USS. *Note: request slip to include EDB and current maternal weight*
  - Nuchal Translucency 11–13 weeks + 6 days
  - NIPT
  - Diagnostic Morphology 18–20 weeks
- SAFE Start or similar tool
- Pre-pregnancy weight, height and BMI recorded (if additional care required referral to dietitian, GP and physio)

**12–18 weeks (Midwife booking visit)** — *Refer to items to be discussed at every visit*

- Consider early Aspirin use if risk factors for FGR/Pre-eclampsia
- Antenatal Booking Details form completed
- EPDS performed / emotional wellbeing discussed
- SAFE Start or similar tool
- Models of care discussed and preference identified (page a10)
- Follow-up Nuchal Translucency / NIPT / Amniocentesis
- Refer to Queensland Clinical Guideline: *Gestational diabetes* for early OGTT
- Urine dipstick / MSU repeated (as required)
- Commence infant feeding education according to page b4, topics for this visit to include breastfeeding recommendations, importance of breastfeeding and risks associated with not breastfeeding
- Refer to *Queensland Clinical Guideline: Establishing breastfeeding*
- Pregnancy, Birth and Parenting classes discussed
- How to register a compliment or complaint about the service
- How to action Ryan's Rule

**20 weeks** — *Refer to items to be discussed at every visit*

- Growth and well-being scans ordered (if required)
- Breastfeeding classes discussed. Referral to Lactation Consultant if required
- Morphology ultrasound reviewed, including cervical length
- General health check attended
- Appropriate model of care confirmed and documented (after risk assessment completed)
- Urine dipstick
- Consent obtained from Rh D negative women for Rh D immunoglobulin (staple inside Pregnancy Health Record)
- Estimated date of birth confirmed
- Recommend during pregnancy influenza vaccination
- Recommend dTpa (diphtheria, tetanus and pertussis) (whooping cough) before 32 weeks

**24–26 weeks** — *Refer to items to be discussed at every visit*

- Discuss normal vaginal discharge vs. abnormal discharge
- 24–28 week blood tests ordered:
  - Full blood count (FBC), ferritin, syphilis serology and OGTT unless diagnosed diabetes / GDM
  - Rh Antibody blood screen
- Purchasing baby equipment (cots, car seats, prams), refer to *Australia Competition and Consumer Commission Product Safety Australia Guidelines*
- Benefits of rooming-in discussed (baby / mother staying together)

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DO NOT WRITE IN THIS BINDING MARGIN

DO NOT WRITE IN THIS BINDING MARGIN

Clinician's section

(Affix identification label here)

URN:
Family name:
Given name(s):
Address:
Medicare number:
Date of birth:

**Recommended Minimum Antenatal Schedule Checklist** *(continued)*

**28 weeks** — *Refer to items to be discussed at every visit*

- Influenza immunisation discussed
- Timing of birth for women with stillbirth individual risk factors discussed
- VTE Risk assessment
- Where to access help in the community
- Pathology results checked (Rh Antibody screen completed)
- First dose of Anti D for Rh D negative woman attended
- Immunisation for dTpa (diphtheria, tetanus and pertussis) administered (recommended before 32 weeks)
- SUDI (includes SIDS and accidents) discussed
  - Refer to *Guideline: Safer Infant Sleep*
- Side sleeping discussed
- SAFE Start or similar tool

**31 weeks** — *Refer to items to be discussed at every visit*

- Timing of birth for women with stillbirth individual risk factors discussed
- Booked into Birthing classes
- Length of hospital stay discussed
- Birth preferences discussed (page b3)
- Side sleeping discussed
- Follow-up ultrasound for identified complexity (e.g. placental position), if required
- Postnatal community supports discussed (i.e. Child Health Service)
- Advise family to have booster immunisation (i.e dTpa (diphtheria, tetanus and pertussis))

**34 weeks** — *Refer to items to be discussed at every visit*

- Timing of birth for women with stillbirth individual risk factors discussed
- Discuss signs of labour and when to come to hospital
- Birth preferences reviewed and discussed
- Second dose of Anti D for Rh D negative women attended
- EPDS repeated and recorded
- Side sleeping discussed
- Antenatal expressing of breast milk and safe storage discussed (if applicable)
- Order full blood count (FBC), ferritin (if indicated) and syphilis serology
- Perineal massage discussed

**36 weeks** — *Refer to items to be discussed at every visit*

**Visit at 36 weeks, then as clinically indicated every 1–2 weeks until 41 weeks:**

- Timing of birth for women with stillbirth individual risk factors discussed
- Discuss signs of labour and when to come to hospital
- Breast feeding education revisited
- Ensure has contact numbers for Birth Suite and healthcare provider
- Referral to child health service if required
- SAFE Start or similar tool
- Mode of preferred birth discussed
- Side sleeping discussed
- SUDI (includes SIDS and accidents) discussed
  - Refer to *Guideline: Safer Infant Sleep*
- Review Birth Suite video tour (if available)
- Contraception discussed
- Vitamin K discussed
- Hepatitis B Immunisation discussed

**At 36 weeks:**

- Elective caesarean section booked (if applicable) including second opinion to confirm necessity
- Blood results reviewed
- VTE risk assessment

**38 weeks** — *Refer to items to be discussed at every visit*

- Timing of birth for women with stillbirth individual risk factors discussed
- Blood results reviewed
- Side sleeping discussed
- Discuss signs of labour and when to come to hospital
- Breastfeeding information reviewed

**40 weeks** — *Refer to items to be discussed at every visit*

- Discuss signs of labour and when to come to hospital
- Side sleeping discussed
- Induction of labour for 41+0 weeks plus or minus membrane sweep discussed

**41 weeks** — *Refer to items to be discussed at every visit*

- Assessment of maternal and baby wellbeing completed (arrange for CTG if indicated)
- Induction of labour by 42 weeks re-discussed (if applicable)
- Side sleeping discussed
- Monitoring if indicated as per current fetal surveillance guidelines

**Comments (note gestation week):**

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[Clinical Excellence Queensland | Pregnancy Health Record]

# Metro North Perinatal Mental Health

- **Metro North HHS Perinatal Mental Health Service (Non-Acute)**
  - https://metronorth.health.qld.gov.au/hospitals-services/mental-health-services/perinatal-mental-health
  - P: 07 3146 2525
  - F: 07 3146 2314
  - E: perinatal-mental-health@health.qld.gov.au
  - Perinatal Psychiatrist – Dr Anastasia Braun – fax referral 07 3646 2314

- **1300 MH CALL (1300 64 2255) (Acute)**

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# Maternity Services

## Pregnancy

- Choosing an option for maternity care
- Maternity Services Referral Catchment
- Tests and scans
- Learning about pregnancy, birth and baby
- Pregnancy problems

## Having your baby

- Preparing for labour
- Labour and birth
- When complications occur
- Care after birth
- While you're in hospital
- Newborn Bloodspot Screening

## Think you might be in labour?

Call **(07) 3647 3931** and speak to a midwife before you come to hospital

## Contact us

**Maternity outpatient appointments**
**Location:** Ground floor, Ned Hanlon Building
**Phone:** (07) 3646 7182
**Email:** rbwh_maternity@health.qld.gov.au
**Open:** Monday-Friday 8.00am-4.00pm

**Birth Suite and Birth Centre**
**Location:** Level 5, Ned Hanlon Building
**Phone:** (07) 3646 8516 or (07) 3646 8317

**Women's Obstetric Review Centre**
**Location:** Level 5, Ned Hanlon Building
**Phone:** (07) 3647 3931

**Private practice appointments**

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# Maternity Services Referral Catchment

To facilitate supporting families closer to home, from October 2021 the RBWH will not be accepting referrals from Brisbane Metro South and West Moreton. This will apply to all models of care currently offered with the exception of the below.

The exclusions include:

- The acceptance of all referrals for Aboriginal and Torres Strait Islander women (i.e. Ngarrama) who would like maternity care at RBWH to support the 'Closing the Gap' initiative
- Women requiring tertiary care at RBWH due to pre-existing medical conditions which are currently managed at RBWH
- Complex maternal cardiac conditions occurring in pregnancy
- Women under the care of Private Practice Midwives credentialled at RBWH; and
- General medicine / Obstetric medicine telehealth referrals

## Contact us

**Maternity outpatient appointments**
**Location:** Ground floor, Ned Hanlon Building
**Phone:** (07) 3646 7182
**Email:** rbwh_maternity@health.qld.gov.au
**Open:** Monday-Friday 8.00am-4.00pm

**Private practice appointments**
**Phone:** (07) 3646 3395

## Refer a patient

**Maternity outpatient**
Complete the Maternity booking in referral form (PDF) and forward it to Metro North Central Patient Intaketo refer your patient.

**RBWH | Maternity Services Referral Catchment**

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Home / Healthcare Services / Maternity Services / Choosing an option for maternity care

# Choosing an option for maternity care

All options for maternity care (PDF)are delivered by caring and dedicated health professionals in partnership with you and your support people. Your general practitioner (GP) or midwife will discuss these options at your first appointment.

## Which maternity care best suits you?

Take the quiz

Choosing the best option for you will depend on your own personal preferences, and sometimes, your medical history. We offer three main options for maternity care for your pregnancy, birth and after your baby is born:

- Midwifery care
- GP shared care
- Specialist care

All care options have the opportunity for discharge home at **6 hours** after birth, if you have a normal birth and you and your baby are well. If you need to stay longer, you can expect to be discharged around **24 hours** following a normal birth or within **72 hours** after a caesarean birth.

## Contact us

**Maternity outpatient appointments**
**Location:** Ground floor, Ned Hanlon Building
**Phone:** (07) 3646 7182
**Email:** rbwh_maternity @health.qld.gov.au
**Open:** Monday-Friday 8.00am-4.00pm

**Private practice appointments**
**Phone:** (07) 3646 3395

## Refer a patient

**Maternity outpatient**
Complete the Maternity booking in referral form (PDF) and forward it to Metro North Central Patient Intaketo refer your patient.

**RBWH | Choosing an option for maternity care**

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Home / Healthcare Services / Maternity Services / Learning about pregnancy, birth and baby

# Learning about pregnancy, birth and baby

Learning about your pregnancy, birth and baby can help build your confidence and prepare you for the weeks ahead. The RBWH has resources and experienced staff available to ensure you're supported throughout your journey.

## Nurture Your Bump - Workshop


Unsure of what foods you need to avoid during pregnancy or if you need a pregnancy multivitamin? Our 2-hour Nurture Your Bump workshop, is run by our experienced maternity dietitian and will provide you with all the building blocks needed to grow a healthy baby. Book your workshop instantly online or call RBWH Maternity Outpatients Department on (07) 3646 7182.

Register or refer now >

## GLOW (online resource)

GLOW (PDF) is a free online resource, full of helpful and factual information about pregnancy, breastfeeding, birth and going home with a newborn. Access to GLOW is offered for all women having their baby at RBWH and includes the following topics:

## Contact us

**Maternity Outpatients**
**Location:** Ground floor, Ned Hanlon Building

**Appointment enquiries**
**Phone:** (07) 3646 7182
**Email:** rbwh_maternity@health.qld.gov.au
**Open:** Monday-Friday 8.00am-4.00pm

**Private practice appointments**
**Phone:** (07) 3646 3395

## Refer a patient

Complete the Maternity booking in referral form (PDF) and forward it to Metro North Central Patient Intake to refer your patient.

**RBWH | Learning about pregnancy birth baby**

# Learning about pregnancy, birth and baby

GLOW

an online resource for pregnant women
proudly presented by Metro North Hospital & Health Service

- Free online resource for women having their baby at RBWH
- Women opt-in at booking-in visit
- Access 24/7 from home computer, tablet or smartphone

# Other RBWH Services

| | |
|---|---|
| Early Pregnancy Assessment Unit (EPAU) | Obstetric Review Centre (ORC) |
| Pregnancy, birth & baby education | Gestational Diabetes Mellitus midwives |
| Postnatal in-home visiting following discharge | Complex Case Manager<br>(Inc. Obstetric Medical Team) |
| Gynaecology, Urogynaecology, Gynaecology Oncology, Adolescent Gynaecology 14-18yrs | Specialist Clinics including Anaesthetics, Cardiac and Endocrine |
| Social Work including Child Protection Liaison Officer | Centre for Advanced Prenatal Care (Maternal Fetal Medicine) |
| Allied Health | Fertility |
| Perinatal Mental Health | OASIS (Obstetric Anal Sphincter Injuries) |
| Lactation Service | Centre for Breast Health |
| Grantley Stable Neonatal Unit | |

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# Maternity services

## Pregnancy

Pregnant? What to do next

Choosing an option for your maternity care

Tests and scans

Learning about pregnancy, birth and baby

Your appointments

## Having your baby

Preparing for labour

Labour and birth

When complications occur

Complete the online registration form to start the booking process

## Contact us

**Antenatal Clinic**
**Location:** Rear of the hospital, access via Silvyn Street
**Phone:** (07) 3883 7802

**Birth Suite**
**Location:** Level 3, Main Building, Redcliffe Hospital
**Phone:** (07) 3883 7714

**Childbirth and Parenting Education**
**Location:** Education Centre, Redcliffe Hospital
**Phone:** (07) 3883 7802
**Open:** Please call 1.00pm-4.00pm Monday-Friday

**Home Maternity Service**
**Phone:** (07) 3883 7709

View on Google Maps

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# Choosing an option for your maternity care

All options for maternity care are delivered by our caring and dedicated health professionals in partnership with you and your support people. Your GP or midwife will discuss these options with you.

## Maternity care options

Choosing the best option for you will depend on your own personal preferences, and sometimes, your medical history.

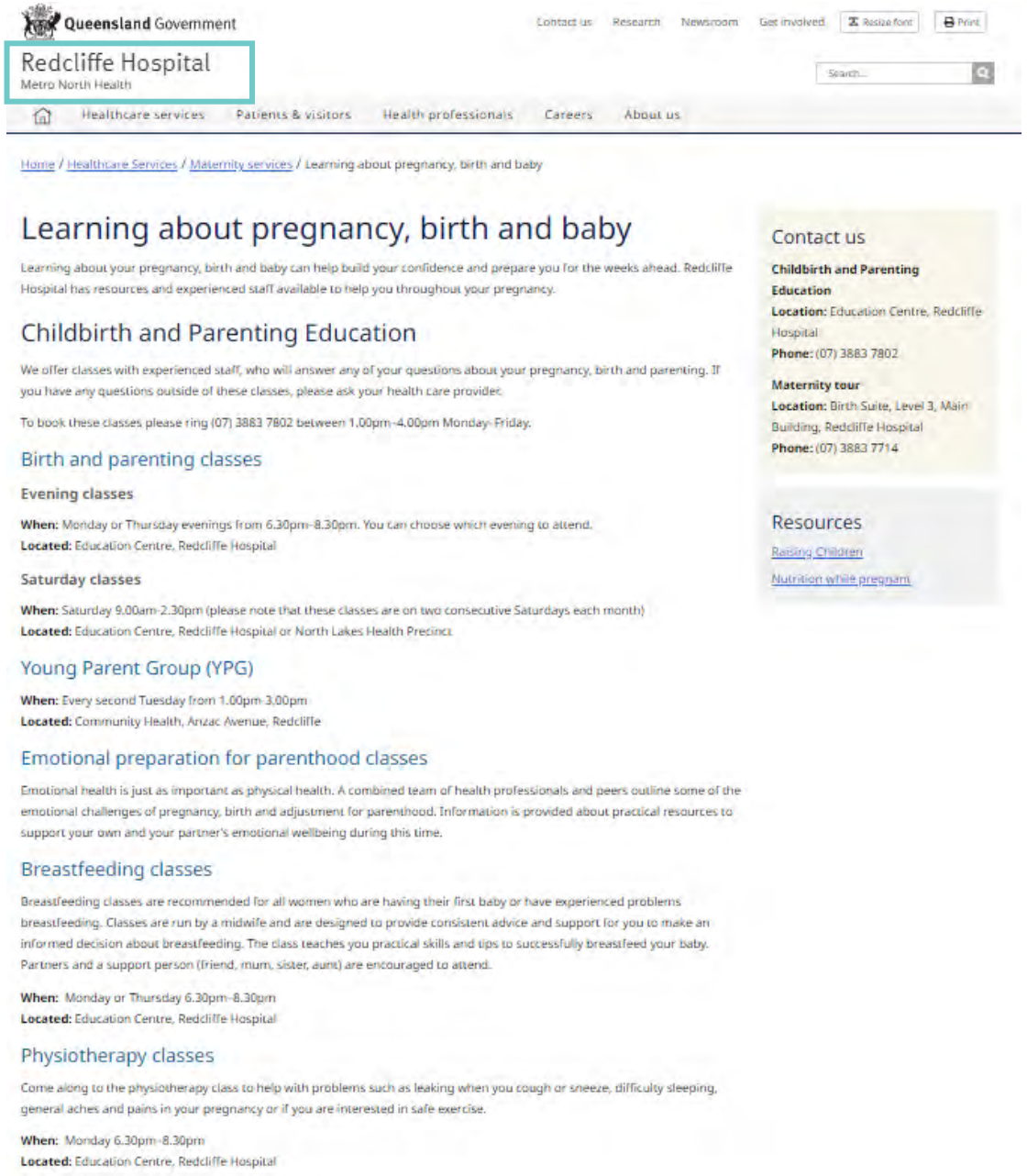
- **Midwives clinic** + CRIB Clinic - complex MH & psychosocial issues – Redcliffe & Deception Bay
- **Midwifery Group Practice** AMITY
- **Private Practice Midwives**
- **Aboriginal and Torres Strait Islander Maternity Service – Ngarrama** Redcliffe & Deception Bay
- **Young Parent Group**
- **Obstetric led care with Doctors and Midwives**
- **GP Shared Care**

### Contact us

**Location:** Antenatal Clinic, Redcliffe Hospital
**Phone:** (07) 3883 7802

Complete the antenatal online registration form

[Redcliffe Hospital | Choosing an option for maternity care]



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# Learning about pregnancy, birth and baby

Learning about your pregnancy, birth and baby can help build your confidence and prepare you for the weeks ahead. Redcliffe Hospital has resources and experienced staff available to help you throughout your pregnancy.

