



MANAGEMENT OF

Preterm Premature Rupture of Membranes (PPROM)

This care process model (CPM) was developed by Intermountain Healthcare’s Obstetrics (OB) Development Team under the guidance of the Women and Newborns clinical program. It provides evidence-based recommendations for assessing and managing pregnancies affected by preterm premature rupture of membranes (PPROM).

► Why Focus on PPRM?

Preterm premature rupture of membranes (PPROM) warrants attention for several reasons.

- **It’s common.** PPRM, defined as premature rupture of membranes prior to 37 weeks completed gestation, occurs in 2% to 4% of all singleton and 7% to 20% of twin pregnancies.^{CAUG} PPRM is a complication in about one third of all preterm births, which have increased by 38% since 1981. Obstetric providers manage many cases of PPRM over the course of their careers.
- **PPROM in particular is associated with increased morbidity and mortality.** About one-third of women with PPRM develop potentially serious infections. Premature delivery and its attendant potential problems, perinatal infection, and in utero cord compression are common complications.^{ACOG} The fetus/neonate is at greater risk of PPRM-related morbidity and mortality than the mother.^{DUFF} PPRM accounts for approximately 20% of perinatal deaths in the United States.^{CAUG}
- **Practice varies widely.** Successful management of PPRM hinges on accurate knowledge of gestational age and on assessing the relative risks of preterm birth versus expectant management.^{ACOG} As understanding of these risks and the factors affecting them evolves, the result will be a reduction of medical practice variability, including delivery timing, medication use, and surveillance practices for expectant management.
- **A systematic evidence- and consensus-based approach will improve outcomes.** See “Goals” at right for key expected benefits of implementing this model.

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► GOALS

The overarching goal of this CPM is to promote evidence-based practice and clinical consistency in the management of PPRM within the Intermountain Healthcare system. Specific goals are to:

- Optimize use of resources applied to the assessment and treatment of PPRM
- Help clinicians navigate the risks of preterm labor and expectant management
- Establish a shared approach that can serve as a baseline for measurement and ongoing improvement

► PROGRAM MEASURES 

- Increase corticosteroid (betamethasone) administration given to patients at 24 to 33 weeks 6 days gestation

 Indicates an Intermountain measure

▶ **ALGORITHM: MANAGEMENT OF PPROM**

Patient presents with suspected PPROM

TRANSFER TO L&D
as needed, give tocolytic **ONLY** to allow transport of PPROM patients having labor contractions.

ASSESS for PPROM
Medical history and physical exam, other tests as needed.
See Assessment Notes on [page 3](#).

CONFIRM PPROM

Evident intrauterine infection, bleeding sufficient to threaten maternal well-being, or fetal death?

yes → **DELIVER expeditiously**

no

MANAGE
per gestational age as outlined below

Less than 24 weeks

PROVIDE COUNSELING to patient and family.
Gestational age at delivery provides best estimate of chance of survival. If 22–24 weeks gestation, recommend consultation with neonatology to discuss resuscitation issues. See [page 3](#) Notes on PPROM.

Per patient choice, either:

- **INDUCE** labor (refer to Intermountain's [Pregnancy Termination Procedure](#)).
- **MANAGE** expectantly/ **MAKE** decision to resuscitate (INPATIENT) as described at right.
- **MANAGE** expectantly/ **MAKE** decision not to resuscitate (OUTPATIENT) as described below.

- **CONSIDER** inpatient evaluation for 24 to 48 hours and administration of latency antibiotics See Medication Table ([page 3](#)).
- **DISCHARGE** to home with instructions to monitor temperature daily (call if temperature $\geq 100.4^{\circ}\text{F}/38^{\circ}\text{C}$).
- **PERFORM** weekly fetal ultrasound
Note that corticosteroids are NOT recommended (see Measures).

If fetus reaches viability and patient and neonatology care team decide to resuscitate infant upon delivery, **ADMIT** as inpatient **AND**:

24 weeks–33 weeks 6 days

MANAGE expectantly (inpatient) as described below.

GIVE magnesium for neuroprotection if delivery at < 32 weeks is expected within 24 hrs
GIVE corticosteroid See Medication Table ([page 3](#)). 

