Document No: **2396208**

TITLE: Preterm Labour (PTL): Prevention and Management of PTL

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1. Purpose

This guideline outlines the expected management of women at risk of, and presenting with threatened or active (established) preterm labour at Te Whatu Ora Lakes.

In recognition of Te Tiriti o Waitangi (the Treaty of Waitangi) and the Crown's special relationship with Maori, Te Whatu Ora – Lakes, is committed to acknowledging the Treaty by working in partnership with Maori. Staff involved in implementing this policy should be aware of the Tiriti o Waitangi Policy (EDMS 40583).

2. Scope

All Te Whatu Ora Health New Zealand Lakes medical and midwifery staff and LMC's working within the Lakes Maternity Service and the women/people they are providing care to.

3. Definitions

ACMM	Associate Clinical Midwife Manager (Waikato)
APH	Antepartum Haemorrhage
BU	Birthing Unit
CMM	Clinical Midwife Manager
CRP	C-Reactive Protein
CTG	Cardiotocography
DAU	Day Assessment Unit
DCC	Delayed Cord Clamping
FBC	Full Blood Count
fFN	Fetal Fibronectin
FHR	Fetal Heart Rate
G&H	Group And Hold
IDC	Indwelling Catheter
IV	Intravenous
LLETZ	Large Loop Excision Of Transformation Zone
LMC	Lead Maternity Carer
MEWS	Maternity Early Warning Score
MSU	Mid-Stream Urine
MVS	Maternity Vital Sign
O&G	Obstetrics & Gynaecology
PPROM	Preterm Pre-Labour Rupture Of Membranes
PTB	Preterm Birth
PTL	Preterm Labour
SCBU	Special Care Baby Unit
UTI	Urinary Tract Infection
WCF	Women Children And Family

Preterm Labour (PTL):

Refers to the onset of labour < 37+0 weeks gestation
Clinically it is determined by regular uterine contractions with accompanied significant cervical dilatation of ≥ 3cm.

Threatened PTL:

Defined as uterine contractions but with no or limited evidence of cervical change at < 37+0 weeks gestation. Clinically it is difficult to differentiate those with threatened PTL who will go onto PTL and birth and those that will not.

4. Background

Preterm birth (PTB), defined as birth before 37 completed week's gestation (up to 36+6 weeks), is one of the most significant causes of perinatal morbidity and mortality. Preterm labour is diagnosed by regular painful uterine contractions and evidence of cervical change. It may be associated with rupture of membranes or positive fetal fibronectin (fFN) test.

Incidence is between 5-10% in most developed countries. Preterm birth is the leading cause of neonatal death and major morbidity. It imposes additional risks on infant, child and life-long health of the off-spring. It results in 75-90% of all neonatal deaths, not due to lethal congenital malformations, and 50% of childhood neurological disabilities, including cerebral palsy, blindness and deafness.

Preterm babies are ten times more likely to die than the babies born at term. The risk of death and neurosensory disability increases with decreasing gestational age. PTB is associated with psychosocial and emotional effects within the family and huge cost implication on the healthcare system.

Prevention of PTB has the potential to reduce adverse outcomes. Management involves identification of high-risk women where preventative treatments can be offered; and accurate risk stratification for those who present with symptoms, to identify which women will benefit from treatments to optimise outcomes if PTB occurs e.g. antenatal corticosteroids.

Of women presenting with symptoms of PTL, 60 - 70% will go on to deliver at term and only approximately 5% deliver within one week of presentation. Clinical assessment of threatened PTL alone is a relatively poor predictor of preterm birth. The use of adjunct tests including vaginal biomarkers such as fetal fibronectin (fFN) or transvaginal ultrasound measurement of cervical length, which have strong negative predictive values, allows us to rule out the risk of preterm birth in many women and limit the use of unnecessary antenatal admissions and interventions.

Special consideration should be made for those women who have barriers to accessing maternity services for assessment and management, for example those who live remote to Rotorua Hospital. Multidisciplinary conversations between the woman, her LMC, Obstetric and Neonatal teams need to occur early to identify these barriers and mitigate any risk to the woman, pepi and whanau.

Maori, Pacific and Indian women have higher rates of perinatal related mortality from spontaneous premature birth compared to "all other". Health Professionals should therefore consider these inequities when assessing and managing these women and their whanau (PMMRC, 2019).

5. Risk Factors for Preterm Birth

Identification of women at high-risk of PTB is important as the risk of PTB after one and two previous PTB is 15% and 41% respectively. Most people with one previous preterm birth have their next birth at term. A significant proportion of preterm births are provider initiated (also known as medically indicated or iatrogenic) due to pre-eclampsia and growth restriction.

Risk factors for spontaneous PTB include;