## Childbirth and Parenting Education

We offer classes with experienced staff, who will answer any of your questions about your pregnancy, birth and parenting. If you have any questions outside of these classes, please ask your health care provider.

To book these classes please ring (07) 3883 7802 between 1.00pm-4.00pm Monday-Friday.

### Birth and parenting classes

**Evening classes**

**When:** Monday or Thursday evenings from 6.30pm-8.30pm. You can choose which evening to attend.
**Located:** Education Centre, Redcliffe Hospital

**Saturday classes**

**When:** Saturday 9.00am-2.30pm (please note that these classes are on two consecutive Saturdays each month)
**Located:** Education Centre, Redcliffe Hospital or North Lakes Health Precinct

### Young Parent Group (YPG)

**When:** Every second Tuesday from 1.00pm-3.00pm
**Located:** Community Health, Anzac Avenue, Redcliffe

### Emotional preparation for parenthood classes

Emotional health is just as important as physical health. A combined team of health professionals and peers outline some of the emotional challenges of pregnancy, birth and adjustment for parenthood. Information is provided about practical resources to support your own and your partner's emotional wellbeing during this time.

### Breastfeeding classes

Breastfeeding classes are recommended for all women who are having their first baby or have experienced problems breastfeeding. Classes are run by a midwife and are designed to provide consistent advice and support for you to make an informed decision about breastfeeding. The class teaches you practical skills and tips to successfully breastfeed your baby. Partners and a support person (friend, mum, sister, aunt) are encouraged to attend.

**When:** Monday or Thursday 6.30pm-8.30pm
**Located:** Education Centre, Redcliffe Hospital

### Physiotherapy classes

Come along to the physiotherapy class to help with problems such as leaking when you cough or sneeze, difficulty sleeping, general aches and pains in your pregnancy or if you are interested in safe exercise.

**When:** Monday 6.30pm-8.30pm
**Located:** Education Centre, Redcliffe Hospital

## Contact us

**Childbirth and Parenting Education**
**Location:** Education Centre, Redcliffe Hospital
**Phone:** (07) 3883 7802

**Maternity tour**
**Location:** Birth Suite, Level 3, Main Building, Redcliffe Hospital
**Phone:** (07) 3883 7714

## Resources

Raising Children

Nutrition while pregnant

## Emotional support

Pregnancy, birth and early parenthood are times of great change. Most women experience various emotional reactions. It helps if you can talk about your concerns openly with your partner or close friend. We are able to provide support and treatment through our expert clinicians.

There are also many organisations that offer support. If you are experiencing signs of depression, there are a number of places you can go for help. A list of these services are below:

Perinatal mental health

- Post and Antenatal Depression Association (PANDA) 1300 726 306
- beyondblue's Just Speak Up 1300 22 4636
- White Cloud Foundation 1300 726 306

Mental health support

- Black Dog Institute
- Lifeline 13 11 14 (24 hours a day)
- Sane Australia 1800 18 7263
- MensLine Australia 1300 789 978 (24 hours a day)

Pregnancy support

- Pregnancy, Birth and Baby
- 13 HEALTH 13 43 25 84
- Women's Health Queensland Wide
- Pregnancy Helpline 1800 090 777 (if you have an unplanned pregnancy and want to discuss your options with a qualified counsellor)
- Perinatal Mental Health

## Alcohol

The safest choice for your baby is to not drink any alcohol. This is advice from the National Health and Medical Research Council of Australia.

## Smoking

It is recommended to stop smoking during pregnancy. We offer support for you to stop or reduce the amount you smoke. Ask your doctor or midwife during your antenatal appointment. You can also call Quitline on 13 78 48.

Smoking while pregnant increases your risk of:

- ectopic pregnancy
- miscarriage

**Redcliffe Hospital | Learning about pregnancy birth baby**

# Other Redcliffe Hospital Services

| | |
|---|---|
| Early Pregnancy Assessment Unit (EPAU) | Antenatal Day Assessment Service (ANDAS)<br>Obstetric Review Centre (ORC) |
| Pregnancy, birth & baby education | Gestational Diabetes Team<br>Credentialed Diabetes Educator |
| Home Maternity Services - postnatal in-home visiting | Complex Case Manager<br>(Inc. Obstetric Medical Team) |
| Gynaecology | Specialist Clinics including Anaesthetics and Endocrine |
| Social Work including Child Protection Liaison Officer | Neonatal Unit from 32 weeks |
| Allied Health | Lactation Service |
| Perinatal Mental Health | Paediatrics |

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# Maternity services

## Pregnancy

- Pregnant? What to do next
- Choosing an option for maternity care
- Tests and scans
- Learning about pregnancy, birth and baby
- Your appointments

## Having your baby

- Preparing for labour
- Labour and birth
- When complications occur
- Newborn Bloodspot Screening

Complete the online registration form to book an appointment

## Contact us

**Outpatient Services**
**Location:** Caboolture Hospital Outpatient services building
**Phone:** (07) 5433 8701

**Birth Suite**
**Location:** Level 2, Caboolture Hospital
**Phone:** (07) 5433 8670

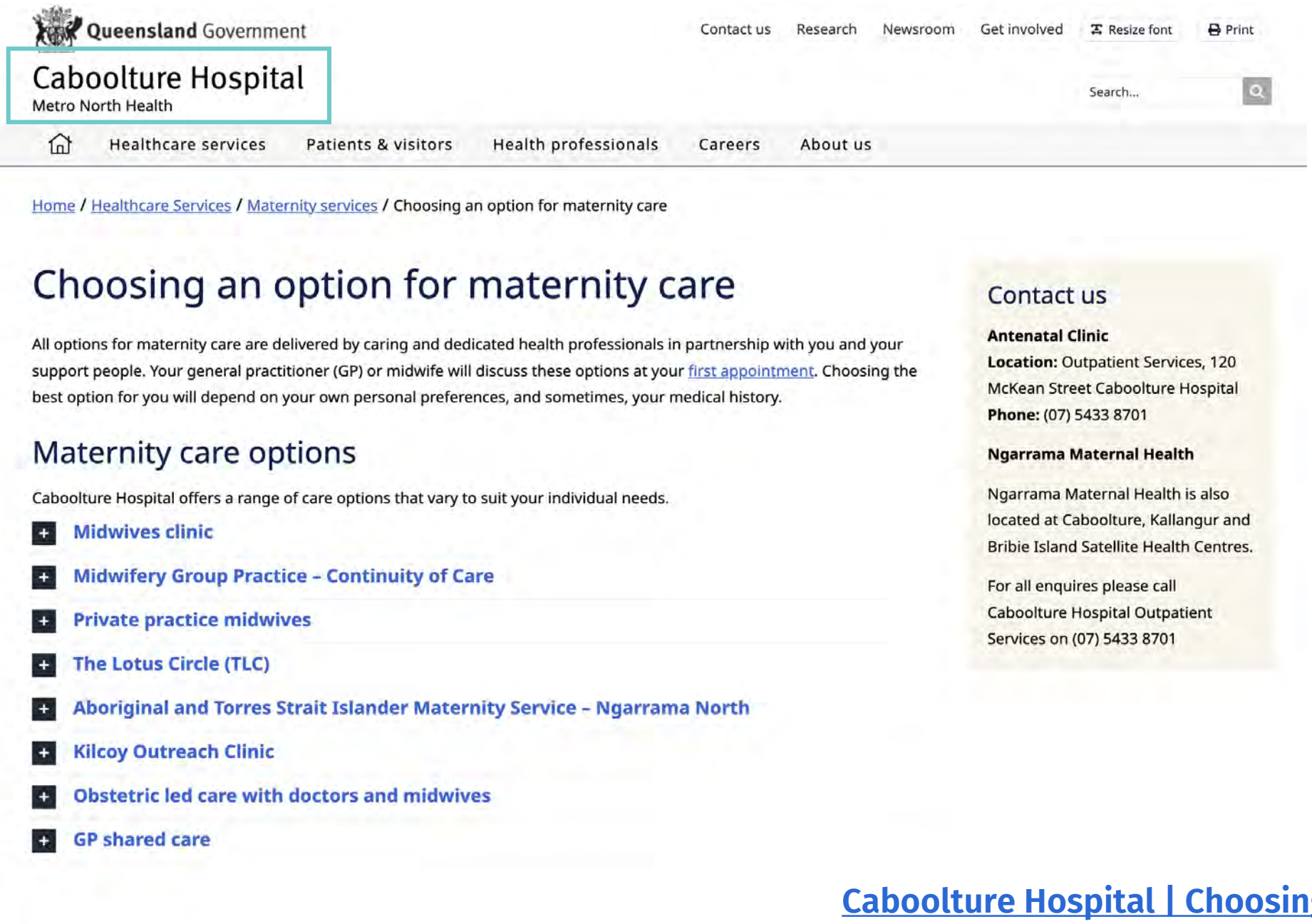
**Community Child Health**
**Location:** Various
**Phone:** 1300 366 039
**Website:** Children's Health

**Home Maternity Service**
**Phone:** (07) 5433 8923

View on Google Maps

## Resources

**Caboolture Hospital | Maternity services**



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# Choosing an option for maternity care

All options for maternity care are delivered by caring and dedicated health professionals in partnership with you and your support people. Your general practitioner (GP) or midwife will discuss these options at your first appointment. Choosing the best option for you will depend on your own personal preferences, and sometimes, your medical history.

## Maternity care options

Caboolture Hospital offers a range of care options that vary to suit your individual needs.

- Midwives clinic
- Midwifery Group Practice – Continuity of Care
- Private practice midwives
- The Lotus Circle (TLC)
- Aboriginal and Torres Strait Islander Maternity Service – Ngarrama North
- Kilcoy Outreach Clinic
- Obstetric led care with doctors and midwives
- GP shared care

## Contact us

**Antenatal Clinic**
**Location:** Outpatient Services, 120 McKean Street Caboolture Hospital
**Phone:** (07) 5433 8701

**Ngarrama Maternal Health**

Ngarrama Maternal Health is also located at Caboolture, Kallangur and Bribie Island Satellite Health Centres.

For all enquires please call Caboolture Hospital Outpatient Services on (07) 5433 8701

[Caboolture Hospital | Choosing an option for maternity care]

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# Learning about pregnancy, birth and baby

Learning about your pregnancy, birth and baby can help build your confidence and prepare you for the weeks ahead. Caboolture Hospital has resources and experienced staff available to help you throughout your journey.

## Classes

We offer classes with our experienced staff, who will answer any of your questions about your pregnancy, birth and parenting. If you have any questions outside of these classes, please ask your health care provider.

- **Becoming a family**
- **Evening class**
- **Saturday class**
- **Breast feeding classes**

## Class timetable

Bookings are essential for all classes

| Antenatal Classes | Time |
|---|---|
| Saturday class (Core team – childbirth and parenting) | Saturday 9.00am–3.30pm |
| Thursday evening class (Core team – childbirth and parenting) | Thursday evening 6:00pm – 8:30pm |
| Team - Ngarrama | See your midwife |
| Team - Midwives and Me | See Your Midwife |
| Breastfeeding class | 2 sessions twice a month. Friday 9.00am–12.00pm and 1.00pm–4.00pm |

## Contact us

**Antenatal Clinic**
**Location:** Outpatient Services, 120 McKean Street, Caboolture Hospital
**Phone:** (07) 5433 8474

[Caboolture Hospital | Learning about pregnancy birth baby]

# Caboolture Complex Maternity Midwife Navigator

**Caboolture catchment**

**Refer by**

- **Email: CABHMidwifeNavigator@health.qld.gov.au**
- **Phone:**

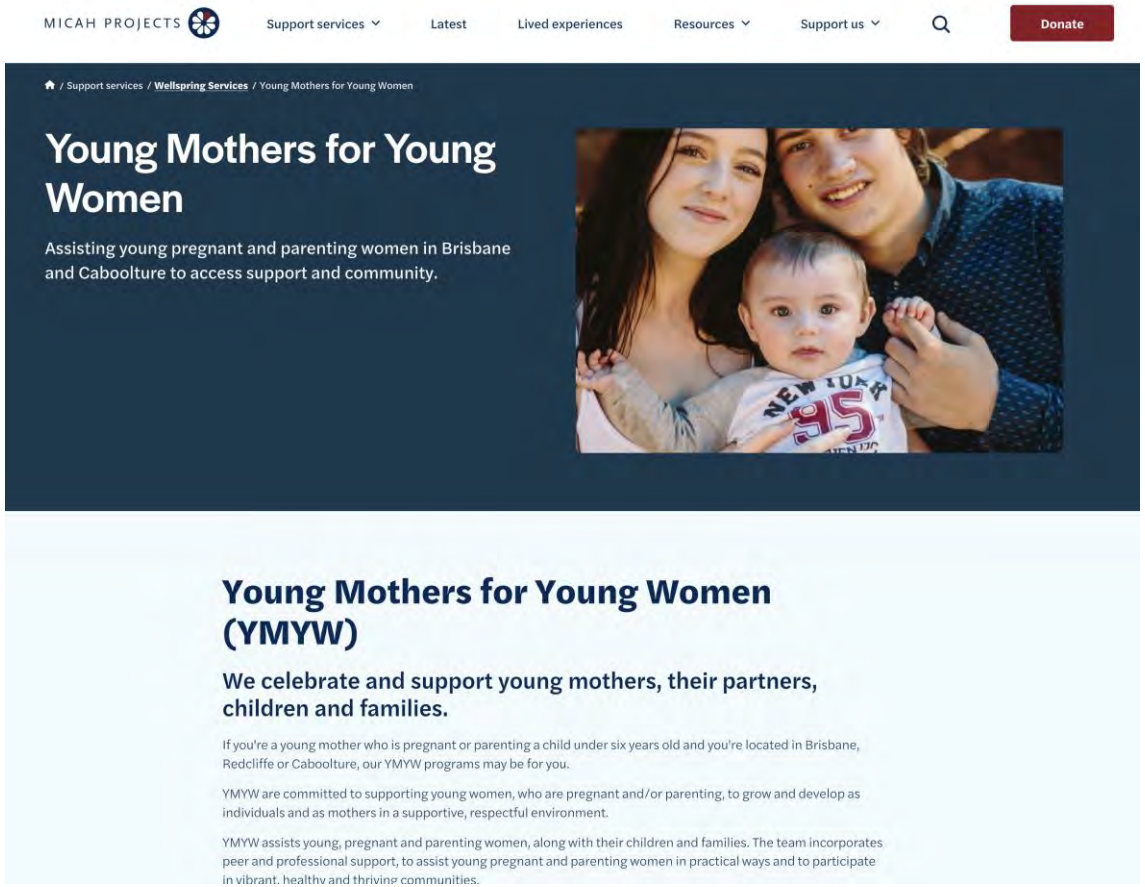
  **0436 937 527**

**Eligibility:**

- **Mental Health**
- **Domestic and Family Violence**
- **Child Safety**
- **Substance use**
- **History of poor engagement with care**

# Caboolture Young Mothers for Young Women


[YPIC – Young. Pregnant. In Control.]