GIVE antibiotic to prolong latency See Medication Table ([page 3](#)).

CONSULT MFM if HSV, HIV, or hepatitis C. If cerclage: **LEAVE IN PLACE**, unless patient has intrauterine infection or unexplained vaginal bleeding.

PROVIDE surveillance:

- **Daily nonstress test** to monitor fetal health.
- **Periodic (not daily) ultrasound to assess amniotic fluid**; if patient no longer reports leakage of fluid, do u/s to check for reaccumulation of fluid suggesting resealing of the rupture. (If resealed, the patient may be discharged home.)

34 weeks or greater

GIVE antibiotic for GBS prophylaxis as needed, following Intermountain's [Prevention of Perinatal GBS](#) guidelines.

GIVE corticosteroid See Medication Table ([page 3](#)). 

DELIVER
(usually by induction of labor)

PPROM MANAGEMENT AT < 24 WEEKS GESTATION

Advances in neonatal care and in management of PPRM at the limits of viability may continue to impact survival; nevertheless, for PPRM at < 24 weeks gestation, fetal and neonatal morbidity remain high. Counseling for patients evaluating their choice for termination (induction of labor) or expectant management should include discussion of both maternal and fetal outcomes and, if gestation is 22 to 23 weeks 6 days, should also include a consultation with neonatology.^{BATT}

- For counseling patients at 22 to 24 weeks 6 days, use the [Neonatal Research Network Extremely Preterm Birth Outcome Data](#)^{NICH}
- If induction of labor before viability is considered, refer to Intermountain’s [Pregnancy Termination Procedure](#) for guidance in conforming to current Utah and Idaho law.

▶ ASSESSMENT AND MANAGEMENT CONSIDERATIONS

PPROM Assessment

PPROM is a clinical diagnosis usually based on patient history and visualization of amniotic fluid during physical exam. In some cases, lab tests are needed to exclude other possible causes of vaginal or perineal wetness.

- **Medical history:** Timing and quantity of leaking or wetness, weeks gestation / EDD, pregnancy history of PPRM, etc.
- **Physical exam:** *Avoid digital exam unless active labor or imminent delivery is expected.* Use sterile speculum examination to:
 - Visually inspect for cervicitis, umbilical cord prolapse, or fetal prolapse
 - Obtain cultures as needed
 - Assess cervical dilation and effacement
 - Visually confirm PPRM diagnosis
- **Test:** if diagnosis of PPRM can’t be visually confirmed:
 - Test pH of fluid from posterior vaginal fornix (amniotic fluid usually ~ 7.1 - 7.3, versus vaginal secretions ~ 4.5 - 6)
 - Look for arborization of fluid from posterior vaginal fornix

Consider ultrasound to check amniotic fluid volume; to assess fetal weight, gestational age, and presentation; to check for fetal anatomic abnormality; or to confirm diagnosis of PPRM by guiding transabdominal instillation of indigo carmine dye.

Consider amniotic fluid-specific biomarker test (e.g., AmniSure or ROM Plus) if diagnosis of PPRM remains uncertain after physical examination, nitrazine, and fern tests.