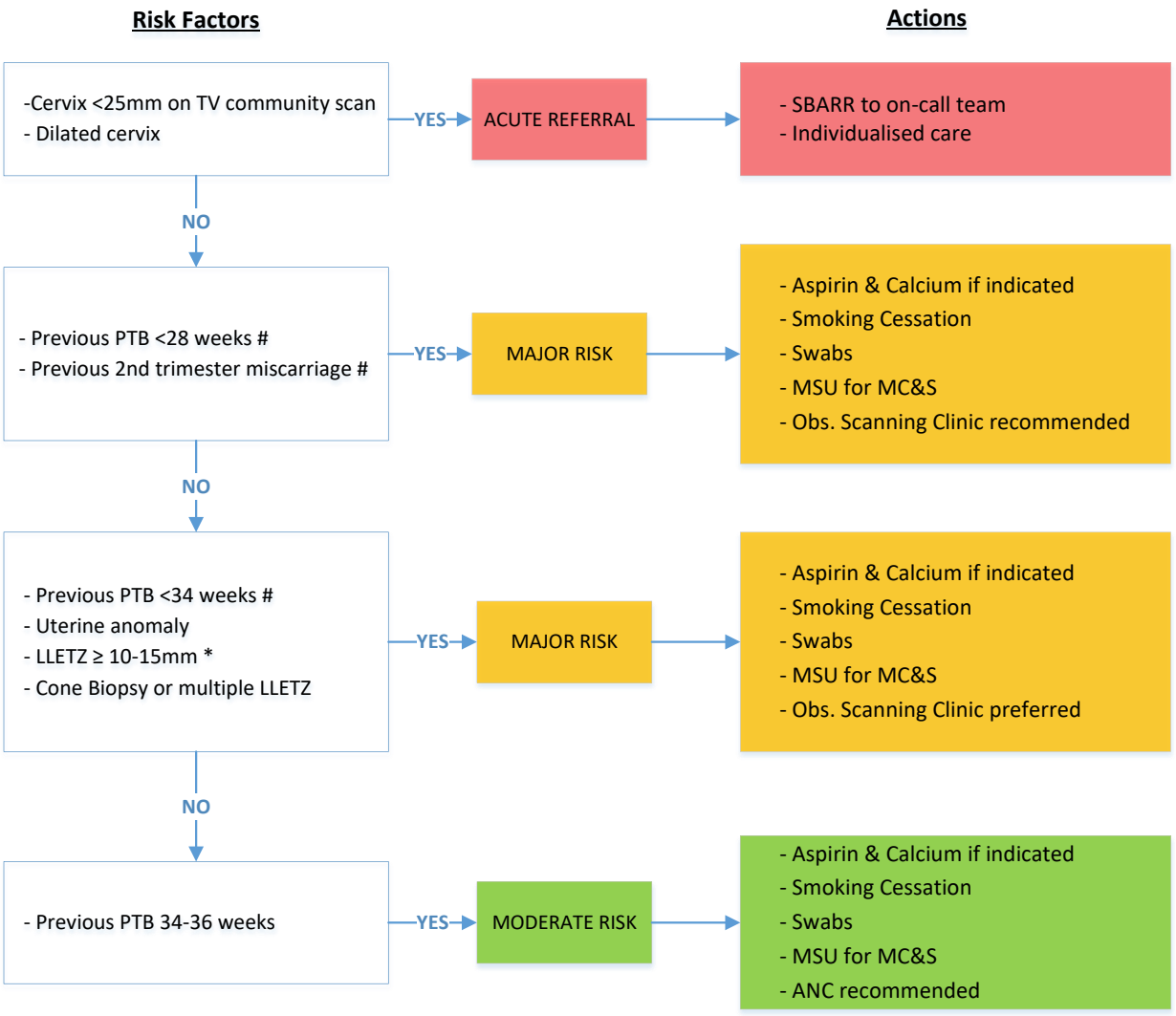
- Previous PTL/PPROM <37 weeks' gestation
- Previous spontaneous second trimester loss
- Cone biopsy or large loop excision of the transformation zone (LLETZ) > 10mm
- Shortened cervix ≤ 25mm < 24 weeks gestation in the current pregnancy
- Multiple uterine instrumentations e.g. surgical termination of pregnancy, evacuation of retained products of conception
- Congenital uterine and/or cervical anomaly
- Over distended uterus – multiple pregnancy, polyhydramnios
- Antepartum haemorrhage and recurrent bleeding in first trimester
- Smoking and/or illicit drug use

6. Prevention of Pre-Term Birth – Primary Care in Early Pregnancy

High quality antenatal care is part of preterm birth prevention. Once risk factors for PTB are identified it is recommended that the LMC or GP;

- Offer **smoking cessation** advice/referral to cessation services at 'Referralhub@manaakiora.org.nz'
- **Prescribe aspirin and calcium** to those with major risk factors for SGA/PET. See: Prevention, detection and management of the small for gestational age fetus (1561674) AND Pre-Eclampsia/Eclampsia (196593) guidelines.
- **Midstream urine** for MC&S for all women in early pregnancy – treat if bacteria present with colony count ≥10^5 even if asymptomatic and recheck one week later
- **Vaginal swab for sexually transmitted infections (STIs)** for all women in early pregnancy with vaginal swabs – treat if any STI identified, ensuring contact tracing and test of cure. National guidance on this topic can be found here: https://sti.guidelines.org.nz/
- There is **no need to screen for bacterial vaginosis** in the absence of symptoms i.e. abnormal discharge. If bacterial vaginosis is identified incidentally, treatment is only recommended if symptomatic, irrespective of whether there are other risk factors for preterm birth. Whilst bacterial vaginosis is significantly associated with spontaneous preterm birth, there is evidence from a Cochrane systematic review that whilst antibiotic treatment eradicates bacterial vaginosis, there is no impact on risk of preterm birth.
- **refer to Antenatal Clinic** (as per Maternity Referral and Models of Care (2499420))

Risk Factors for PTB – Early Pregnancy Care



Key:
Without other explanation/cause
* No term births since

N.B.: Unless other risk factors are present, the following indications do not warrant serial ultrasound surveillance of the cervical length: multiple gestation, single LLETZ < 10mm.

6.1 Cervical Length Monitoring

Cervical length is associated with the risk of spontaneous PTB and can therefore be used in risk prediction. The rate of PTB < 32 weeks related to cervical length in one study was 1% if cervix > 25 mm, 4% if cervix < 15 mm and 78% with cervical length of < 5 mm respectively in one study (Heath et. al, 1998). A cervical length < 25 mm in women with previous cone biopsy is associated with increased risk of PTB < 35 weeks (likelihood ratio is 4.7)

- Those with pre-existing risk factors may be referred for serial transvaginal scan surveillance of cervical length. This may be done through the OSC or the ANC with community scans.
- It is reasonable to commence transvaginal scan surveillance of cervical length from 16 and until 24 weeks of gestation.