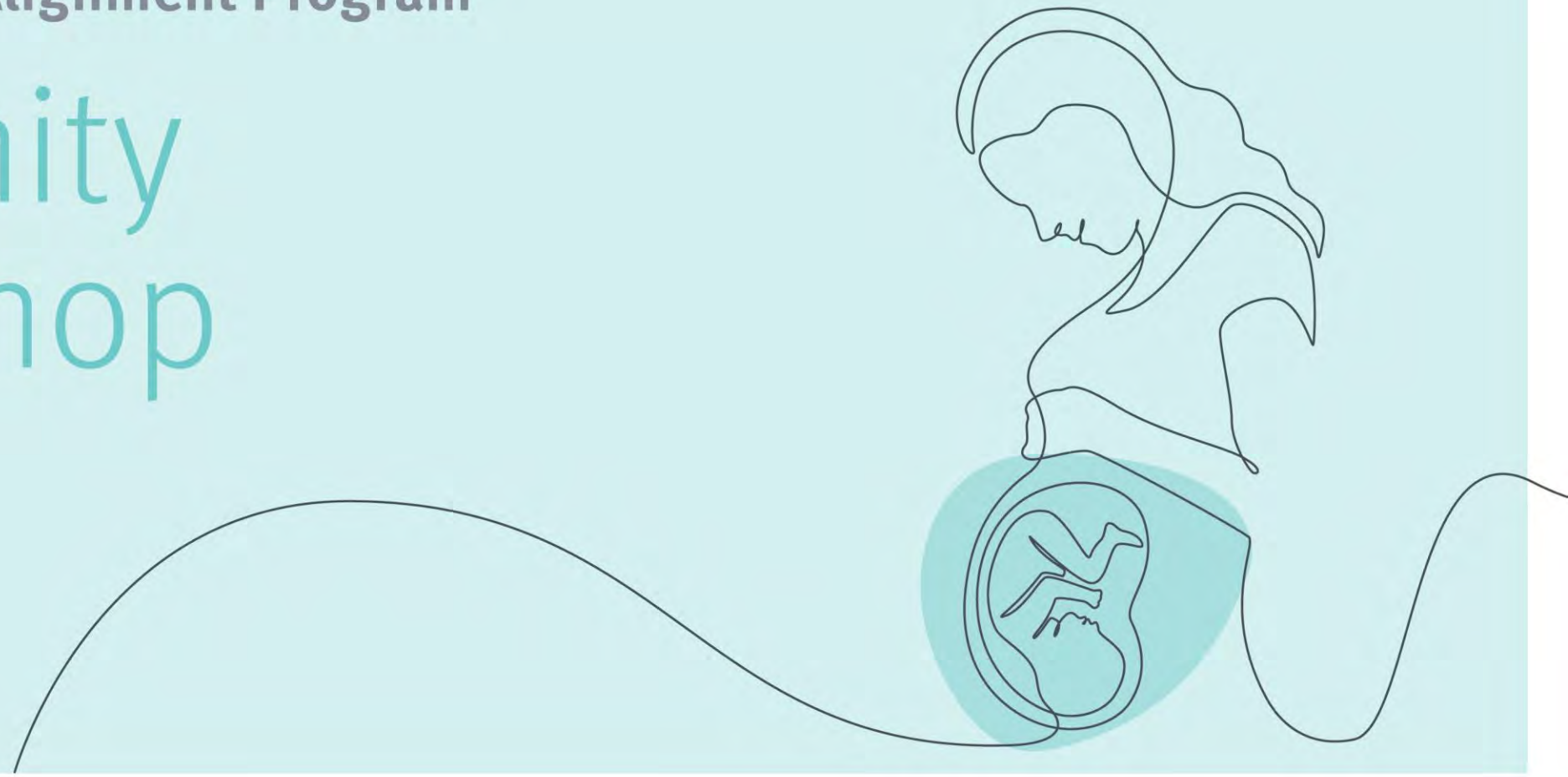

[Young Mothers for Young Women | Micah Projects]

# Caboolture Young Mothers for Young Women

## 19 Morayfield Road Caboolture South P: 07 5294 9600

Metro North **GP Alignment Program**

# Maternity Workshop



## GENETIC SCREENING

**Pauline McGrath**
**Principal Genetic Counsellor | Children's Health Queensland**

phn BRISBANE NORTH
An Australian Government Initiative

Queensland Government
Metro North Health

# Screening and Diagnosis in Pregnancy Care

Pauline McGrath
Principal Genetic Counsellor
Queensland Children's Hospital

1st March 2025

Version control: v01. DD/MM/YYYY

# Overview

- Reproductive Carrier Screening
- First trimester screening
  - cFTS
  - NIPT
- Second trimester screening
  - MSS
- Ultrasound scanning
- Genomic Medicine

# Reproductive Carrier Screening

- All women should be offered reproductive carrier screening
- Genetic Carrier Screening (C-Obs 63) (ranzcog.edu.au)

# Reproductive Carrier Screening

- Hundreds of inherited genetic conditions that can affect human health
- Most are very rare
- All these inherited conditions are considered together affect up to 1 in 400 people
- The majority of children born with such conditions are born into families with no other affected family members
- The two major types of inheritance that can lead to a healthy couple having children with serious genetic conditions are autosomal recessive and X-linked recessive

# Reproductive Carrier Screening

Mackenzie's Mission

- Tested reproductive couples for pathogenic variants in at least 1281 genes associated with approximately 750 serious, childhood-onset autosomal recessive or X-linked conditions
- 1.9% of reproductive couples had a newly identified increased chance of having a child with one of these conditions
- Most of these couples have since chosen a reproductive option with the aim of avoiding having a child with the condition
- There was a high level of engagement with the study, positive attitudes toward screening, and minimal decisional regret
  - Nationwide, Couple-Based Genetic Carrier Screening | New England Journal of Medicine (nejm.org)

# Reproductive Carrier Screening - Options

1. Having a child naturally and testing after birth to see if the child is affected
2. Conceiving naturally and having diagnostic testing during pregnancy to determine if the fetus is affected. This is usually performed with an invasive test (amniocentesis or chorionic villus sampling)
3. Conceiving the pregnancy by in vitro fertilisation (IVF) and testing embryos by preimplantation genetic diagnosis (PGD). Unaffected embryos would then be selected for achieving pregnancy. Using donor sperm, egg or embryo from unaffected individuals
4. Adoption
5. Not having children

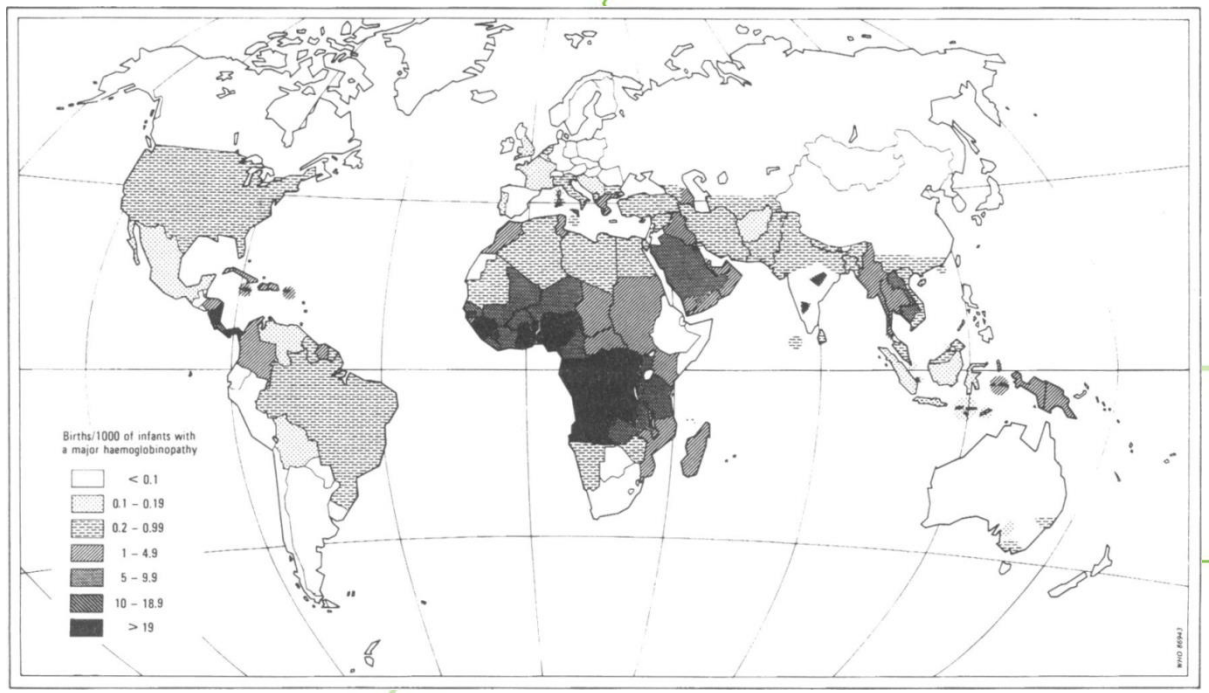
# Reproductive Carrier Screening

- All couples intending to have children, or who are pregnant, should have a family history taken with a view to identifying relatives with heritable genetic disorders, as well as the presence of consanguinity or Ashkenazi Jewish heritage
- Those identified with a family history of a specific inherited disorder should be offered referral to a genetic counselling service for information about carrier testing and prenatal diagnosis/ preimplantation genetic diagnosis for the condition
- All pregnant women should be offered basic screening for thalassaemia carrier status by a full blood examination initially
- Screening with specific assays for haemoglobinopathies (such as HPLC or EPG and haemoglobinopathy DNA testing) should be considered in high probability ethnic or population groups

# Reproductive Carrier Screening

Prevention and control of haemoglobinopathies*

M. Angastiniotis, B. Modell, P. Englezos, & V. Boulyjenkov




Bulletin of the World Health Organization, 1995, 73 (3): 375-386

# Reproductive Carrier Screening

Genetic Carrier Screening (C-Obs 63) (ranzcog.edu.au)

| Condition | Carrier | Affected | Main clinical features of the condition |
|---|---|---|---|
| **Cystic fibrosis** | 1 in 35 | 1 in 4925* | Recurrent lung infections, malabsorption, shortened life span |
| **Spinal muscular atrophy** | 1 in 50 | 1 in 9917* | Severe muscle weakness, death usually during childhood |
| **Fragile X syndrome** | 1 in 332 | 1 in 7143 males^ | Intellectual disability, autism |

* = inferred from the carrier frequency

# Reproductive Carrier Screening

**Item 73451** *(Updated 1 November 2024)*

- Testing of a patient (who is pregnant or planning pregnancy) to identify carrier status for pathogenic or likely pathogenic variants in a gene mentioned in paragraph (a), (b) or (c), to determine:

  (a) for the cystic fibrosis transmembrane conductance regulator (CFTR) gene—reproductive risk of cystic fibrosis;

  (b) for the survival motor neuron 1 (SMN1) gene—reproductive risk of spinal muscular atrophy;

  (c) or the fragile X mental retardation 1 (FMR1) gene—reproductive risk of fragile X syndrome;

  (other than a service associated with a service to which item 73300, 73305, 73345, 73346, 73347, 73348, 73349 or 73350 applies)

  One test per lifetime

  *The intent of MBS item 73451 is to test an asymptomatic female chromosomal sex patient who is either planning a pregnancy or is already pregnant*

# Reproductive Carrier Screening

**Item 73452**

- Testing of the reproductive partner of a patient who has been found to be a carrier of a pathogenic or likely pathogenic variant in the CFTR or SMN1 gene identified by testing under item 73451, for the purpose of determining the couple's reproductive risk of cystic fibrosis or spinal muscular atrophy

  One test per condition per lifetime

  *The intent of MBS item 73452 is to test an asymptomatic male chromosomal sex patient who is the reproductive partner of the patient planning pregnancy or already pregnant and has been tested under item 73451*

# Reproductive Carrier Screening

- MBS item numbers were also approved for individuals who identify as being of Ashkenazi Jewish descent to access screening for up to nine autosomal recessive conditions more commonly present in this population (MBS items 73453, 73454 and 73455)

# Reproductive Carrier Screening

- Many commercially available options
- Expanded genetic carrier testing all offer different gene panels for different costs
- Women with a family history of CF, SMA or FXS should be referred directly to a clinician with genetics expertise rather than offered a “3-gene” screening panel, as they may require specialised testing
- If one reproductive partner is found to be a carrier it may also be wise to refer to a genetic service for testing of the other reproductive partner – ie – cystic fibrosis

# Reproductive Carrier Screening

- All couples found to have a higher chance of having a child with one of the conditions screened for should be referred for genetic counselling to be informed of available reproductive options
- The preconception period is the preferred timing for carrier screening
- If a couple are found to have an increased chance during pregnancy, genetic counselling and prenatal diagnosis should be offered
- Diagnostic testing (usually involving amniocentesis or chorionic villus sampling) may allow couples to prepare for the birth of a child with a genetic condition, to consider the option of terminating an affected pregnancy
- Regardless of the timing of diagnosis, it may be appropriate to refer the couple to see a physician with expertise in the condition ie - referral of a couple found have a high chance of having a child with SMA to a paediatric neuromuscular physician

# Aneuploidy Screening

- All women should be offered aneuploidy screening

- Screening and diagnosis of fetal structural anomalies and chromosome conditions (C-Obs 35) (ranzcog.edu.au)

# Aneuploidy Screening

More accurate than age-related risk alone

Screening in first trimester enables diagnostic testing

Reduction of invasive tests

Highest detection rate

- NIPT – 99% detection rate for trisomy 21
- Combined first trimester screen - 85-90% detection rate

# Aneuploidy Screening

Source: https://www.ranzcog.edu.au

| Test | Down Syndrome Detection Rate | Screen positive rate |
|---|---|---|
| Non-Invasive Prenatal Testing (NIPT) | 99% | 0.1% |
| Nuchal translucency scan (NTS) | 70% | 5% |
| Combined NTS, Serum testing (B HCG, PAPP-A) | 85-90% | 5% |
| Second trimester serum test (Free B HCG, oestriol, AFP +/- Inhibin) | 65-70% | 5% |
| Morphology scan | 20-50% | 10-15% |

