Obstetric Ultrasound Interpretation and Preterm Birth Prevention

DR DAVID MACKIN FRANZCOG DDU CMFM

CONSULTANT OBSTETRICIAN

MATERNAL FETAL MEDICINE SUBSPECIALIST

JOAN KIRNER WOMEN'S AND CHILDREN'S

SUNSHINE HOSPITAL

Objectives

- First trimester ultrasound
  - Rationale
  - Acceptable parameters
  - Is the 11-14 week ultrasound still relevant in the era of NIPS?
- Second trimester ultrasound
  - 16 weeks ultrasound
  - 20 week ultrasound
- Third trimester ultrasound
  - Why??
- Preterm Birth
  - Screening
  - Prevention

First trimester ultrasound

- Allows for:
  - Viability of pregnancy
    - Ideally wait 6 weeks from LMP
  - Dating of the pregnancy
  - Assessing for multiples/chorionicity
  - Early anatomy survey
  - Nuchal translucency
  - First trimester ultrasound should always be performed prior to NIPS
    - 10 weeks from LMP

Early pregnancy Ultrasound

- Ultrasound before 11 weeks
- Can be performed transabdominally or transvaginally
  - A TV ultrasound assessment should always be available
- Assess for
  - Gestation sac
  - Fetal pole/fetus
  - Maternal structures
- History
  - GA assessed based on maternal LMP
  - Awareness of the b-HCG level
  - IVF

Early Pregnancy Ultrasound

- Gestation sac
  - Should be visible 4 weeks 3 days after LMP
- Fetal heart beat
  - Should be visible 5-6 weeks - CRL 2mm (high-frequency TV)
  - May not be visible until CRL 6-7mm
- The EDD by LMP (adjusted for cycle length) should be used unless:
  - The LMP is unknown;
  - The GA by CRL is <10 weeks and differs from GA by LMP by more than five (5) days; or
  - The GA by CRL (+/- BPD) is ten to fourteen (10-14) weeks and differs from GA by LMP by more than seven (7) days.
- EDD by assisted reproduction dates (for example, IVF) should only be adjusted with extreme caution.

Early Pregnancy Ultrasound

- Pregnancy Failure
  - Using high frequency TV ultrasound:

1. When the Mean Sac Diameter (MSD) is ≥25 mm with no visible yolk sac or embryo; or
2. When there is a visible embryo with CRL ≥7mm but no cardiac activity can be demonstrated (over 30 seconds)

  - If no live embryo is demonstrated but the above criteria are not met, then the following criteria can be used to diagnose pregnancy failure by follow-up imaging:

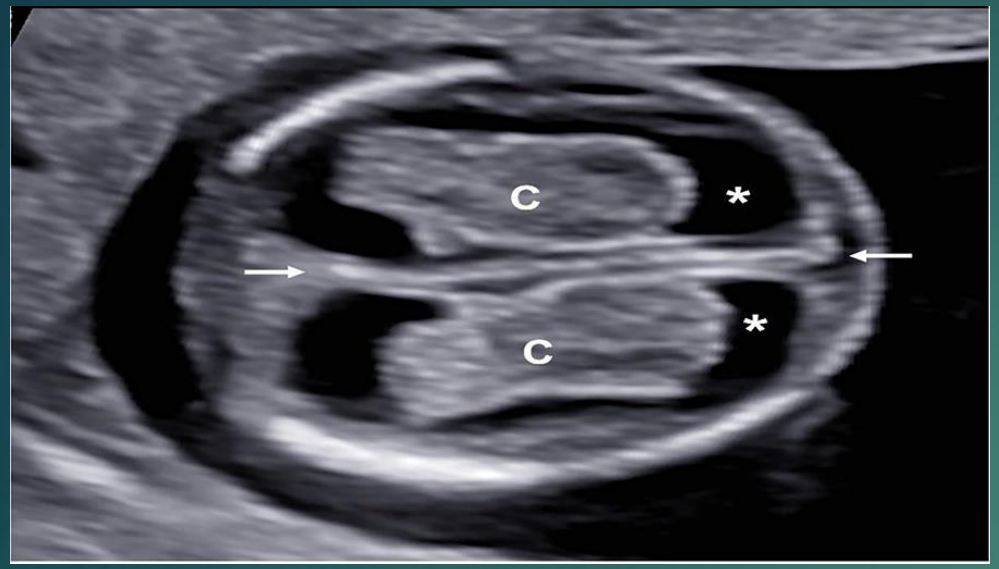
1. if the initial scan showed a fetal pole <7 mm with no cardiac activity beat and a repeat scan in 7 or more days also shows no cardiac activity;
2. if the initial scan showed a MSD ≥12 mm with no embryo and a repeat scan in 7 or more days does not show interval development of a yolk sac or an embryo with cardiac activity;
3. if the initial scan showed a MSD <12 mm with no embryo and a repeat scan in 14 or more days shows no visible yolk sac or cardiac activity and the MSD has not doubled;
4. if a yolk sac is visible on initial scan and there is no embryo with a heartbeat after 11 days;
5. absence of cardiac activity, which was seen to be present on an earlier scan.

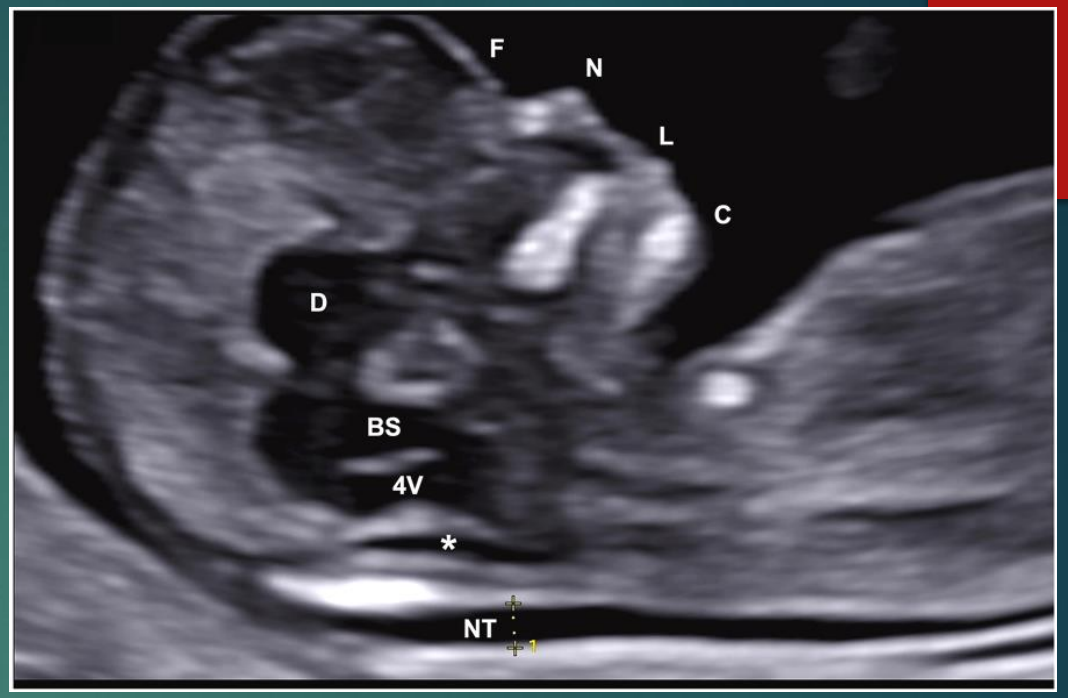
Early Pregnancy Ultrasound

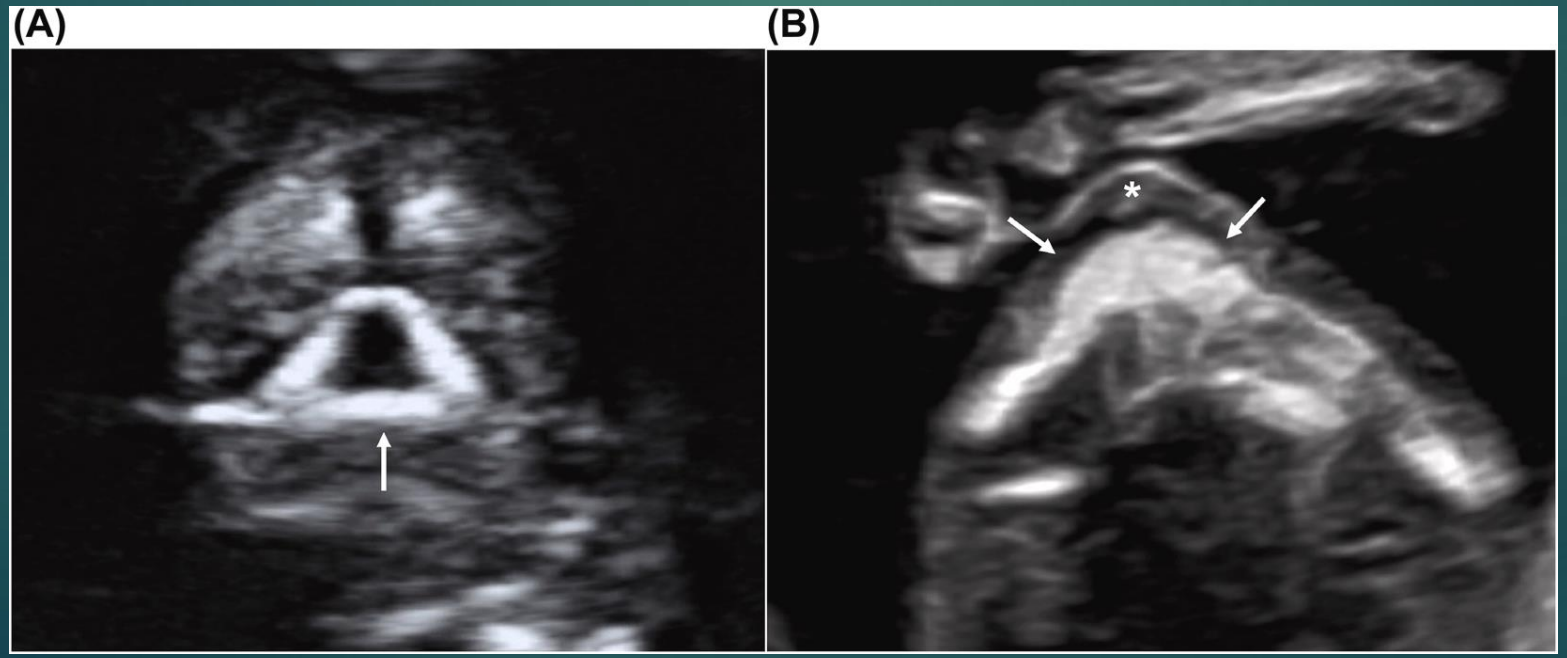
- **Fetal Structure**
  - **9 weeks -** Head, trunk and limbs
  - **10 weeks -** Some ossification of long bones, jaw and skull
  - **11 weeks -** Stomach, spine, ossified cranium, four chamber heart, hands and feet
  - **12 weeks -** Kidneys, bladder
  - **13 weeks -** Mid gut herniation resolution