- The frequency should be individualised according to level of risk and cervical length. Possible regimes might include, but are not limited to:

  If > 40mm, repeat in 3 weeks
  If > 30mm, repeat in 2 weeks
  If < 30mm and shortening, repeat in 1 week

Those who may require this level of care includes:

- Women with history of spontaneous PTB/PPROM (< 33+6 weeks') or second trimester loss.
- Congenital uterine anomaly.
- History of a cone biopsy, or one LLETZ procedure, with known depth excision ≥10mm, or more than one LLETZ procedure of any depth of excision

6.2 Utrogestan/Progesterone

Progesterone promotes pregnancy and uterine quiescence. There is good evidence that progestagenic agents such as 17-Hydroxy progesterone and natural progesterone reduce the risk of preterm labour. The drug of choice is progesterone 100 mg (Utrogestan® Capsules) inserted vaginally once a day until 34 weeks of gestation.

6.3 Cervical Cerclage

Cervical cerclage will provide a degree of structural support to a weak cervix, as well as maintain the cervical length and the endocervical mucus plug as a mechanical barrier to ascending infection. See Appendix 1. on cervical cerclage.

- Elective Cerclage

  Women who fulfil the following criteria should be offered elective cerclage;

  History indicated cerclage:
  - women with previous preterm births (< 33+6 weeks') and/or second trimester losses. The greater the number of preterm births, the greater the potential benefit from cerclage. In general, women who have had one previous preterm birth/mid trimester loss will safely avoid cerclage through serial cervical length monitoring.

  Ultrasound indicated cerclage:
  - Women with pre-existing risk factors who develop a short cervix <25mm prior to 24 weeks.
  - Women with an incidental finding of a cervical length <10mm in the absence of risk factors for preterm birth.
  - Women with a twin pregnancy and a cervical length of less than 15mm

- Emergency Cerclage

  An emergency cerclage may be performed (and justifiably out of hours);

  - when the membranes are exposed
  - if cervix is dilated before viability*, and
  - if there is no evidence of significant local or systemic infection.

*As dilation and amount of prolapsed membrane increase, chances of success decrease. The decision to attempt cerclage should be individualised.

7. Care on Presentation with Signs or Symptoms of Pre-Term Birth

History Taking

- Review history for symptoms of labour or other diagnosis which may present with similar symptoms (e.g. APH, UTI, constipation) and review risk factors
- Confirm gestational age

Physical Examination

- Maternal Vital signs (full set as per MEWS Chart)
- Abdominal palpation to detect uterine activity (frequency, duration and strength), assess fetal size and presentation
- Sterile speculum examination. Avoid gel to allow fetal fibronectin (fFN) testing if indicated (see below)
- Look for pooling of liquor, discharge, cervical dilatation and length
- If pooling of liquor present and/or rupture of membrane is confirmed, refer to Pre-Labour Rupture of Membranes Guideline
- Digital vaginal examination if clinically appropriate, and only after speculum examination (+/- fFN). Assess using Bishop Score if cervix < 3cm dilated
- CTG – assess FHR features using CTG Sticker tool, including evidence of uterine activity

Investigations

- MSU
- Consider use of fFN (see below) if ≤ 34+6 weeks
- High vaginal swab for culture
- FBC and CRP
- If fFN is not available and ≤ 34+6 weeks, Obstetric Team may review and consider transvaginal ultrasound (TV USS) of cervical length. As per below table:

Cervical length on TV USS	Management
≥ 30mm	Treat as fFN 0 - 49 ng/mL
15 - 30mm	Assess clinical situation and discuss with specialist obstetrician on-call
≤ 15mm	Treat as fFN > 200 ng/mL

7.1 Fetal Fibronectin (fFN) Testing

Fetal Fibronectin (fFN) (a glycoprotein found in amniotic fluid) can be found at elevated levels in the cervico-vaginal fluid of women between 22 and 36 weeks gestation who have an increased risk of PTL.

- A fFN test is used to identify women/people at most risk of going into PTL within the next seven days.
- Its greatest value lies in its negative predictive value. i.e. women presenting with symptoms of PTL and a negative fFN 0-49ng/mL are very unlikely (< 2%) to deliver within a time-frame where current hospital admission and corticosteroid use will be of benefit.
- Women with a positive test ≥ 50 ng/mL have a higher risk of delivery within the next seven days (positive predictive value 15 - 50%). However, the majority of women will still not deliver within a time-frame where current hospital admission and other interventions may be of benefit.

Use of the quantitative analyser to obtain an absolute value of fFN is better able to;

- identify those at highest risk
- more appropriately tailor care to each individual
- ensure antenatal care is not compromised to the detriment of mother and their baby who do go on to deliver preterm
- reduce unnecessary interventions for all others. The following thresholds for care have been set:

Table: Stratification of Preterm Birth Risk by fFN Concentration

fFN Level	Delivery <7days	Delivery <14 days	Delivery before 34+0 gestation
10-49 ng/mL	0%	1.6%	8.2%
50-199 ng/mL	0%	7.7%	11.5%
200-499 ng/mL	14%	29%	33%
>500 ng/mL	38%	46%	75%

Abbott et. al (2013)

Indications for fFN Testing:

Inclusion criteria	Exclusion criteria*
▪ Fetus is alive and viable ▪ 24+0 - 34+6 weeks gestation ▪ 23+0 - 23+6 weeks gestation if active intervention is being considered* ▪ Membranes are intact ▪ Cervix is < 3cm dilated ▪ Corticosteroid use, +/- tocolysis, +/- magnesium sulphate are being considered ▪ Singleton and twin pregnancy	Absolute Contraindications; ▪ Other complications have been identified that warrant delivery within the next seven days (and admission/use of corticosteroids) ▪ PPROM ▪ Higher order multiple pregnancy (≥ triplets)

Relative contraindications**
▪ current vaginal bleeding ▪ sexual intercourse within 24hrs ▪ speculum or digital vaginal examination within the last 24 hours ▪ transvaginal ultrasound examination within the last 24 hours