# Combined First Trimester Screening

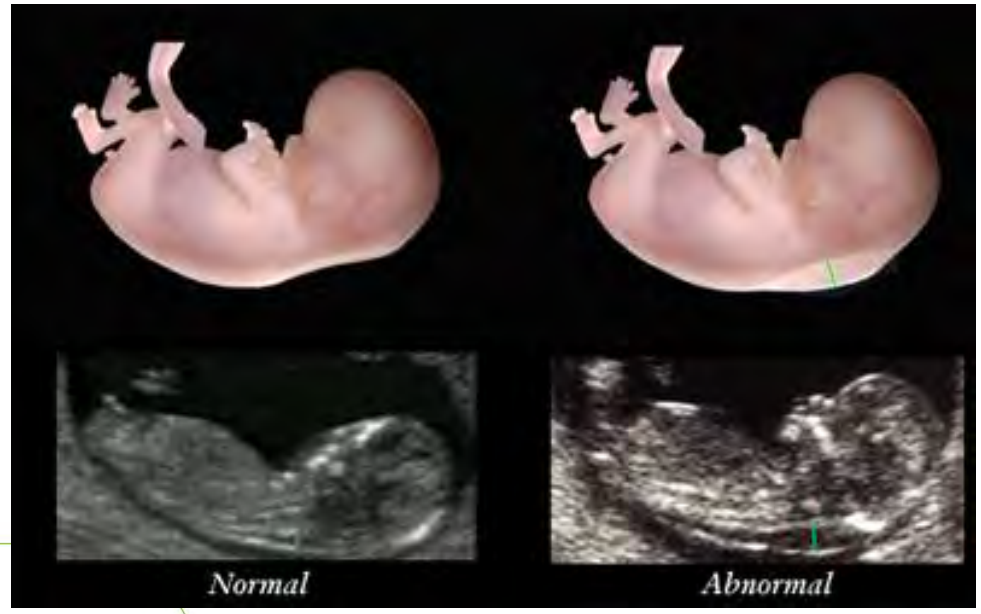



Image source: http://www.fetal.com

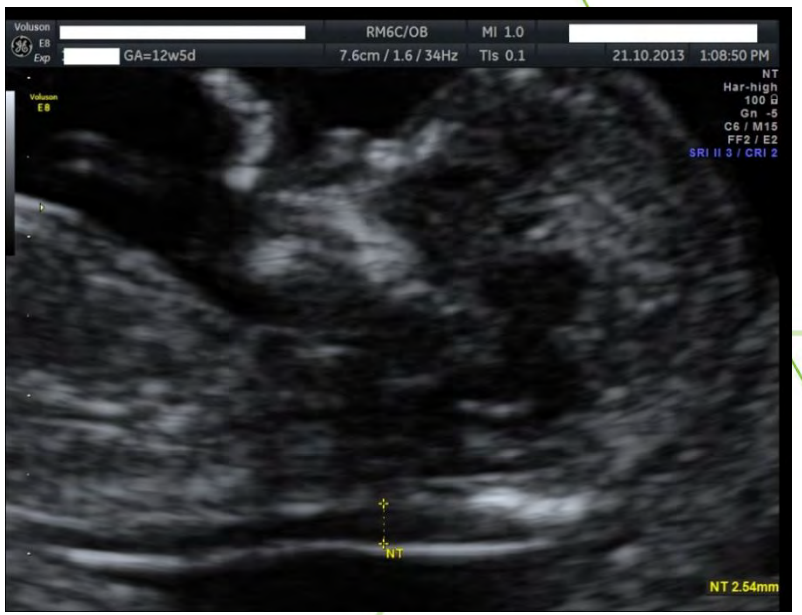
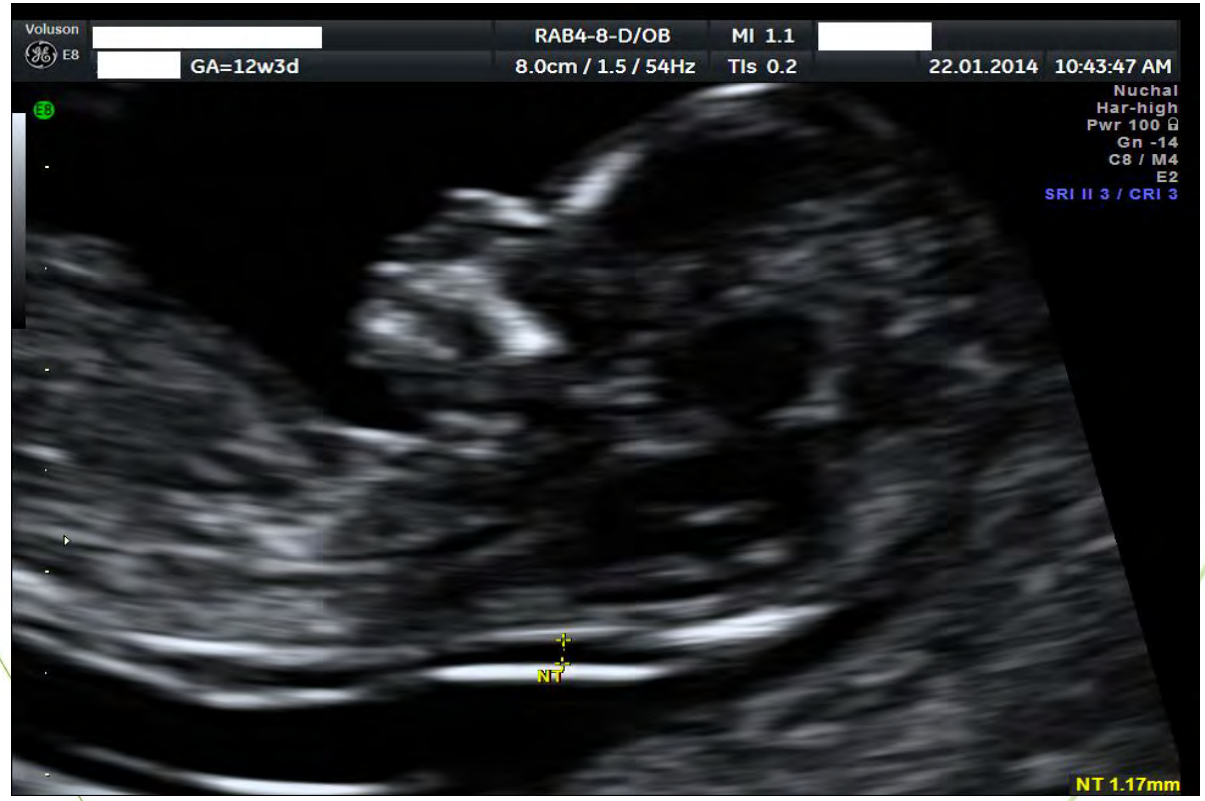



Image source: Woman's and Newborn  Services RBWH

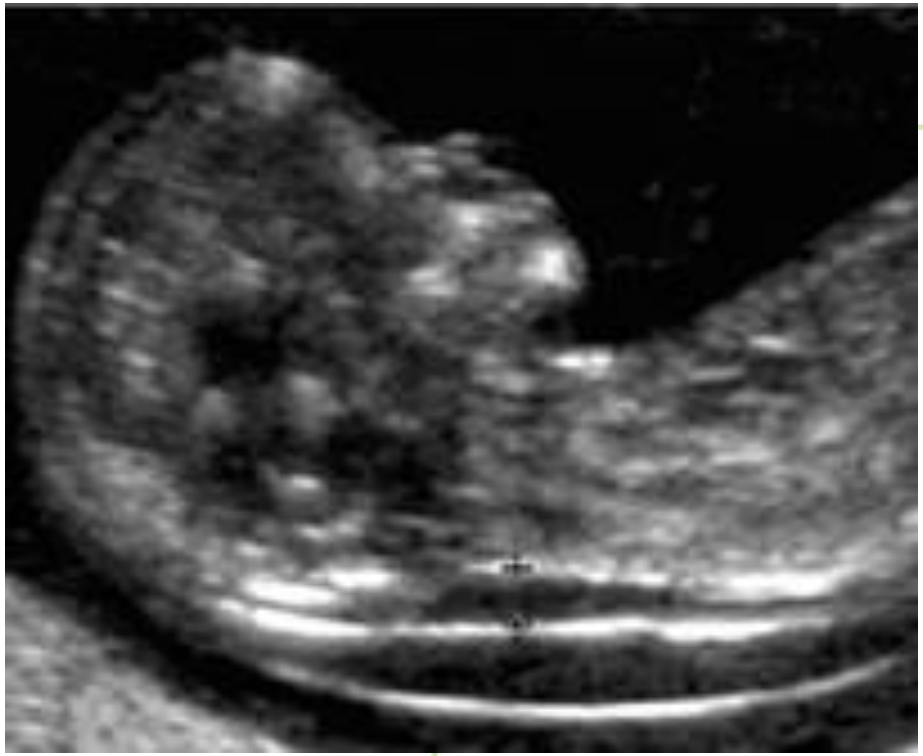
# Combined First Trimester Screening – Nasal bone

- The presence of the nasal bone increased screening accuracy



# Combined First Trimester Screening – Nasal bone

- Absent nasal bone
  - Delayed ossification of the nasal bone
  - Reassure women the baby will have a nose



# Combined First Trimester Screening – Nasal bone

- At 11-13 weeks gestation, ~1-2% of normal fetuses have an absent nasal bone
- ~60% of fetuses with trisomy 21 have an absent nasal bone
- Overall effect on screening is increased detection and reduced screen positives

# Combined First Trimester Screening

**Indication**:
1st Trimester screening.

**History**:
Maternal age: 33 years, pre-pregnancy weight 62.0 kg, height 170.0 cm, BMI 21.5, blood group: O, (Rh D): Rh +ve. Conception spontaneous. Non-smoker.
**Obstetric History**: **Gravida: 5**. **Para: 2**. CMV infection.

**EDD by ultrasound: 7 January 2011**.
**Gestational age: 13 weeks + 3 days**

**First Trimester Ultrasound**:
Transabdominal US with Voluson E8. Ultrasound view: good.
Fetal heart action present. Frequency 149 bpm.
Crown-rump length (CRL) 75.0 mm 50th%
Nuchal translucency (NT) 1.92 mm
Nasal bone present
**Fetal anatomy**: **skull/brain** appears normal, **heart** not examined, **spine** appears normal, **abdomen** appears normal, **stomach** visible, **bladder** visible, **hands** both visible, **feet** both visible.
**Additional Markers for Risk Assessment:** Ductus Venosus (a-wave): positive.
Placenta: posterior, structure normal. Amniotic fluid: normal. Cord: 3 vessels.
Cervix length 46 mm.

**Summary of ultrasound findings:** normal intrauterine pregnancy.
Size agrees with dates. I could not see any fetal abnormality on today's scan. Ultrasound is unable to detect all fetal abnormalities.

**Maternal Serum Biochemistry**:
Sample taken on 30 June 2010.
No. of fetuses: A. Maternal weight: 62.0 kg. Non-smoker. Ethnic origin: White. Parity > 0. Manufacturer: Kryptor.
Free beta hCG: 99.000 IU/l, equivalent to 2.7078 MoM.
PAPP-A: 2.000 IU/l, equivalent to 0.5254 MoM.

**Estimated risk for chromosomal abnormalities:**

| | Trisomy 21 | Trisomy 18 | Trisomy 13 |
|---|---|---|---|
| Background risk: | 1 : 360 | 1 : 924 | 1 : 2886 |
| Adjusted risk: | 1 : 110 | 1 : 18484 | 1 : 57726 |

# Combined First Trimester Screening – when to refer

| Nuchal translucency | % Chromosomal defects | % Normal karyotype – fetal death usually prior to 20 weeks of gestation | % Normal karyotype – major fetal abnormalities | % Normal karyotype – alive and well |
|---|---|---|---|---|
| < 95th centile | 0.2 | 1.3 | 1.6 | 97 |
| 3.5 – 4.4mm | 21.1 | 2.7 | 10.0 | 70 |
| 4.5 – 5.4mm | 33.3 | 3.4 | 18.5 | 50 |
| 5.5 – 6.4mm | 50.5 | 10.1 | 24.2 | 30 |
| > or equal to 6.5mm | 64.5 | 19.0 | 46.2 | 15 |

Image source: Snijders et al 1998;2001;2005; Michailidis et al 2001

# Combined First Trimester Screening –when to refer

## Increased nuchal translucency (>3.5mm)

- cardiac malformations, genetic syndromes
- Recommend tertiary morphology scan 18-20 weeks gestation

## Low PAPP-A (<0.4 MoM)

- associated with pre-eclampsia, growth restriction & stillbirth
- fetal growth & uterine artery doppler assessment at 22-24 weeks gestation

# Non-invasive Prenatal Testing

- All women should be offered a first trimester anatomy scan even if they are choosing to have NIPT as a primary screening test

# Non-invasive Prenatal Testing

Fetal cell-free DNA found in plasma of pregnant women from 10 weeks gestation

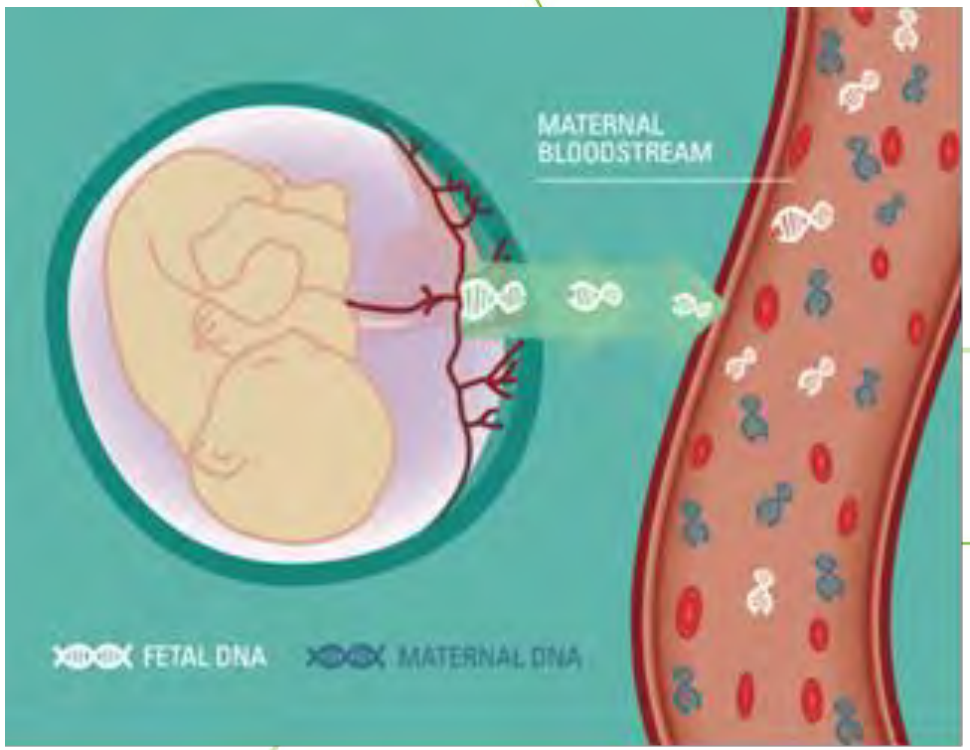
Testing of fetal DNA in maternal blood poses no risk to pregnancy

Not a diagnostic test, **abnormal results should be confirmed via invasive testing**

Cost approximately $400

# Non-invasive Prenatal Testing

- Mother with chromosomally normal fetus the proportion of fragments will be in a narrow normal range
- If fetus has abnormal chromosomes the fetal contribution for that chromosome will be abnormal and distort the overall proportion



# Non-invasive Prenatal Testing

- Benefits of NIPT
  - Highest sensitivity and specificity
  - Reduces invasive testing
  - Beneficial for women unable to access cFTS or later gestation
  - Low false positive rate
  - Early as 10 weeks
  - Noninvasive
  - Large RATs may be detected by some platforms

# Non-invasive Prenatal Testing

- Limitations of NIPT
  - No Medicare rebate, costs vary
  - Abnormal results may require confirmation by invasive testing
  - Complex false positive and negative results
  - Failure rate of NIPT 0.1-3%
  - More likely to fail in
    - High BMI
    - Patient using anti-coagulant therapy
  - A quarter of CNV go undetected
  - Which one to choose?