What I assess when I perform 11-13 week US

- Crown lump length – can assist with accurate dating
- Fetal head
  - Choroids with midline separation
  - Face – including orbit, nasal bone, hard palate (retronasal triangle), profile
- Fetal neck
  - Nuchal translucency, cystic hygroma, dilated jugular venous sacs
- Fetal thorax
- Fetal heart
  - 4-Chambers present, RVOT, LVOT, Aortic arch, Ductal arch



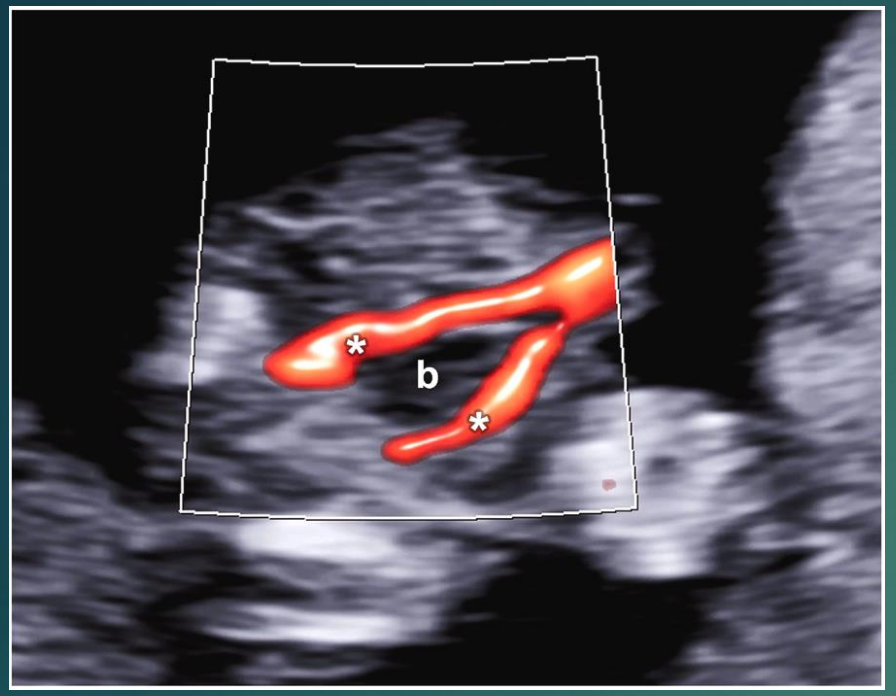


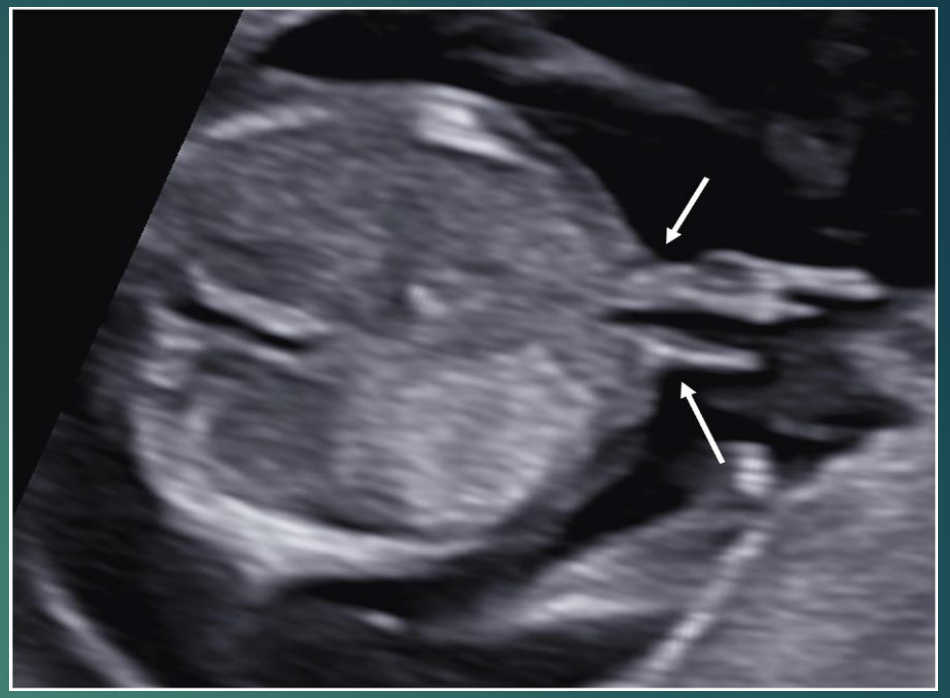


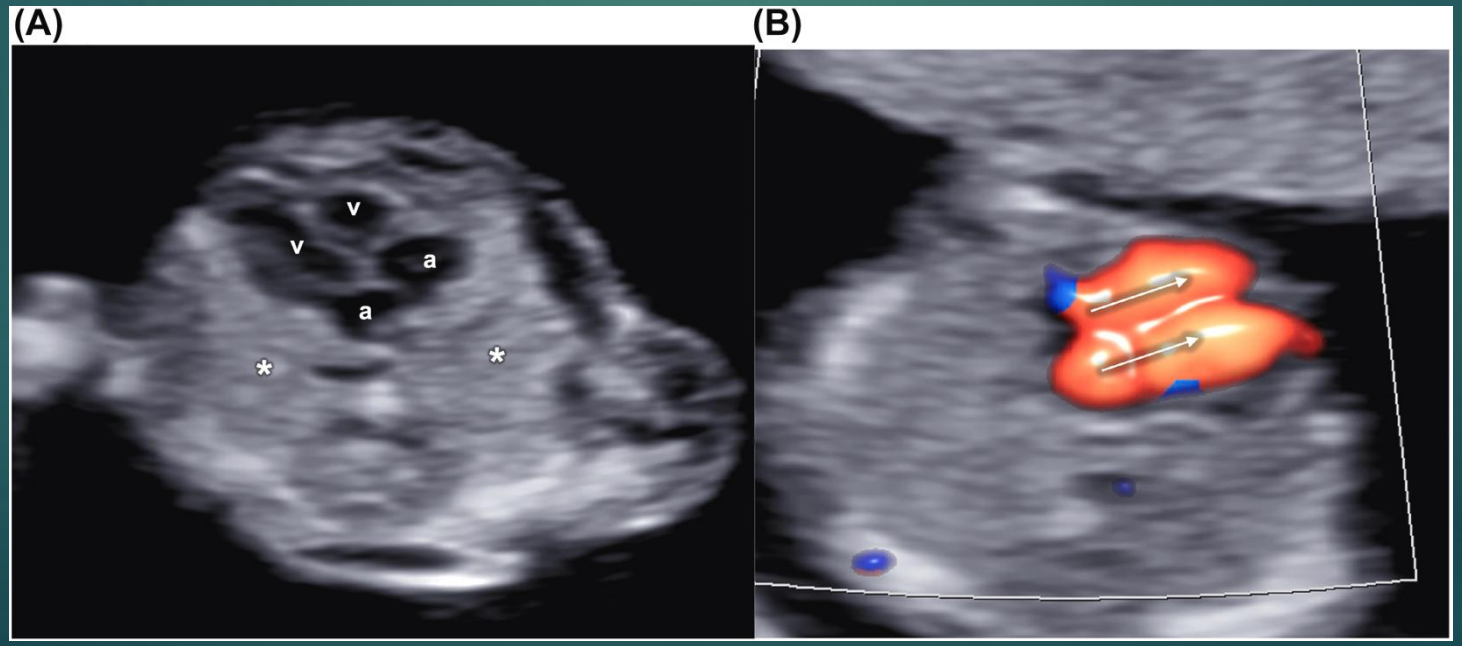
Volpe N et al. First trimester examination of fetal anatomy: clinical practice guideline by the World Association of Perinatal Medicine (WAPM) and the Perinatal Medicine Foundation (PMF). Journal of Perinatal Medicine. 2022 Sep 27;50(7):863-77.

What I assess when I perform 11-13 week US

- Fetal abdomen
  - Cord insertion, assess for abdominal wall defects
  - 2 kidneys/2 renal arteries
  - Fetal bladder, 2 umbilical arteries
- Fetal skeletal system
  - 2 arms, 2 legs, 2 hands, 2 feet, 8 fingers, 2 thumbs, 10 toes!
  - Spine (straight spine) to sacrum
- Placenta position with cord insertion
- Maternal ovaries
- Maternal uterus







Volpe N et al. First trimester examination of fetal anatomy: clinical practice guideline by the World Association of Perinatal Medicine (WAPM) and the Perinatal Medicine Foundation (PMF). Journal of Perinatal Medicine. 2022 Sep 27;50(7):863-77.