* fFN can be taken at time of first examination at 23+0 - 23+6 weeks and only sent after consideration of case and full discussion with specialist obstetrician on-call, paediatrician on call +/-neonatologist and parents (refer to Section 13 - Threatened and active PTL at < 24+0 weeks).
** These factors will increase the likelihood of a positive fFN result (but may represent a false positive). However, a negative result will be a true negative result and can guide the clinical management of the woman. These cases must be discussed with the specialist obstetric team on call.

fFN Specimen Collection

To collect a specimen for fFN testing staff should;

- do the swab at the time of **first** speculum examination and prior to any other cervical examination or swab
- use water as a lubricant for speculum examination (N.B. The use of a gel lubricant should be avoided at the time of testing as it may produce a false negative result).
- place the fFN swab into posterior fornix of vagina and rotate for 10 seconds.
- place the swab into the fFN plastic specimen collection tube.
- then proceed with the remaining vaginal assessment and follow the PTL Care Plan Algorithm for on-going care.
- If assessment is not suggestive of significant risk of PTL, store the fFN sample for up to six hours at room temperature, and three days in the refrigerator if required, before processing.

The decision to process the fFN specimen through the machine must be discussed with the on-call Obstetrician.

See the fFN “How to guide” located adjacent to each fFN testing machine.

8. Management of Confirmed Active Pre-Term Labour - 24+0 - 34+6 weeks

Please see relevant care plan for women who present to either ROTORUA (Appendix 2.) or TAUPO (Appendix 3.)

Staff to be Informed

- Midwife in charge on BU +/- Clinical Midwife Manager (CMM)
- Obstetrician on-call
- Paediatrician on-call + Special Care Baby Unit (SCBU) staff
- LMC
- Social Worker, National Travel Assistance Office, if considering transfer

In Utero Transfer

- The appropriateness of transfer should be made after clinical assessment, followed by discussion between the obstetric and paediatric and SCBU teams.
- Rotorua SCBU is a Level 2 Neonatal Unit (>32+0 singleton and >34+0 multiple pregnancies)
- Waikato NICU is a tertiary neonatal intensive care unit. If considering transfer to Waikato Hospital please see Waikato Hospital Maternity Services – Inter Hospital Transfer and Repatriation Guideline
- Social worker and National Travel Assistance(NTA) Office to be notified of transfer by the Obstetric team (please email NTA@lakesdhb.govt.nz: name, DOB, NHI and destination). Women are entitled to have a support person travel and accommodated with them in the area of destination and it is Lakes DHB responsibility to arrange this.

Monitoring and Assessment

- Insert large bore IV line
- Obtain FBC, CRP, G&H
- Confirm fetal presentation
- Maternal monitoring (see Maternal Vital Signs Monitoring Chart)
- Fetal monitoring (see Fetal Surveillance policy in associated documents). Continuous CTG should be performed while in active labour
- At peri-viable gestations 23+0- 25+0 weeks - individual plan to be made in consultation with parents and obstetrician on-call and paediatric team regarding degree of monitoring and level of intervention (refer to Threatened and active PTL at < 24+0 weeks for further guidance (Section 13).

Antenatal Corticosteroids

- Refer to Antenatal Corticosteroids Given to Women Prior to Birth to Improve Fetal, Infant Child and Adult Health: New Zealand and Australian clinical practice guideline (2015)
  - Should be considered for all women between 24 and 34+6 weeks gestation with threatened preterm labour and a fFN >50ng/mL
  - Should be considered for all women between 23-24 weeks with threatened preterm labour and a fFN >50ng/ml if active management planned.
  - In women who have received previous corticosteroids in this pregnancy, refer to guideline for repeat doses.

Management of Confirmed Active Pre-Term Labour - 24+0 - 34+6 weeks cont'd..

Magnesium Sulphate

- Refer to Magnesium Sulphate for Pre-eclampsia and for Neuroprotection in Pre-term Births < 30+0 Weeks Guideline
- Australian and New Zealand National Clinical Practice Guidelines were published in March 2010 (The Antenatal Magnesium Sulfate for Neuroprotection Guideline Development Panel, 2010). They recommend consideration of the antenatal use of magnesium sulphate in women at risk of imminent* preterm birth < 30 weeks regardless of plurality (number of babies in utero), parity, reason for early delivery, anticipated mode of delivery and whether or not antenatal corticosteroids have been used.
- The decision to give magnesium for women at risk of **imminent*** preterm birth should be made on an individual basis and involve discussion with the on call obstetric Consultant.

> ***Imminent delivery is defined*** as when early delivery is planned or definitely expected within 24 hours (if birth is planned commence magnesium sulphate as close to four hours before birth as possible). Do not delay starting magnesium sulphate in eligible women who may deliver within a few hours - the sooner the better and there is benefit even if a full 4 hours is not given.

- If urgent delivery is necessary because of actual or imminent maternal or fetal compromise e.g. severe fetal distress or antepartum haemorrhage, birth should NOT be delayed to administer magnesium sulphate.

Tocolysis

- Should be considered for all women ≤ 34+6 weeks gestation who are actively contracting to allow time for corticosteroid administration and in utero transfer. Contraindications include active vaginal bleeding, suspected or confirmed infection or evidence of maternal or fetal compromise that would indicate birth e.g. abnormal CTG.
- Nifedipine (Section 12.) should be the first-line tocolytic agent. It is administered orally with less side effects than other available tocolytic agents (betamimetics).
- Refer to and follow the Nifedipine Tocolysis Flowchart

Neonatal Group B Streptococcal disease prevention

- Preterm birth is a risk factor for neonatal group B streptococcal disease
- Group B streptococcus prophylaxis should be offered for all women in **active** PTL. Refer to Group B Streptococcus (GBS) - prevention of early - Onset Neonatal Infection Guideline
- Treatment should continue until birth or until the patient is transferred from Labour and Birthing Unit if symptoms of PTL settle and the patient remains undelivered

Management of Confirmed Active Pre-Term Labour - 24+0 - 34+6 weeks cont'd..