# Non-invasive Prenatal Testing

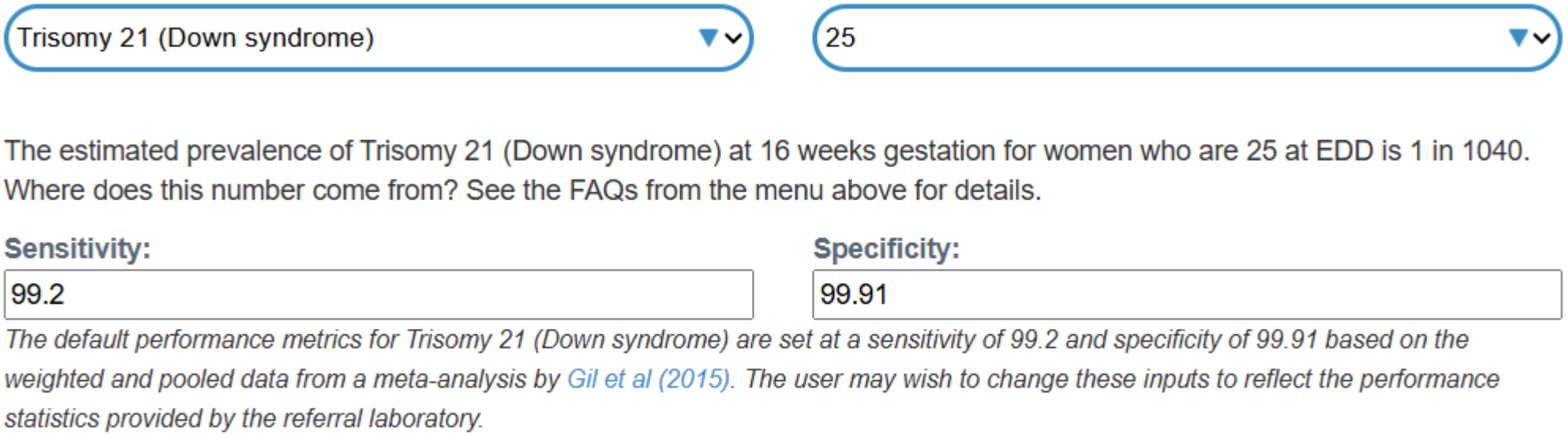
When is NIPT not a good option

- Abnormalities on USS
  - NT > 3.5mm
  - Ventriculomegaly
  - Cardiac anomalies
- 8% of women who have fetal abnormality detected with have an abnormal chromosome micro array test
- Screening results > 1:100 (minimise delay)

- Chromosomal abnormalities detected by chromosomal microarray analysis and pregnancy outcomes of 4211 fetuses with high-risk prenatal indications | Scientific Reports

# Non-invasive Prenatal Testing

- Use a risk calculator
- NIPT Predictive Value Calculator



# Non-invasive Prenatal Testing

The prevalence of Trisomy 21 (Down syndrome) at 16 weeks gestation for a woman who is 25 at EDD is 1 in 1040.

The probability that result is a **true positive** (the fetus **is affected**). **PPV:** **51%**

Probability that it is a **false positive** (the fetus is **not affected**). **49%**

PPV (not rounded): 51.47631155622404%
PPV = (sensitivity x prevalence) / ((sensitivity x prevalence) + (1 – specificity)(1 – prevalence))
PPV = (0.992 x 0.0009615384615384616) / ((0.992 x 0.0009615384615384616) + (1 – 0.9991)(1 – 0.0009615384615384616))
Please note: the post-test probability for an individual patient may differ based on other factors that influence her unique prior risk to have an affected pregnancy, such as gestational age of the patient, ultrasound findings and biochemical screening.

# Non-invasive Prenatal Testing

- Refer repeated failed NIPT for specialist care
- False positive NIPT
  - Placental
    - Confined placental mosaicism
  - Fetal
    - Vanishing twin – early demise of aneuploid twin
  - Maternal
    - Sex chromosome aneuploidy (SCA) – mosaic or non mosaic
    - Other aneuploid or structural mosaicism
    - Benign or malignant tumour
    - Bone marrow or organ transplant

# Maternal Serum Screening

- Rarely used
- Blood test at 15-20 weeks gestation
- fβhCG + Oestriol + alpha fetoprotein (AFP)
- Detection rate 70%
- Provided risk assessment for open neural tube defects (AFP)
- Used 1 in 250 cut-off for high risk for chromosomal abnormalities
- Provides an option for screening later in gestation

# Appropriate Diagnostic Test

| High Risk Result | CVS | Amnio |
|---|---|---|
| T21 | ☑ | ☑ |
| T18 | ☑ | ☑ |
| T13 | | ☑ |
| XO | | ☑ |
| XXX | ☑ | ☑ |
| XXY | ☑ | ☑ |
| XYY | ☑ | ☑ |

* CVS would be appropriate for inc risk T13 and XO in the context of an abnormal ultrasound

# CVS and Amniocentesis

**Risks associated with CVS**

- The risk of pregnancy loss due to a transabdominal CVS is between 0.5 and 1%
- The risk of pregnancy loss due to a transcervical CVS is up to 2%
- In 1%of cases, a CVS result may be difficult to interpret due to mosaicism. This uncertainty may be resolved by performing an amniocentesis
- In rare cases a result can not be provided from a CVS and repeat sampling may be required

**Risks associated with amniocentesis**

- The risk of pregnancy loss due amniocentesis is one in 900 procedures.
- Infection following amniocentesis is very rare and occurs in less than one in 1000 procedures performed
- In rare cases a result can not be provided from amniocentesis and repeat sampling may be required

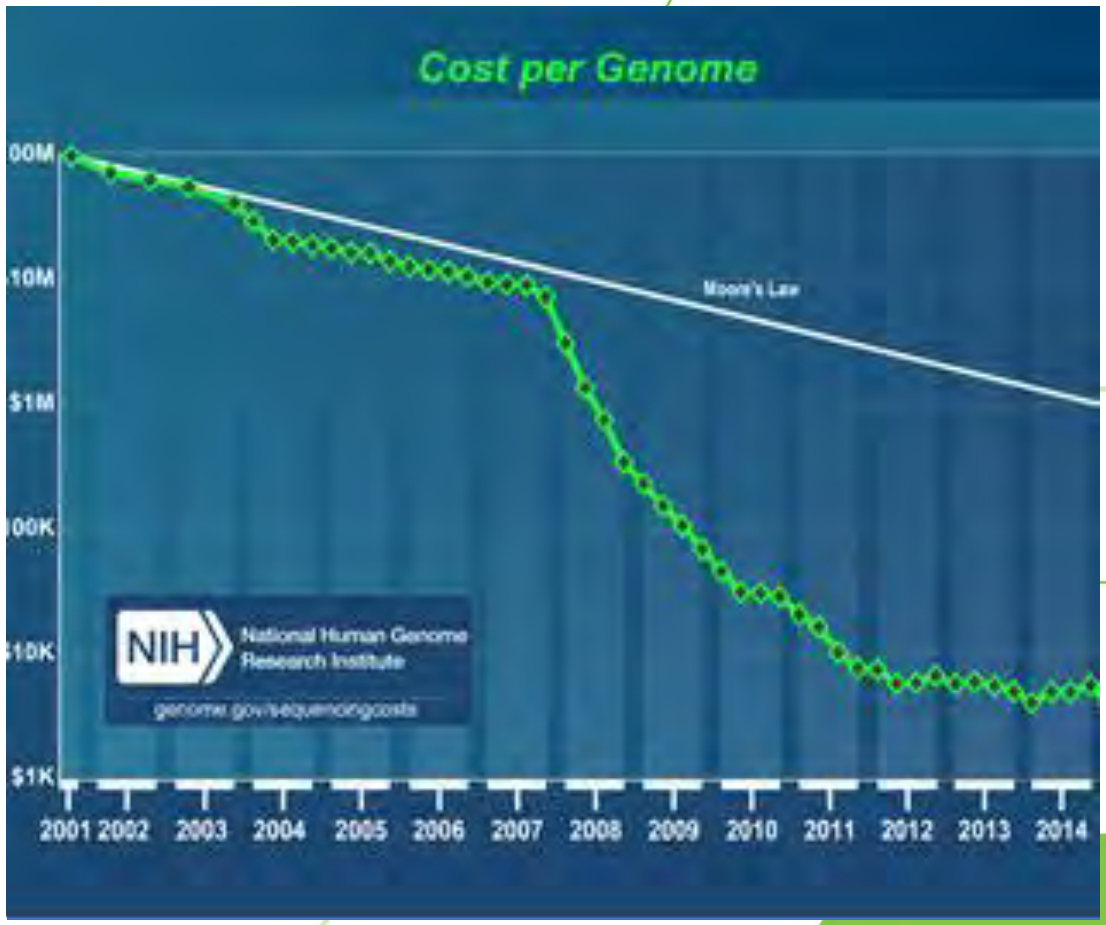
- Risk of miscarriage following amniocentesis or chorionic villus sampling: systematic review of literature and updated meta-analysis - PubMed

# Ultrasound Scan – First Trimester Scan 11-14 weeks

- Advantages
  - Early Detection: Can identify major structural abnormalities earlier
  - Nuchal Translucency Measurement: Helps assess the risk of chromosomal abnormalities like Down syndrome
  - Accurate Dating: Provides accurate gestational age, to assist managing the pregnancy
  - Can detect multiple pregnancies (twins, triplets, etc.) early
  - Placental position
- Disadvantages:
  - Limited Detail: Some abnormalities may not be visible or fully developed at this stage
  - False Positives/Negatives: Early scans can sometimes lead to false positives or negatives, requiring follow-up scans
  - Anxiety: Discovering abnormalities at this stage can cause significant anxiety for expectant parents

# Genomics in Pregnancy

- More than 10 years ago the ‘reference’ human genome sequence was published
- Approximately 20,000 human genes
- The smaller than expected number hinted at the hidden complexity of the human genome



# Genomics in Pregnancy – Prenatal Testing

- Banded karyotype – to determine translocations, used if testing for familial translocation or in the presence of an abnormal FISH result for trisomy 13 and 21
- Chromosome microarray
- Routine Genetic testing for known familial conditions
  - TAT 2-4 weeks ie CF, DMD, Fragile X
- Targeted Panel testing – ie skeletal dysplasia panel
- Whole Exome Sequencing – approximately 2% of the genome, analyses manageable data sets
- Whole Genome Sequencing – includes coding, non-coding and mitochondrial DNA can detect novel genomic variants (structural, single nucleotide, insertions, deletions and CNV)

# Genomics in Pregnancy – Prenatal Testing

| Fetal phenotype group | Definition | Total cases | Solved cases (diagnostic yield) |
|---|---|---|---|
| Skeletal malformations | Evidence of skeletal abnormalities in ultrasound, such as shortened tubular bones, multiple fractures, achondroplasia, thanatophoric dysplasia, other skeletal dysplasias | 63 | 33 (52%) |
| Complex malformations | ≥2 organ systems affected in ultrasound, incl. Facial dysmorphias | 122 | 54 (44%) |
| Urogenital malformations | Renal agenesis, renal dysplasia, polycystic kidneys | 25 | 11 (44%) |
| Brain malformations | Lissencephaly, corpus callosum agenesis, holoprosencephaly, hydrocephalus, ventrikulomegalia | 79 | 34 (43%) |
| Increased nuchal transparency | Nuchal transparency >3 mm, nuchal edema, hygroma colli | 72 | 24 (33%) |
| IUGR (intrauterine growth retardation) | <10th percentile | 27 | 7 (26%) |
| Heart defects | Ventricular septal defect, hypoplastic left heart syndrome, tetralogy of Fallot | 50 | 12 (24%) |
| Eye anomalies | Anophthalmie, cataracts | 10 | 2 (20%) |
| Arthrogryposis | Arthrogryposis | 10 | 2 (20%) |
| Abnormalities of internal organs | Intestinal malformations (e.g., microcolon), megacystis, malformations of the liver | 21 | 4 (19%) |
| Other | For example, abnormal biochemical parameters such as PAPP-A, β-hCG; akinesia, generalized edema, harlequin ichthyosis | 21 | 6 (29%) |

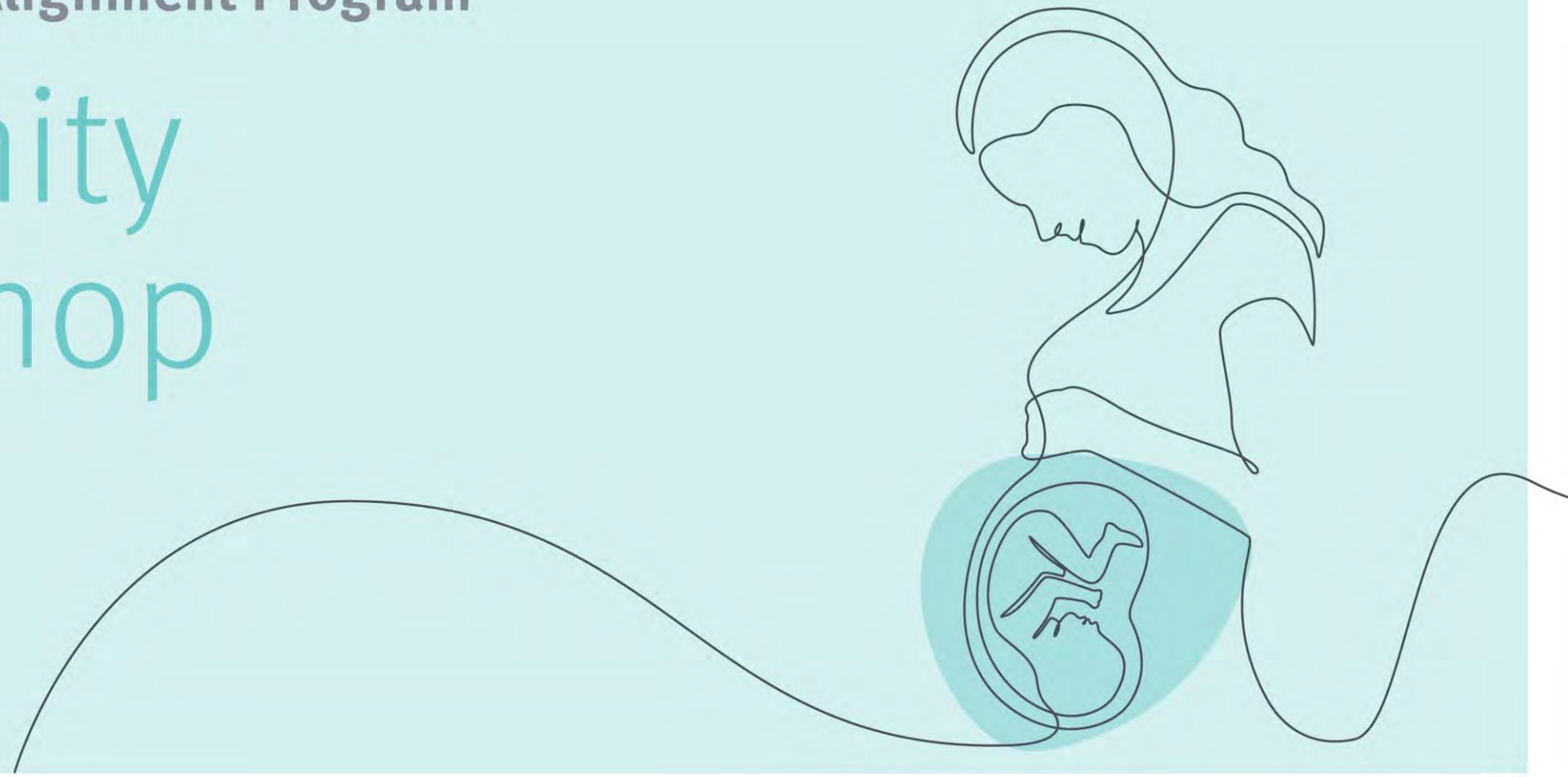
Trio exome sequencing is highly relevant in prenatal diagnostics - Gabriel - 2022 - Prenatal Diagnosis - Wiley Online Library

# Thank you

- Statements and guidelines directory – RANZCOG
- Guideline: Preconception and prenatal genetic screening

Metro North **GP Alignment Program**

# Maternity Workshop



# EPILEPSY IN PREGNANCY

**Dr Lata Vadlamudi**
**Staff Specialist | Neurology, RBWH**

phn BRISBANE NORTH
An Australian Government Initiative

Queensland Government
Metro North Health

# Epilepsy and Pregnancy 2025

Lata Vadlamudi
Senior Staff Specialist Neurology, Epileptologist, Comprehensive Epilepsy Program
Royal Brisbane and Women's Hospital
UQCCR Brain, Neurology and Mental Health Theme Lead