Nuchal translucency

- The subcutaneous fluid visualized behind the fetal neck on ultrasound in the first trimester
- Should be performed between 11+0 and 13+6 weeks' gestation (CRL 45-84mm)
- A powerful marker:
  - Aneuploidy
  - Structural anomalies (cardiac)
  - Adverse outcome
- Forms a component of first trimester combined screening
  - With PAPP-A, free b-HCG
  - 94% of T21 with 5% false positive rate

www.fetus.net

Nuchal translucency

- The normal range for NT changes with gestational age in euploid fetuses
  - usually 3-3.5mm (at JK accept referrals >3.0mm)
  - Gestational age specific – 95th to 99th centile
  - Suggest NT scan in latter half of window (12+4 – 13+6 weeks)

- Nuchal oedema prior to 11 weeks
  - Suggest rescan
  - Majority will resolve

NT assessment in the era of NIPS

- NIPS
  - Good test for T21 – high probability
  - Good test at excluding T21, T13 and T18
- Low probability NIPS and increased NIPS does not exclude abnormality
  - Conditions associated with increased NT after low-risk targeted NIPT
    - Structural anomalies – cardiac
    - Microdeletions – 22q11
    - Single gene disorders – Noonans
    - Triploidy

NT assessment in the era of NIPS

- Remember: NIPS depends on the product used and the negative predictive value of the test
- If NT increased – recommend deferring NIPS and referral to MFM
- Structural anomalies are present in approximately one in three (30.7%) of euploid fetuses with NT ≥3.5 mm
  - With TV imaging 50% are seen at 12-13 week ultrasound
  - Increasing sensitivity at 16 week and 22 week ultrasound

NT assessment in the era of NIPS

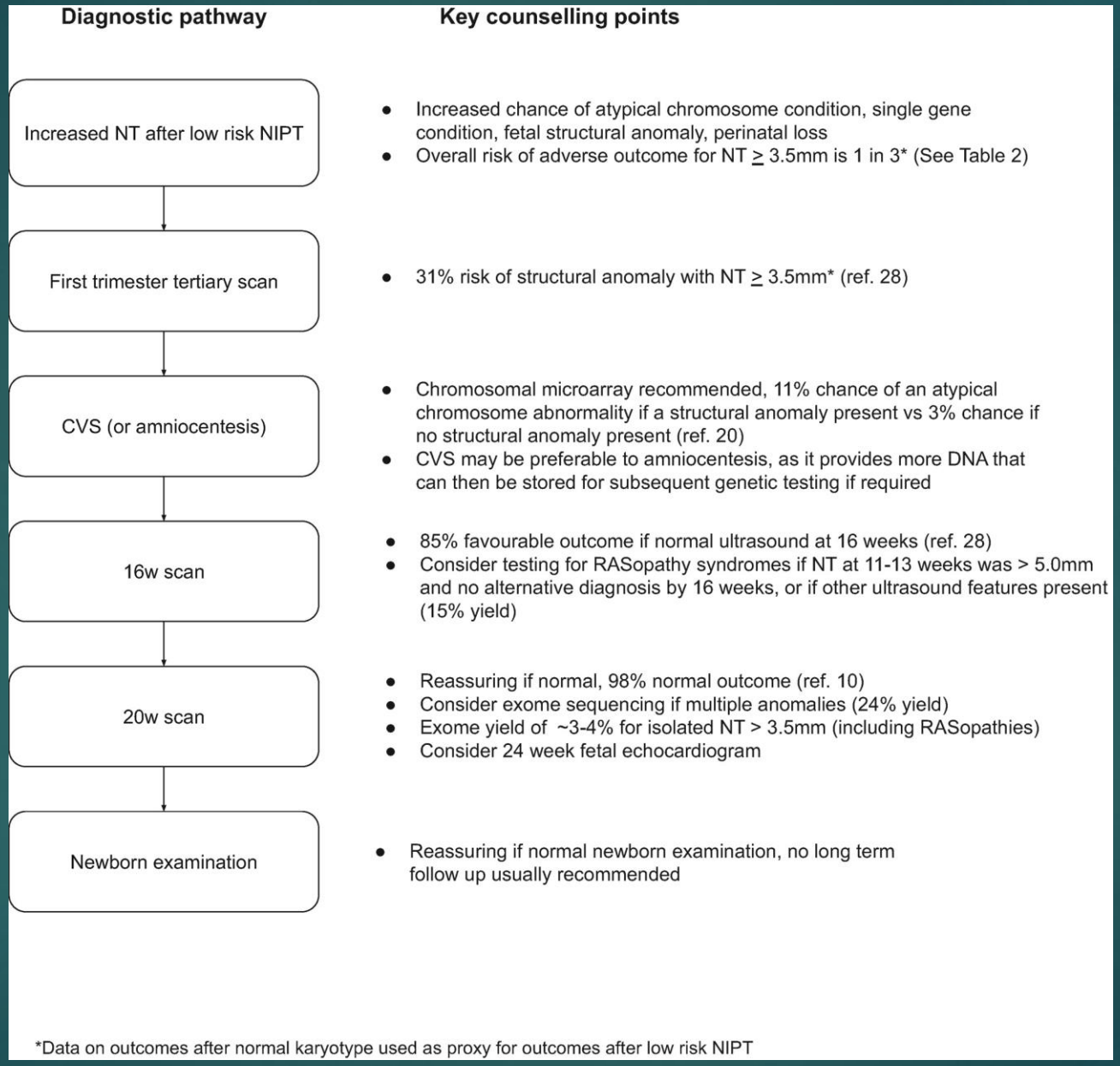
NT (mm)	N	Chance of liveborn without congenital anomaly	Risk of abnormal outcome
3.5 - 4.4	157	141 (90%)	1 in 10
4.5 – 5.4	38	30 (79%)	2 in 10
5.5 – 6.4	11	5 (45%)	5 in 10
>6.5	17	3 (18%)	8 in 10
Total	**223**	**149 (67%)**	**1 in 3**

Risk of abnormal pregnancy outcome with NT >3.5mm and normal karyotype.

Ayräs O, Tikkanen M, Eronen M, Paavonen J, Stefanovic V. Increased nuchal translucency and pregnancy outcome: a retrospective study of 1063 consecutive singleton pregnancies in a single referral institution. Prenat Diagn. 2013; 33(9): 856-862. Erratum in: Prenat Diagn. 2016; 362:199.

Abnormal ultrasound – what to do?

- Discuss findings with women
- Referral to local Maternal Fetal Medicine Unit
  - Joan Kirner, RWH, Mercy Heidelberg, MMC
- Woman's journey
  - Repeat ultrasound
    - Detailed anatomy
  - Depending on findings offer further testing
    - Chorionic villus sampling
    - Amniocentesis
    - Further ultrasounds
      - 16 week, 20 week, fetal echocardiogram



Kelley J, McGillivray G, Meagher S, Hui L. Increased nuchal translucency after low-risk noninvasive prenatal testing: What should we tell prospective parents?. Prenatal Diagnosis. 2021 Sep;41(10):1305-15.

16 week ultrasound

- Occasionally performed
- Usually specialist
- Reasons:
  - Abnormality seen on first trimester US
  - Past history of fetal anomaly/adverse outcome
  - As part of cervical surveillance

Morphology (second trimester) ultrasound

- Should be performed between 18-22 weeks gestation
  - Examining the fetal anatomy may be appropriate at other times depending on the clinical situation
- *"The information obtained from this scan aims to provide the patient and the maternity health care professional with as much information as possible about the pregnancy, in the safest and most cost-effective manner."* ASUM 2018
- Limitations
  - Maternal factors, fetal factors
- Safe
  - diagnostic procedure
  - performed only when there is a valid medical indication
  - As low as reasonably achievable (ALARA) principle
  - The lowest possible ultrasonic exposure setting should be used to gain the necessary diagnostic information

Morphology (second trimester) ultrasound

- Pre-performance
  - Current and past pregnancies
  - Maternal medical history
  - Family history
- What is the EDD?
- Previous US?
- Aneuploidy screening?

The Examination

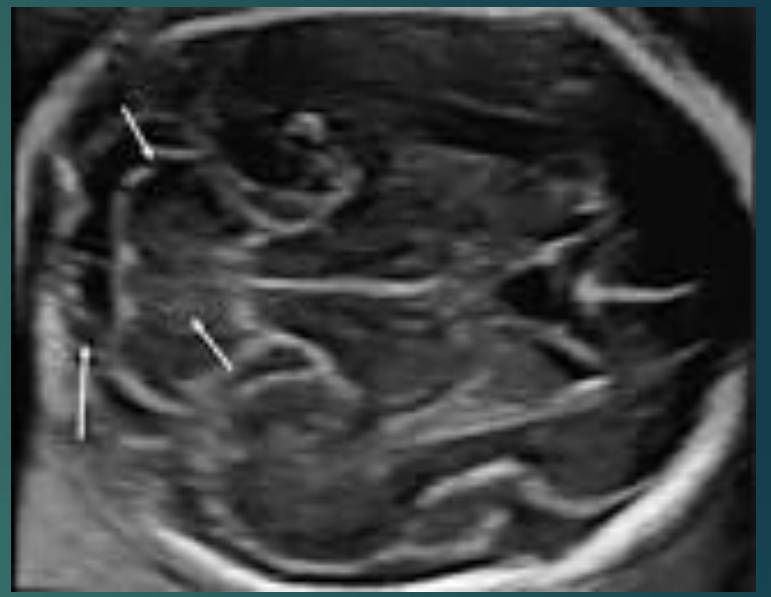
- Fetal biometry
  - Occasionally need for gestational age calculation
  - GA can be assessed by the bi-parietal diameter (BPD), head circumference (HC) and femur length (FL)
  - Abdominal circumference (AC) is used to assess fetal size
- If the ultrasound due date differs from the menstrual date by more than 2 standard deviations
  - Review previous scans to assess for early fetal growth restriction
  - If no previous scans and the dates are uncertain, then a revised due date together with a predicted range should be given

Fetal Anatomy

- Careful assessment
- Have a checklist
- Even minor abnormalities can be significant
- If incomplete then record and rebook to complete
  - Beware the incomplete morphology scan!!!!!!
- Fetal sex determination is rarely medically indicated
  - Not 100% accurate
  - NIPS result