Cord clamping

- Delayed cord clamping (DCC) (60 seconds) at the time of preterm birth has a beneficial effect on neonatal outcome reducing mortality for all births < 37 weeks (RR 0.68, 95% CI 0.52 - 0.90) and ≤ 28 weeks (RR 0.70, 95% CI 0.51-0.95) with no reported adverse effects for mother or neonate and so should be used for all births regardless of mode of delivery, plurality or indication for preterm birth. **Cord milking is not recommended as this increases the risk of intraventricular haemorrhage.**
- At the time of birth, the neonate should be held below the level of introitus or placenta with no palpation or milking of the cord. A clock or stopwatch should be used to time 60 seconds before clamping the cord in the usual way and handing the baby to the neonatal team.
- Oxytocic drugs should be used in the usual manner and can be given before or after cord clamping. Delayed cord clamping is not associated with an increased risk of postpartum haemorrhage.
- Document a plan for DCC (60 seconds) in event of births in clinical records

Future pregnancy risks after preterm birth

- Medical review should occur prior to hospital discharge and advice regarding the risk of recurrence should be given.
- If delivery < 35+0 weeks gestation, referral for Obstetric Consultation is recommended in future pregnancies.

9. Management of fFN > 200 ng/mL, not in active Preterm Labour

fFN Level	Delivery <7days	Delivery <14 days	Delivery before 34+0 gestation
200-499 ng/mL	14%	29%	33%
>500 ng/mL	38%	46%	75%

Please see relevant care plan for women who present to either ROTORUA (Appendix 2.) or TAUPO (Appendix 3.)

Staff to be informed

- Midwife in Charge on BU +/- LMC
- Specialist obstetrician on-call
- Paediatrician on call +/- SCBU staff
- LMC
- Social Worker, National Travel Assistance Office if considering transfer

In utero transfer

- The appropriateness of transfer should be made after clinical assessment, followed by discussion between the Midwife, Obstetric, Paediatric and SCBU teams.
- Rotorua SCBU is a Level 2 Neonatal Unit (>32+0 singleton and >34+0 multiple pregnancies)
- Waikato NICU is a tertiary neonatal intensive care unit. If considering transfer to Waikato Hospital please see Waikato Hospital Maternity Services – Inter Hospital Transfer and Repatriation Guideline
- Social worker and National Travel Assistance(NTA) Office to be notified of transfer by the Obstetric team (please email NTA@lakesdhb.govt.nz: name, DOB, NHI and destination). Women are entitled to have a support person travel and accommodated with them in the area of destination and it is Lakes DHB responsibility to arrange this.

Monitoring and assessment

- Insert large bore IV line
- Obtain FBC, CRP, G&H and ask Laboratory to process urgently
- Confirm fetal presentation
- Maternal monitoring: Maternal Vital Signs Monitoring Chart and MEWS
- Fetal monitoring: daily CTG unless uterine activity (refer to the Nifedipine use flowchart)

Antenatal Corticosteroids

Refer to Antenatal Corticosteroids to Improve Neonatal Outcomes Guideline.
Should be considered for all women ≤ 34+6 weeks gestation;

- In women who have received previous corticosteroids in this pregnancy, refer to guideline for repeat doses

Management of fFN > 200 ng/mL, not in active Preterm Labour cont'd…

Magnesium Sulphate

- Not always warranted in this group of women
- Refer to Magnesium Sulphate for Pre-eclampsia and for Neuroprotection in Pre-term Births < 30+0 Weeks Guideline
- Australian and New Zealand National Clinical Practice Guidelines were published in March 2010 (The Antenatal Magnesium Sulphate for Neuroprotection Guideline Development Panel, 2010). They recommend consideration of the antenatal use of magnesium sulphate in women at risk of imminent* preterm birth < 30 weeks regardless of plurality (number of babies in utero), parity, reason for early delivery, anticipated mode of delivery and whether or not antenatal corticosteroids have been used.
- The decision to give magnesium for women at risk of **imminent*** preterm birth should be made on an individual basis and involve discussion with the on call obstetric Consultant.

> ***Imminent delivery is defined*** as when early delivery is planned or definitely expected within 24 hours (if birth is planned commence magnesium sulphate as close to four hours before birth as possible). Do not delay starting magnesium sulphate in eligible women who may deliver within a few hours - the sooner the better and there is benefit even if a full 4 hours is not given.

Tocolysis

- Should be considered for all women ≤ 34+6 weeks gestation with on-going painful uterine contractions to allow time for corticosteroid administration and in utero transfer. Contraindications include active vaginal bleeding, suspected or confirmed infection or evidence of maternal or fetal compromise that would indicate birth e.g. abnormal CTG.
- Nifedipine (Section 12.) should be the first-line tocolytic agent. It is administered orally with less side effects than other available tocolytic agents (betamimetics)
- Refer to and follow the Nifedipine Tocolysis Flowchart

Neonatal Group B Streptococcal Disease Prevention

- Should not be routinely used but consider in women < 37+0 weeks gestation if they progress to active PTL
- Refer to Group B Streptococcus (GBS) - Prevention of Early Onset Neonatal Infection Guideline

Cord clamping

- Document a plan for delayed cord clamping (60 seconds) in event of woman going onto preterm birth <37 weeks

On-going care

- A referral should be made for a DAU or BU appointment in one week for clinical review as there is still a risk of pre-term labour after admission, and Appendix ??(checklist) can be used to guide this review.
- All women should be discharged with written and verbal advice of the signs and symptoms of preterm labour with a plan for return if symptoms recur.

10. Management of fFN 50 - 200 ng/mL, not in active Preterm Labour

fFN Level	Delivery <7days	Delivery <14 days	Delivery before 34+0 gestation
50-199 ng/mL	0%	7.7%	11.5%

- Patients with symptoms of PTL and a fFN 50 - 200 ng/mL are unlikely to deliver within the next few days but may be at risk of preterm birth (at a later time).
- Antenatal corticosteroids are usually still warranted.
- Admission to hospital is unlikely to make a significant impact on improving outcomes therefore once a clinical review to exclude other causes has been completed and corticosteroids given these women can be discharged home.
- For those women who present to Taupo or live remote to Rotorua, discussion with the on call Obstetrician is warranted and these women may need transfer to Rotorua for observation and to facilitate corticosteroid completion.