**Metro North GP Maternity Workshop**
**Saturday 1 March 2025**

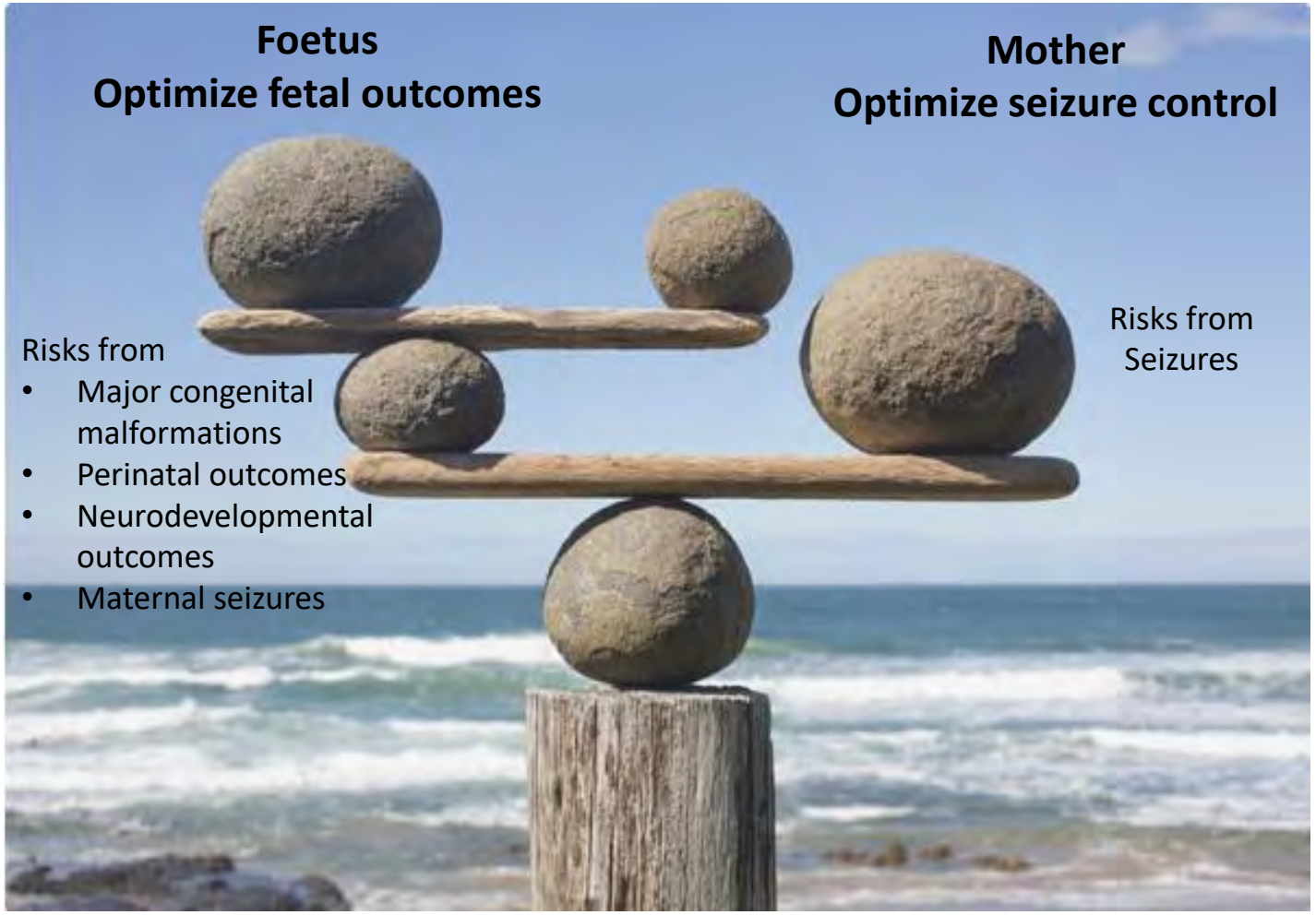
Metro North Health | Queensland Government

Metro North Health acknowledges the Traditional Custodians of the land upon which we live, work and walk, and pay our respects to Elders past, present and emerging.

Metro North Health | Queensland Government

# Epilepsy and Pregnancy

Optimizing fetal outcomes and maternal seizure control




- Vast majority of women with epilepsy have uneventful pregnancies and give birth to healthy children.
- **Planning** will improve outcomes for mother and baby
- **Shared decision-making** with your GP, neurologist and up-to-date knowledge is the key

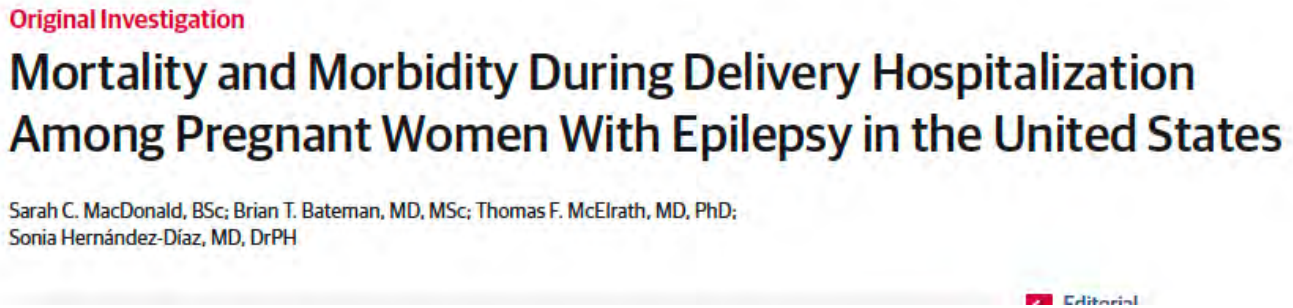
# Maternal and Foetal Risks of Seizures

## Maternal

- Injury
- Status epilepticus
- Sudden unexplained death with epilepsy
  - More than 10 times higher
- Adverse outcomes- preterm labour, pre-eclampsia, postpartum haemorrhage
- Prolonged hospital admissions

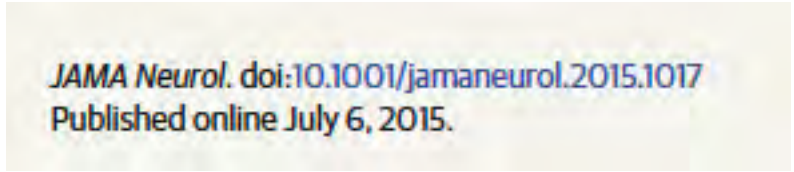
## Foetal

- Trauma from uterine injury
- Adverse outcomes - low-birth weight baby and premature baby
- Prolonged bilateral tonic-clonic seizures (BTCS) associated with foetal hypoxia
- Stillbirth
- Frequency of BTCS in the mother may be a risk factor for low IQ in their children


Original Investigation

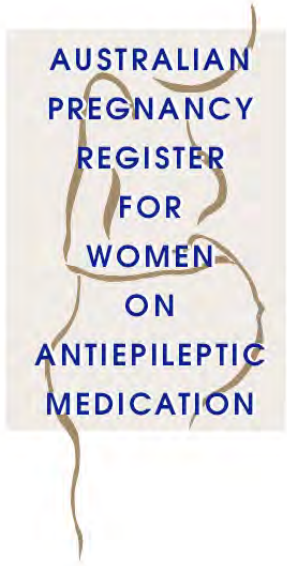
Mortality and Morbidity During Delivery Hospitalization Among Pregnant Women With Epilepsy in the United States

Sarah C. MacDonald, BSc; Brian T. Bateman, MD, MSc; Thomas F. McElrath, MD, PhD; Sonia Hernández-Díaz, MD, DrPH

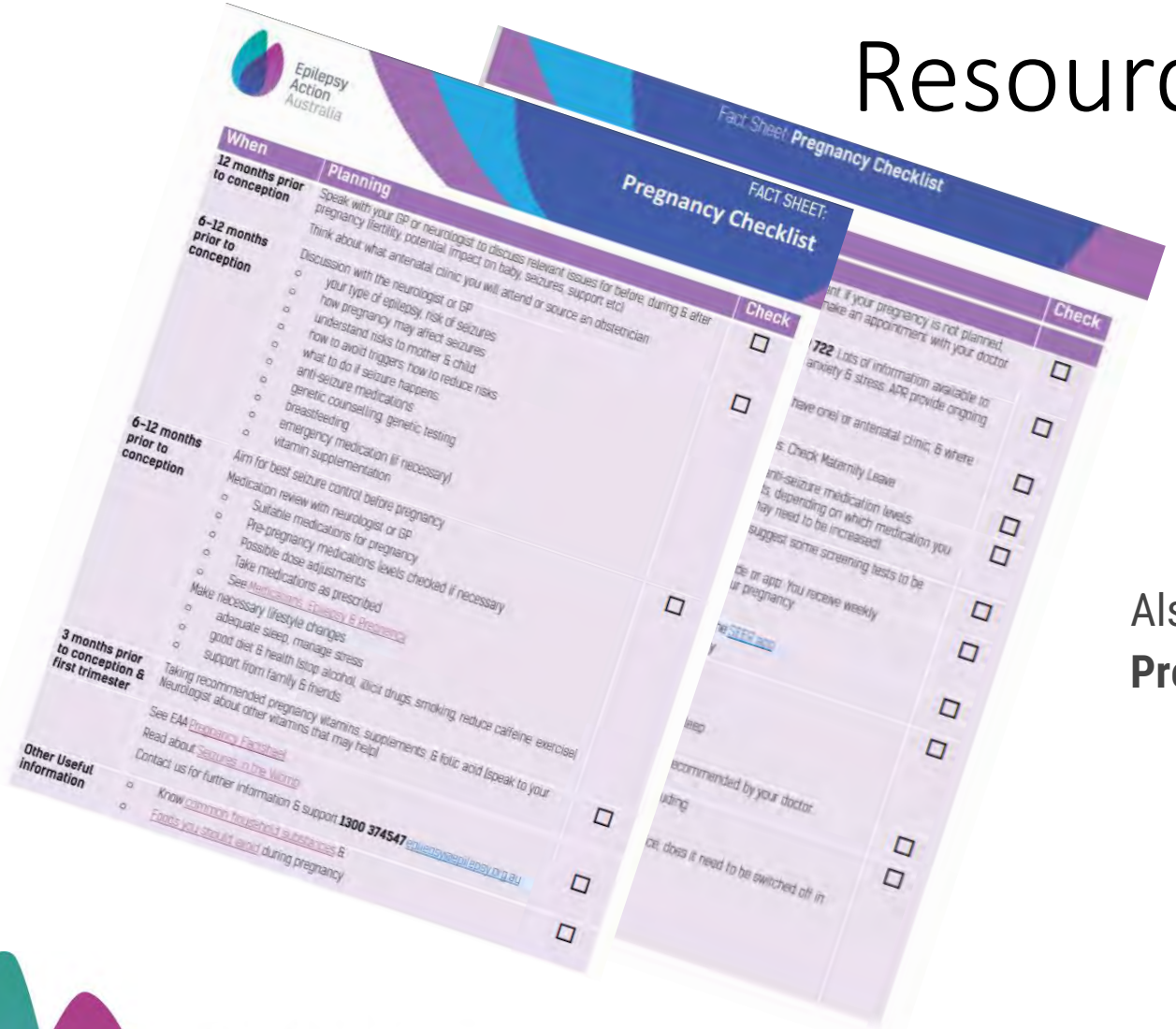

*JAMA Neurol.* doi:10.1001/jamaneurol.2015.1017
Published online July 6, 2015.

# Pre-Pregnancy planning tips

- Regular neurologist review (there is a **Women with Epilepsy clinic at RBWH**)
  - Review medication choices
  - Ensuring the most optimal medication for the epilepsy type and for pregnancy
  - Review the dose- aim for lowest, safest dose needed to control seizures
- Shared decision regarding use of anti-seizure medications if falls pregnant
- Discuss general health, diet and well being
- Review their support network for after the baby is born
- Screen for anxiety and depression
- Start folic acid supplements- at least 0.4 mg/day
- Obtain pre-pregnancy anti-seizure medication levels
- Talk about the Australian Pregnancy Register and other resources
- Assisted reproductive technology- watch seizure control if on Lamotrigine
- **Ob Med pre-conception clinic at RBWH, with pharmacist support**



# Resources

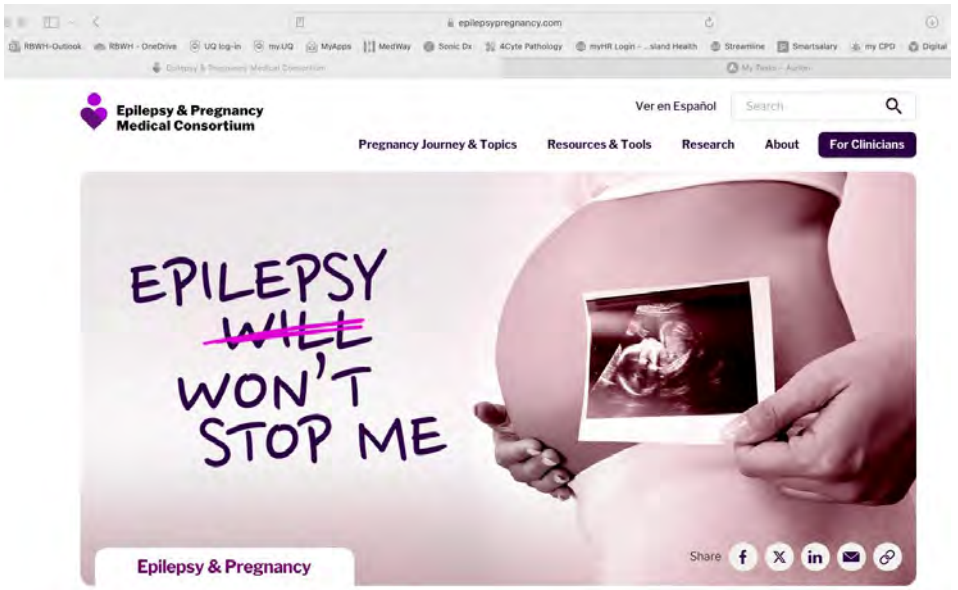



Australian Pregnancy Register (APR)

For pregnant women with epilepsy and/or pregnant women taking antiepileptic meds for other conditions

1800 069 722 | www.apr.org.au | apr@mh.org.au

Also, the APR are currently recruiting for the **Lacosamide and Pregnancy** study. Call the APR for more information.




Epilepsy Action Australia

**1300 37 45 37**

epilepsy@epilepsy.org.au

www.epilepsy.org.au

# Fertility in women with epilepsy

## Epilepsy

- Higher rate of menstrual disorders
  - around 30% versus 12-14 % in the general population
- Higher rate of polycystic ovary syndrome
  - 10-25% compared with 4-7% in the general population
- Higher rate of sexual dysfunction
- Higher risk of premature ovarian failure (< 42 years)
  - 14% compared with 1% population risk
- Poorly controlled seizures may lead to earlier age of menopause

## Anti-seizure medications (ASM)

- Enzyme-inducing ASM can contribute to sexual dysfunction, menstrual irregularities, fertility issues
- Valproate is associated with polycystic ovarian syndrome, weight gain, anovulatory cycles and menstrual irregularities
- Levetiracetam not found to have endocrine or sexual dysfunction effects
- Lamotrigine possible improvement in sexual function in women
- No data on newer anti-seizure medications

# Genetics and pre-pregnancy care

- There is no single test that will diagnose all epilepsies with a genetic basis
  - Copy number variation or single gene mutation can cause some epilepsies
- Referral to a clinical geneticist for discussion
  - If there is a known copy number variation or single gene causing the epilepsy
  - If there is a history of major congenital malformations with a previous pregnancy
  - If there is a strong family history of epilepsy, unknown cause for epilepsy, drug resistant epilepsy and neurodevelopmental comorbidities
- Routine testing for all epilepsy patients is not undertaken
- We know certain epilepsy types run in families, but have a low yield for a single gene on testing, likely multiple genes of small effect
- **Neurogenetics clinic- referral to Genetic Health Queensland**

# Risk of epilepsy to offspring

- If you have generalised epilepsy the chance your child will develop epilepsy is around 1 in 12
- If you have focal epilepsy the chance your child will develop epilepsy is 1 in 50

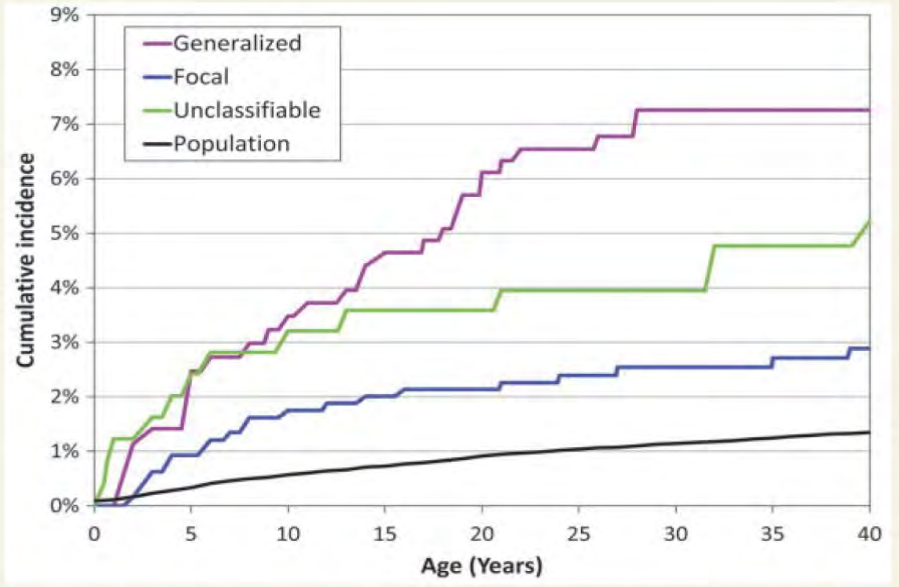



**Figure 1** Age-specific cumulative incidence of epilepsy in first-degree relatives of probands with epilepsy, by proband epilepsy type.