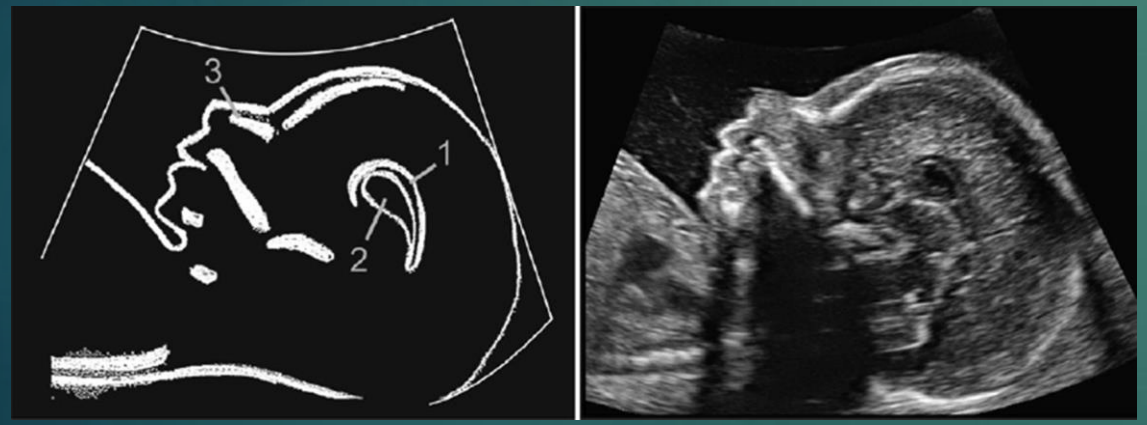
Checklist

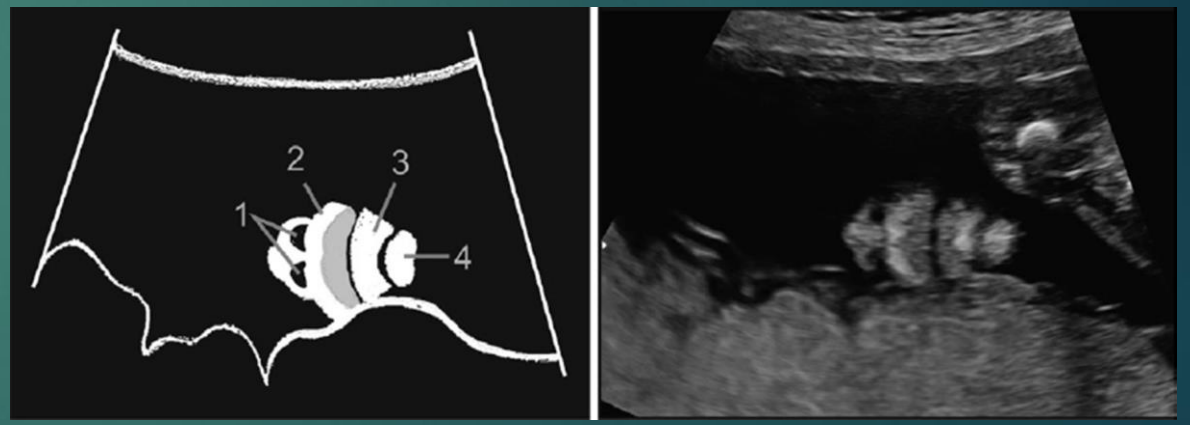
- Head
  - Falx, CSP, Skull bones
  - Lateral ventricles (<10mm), Cisterna Magna (<10mm)
  - Cerebellum (= GA +/- 2 weeks)
  - Nuchal fold (< 6mm)
  - Corpus callosum



Checklist

- Face
  - Orbits, nose, palate, mandible, lips, nasal bone, profile

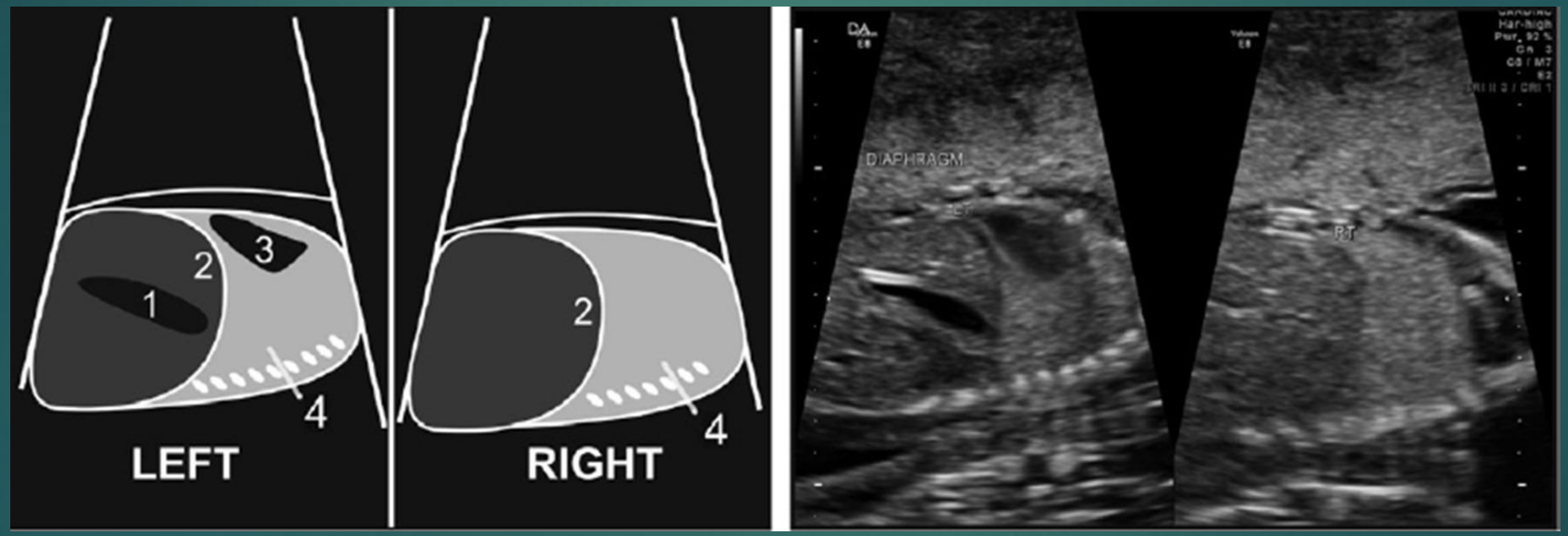




Bethune M, Alibrahim E, Davies B, Yong E. A pictorial guide for the second trimester ultrasound. Australasian journal of ultrasound in medicine. 2013 Aug;16(3):98-113.

Checklist

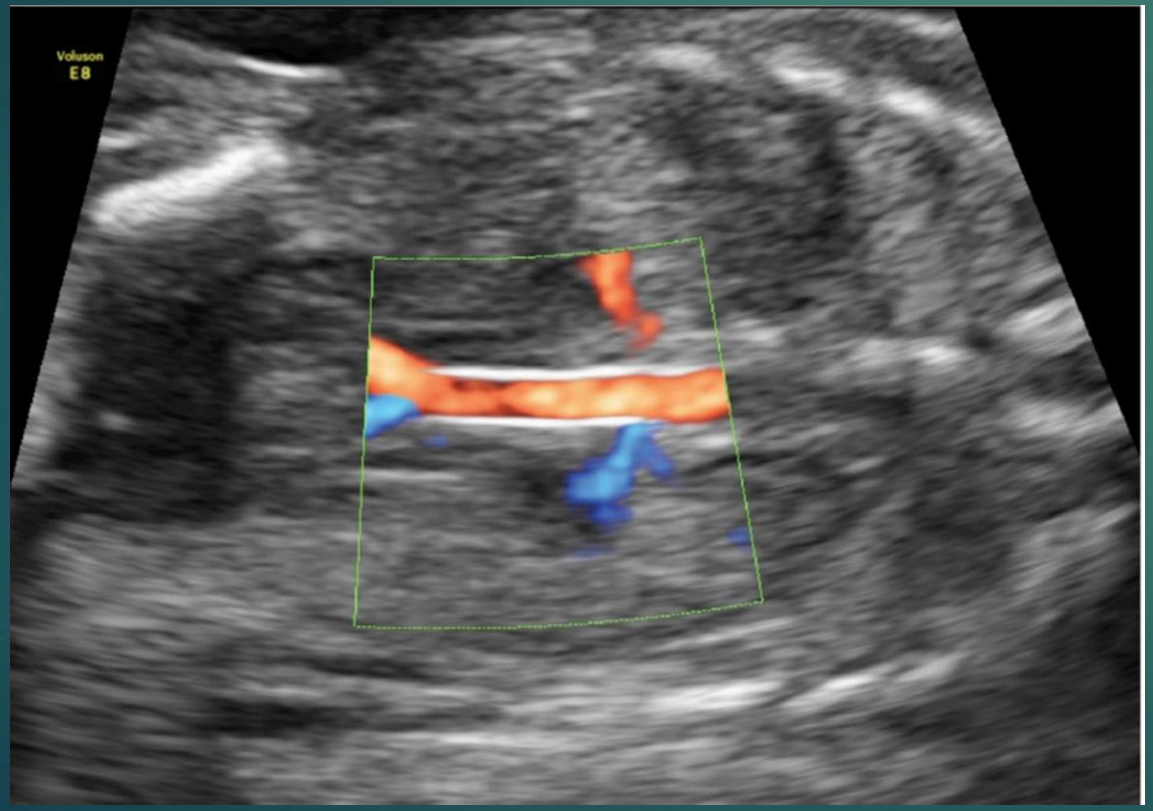
- Thorax
  - Lungs
  - Diaphragm (right and left)



Bethune M, Alibrahim E, Davies B, Yong E. A pictorial guide for the second trimester ultrasound. Australasian journal of ultrasound in medicine. 2013 Aug;16(3):98-113.

Checklist

- Abdomen
  - Stomach (left - situs), abdominal wall, cord insertion (cord – 3 vessels)
  - Kidneys (right & left), bladder