Antenatal Corticosteroids

Refer to Antenatal Corticosteroids to Improve Neonatal Outcomes Guideline.
Should be considered for all women ≤ 34+6 weeks gestation

- In women who have received previous corticosteroids in this pregnancy, refer to guideline for repeat doses
- Discharge home if appropriate with plan for review in DAU or BU on the following day
  - Verbal and written advice should be given regarding signs and symptoms of preterm labour and plan for earlier return if symptoms recur (see appendix leaflet).
  - Three-way conversation between woman, LMC and Obstetric team.

Next day review in DAU/BU

- Review any current symptoms
- Administer the second dose of corticosteroid
- Follow-up in DAU in one week. If this is unlikely to be achieved e.g. woman lives remote to DAU and has access difficulties, then Obstetric team to discuss with woman and LMC a clear plan for one week review. For example, if LMC can do in a primary birthing unit. See appendix checklist.

One week review in DAU

- Review laboratory results from initial presentation - urine, bloods, and swabs.
- Assess for on-going symptoms

Any concerns for on-going or new symptoms repeat maternal assessment as appropriate, commence fetal monitoring and refer to the on call Obstetric team.

11. Management of fFN 0 - 49 ng/mL, Preterm Labour Excluded

fFN Level	Delivery <7days	Delivery <14 days	Delivery before 34+0 gestation
10-49 ng/mL	0%	1.6%	8.2%

Patients with symptoms of PTL and fFN 0 - 49 ng/ml are very unlikely to deliver within the next seven days (< 2%)

- Reassurance should be given to these patients
- Clinical review to exclude other causes of symptoms e.g. UTI, placental abruption
- Discharge home with advice regarding signs and symptoms of preterm labour and plan for return if symptoms recur
- LMC to phone patient in 24hours for a review of symptoms, and liaise with on call Obstetric team if on-going concerns.

12. Nifedipine Tocolysis

The aim of tocolysis, in the presence of threatened preterm labour, is to delay birth to allow for;

- the administration of antenatal corticosteroids for fetal lung maturation (≤34+6 weeks)
- magnesium sulphate for fetal neuroprotection (≤30 weeks gestation) or
- for transfer to another facility if required.

Nifedipine is the drug of choice for tocolysis in threatened preterm labour. It is a calcium channel blocker that decreases tone in the smooth muscle of the myometrium. Its use for tocolysis is 'off-label', however many studies that have assessed its use as a tocolytic agent, including a Cochrane review, favourably compare it to other tocolytic drugs. Calcium channel blockers were associated with fewer side effects and reduced the need to stop treatment as a result of these side effects.

Trade name: Adalat® 5 mg capsules (short acting Nifedipine) (section 29),
Nyefax Retard® 20 mg tablets (slow release Nifedipine)

Contraindications:

Absolute:	Relative:
• Suspected/confirmed intrauterine infection • Suspected/confirmed placental abruption • Significant hypotension • Maternal shock • Previous allergic response to Nifedipine	• Use of β-blocker (risk of hypotension) • Lethal congenital anomalies of the fetus • Severe fetal growth restriction with suspected fetal compromise • Abnormal CTG • Steroids completed within last 7 days

Possible adverse effects:

- Most common: transient palpitation, headaches and facial flushing
- Less common: constipation, dizziness, nausea, tachycardia, fatigue, peripheral oedema, increased liver enzymes. Liver enzyme changes are not a concern with such a limited use, but care should be taken in those with known liver disease

Dose and administration:

- Refer to Nifedipine Tocolysis Flowchart
- Initial dosing: Short acting Nifedipine 10 mg (2 x 5 mg capsules) (Adalat®) every 15 minutes if still contracting (up to 4 doses)
- Maintenance: Slow release Nifedipine 8 hourly 20 - 40 mg (maximum of 160 mg in 24 hours) (Nyefax Retard)
- Dose can be adjusted according to clinical symptoms
- Slow release Nifedipine should be discontinued 12 hours after the last corticosteroid dose. There is no data to support continued maintenance therapy

Monitoring:

Maternal:

- First hour: MVSC – Obtain MEWS score with full set of observations at 0, 30 and 60 minutes
- Next 2 hours: as above hourly
- Remaining time on treatment: as above four hourly

Fetal:

- Continuous CTG at commencement of treatment
- Continuous CTG for the first hour and until painful contractions cease
- Subsequent CTG daily or as clinically indicated e.g. increase in maternal temperature or pulse rate or return/increase in contractions

13. Associated Documents

- Te Whatu Ora Auckland - Antenatal Corticosteroids to Improve Neonatal Outcomes
- Diabetes in Pregnancy
- Fetal Surveillance Policy
- Te Whatu Ora Auckland - Group B Streptococcus (GBS) - prevention of early - Onset Neonatal Infection
- Intrapartum Care - Normal Labour and Birth
- Magnesium Sulphate for Pre-eclampsia and for Neuroprotection in Preterm Births < 30+0 Weeks
- Point of Care Testing Equipment Management - POCT Protocol
- Pre-Labour Rupture of Membranes Guideline
- Waikato Hospital Maternity Services - Inter Hospital Transfer and Repatriation
- Te Whatu Ora Health NZ. (2023). Guidelines for Consultation with Obstetric and Related Medical Services (Referral Guidelines)

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15. Disclaimer

No guideline can cover all variations required for specific circumstances. It is the responsibility of the health care practitioners using this Lakes DHB guideline to adapt it for safe use within their own institution, recognise the need for specialist help, and call for it without delay, when an individual patient falls outside of the boundaries of this guideline.