MEDICATION MANAGEMENT	
Medication type, use in PPRM	Recommended
Magnesium for neuroprotection in PPRM <32 weeks when delivery is expected within 24 hours	<input type="checkbox"/> MAGNESIUM SULFATE, IV: Bolus 6 grams over 40 minutes, then infuse 2 grams / hour maintenance dose from premixed 20 gram / 500mL bag until delivery or until 12 hours of therapy. (If preterm delivery seems unlikely after 12 hours of therapy, discontinue therapy).
Corticosteroid to lower risk of RDS	<input type="checkbox"/> BETAMETHASONE: 12 mg IM every 24 hours x 2 doses. If betamethasone isn’t available, may use dexamethasone: 6 mg IM every 12 hours X 4 doses. DO NOT GIVE if > 34 weeks and patient has previously received betamethasone.
Antibiotics to prolong latency (Options listed at right will provide GBS coverage for 48 hours. If delivery is expected after 48 hours and before completion of antibiotics used to prolong latency, follow Intermountain’s Prevention of Perinatal GBS guidelines	<input type="checkbox"/> AMPICILLIN 2 grams IV every 6 hours and erythromycin 250 mg IV every 6 hours x 48 hours <i>followed by:</i> AMOXICILLIN 250 mg PO every 8 hours for 5 days and ERYTHROMYCIN 333 mg PO every 8 hours for 5 days. If penicillin allergy, low risk (e.g., isolated macupapular rash without urticaria or pruritis): <input type="checkbox"/> cefazolin 1 gram IV every 8 hours x 48 hours and erythromycin 250 mg IV every 6 hours x 48 hours <i>followed by:</i> cephalexin 500 mg PO every 6 hours x 5 days and erythromycin 333 mg PO every 8 hours x 5 days If penicillin allergy, high risk (e.g., anaphylaxis, angioedema, respiratory distress, urticaria): <input type="checkbox"/> vancomycin 1 gram IV every 12 hours x 48 hours and erythromycin 250 mg IV every 6 hours x 48 hours <i>followed by:</i> clindamycin 300 mg PO every 8 hours x 5 days and erythromycin base 333 mg PO every 8 hours x 5 days

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BIBLIOGRAPHY

McElrath T. Midtrimester preterm premature rupture of membranes. UpToDate website. <http://www.uptodate.com/contents/midtrimester-preterm-premature-rupture-of-membranes>. Accessed October 17, 2017.

Dinsmoor MJ, Bachman R, Haney El, Goldstein M, Mackendrick W. Outcomes after expectant management of extremely preterm premature rupture of the membranes. *Am J Obstet Gynecol.* 2004;190(1):183-187.

REFERENCES

ACOG American College of Obstetricians and Gynecologists. ACOG Practice Bulletin No. 80. Premature rupture of membranes. *Obstet Gynecol.* 2007;109:1007–1019.

BATT Batton DG, Committee on Fetus and Newborn. Antenatal counseling regarding resuscitation at an extremely low gestational age. *Pediatrics.* 2009;124:422-427.

CAUG Caughey AB, Robinson JN, Norwitz ER. Contemporary diagnosis and management of preterm ruptures of membranes. *Rev Obstet Gynecol.* 2008;1(1):11-22.

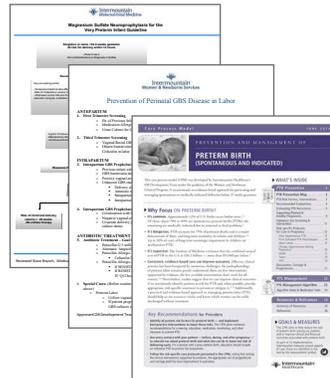
DUFF Duff P. Preterm premature rupture of membranes. UpToDate website. <http://www.uptodate.com/contents/preterm-premature-rupture-of-membranes>. Updated June 13, 2012. Accessed September 18, 2012.

NICH National Institute of Child Health and Human Development. Extremely Preterm Birth Outcome Data. https://www.nichd.nih.gov/about/org/der/branches/ppb/programs/epbo/pages/epbo_case.aspx. Accessed October 16, 2017.

► RESOURCES

For Providers:

This CPM and other related resources (below) are accessible through the Clinical Programs Care Process Models page on intermountainphysician.org or the Women & Newborns Clinical Program home page on intermountain.net.



- [Magnesium Sulfate Neuroprophylaxis for the Very Preterm Infant Guideline](#)
- [Prevention of Perinatal GBS Disease in Labor](#)
- [Preterm Birth \(Spontaneous and Indicated\) CPM](#)



Patient Education Fact Sheets:

Clinicians can view or order Intermountain patient education materials for distribution to their patients.

- **View** by opening the appropriate topic page via the Clinical Programs pages on intermountain.net or intermountainphysician.org.
- **Order** from Intermountain's iprintstore.org.

Intermountain PPROM-related patient materials include the following:



- [17P for Preventing Preterm Birth](#)
- [Preterm Birth: 10 Steps to Help Prevent It](#)