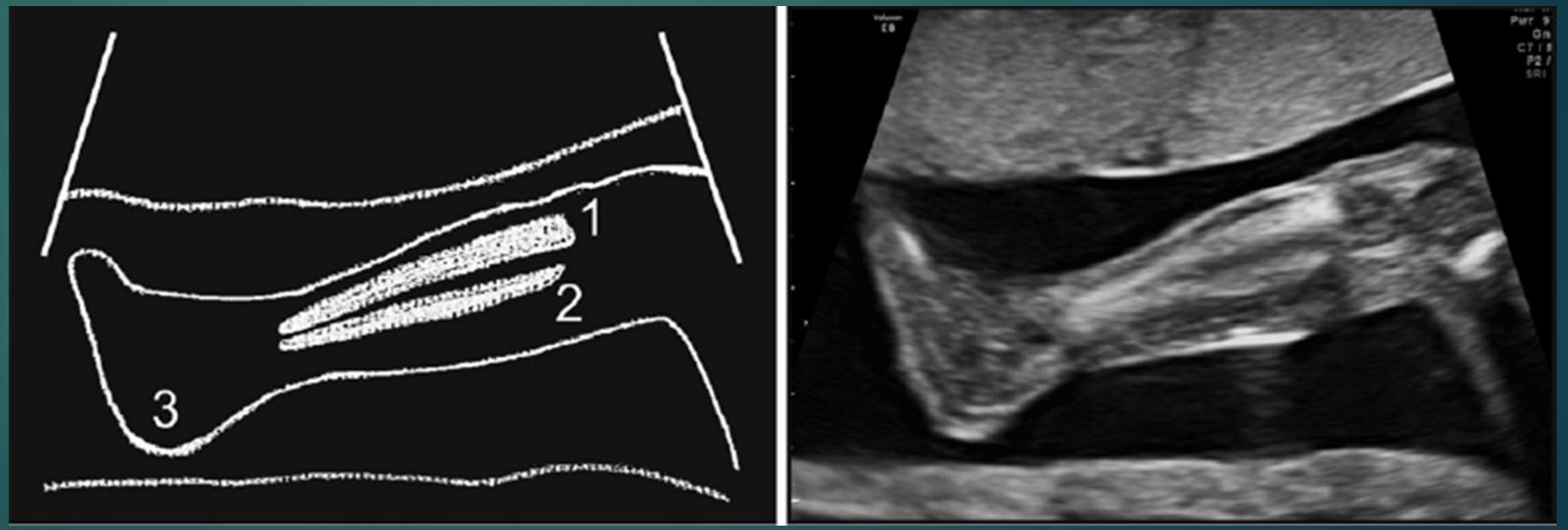


Checklist

- Spine
  - Ossification centres (sagittal, coronal, axial)
  - Skin line

Checklist

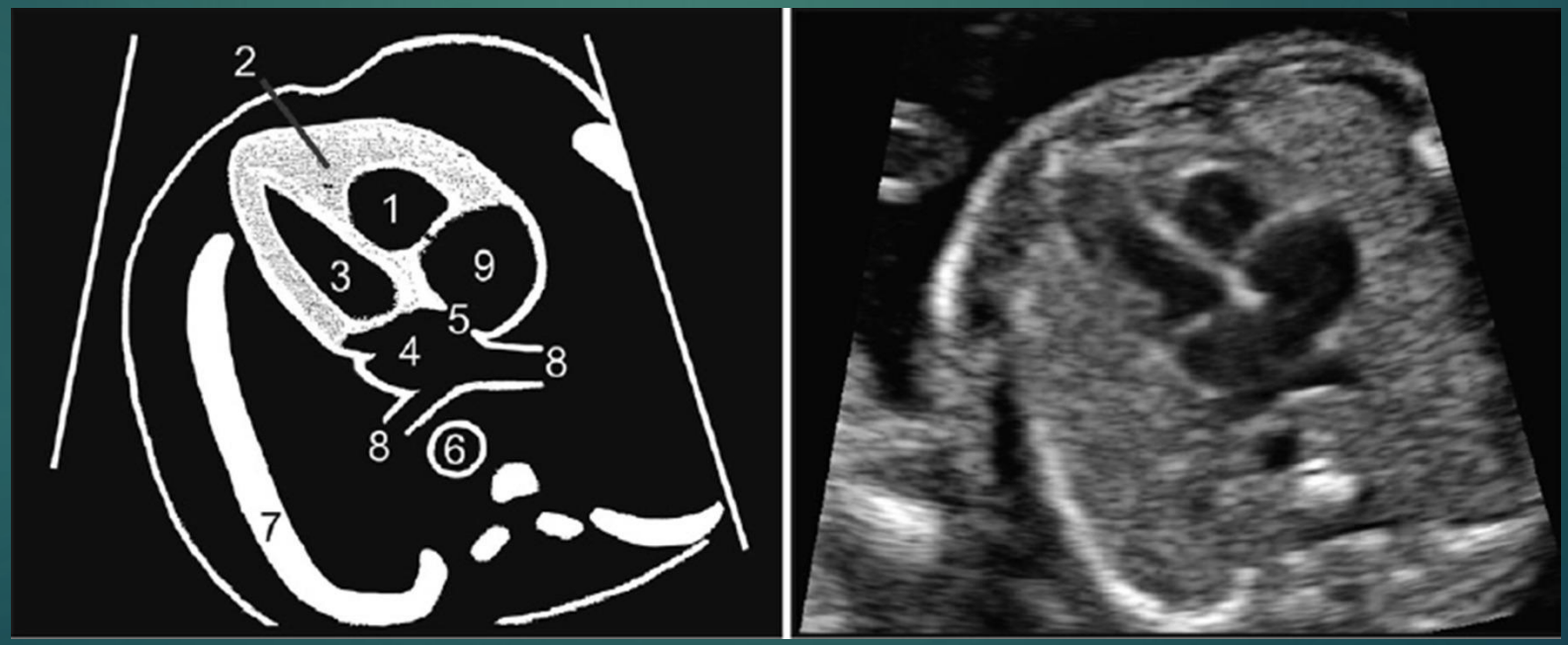
- Extremities
  - Long bones
  - Hands/Fingers
  - Feet/Toes



Bethune M, Alibrahim E, Davies B, Yong E. A pictorial guide for the second trimester ultrasound. Australasian journal of ultrasound in medicine. 2013 Aug;16(3):98-113.

Checklist

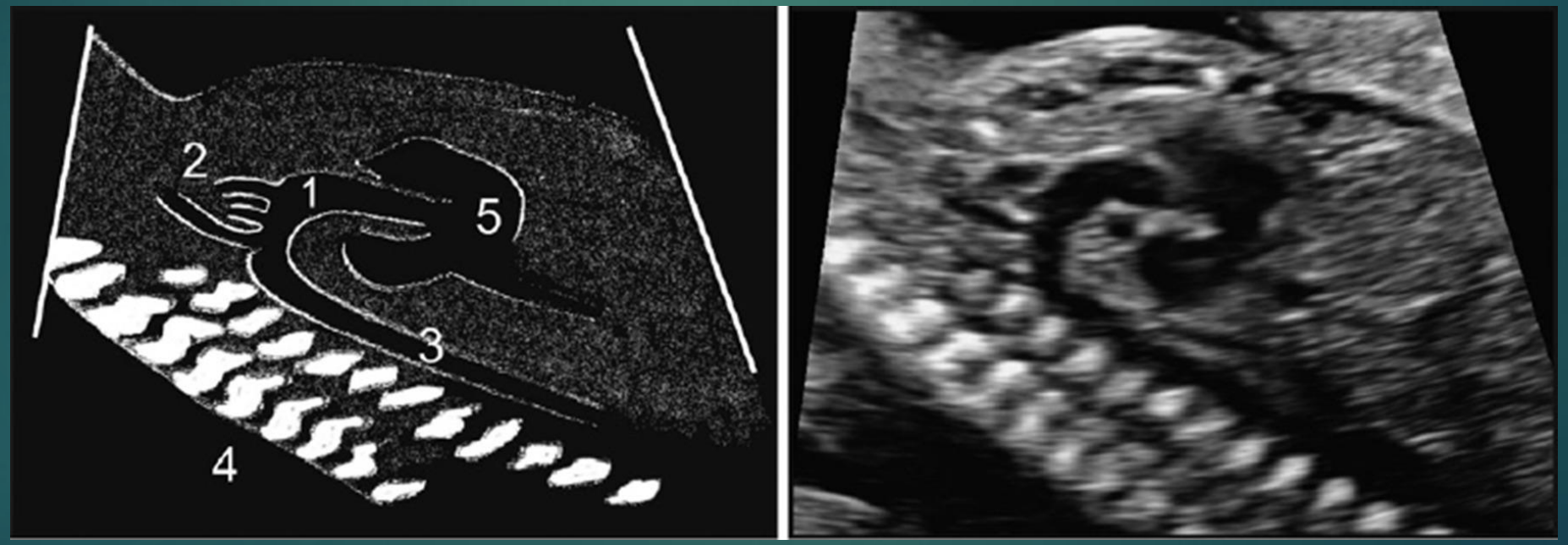
- Heart
  - Heart motion, position, axis, 4-Chambers
  - Interventricular septum, foramen ovale
  - Mitral valve, Tricuspid valve



Bethune M, Alibrahim E, Davies B, Yong E. A pictorial guide for the second trimester ultrasound. Australasian journal of ultrasound in medicine. 2013 Aug;16(3):98-113.

Checklist

- Great vessels
  - LVOT, RVOT
  - 3 vessel view (pulmonary artery, transverse aorta, superior vena cava)
  - Aortic arch, Ductal arch



Bethune M, Alibrahim E, Davies B, Yong E. A pictorial guide for the second trimester ultrasound. Australasian journal of ultrasound in medicine. 2013 Aug;16(3):98-113.

Checklist

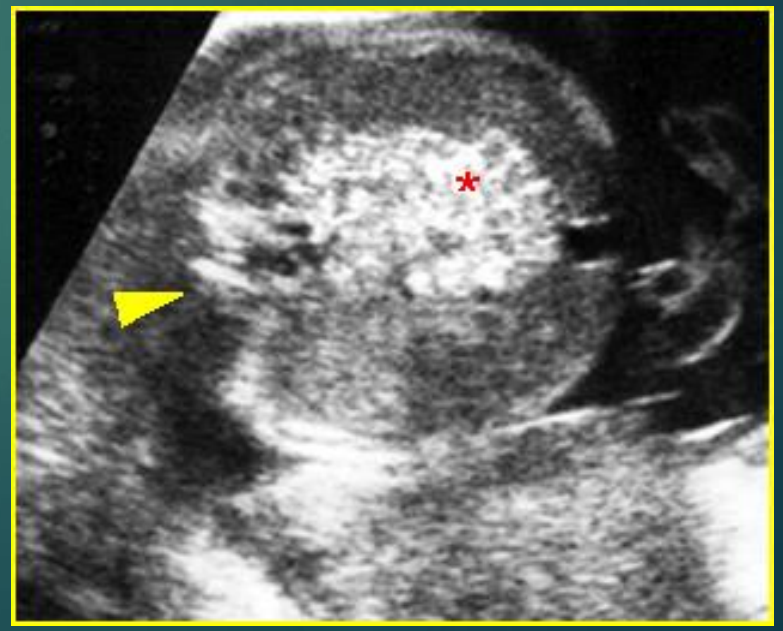
- Amniotic fluid volume
  - Not formally measured
- Placental location
  - High/low/placenta praevia
    - If low/praevia – reassess in the third trimester (32 weeks)
    - If vasa praevia – refer to MFM
  - Distance from internal os
  - Previous CS
    - If suspected placenta accreta spectrum – refer to MFM
- Cervical length – more on this later
- Maternal adnexa

Soft Ultrasound Markers

- Soft ultrasound markers were initially described as a screening method for trisomy 21 to improve the detection rate (DR) over that based on age-related risk alone
- Minor ultrasound findings identified in the mid- trimester of pregnancy that most commonly do not represent a structural abnormality and may be normal variants but are noteworthy because of their association with an increased aneuploidy risk
- Soft markers found on routine morphology scan need review and confirmation by an experienced clinician
- Take into account
  - A priori risk
  - Aneuploidy screening
  - Presence of multiple ”soft-markers”