16. Corrections and Amendments

The next scheduled review of this document is as per footer. However, if the reader notices any errors or believes that the document should be reviewed before the scheduled date, they should contact the owner or Document Control without delay.

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Authorised by: **Maternity Clinical Quality Improvement (CQI) Meeting**

17. Appendices

Appendix 1: Principles of Transvaginal Cervical Cerclage

The goal of cerclage is to reinforce the cervix at the level of the internal os. The suture should be placed as close as possible to the internal cervical os and into the dense cervical stroma.

An emergency (rescue) cerclage is one where the cervix is dilated and membranes are usually exposed. It may be considered reasonable if there is no evidence of significant local or systemic infection.

This is an emergency and it is justified to perform this operation out-of-hours, to improve the chance of success.

Peri-operative preparation:

Elective: routine perioperative tocolysis, progesterone supplementation or antibiotics are not indicated

Emergency: Consider indomethacin 100mg PR or Nifedipine SR 10mg preoperatively and then eight hourly for 24 hours as tocolysis and pain relief (limited use of indomethacin for 24 hours is safe for fetus).
Broad spectrum antibiotics are recommended There is limited evidence to support any one regime, however a common practice is for cefazolin/metronidazole for 24 hours post-operatively followed by one week of oral therapy.

Intraoperative:

- Regional anaesthesia if appropriate/possible
- Left lateral tilt if >20 weeks gestation or multiple gestation
- Both Mersilene tape or Monofilament (Ethilon 1 CTX needle/ Nylon) sutures are reasonable choices based on clinician preference.
- Indwelling catheter is not required pre-cerclage but may be required post-operatively if regional anaesthesia was used
- Cervical suture can be placed with or without dissection of the bladder/rectum off the vaginal wall depending on the external cervical length.

Emergency: If membranes do prolapse to, or through, the cervix they may be reduced with:

- Trendelenburg position - consider a uterine relaxant.
- Pull and shake technique with sponge forceps or stay sutures on the cervix.
- Push back with smooth surfaced device such as an inflated IDC balloon (tip cut off)

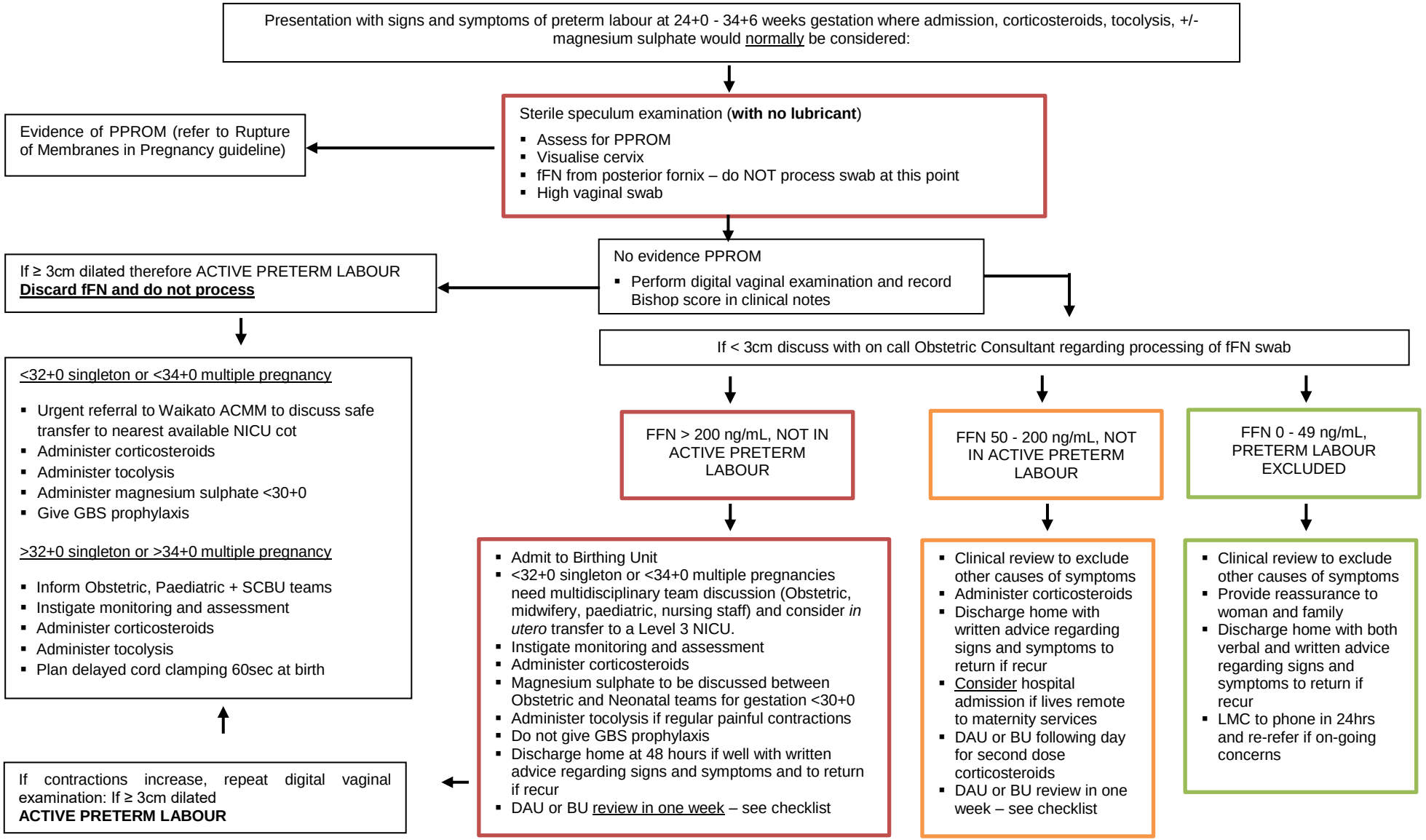
Postoperatively:

- Elective and ultrasound-indicated cerclage are usually performed as day case procedures. A small number of women may stay overnight. A longer admission (1-2 nights) is expected after rescue cerclage for intravenous antibiotics and further observation for infection/labour.
- Monitor fetal heart – auscultate in recovery and daily on ward until discharge

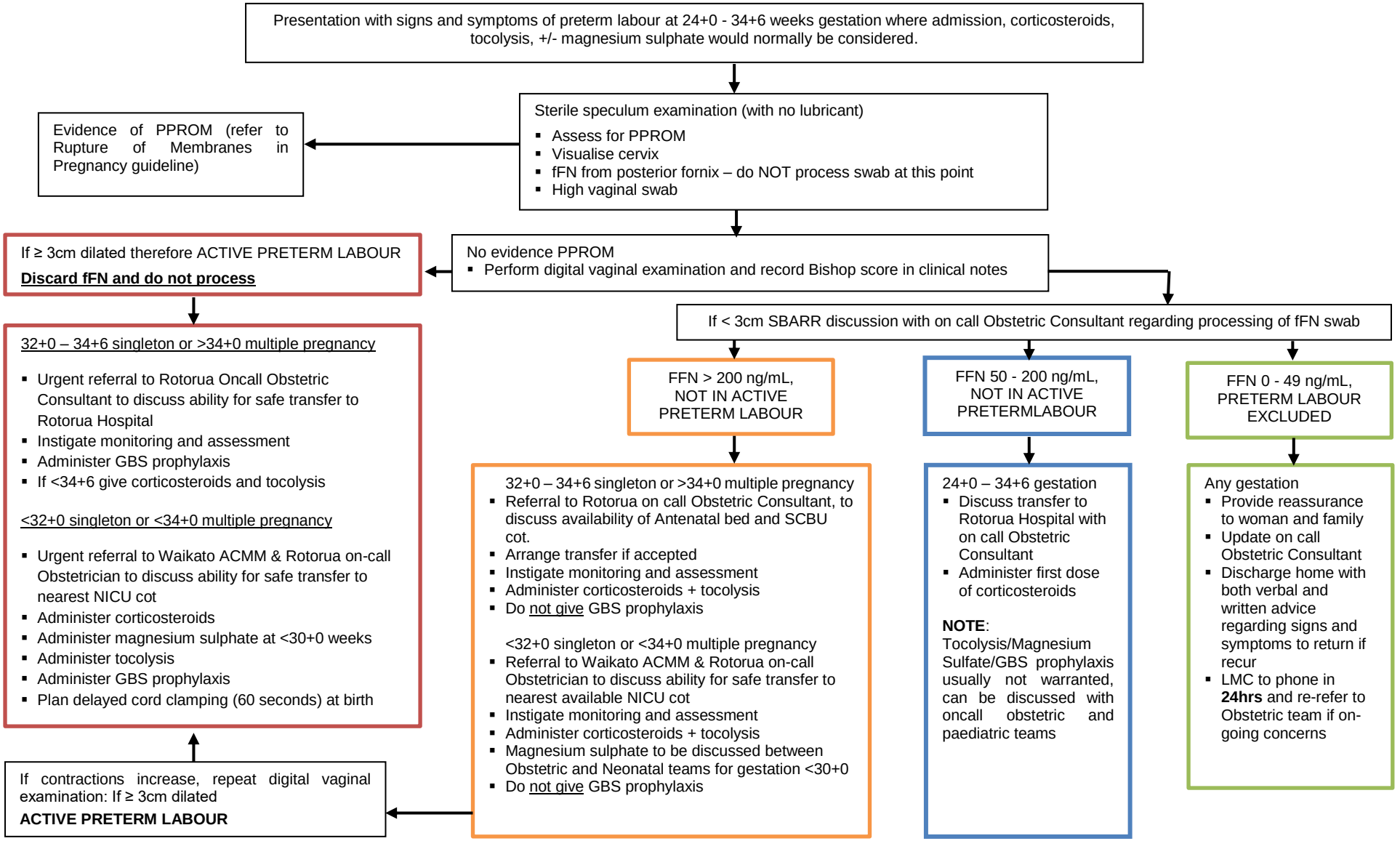
Follow-up:

- Fetal Medicine Clinic follow-up 2 weeks after cerclage insertion or at 23 to 24 weeks
- gestation, whichever that is earlier. Please refer.
- Removal of cervical cerclage: electively at 36-37 weeks in Birthing Unit or if PPROM and PTB

Appendix 2: PTL Care Plan Algorithm - ROTORUA



Appendix 3: PTL Care Plan Algorithm - TAUPO



Appendix 4: Nifedipine Tocolysis Flowchart

ACTIVE PRETERM LABOUR

or

FFN > 200 ng/mL, NOT IN ACTIVE PRETERM LABOUR (& regular painful contractions)

at 24+0 - 34+6 weeks gestation and corticosteroids and/or magnesium sulphate not yet completed or if antenatal transfer is planned

↓

No contraindication to tocolysis

↓

Time 0
- Short acting nifedipine 2 x 5 mg po (Adalat®)
- Pulse and BP
- Continuous CTG

↓

Time 15 mins
- Short acting nifedipine 2 x 5 mg po (Adalat®) if still contracting
- Continuous CTG

↓

Time 30 mins
- Short acting nifedipine 2 x 5mg po (Adalat®) if still contracting
- Pulse, BP and temperature
- Continuous CTG

↓

Time 45 mins
- Short acting nifedipine 2 x 5 mg po (Adalat®) if still contracting
- Continuous CTG

↓

Time 60 mins
- Slow release nifedipine (Nyefax Retard®) 20 - 40 mg po and chart every 8 hours
- Pulse, BP and temperature hourly for 2 hours and then four hourly
- Stop CTG if contractions settled and repeat

↓

Time 36 hours - (12 hours after second corticosteroid dose)
- Last dose slow release nifedipine (Nyefax Retard®)