Maternal effect- higher risk of epilepsy in children born to mothers with epilepsy compared with fathers

(Peljto et al Brain 2014;137:795-805)

# Contraception and interactions with anti-seizure medications

**Anti-seizure medications can reduce effectiveness of the contraception**

Enzyme-inducing anti-seizure medications increase activity of the CYP3A4 system and increase sex hormone-binding globulin.
**Increase the metabolism of estrogen and progesterone, decreasing their levels**

**Contraception can reduce anti-seizure medication levels**

Lamotrigine, in particular (also valproate and oxcarbazepine).
Estrogen induces glucuronidation (enzyme UGT1A4) and **increases lamotrigine elimination**

| STRONG INDUCERS | WEAK INDUCERS | NON-INDUCERS |
|---|---|---|
| Carbamazepine | Topiramate (higher doses) | Levetiracetam |
| Oxcarbazepine | Perampanel (higher doses) | Zonisamide |
| Phenytoin | Lamotrigine* | Briviracetam |
| Phenobarbital | Felbamate | Lacosamide |
| Primidone | Rufinamde | Ethosuximide |
| Clobazam | | Valproate (inhibitor) |
| Cenobamate | | Clonazepam |

* Lamotrigine
No change to estrogen levels, modest decrease in progestins

# Mirena and Kyleena

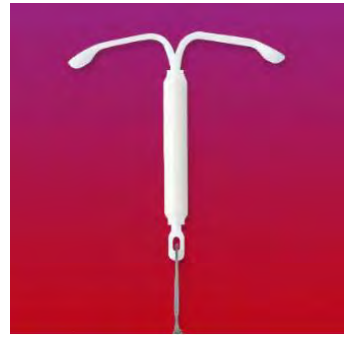
- **Contraception of choice for women with epilepsy**
- levonorgestrel- releasing intrauterine device (IUD)
- Mirena (52 mg), releases 21 mcg/day
- Kyleena (19.5 mg), releases 9 mcg/day - suited for younger women without children
- Local hormone release-thickens cervical mucous and thins endometrium

## Advantages

- User independent
- Effectiveness Mirena 99.8%,Kyleena 99.75%
- Low risk of complications, lighter periods
- Mirena duration extended from 5 to 8 years Kyleena up to 5 years
- Rapid return to fertility after removal
- No oestrogen
- No expected change in contraception effectiveness with any anti-seizure medications
- No effect on anti-seizure medication levels

## Disadvantages

- Some hormonal side effects possible- bloating, mood swings
- Temporary pain with insertion
- Expulsion or removal - pain, increased bleeding
- Risk of pelvic infection



# Medroxyprogesterone acetate intramuscular injection (Depo Provera)

- Inhibits ovulation

**Advantages**

- User-independent
- Effectiveness 99.8%
- Can cause loss of periods
- No estrogen
- No change in contraception effectiveness with any anti-seizure medications
- No effect on anti-seizure medication levels

**Disadvantages**

- reinjection every 3 months
- can cause irregular bleeding, mood changes
- Once given can not be removed
- Not immediately reversible, return to fertility can be delayed up to 18 months
- Can reduce bone density
- Prolonged use (> 3 years) and association with increased risk of brain meningioma

OPEN ACCESS
Check for updates

Use of progestogens and the risk of intracranial meningioma: national case-control study

Noémie Roland,[1] Anke Neumann,[1] Léa Hoisnard,[2] Lise Duranteau,[3] Sébastien Froelich,[4] Mahmoud Zureik,[1,5] Alain Weill[1]

the bmj | BMJ 2024;384:e078078 | doi: 10.1136/bmj-2023-078078

# Implanon

Slow release Etonogestrel
3 cm soft, flexible rod,  sits under the skin in the upper arm

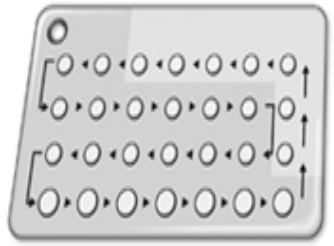
**Advantages**

- Effective 99.95%
- User independent
- Lasts up to 3 years
- No estrogen
- No effect on anti-seizure medications

**Disadvantages**

- Reversible with removal
- Pain and complications at the insertion site
- Bleeding irregularities
- Enzyme inducing anti-seizure medications can reduce contraception effectiveness

# Oral contraceptive (OC) pill



- Combined pill contains estrogen and progesterone
- Apart from dropirenone, progesterone only pills do not reliably inhibit ovulation

**Advantages**

- Non-invasive
- May shorten periods
- No impact on fertility after cessation
- Effectiveness 99.7% if taken correctly

**Disadvantages**

- User dependent
- If missed pills, effectiveness can drop to 91%
- Contains estrogen- can increase risk of thrombosis
- Enzyme-inducing anti-seizure medications reduce the contraception effectiveness
- Combined OC pill reduces lamotrigine levels, can also reduce valproate and oxcarbazepine levels
- Dropirenone may decrease lamotrigine levels

# Contraception Barriers- Condoms

**Advantages**

- Condoms protect against sexually transmitted infections
- Useful in conjunction with other contraception (dual protection)
- No change in contraception effectiveness with any anti-seizure medications
- No effect on anti-seizure medication levels

**Disadvantages**

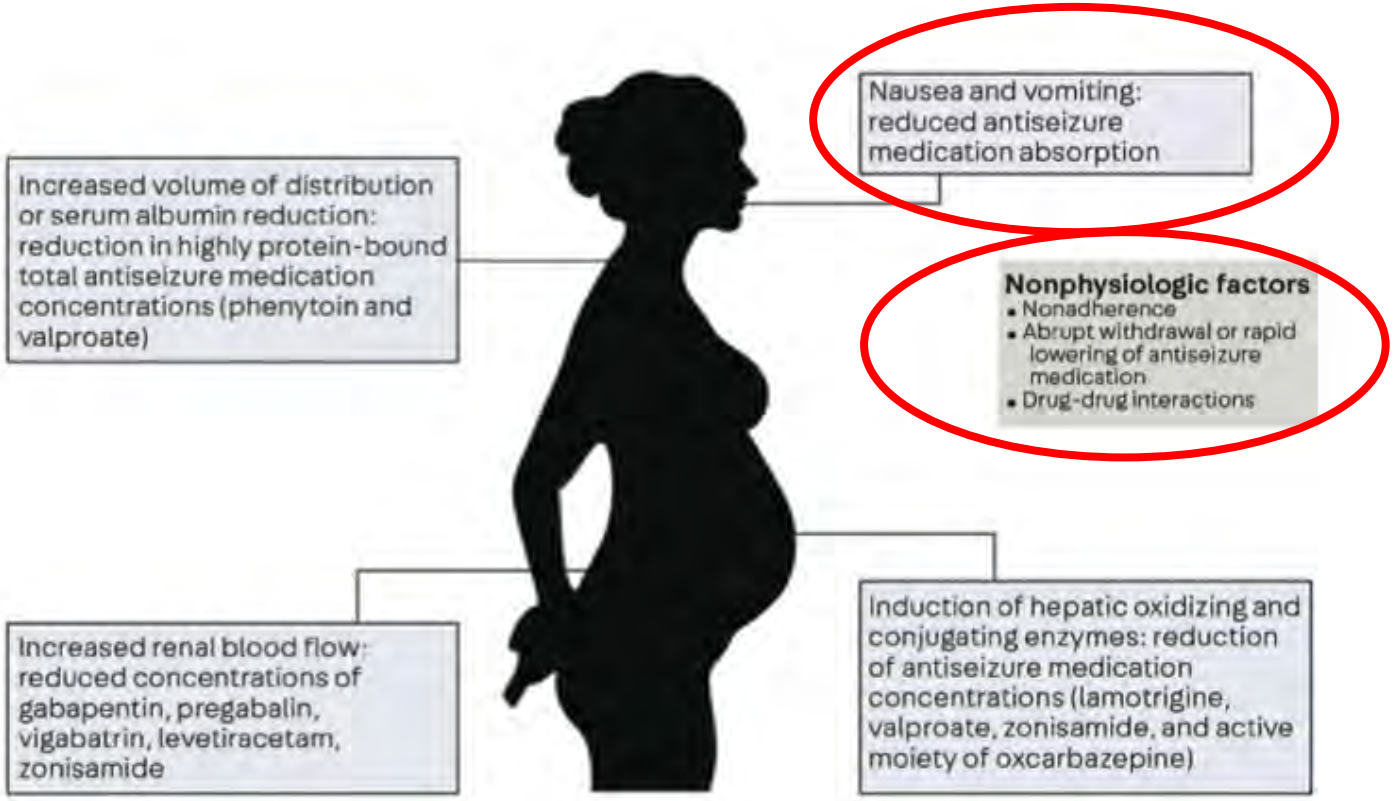
- User dependent
- Effectiveness around 85%

# Predictors of seizure control

- **Seizure occurrence prior to the pregnancy is the most important predictor of seizures during pregnancy**
  - If seizure in the month prior to pregnancy- 15x greater risk of seizure during pregnancy
  - If seizure-free the year before conception, more than 80% remain seizure-free
- Other predictors of worsening seizures
  - Focal epilepsy syndrome in particular frontal lobe epilepsy (Voinescu et al Neurology 2022)
  - Sleep deprivation
- Changes to antiseizure medication levels

# Changes in antiseizure medication (ASM) levels

**ASM dependent and substantial inter-individual variability**
**Decline in serum concentration > 35% from pre-pregnancy optimal concentration is associated with increased risk of deterioration in seizure control**



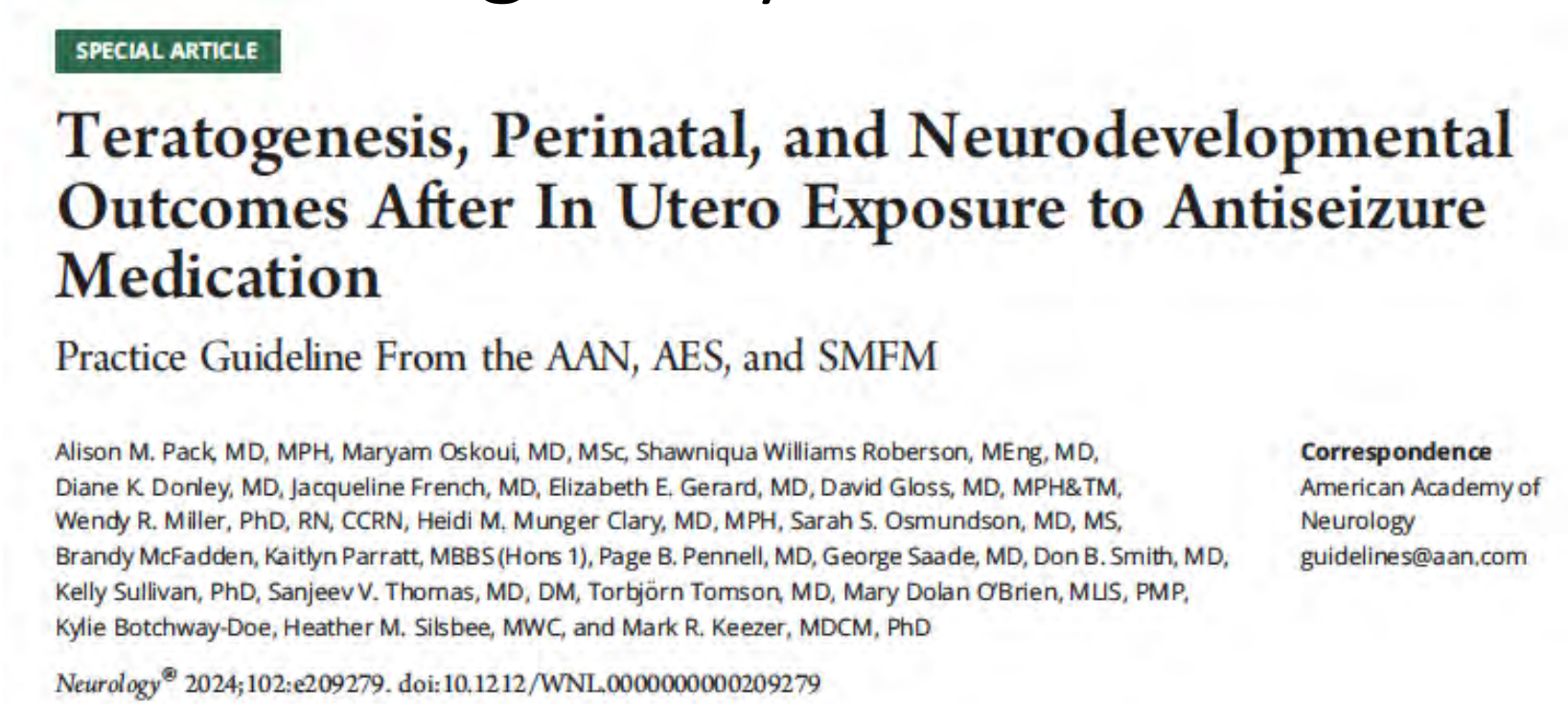

Defined therapeutic window for effective seizure control

Decreases can occur at any point during the pregnancy

Many ASM – in particular, lamotrigine and levetiracetam

Stephen et al Lancet Neurol 2019;481-491
CONTINUUM (MINNEAP MINN) 2022;28(2, EPILEPSY):399–427

# Pregnancy



SPECIAL ARTICLE

## Teratogenesis, Perinatal, and Neurodevelopmental Outcomes After In Utero Exposure to Antiseizure Medication

### Practice Guideline From the AAN, AES, and SMFM

Alison M. Pack, MD, MPH, Maryam Oskoui, MD, MSc, Shawniqua Williams Roberson, MEng, MD, Diane K. Donley, MD, Jacqueline French, MD, Elizabeth E. Gerard, MD, David Gloss, MD, MPH&TM, Wendy R. Miller, PhD, RN, CCRN, Heidi M. Munger Clary, MD, MPH, Sarah S. Osmundson, MD, MS, Brandy McFadden, Kaitlyn Parratt, MBBS (Hons 1), Page B. Pennell, MD, George Saade, MD, Don B. Smith, MD, Kelly Sullivan, PhD, Sanjeev V. Thomas, MD, DM, Torbjörn Tomson, MD, Mary Dolan O'Brien, MLIS, PMP, Kylie Botchway-Doe, Heather M. Silsbee, MWC, and Mark R. Keezer, MDCM, PhD

**Correspondence**
American Academy of Neurology
guidelines@aan.com

*Neurology*® 2024;102:e209279. doi:10.1212/WNL.0000000000209279

- Systematic review by a multidisciplinary panel up to August 2022
- Total articles included = 82
- Summary of the key findings

a) Prevalence of major congenital malformations across specific anti-seizure medications (ASM)
b) Perinatal outcomes
c) Neurodevelopmental outcomes after in utero exposure of ASM
d) Impact of folic Acid

# Prevalence of major congenital malformations (MCM)

- Without epilepsy prevalence of MCM in the general population 2.4-2.9%
- No independent effect of polytherapy
- Data from >1000 exposures lowest prevalence of MCM
  - Lamotrigine 3.1%,
  - Levetiracetam 3.5%,
  - Oxcarbazepine 3.1%
- Highest prevalence- Valproate 9.7%
- Types of malformations
  - Valproate -neural tube defects (1.4%), urogenital (1.2%), renal (1.4%)
  - Phenobarbitone- cardiac malformations (4.4%), oral and cleft palate (2.2%)
  - Topiramate- oral and cleft palate (1.4%)