Common soft markers

- Intracardiac echogenic focus
  - Small echogenic area (<6mm) in either cardiac ventricle
  - Calcification of papillary muscles
  - No increased risk
- Echogenic bowel
  - Most echogenic bowel is not echogenic (as bright as bone)
  - Antepartum haemorrhage
  - LR T21 1.7
  - Congenital infection
    - CMV, Toxoplasmosis screen
  - Cystic fibrosis
    - Parental carrier screening +/- invasive testing
  - Fetal growth restriction
    - Growth surveillance in third trimester



www.fetus.net

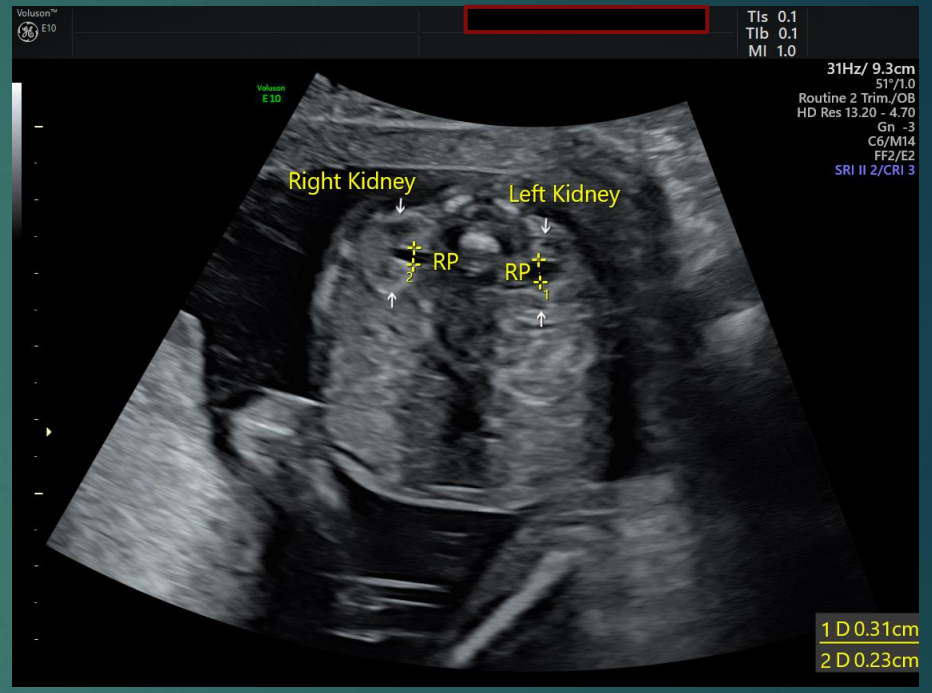
Common soft markers

- Choroid plexus cyst
  - a small, fluid-filled structure within the choroid of the lateral ventricles of the fetal brain
  - single or multiple, unilateral or bilateral, and most often are <1 cm in diameter
  - Associated with T18 – but will have other ultrasound findings
  - In isolation – LR T18 <2
  - Does not alter risk of T21

www.fetus.net

Common soft markers

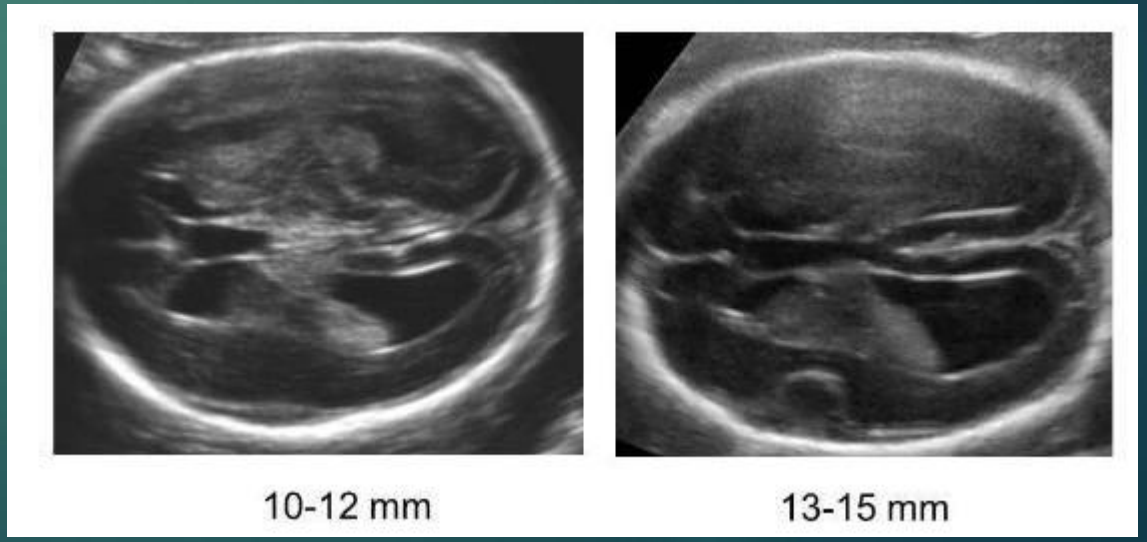
- Absent/hypoplastic nasal bone
  - <2.5th centile on age specific chart
  - LR T21 – 6.6
- Short humerus/short femur
  - Sonographer dependent
  - <2.5th centile
  - No increase for T21
  - Assess all long bones – skeletal dysplasia
- Mild hydronephrosis
  - Minimum AP diameter of renal pelvis 4-7 mm.
  - No increased risk T21
  - Repeat assessment in third trimester to determine neonatal management



* Dr Danny Ngong

Common soft markers

- Thickened nuchal fold
  - <6mm
  - LR T21 3.8
- Mild ventriculomegaly
  - Diameter of lateral ventricles 10mm to 15mm
  - Causes – structural, infection, chromosomal, idiopathic
  - Need to determine if isolated (90+% normal neurodevelopment)
  - Work-up
    - Repeat US
    - Offer invasive testing
    - CMV and Toxoplasmosis serology
    - Fetal MRI



www.isuog.org

The umbilical cord

- Contains 2 arteries and 1 vein
- Single umbilical artery not associated with increased risk of aneuploidy
  - Can be associated with renal and cardiac anomalies

- Cord insertion to placenta should be central/paracentral
  - Marginal insertion associated with fetal growth restriction and adverse outcome
  - Velamentous insertion as above and vasa praevia
- Recommend third trimester growth surveillance

Third trimester ultrasound

- Fetal growth and wellbeing
  - Biometry assessment
  - Liquor volume
  - Doppler assessment (umbilical artery, middle cerebral artery, Ductus venosus)
  - Biophysical profile
    - Tone,
  - Overview of anatomy

Third trimester ultrasound

- Criteria
  - Because we feel like it!
  - Placenta location
  - Vasa praevia
  - Pregnancy history
  - Reduced fetal movements
  - Hypertensive disorder
  - SGA/FGR
  - Umbilical cord – SUA, marginal insertion, velamentous insertion
  - Etc, etc, etc
- Remember ALARA

Preterm Birth Prevention

- Background
- Aetiology
- Australian Preterm Birth Prevention Collaborative
- Preterm birth screening
- Preterm Birth Prevention Strategies
- Preterm Birth Prevention Clinic at Joan Kirner
- Why do we do it?

Background

- Birth before 37 completed weeks (and after 20 weeks)
- Rate of preterm birth in Australia is around 7%
  - 26,000 Australian babies born preterm each year
  - Rates amongst Aboriginal and Torres Strait Islanders is approximately 14%
- 25% of PTB in the developed world is iatrogenic
  - multiple pregnancy a large contributor – 50% of twins born preterm and 90% of triplets
- Mortality from PTB – over a third of the deaths in the first year of life
- Preterm birth is associated with:
  - long-term neurological disability (including cerebral palsy)
  - admission to neonatal intensive care
  - severe morbidity in the first weeks of life
  - prolonged hospital stay after birth
  - readmission to hospital in the first year of life
  - increased risk of chronic lung disease

Aetiology

- Multifactorial with multiple possible pathways:
  - Progesterone withdrawal
  - Inflammation
  - Immunological
  - Infection
  - Cervical
  - Uterine distension
  - Abruption
  - Abnormal implantation

Aetiology

- Prior OB/Gyn history
  - Prior PTB (15-30% risk of recurrence)
  - Prior cervical surgery/fully dilated CS
  - Multiple D and Es
  - Uterine anomalies
- Maternal social and behavioral demographics
  - Lower SES
  - Smoking/drug misuse/alcohol
  - Short interpregnancy interval <6months
- Maternal and pregnancy characteristics
  - IVF
  - Multiple gestation
  - Polyhydramnios
  - Maternal medical conditions eg diabetes
  - Infection (BV, trich, chlamydia, gono, syphilis, UTI, intrauterine infection, severe viral infection)

Australian Preterm Birth Prevention Alliance

- In 2022 Joan Kirner Women's and Children's Hospital joined the "Every Week Counts National Preterm Birth Prevention Collaborative"
- 50+ other hospitals Australia wide.
- We committed to reducing the rate of preterm and early term birth in Australia by 20% by March 2024.

The key strategies to **prevent preterm birth**

More than 26,000 Australian babies are born too soon each year.

New research discoveries have led to the development of key strategies to safely lower the rate of preterm birth and are continuing to make pregnancies safer for women and their babies.

No pregnancy to be ended until at least 39 weeks unless there is obstetric or medical justification.

Measurement of the length of the cervix at all mid-pregnancy scans.

Use of natural vaginal progesterone (200mg each evening) if the length of cervix is less than 25mm.

If the length of the cervix continues to shorten despite progesterone treatment, consider surgical cerclage.

Use of vaginal progesterone if you have a prior history of spontaneous preterm birth.

Women who smoke should be identified and offered Quitline support.

To access continuity of care from a known midwife during pregnancy where possible.

AUSTRALIAN
Preterm Birth
Prevention
ALLIANCE

These strategies have been approved and endorsed by the Australian Preterm Birth Prevention Alliance.

Screening

- Sonographic measurement of cervical length is an indispensable part of routine screening for preterm birth
- It is recommended that all pregnant women should have cervical length measured at the mid-trimester morphology scan
  - Consistent with guidance from ASUM and RANZCOG
- Women without risk factors for preterm birth with singleton pregnancies have initial transabdominal (TA) screening of cervical length at the mid-trimester fetal morphology scan.
- If the cervix is ≤ 35mm on TA assessment (or cannot be clearly seen TA), then a transvaginal (TV) assessment is undertaken
- For women at high risk of preterm birth (for example a previous birth before 32 weeks) **transvaginal CL-assessment** between 16 and 24 weeks as first-line screening test is recommended
- Document the cervical length and method of measurement (TA of TV) on the ultrasound report
- If the cervix is < 25mm on TV assessment, then please contact the Maternity Assessment Centre (MAC) Midwife in Charge so that the woman can be promptly reviewed that same day and commence natural vaginal progesterone pessaries.

Preterm Birth Prevention Clinic

7.1 Criteria for Referral to Preterm Labour Surveillance Clinic

Women who are deemed to be at risk of preterm birth should be managed as a **Red Pathway** and not suitable for ongoing care at **BMM.**

Past medical history:

- Previous spontaneous pre-term or premature rupture of membranes birth prior to 32 weeks;
- Previous spontaneous mid-trimester delivery (16-26 weeks) where the **obstetric consultant** is uncertain about the merits of a cerclage (or the patient has declined a cerclage);
- Previous cervical surgery:
  - 2 or more LLETZ procedures;
  - Cone biopsy/trachelectomy;
  - More than 4 procedures requiring cervical dilatation, including:
    - Dilation and Curette;
    - Instrumentation for IVF (e.g. embryo transfers).
- Cervical trauma;
- Congenital Uterine Malformations:
  - Bicornuate uterus;
  - Subseptate uterus;
  - Unicornuate uterus;
  - Uterine didelphys.
- Previous pregnancy requiring progesterone therapy for prevention of preterm labour in the context of a short cervix*.

***Women with previous pregnancies requiring an emergency cerclage should be recommended to have an elective vaginal cerclage at 13-14 weeks gestation (to be arranged and managed by the home obstetric team).**

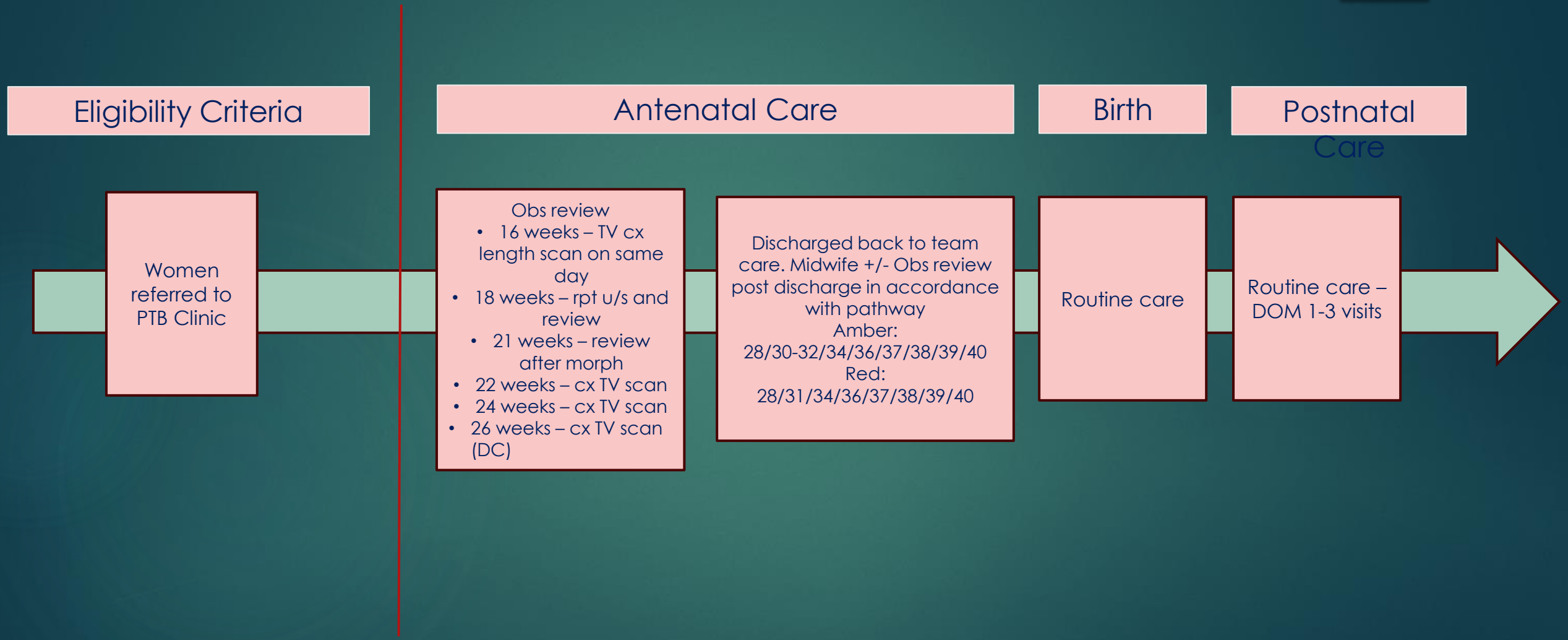
Women with previous risk factors should be managed as a **Red Pathway** and referred to the Preterm Labour Surveillance clinic before 14 weeks gestation. The women should be seen in the team clinic for a midwifery and obstetric booking appointment for a detailed baseline assessment and to offer aneuploidy screening prior to the visit in the Preterm Labour Surveillance clinic. Pregnancy and birth records from other hospitals should be obtained prior to the Preterm Labour Surveillance Clinic appointment.

7.1.1 Short Cervix Identified at Midtrimester Ultrasound

If Cervical length less than 25 mm is detected by transvaginal scan at routine midtrimester ultrasound at 17-22 weeks:

- Patient should be immediately referred to MAC for review and ongoing plan.
  - Move to **Red Pathway**
  - Progesterone Pessaries should be commenced immediately (ideally within 24 hours of the ultrasound finding)
  - Immediate referral to the Preterm Labour Surveillance Clinic via ISBAR Inpatient referral form (AD19) to the bookings office should be done as soon as cervical shortening is identified
  - **BMM:** Escalate to on call consultant or Senior Reg to commence progesterone pessaries and refer to **JKWC** for ongoing care.

Preterm Birth Prevention Clinic



Interventions to prevent preterm birth

- Primary prevention: for the whole population
  - Appropriate spacing between pregnancies – wait at least 12 months between delivery and conception – cohort study evidence
  - Stop smoking – huge benefits but exact improvement of PTB rates unproven
  - Optimise BMI – overall benefits but no clear data on PTB prevention
  - Treat genitourinary infection/urinary tract infection
  - Women with BV and a previous PTB may benefit from BV screening and treatment but insufficient data to recommend as routine practice
  - Single embryo transfer in IVF
  - Aspirin- ASPIRIN trial 2020, IPD metaanlysis 2017
    - Aspirin reduced PTB <37 (11.6% versus 13.1%) and <34w (3.3% and 4%)
  - Omega 3 – Cochrane review 2018 some benefit

Interventions to prevent preterm birth

- **Secondary prevention – women at risk of preterm birth**
- Progesterone – reduces the risk of recurrent PTB by 30% (20%)

- 2013 meta-analysis Cochrane Crowther 11 trials 1899 women progesterone resulted in
  - RR birth <34w 0.31
  - RR birth <37w 0.55
  - And as a result less neonatal death, ventilation, NEC, NICU admission

- 2018 meta-analysis Jarde 40 trials
  - Vaginal progesterone was the only intervention with consistent effectiveness for preventing preterm birth (<34w and <37w and NND) overall in singleton at risk pregnancies.
  - In those with a hx of previous PTB vaginal prog decreased significantly PTB <34w and <37w although not NND.
  - In those with short cervix PTB reduced risk of PTB <34w but less strong data.

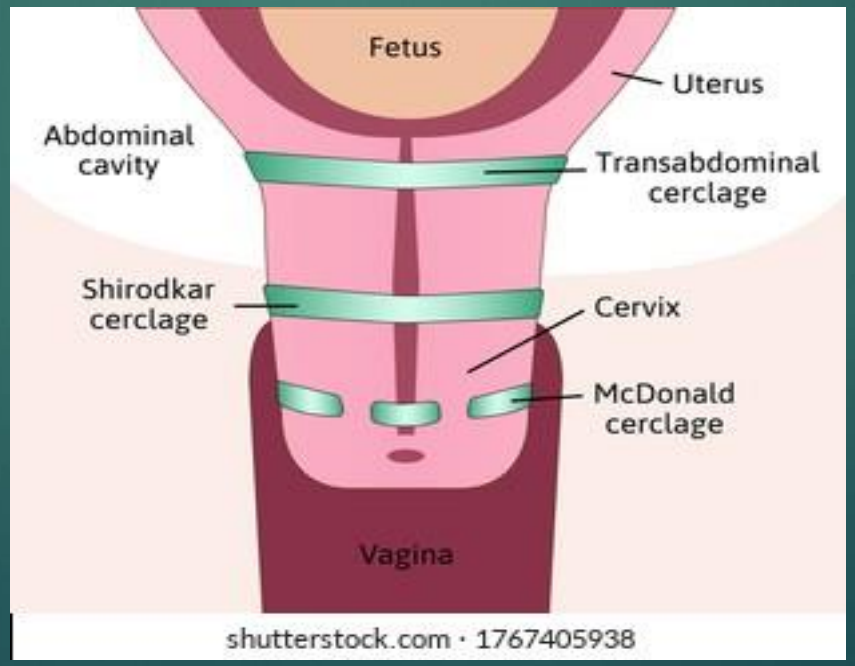
- 2022 meta-analysis Care 40 trials 13310 women
  - For preterm birth <34 week and with placebo or no treatment as the comparator, vaginal progesterone was associated with fewer women with preterm birth <34 weeks (odds ratio 0.50, 95% credible interval 0.34 to 0.70, high certainty of evidence).