# Neurodevelopmental and Functional Outcomes Following In Utero Exposure to Antiseizure Medication

## A Systematic Review

Eliza Honybun, MPsych, Emily Cockle, MPsych, Charles B. Malpas, MPsych, PhD, Terence J. O'Brien, MB, BS, MD, FRACP, FRCPE, FAHMS, FAES, Frank J. Vajda, MB BS, MD, FRCP, FRACP, Piero Perucca, MD, PhD, FRACP,* and Genevieve Rayner, BA (Hons), MPsych, PhD*

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*Neurology*® 2024;102:e209175. doi:10.1212/WNL.0000000000209175

Systematic review of 43 studies from 1990 to 2023

- Focus on the social, emotional, behavioural and adaptive domains
- Valproate- 2-4 x increased risk autism spectrum disorder (ASD), 2-5 x increased risk intellectual disability (ID) and poor adaptive functioning
- Topiramate- growing evidence 2x increased risk ASD, 3-4 x increased risk ID
- These outcomes are dose dependent
- Levetiracetam linked to increased attention deficit hyperactivity disorder and anxiety
- Carbamazepine variable neurodevelopmental outcomes
- Lamotrigine seems to be "safe" in terms of post natal development
- Evidence for other anti-seizure medications is lacking

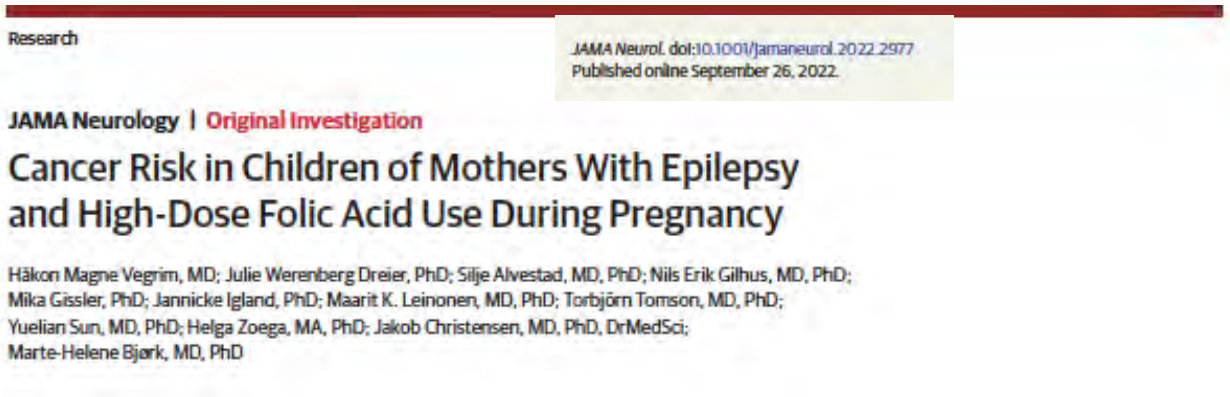
# Folic acid benefits

- No benefit specific benefit for prevention of major congenital malformations for people with epilepsy, general childbearing evidence
- Possibly associated with better neurodevelopmental outcomes
- **Reduced autistic traits and language delay** at 3 years (Norwegian Mother and Child Cohort Study)
- Likely associated with with **higher global IQ at 6 years** in children exposed to ASM in utero (NEAD study Group)


- Bjork M, Riedel B, Spigset O, et al. JAMA Neurol. 2018;75(2):160-168.
- Husebye ESN, Gilhus NE, Riedel B, Spigset O, Daltveit AK, Bjork MH. Neurology. 2018;91(9):e811-e821. doi:10.1212/WNL.0000000000006073
- Meador KJ, Baker GA, Browning N, et al; NEAD Study Group. Lancet Neurol. 2013;12(3):244-252.doi:10.1016/S1474-4422(12)70323-X

# What is the safe dose of folic acid?

- Association between high dose folic acid (defined at greater than 1 mg/day) and cancer risk in children of mothers with epilepsy
- Further population study-  showed association between high dose folic acid (greater then 1 mg/day) in all women who have given birth
- At least 0.4 mg/day
- Adherence is generally poor
- Consider if they are also on another supplement (eg elevit- 800 mcg folic acid)



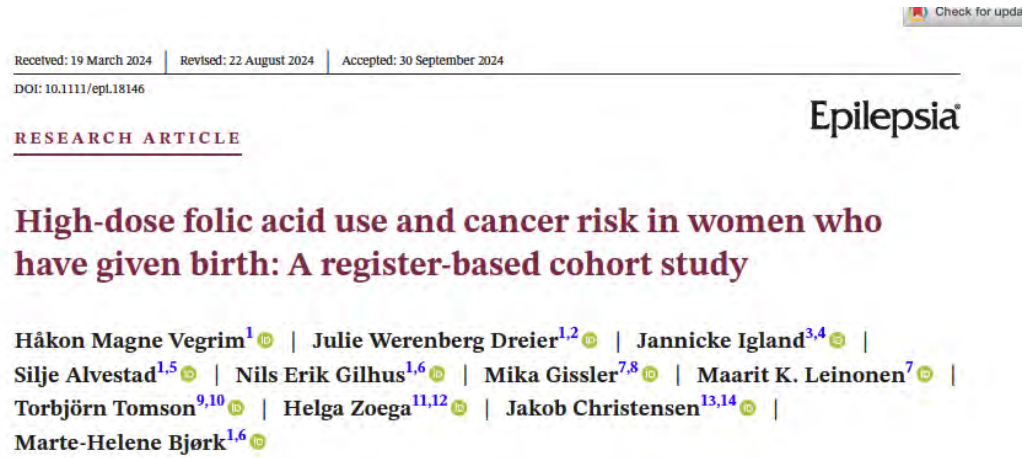
Research

JAMA Neurol. doi:10.1001/jamaneurol.2022.2977
Published online September 26, 2022.

JAMA Neurology | Original Investigation

Cancer Risk in Children of Mothers With Epilepsy and High-Dose Folic Acid Use During Pregnancy

Håkon Magne Vegrim, MD; Julie Werenberg Dreier, PhD; Silje Alvestad, MD, PhD; Nils Erik Gilhus, MD, PhD; Mika Gissler, PhD; Jannicke Igland, PhD; Maarit K. Leinonen, MD, PhD; Torbjörn Tomson, MD, PhD; Yuelian Sun, MD, PhD; Helga Zoega, MA, PhD; Jakob Christensen, MD, PhD, DrMedSci; Marte-Helene Bjørk, MD, PhD



Received: 19 March 2024 | Revised: 22 August 2024 | Accepted: 30 September 2024

DOI: 10.1111/epi.18146

Epilepsia

RESEARCH ARTICLE

High-dose folic acid use and cancer risk in women who have given birth: A register-based cohort study

Håkon Magne Vegrim[1] | Julie Werenberg Dreier[1,2] | Jannicke Igland[3,4] | Silje Alvestad[1,5] | Nils Erik Gilhus[1,6] | Mika Gissler[7,8] | Maarit K. Leinonen[7] | Torbjörn Tomson[9,10] | Helga Zoega[11,12] | Jakob Christensen[13,14] | Marte-Helene Bjørk[1,6]

ASM- anti-seizure medication

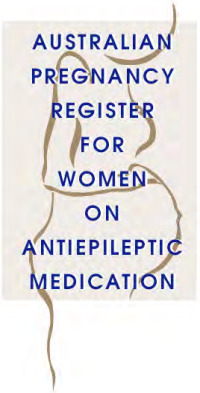
# Unplanned pregnancy

- Seek neurological advice, urgent referral to the Comprehensive Epilepsy Program
- Scenario's- taking multiple ASM, on Valproate, poor seizure control, minimal work-up prior to pregnancy
- Caution in attempting to remove or replace ASM if it is effective, even if it is not optimal choice (Valproate)
- Ensure safety for mother and baby, seizure control is paramount
- Stress to the patient the importance of not ceasing ASM
- Commence folic acid supplements (at lease 0.4 mg/day)
- Generally, if medication change is warranted, we try to avoid in the first trimester (organogenesis), but best to obtain neurological advice

# Pregnancy Management

ASM- anti-seizure medication

- Will be a high-risk pregnancy for obstetric care
- Caution in changing an ASM if effective seizure control, even if not optimal
- Folic acid supplements, review other supplements (elevit- 800 mcg folate)
- If hyperemesis gravidarum- re-dose ASM if vomiting occurs within 1 hour
- Discuss the Australian Pregnancy Register
- Screen for anxiety and depression
- Trough ASM levels
  - Ideal is monthly
  - In practice, at least every trimester, generally 3-4 levels (12 weeks, 20 weeks, 28 weeks, 36 weeks) and more frequently as required
- Aim to ensure decline in level is <35% of pre-pregnancy level
- Review for anxiety and depression
- Check on support networks for after the birth



# Post-Partum Management

- Develop plan for contraception
- **Maternal safety**
  - Risk of seizures increased and may persist for several months due to sleep deprivation
  - Discourage from taking a bath alone/behind locked door
  - Assess post-partum depression and anxiety
  - Sleep hygiene
    - At least 6 hours of sleep, at least one 4 hours stretch/24 hours cycle
    - Early introduction of the bottle given by family member if breast feeding
    - eg shift approaches to ensure the mother has uninterrupted sleep
- **Newborn safety**
  - No driving, subject to seizures and sleep deprivation
  - No bathing of the baby with the mother alone
  - No co-sleeping with the mother
  - Baby carrier if mother at risk of myoclonic jerks

# Breast feeding

ASM- anti-seizure medication

- Generally encouraged due to established benefits
- Children of mothers treated with Valproate, IQ at 6 years higher compared if not breastfed
- Different ASM concentrations in breastmilk
  - low with Levetiracetam and medium with Lamotrigine
- If ASM has been increased during pregnancy, reduction but generally a bit higher than pre-pregnancy dose (balance seizure risk and sleep deprivation)
- Take ASM immediately after breastfeeding or before baby's longest sleep
- Adverse effects to the newborn appear to be rare (sedation, poor suckling and weight gain)
  - serum levels if symptoms, consider reducing amounts, combining with formula
- Importance of avoiding stress and sleep deprivation related to breast feeding

Tomson et al, Seminars in Epileptology 2022;24(6):1-13

# Summary

## Pre-pregnancy

- Planning
- Shared decision-making
- IUD contraception of choice
- Folic acid- at least 0.4 mg/day folic pre-conceptionally and during pregnancy
- Baseline ASM drug levels
- screen for anxiety and depression

IUD- intrauterine device
ASM- anti-seizure medication
LTG-lamotrigine
LEV-levetiracetam
OXC-oxcarbazepine
TPM-topiramate
VPA- valproate

## Pregnancy

- If unplanned-caution in changing if effective seizure control, Neurology review
- Discuss Australian Pregnancy Register
- VPA and TPM- dose dependent risks
- Consider using LTG, LEV, OXC
- LEV may affect post-natal neurodevelopment, at least at higher doses
- Breast feeding is encouraged
- Post-partum care of mother and newborn

# Acknowledgements

**A/Prof Cecilie Lander**

**Women with epilepsy**

Australian Pregnancy Register (APR)

For pregnant women with epilepsy and/or pregnant women taking antiepileptic meds for other conditions

1800 069 722 | www.apr.org.au | apr@mh.org.au

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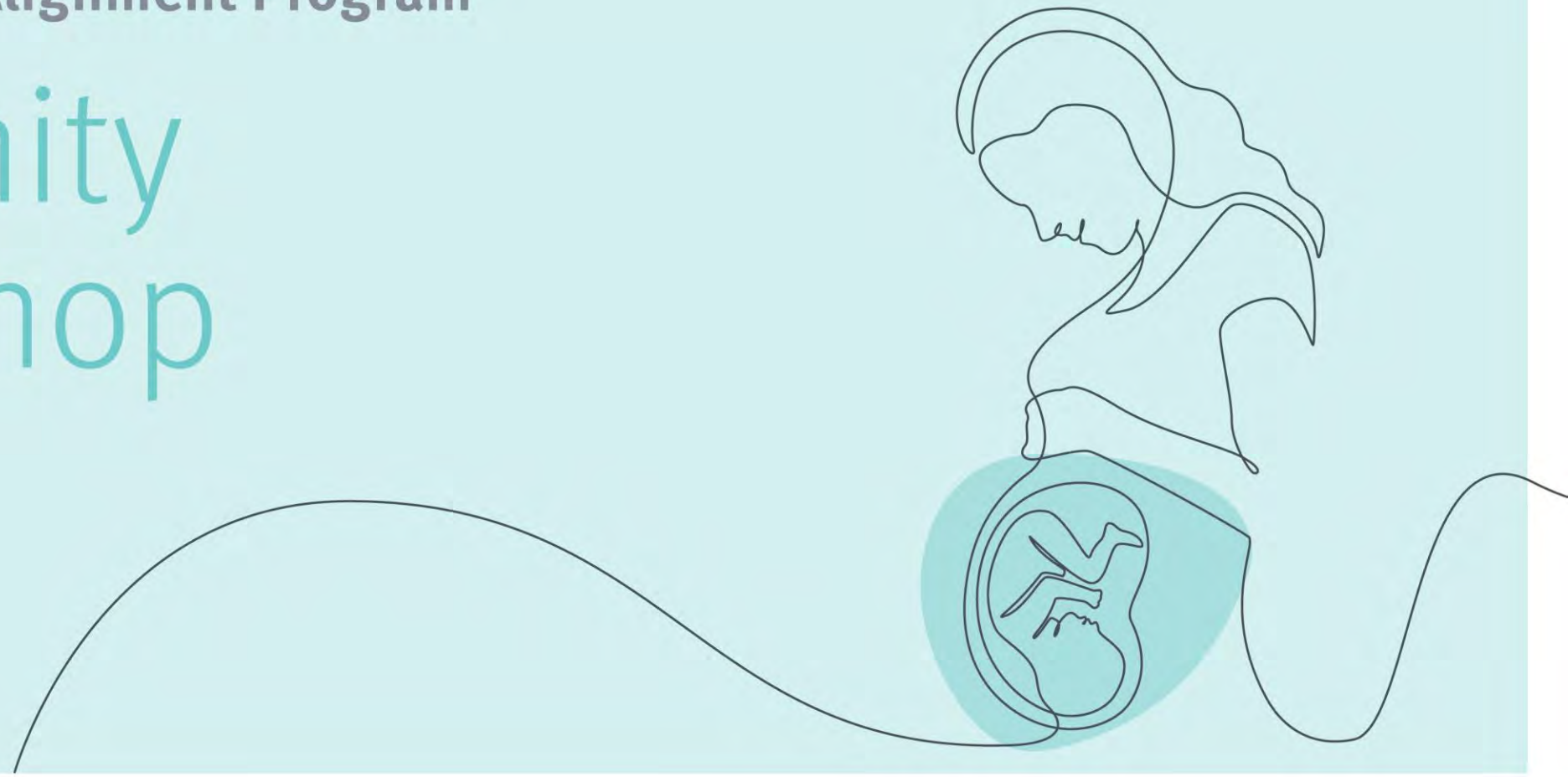
Metro North **GP Alignment Program**

# Maternity Workshop



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**Dr Meg Cairns**
**GPLO | Metro North Health & Brisbane North PHN**

phn BRISBANE NORTH
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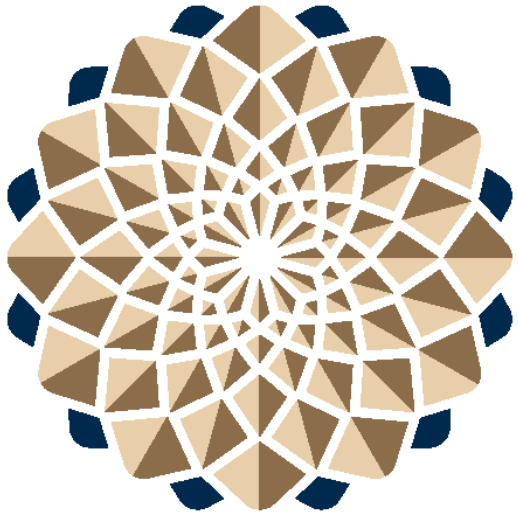
Metro North Health

# A big thank you to our sponsors!



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