Interventions to prevent preterm birth

Note: Pregnancies where the benefit of progesterone supplementation is unclear include:

- Women at high risk of PTB but without a short cervix or a prior history of a singleton spontaneous PTB
- Singleton with previous twin preterm birth
- Positive fetal fibronectin
- After cerclage (but many would just continue)
- Maintenance therapy after threatened preterm labour

- Cerclage
  - McDonald: A transvaginal purse-string suture placed at the cervical isthmus junction, without bladder mobilization
  - Shirodkar (high transvaginal): A transvaginal purse-string suture placed following bladder mobilization, to allow insertion above the level of the cardinal ligaments
  - Transabdominal: A suture performed via a laparotomy or laparoscopy, placing the suture at the cervicoisthmic junction

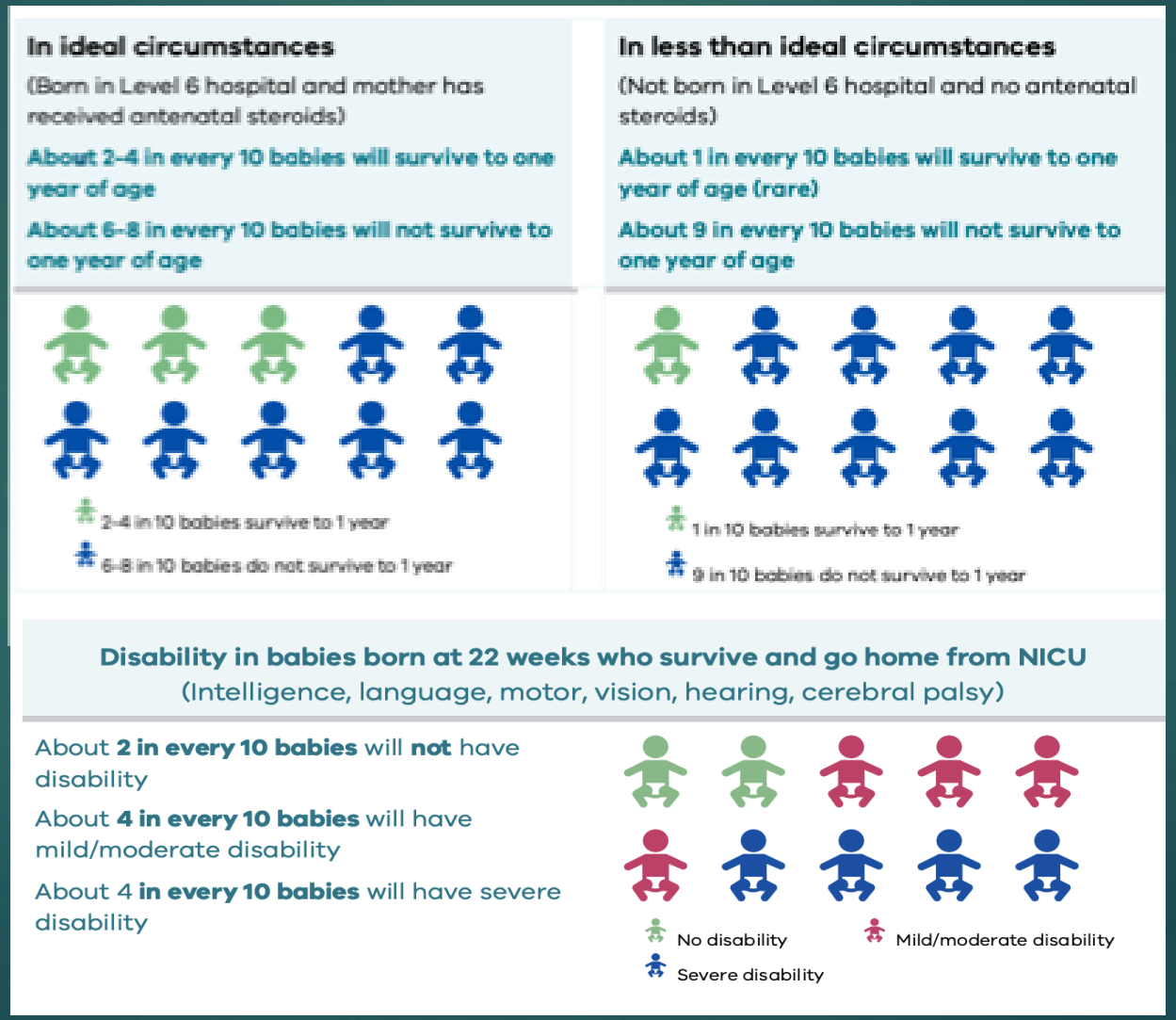


Interventions to prevent preterm birth

- Berghella metanalysis 2011
  - In women with a singleton, previous PTB and CL <25mm, cerclage significantly prevents preterm birth and composite perinatal mortality and morbidity
  - History indicated (based on previous midtrimester loss) supported by very old RCT 1993
    - Should offer to women at high risk with three or more pregnancies ending before 37w
    - In practise a hx indicated cerclage is offered after one classic midtrimester cervical insufficiency loss.
- US indicated cerclage
    - For women with no prior PTB but a short cervix, then progesterone should be commenced as above
    - Placement of a cerclage may be helpful in those with TV US cervical length <10mm
  - This needs to be an individualised decision taking into consideration the patients values and preferences
  - Berghella meta-analysis IPD 2017 in singleton gestations without prior spont PTB but with cervix <25mm in the second trimester
    - cerclage does not seem to prevent PTB or improve neonatal outcome.
    - However, cerclage seems to be efficacious at CL <10mm
- Care meta-analysis 2022
  - Shirodkar cerclage showed the largest effect size (0.06, 0.00 to 0.84), but the certainty of evidence was low.

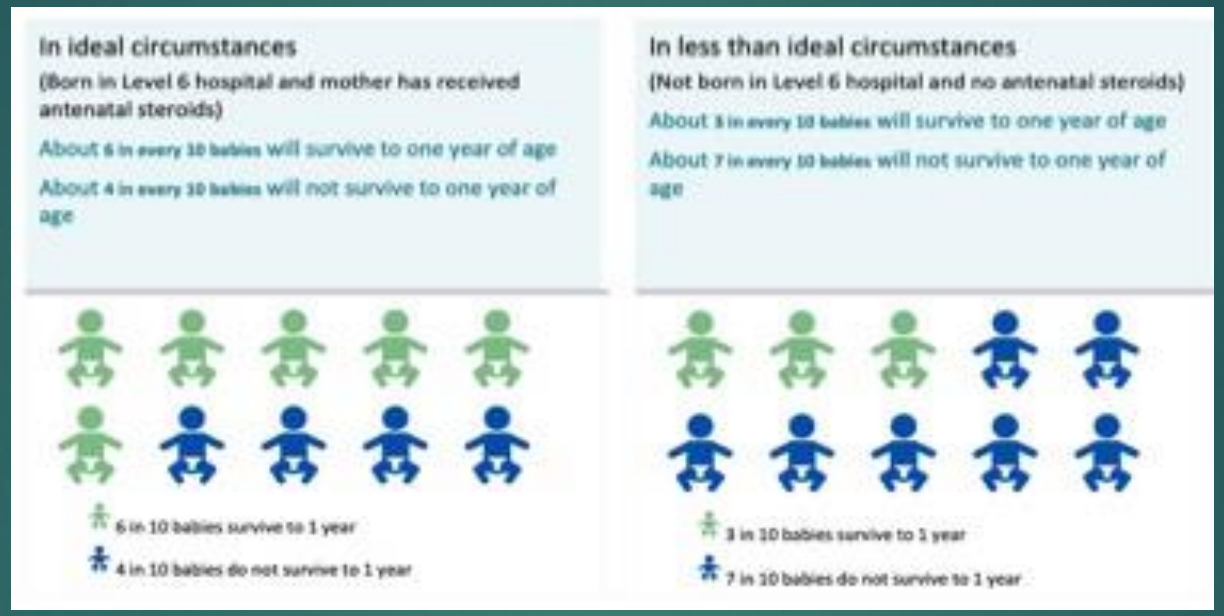
Why do we do it?

- 22 weeks



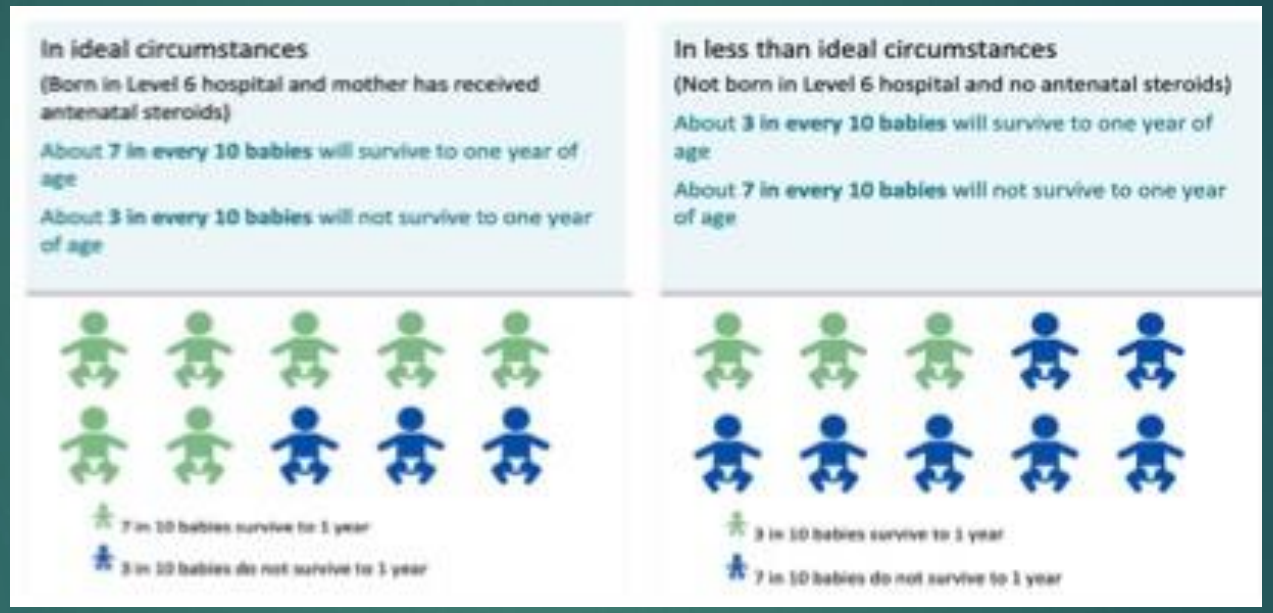
Why do we do it?

- 23 weeks



Why do we do it?

- 24 weeks



Resources

- Mizia K, Campbell Westerway S, Robertson M, Parry E, Paoletti D, Perry D, Ramkrishna J, Macpherson L, Condous G. Guidelines for the performance of the first trimester ultrasound. Australasian Journal of Ultrasound in Medicine. 2018 Aug;21(3):179-82.
- ASUM standards of practice: Guidelines for the Performance of Second (Mid) Trimester Ultrasound
- Prabhu M, Kuller JA, Biggio JR, Society for Maternal-Fetal Medicine: Evaluation and management of isolated soft ultrasound markers for aneuploidy in the second trimester. American Journal of Obstetrics and Gynecology. 2021 Oct 1;225(4):B2-15.
- www.pretermalliance.com.au/Our-Research/Clinical-Guidelines
- www.safercare.vic.gov.au/best-practice-improvement/clinical-guidance/maternity/preterm-labour
- www.safercare.vic.gov.au/best-practice-improvement/clinical-guidance/neonatal/extreme-prematurity